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By

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List of Acronyms

BIS	Bank for International Settlements
CD	Certificate of Deposit
CR	Concentration Ratio
CS	Consumer Surplus
EMU	Economic and Monetary Union
ECB	European Central Bank
EC	European Community
ECU	European Currency Unit
EEA	European Economic Area
EFTA	European Free Trade Association
EMI	European Monetary Institute
EMS	European Monetary System
ESCB	European System of Central Banks
ERM	Exchange Rate Mechanism
FDIC	Federal Deposit Insurance Corporation
GDP	Gross Domestic Product
GNP	Gross National Product
H	Herfindahl index
IBCA	International Bank Credit Analysis Ltd
IMF	International Monetary Fund
MMDA	Money Market Deposit Accounts
NOW	Negotiable Order of Withdrawal
NICs	Newly Industrialised Countries
OECD	Organisation for Economic Cooperation and Development
OPEC	Organisation of Petroleum Exporting Countries
ROA	Return-on-Assets
ROE	Return-on-Equity
SMSA	Standard Metropolitan Statistical Area
SCP	Structure-Conduct-Performance

Abstract

Two competing hypotheses with regard to market structure and performance are the traditional structure-conduct-performance (SCP) paradigm and the efficiency hypothesis. This thesis presents results for tests of both hypotheses with respect to the European banking industry using pooled and annual data for the period 1986 to 1989. The cross-sectional and pooled results generally support the traditional SCP paradigm as an explanation for the market behaviour of European banks, with little evidence to suggest that the efficiency hypothesis holds. We also find that changes in market demand conditions, the equity-to-assets ratio and the staff expenses ratio appear to be significant and positively related to banking industry performance. In the majority of cases the loans-to-assets ratio exerts a negative influence on banks' profitability. The individual country estimates find evidence that the SCP paradigm unambiguously seems to hold in Belgium, France, Italy, the Netherlands and Spain. These findings are in line with the Price Waterhouse/Cecchini study which identified the same countries, apart from the Netherlands, as the markets which would experience the largest financial service price falls post 1992. As such, these banking markets appear to offer the greatest incentive for new entrants to benefit from (and compete away) high average industry margins.

The second part of this thesis adopts a methodology which allows us to test for inter-firm behaviour between leading banks across European banking markets. The initial findings indicate that a large leading bank appears on average to promote cooperation with other leaders and this, on average, increases banking industry profitability. A large second bank, however, seems on average to induce rivalry with leaders rather than cooperation. The impact of more distant rivals does not seem to affect the profitability of banks in the industry. Further investigation of these results however, reveals that there are estimation problems brought about by the way in which the interactive market share variables - which test for cooperation and rivalry - are calculated. The nature in which these variables are constructed implies a collinearity bias when the market shares of the largest firms are of a similar size. As a result, the Kwoka and Ravenscroft (1986) approach adopted to test for cooperative and rivalrous behaviour in European banking may be inappropriate. If we re-specify the model, however, to take account of this collinearity problem, we still observe evidence of duopoly behaviour in European banking thus confirming our earlier findings.

Chapter 1

Introduction

1.1 Background to the Study

Banking markets in the European Community (EC) have experienced marked changes over the last few years as a result of the completing of a single market in financial services. Substantial restructuring has also taken place in other European banking markets. The single European market study, undertaken by Price Waterhouse (1987) and updated and published in the Cecchini Report (Commission of the European Communities (1988a)), is predicated on the a *priori* assumption that competitive conditions are different across banking and financial systems. Other researchers, such as Neven (1990) and Vives (1991), have also noted that significantly different competitive conditions exist across European banking systems, yet few studies directly address the problem of estimating competitive conditions across and within individual banking markets.

The primary purpose of this thesis is to investigate competitive conditions across European banking markets by using the structure-conduct-performance (SCP) methodology. There are two important rationales for testing the SCP hypothesis in European banking markets. First, very little empirical work has been undertaken investigating the competitive behaviour of European banking systems and such an empirical investigation may yield interesting insights that could be of interest to academics, bankers and policymakers.

Secondly, the Price Waterhouse/Cecchini study on completion of an EC internal financial market drew attention to the fact that aspects of the SCP framework could be used to evaluate the evidence of oligopoly profits in EC banking systems. If oligopoly profits are present in these banking systems then producer surplus losses may be substantial after integration. Or to put it another way, banking industry profitability (in the short-term) would be eroded in these countries as a result of the increased competition resulting from the single market proposals. An analysis of the SCP relationship in European banking may help us to shed light on these issues.

The SCP approach has long been the predominant methodology in the study of industrial economics. Simply stated, the conduct or rivalry by firms in a market is determined by market structure conditions, especially the number and size distribution of firms and the conditions of entry. This rivalry leads to unique levels of profits, prices, advertising and other aspects of market performance. Through the link of conduct, the performance of firms in a particular market is tied to the structure of that market. The reason for testing the SCP relationship in banking markets, as identified by Heggestad (1979, p.450) is to address three main issues:

1. Does market structure matter in banking markets, or is the industry so highly regulated that market structure is not an important/relevant factor in determining market performance?

2. Which aspects of market structure are the most important, and, therefore, which type of regulations or regulatory reform have the greatest impact?

3. What aspects of bank performance are most sensitive to differences in market structure?

In general, analysis of the SCP relationship in banking is used to help evaluate the main policy issue of which type of banking structure best serves the public in terms both of the cost and availability of banking services.

There have been many empirical studies of SCP relationships in the United States banking industry, as identified in Gilbert (1984). Early studies, for example, Heggestad and Mingo (1977), Spellman (1981) and Rhoades (1982a) suggested that collusive profits occur in US banking markets, whereas later studies, for example Osborne and Wendel (1983), indicate that the literature contains too many inconsistencies and contradictions to provide a satisfactory description of the SCP relationship in banking. More recent attempts at explaining the link between market structure and performance have concentrated on an alternative efficiency hypothesis.

The efficiency hypothesis maintains that an industry's structure arises as a result of superior operating efficiency by particular firms. Accordingly, a positive relationship between firm profits and market structure is attributed to the gains in market share by more efficient firms; in turn these gains lead to increased market concentration. In other words, increased profits are assumed to accrue to larger firms because they are more efficient and not because of collusive activities. In support of this approach, Brozen (1982), Smirlock (1985) and Evanoff and Fortier (1988) find that 'firm-specific efficiency' seems to be the dominant variable explaining bank performance in studies of the US banking industry.

Additionally, studies undertaken by *inter alia* Kwoka and Ravenscroft (1986) in the industrial economics literature suggest that SCP relationships are more complex than the traditional paradigm or the efficiency hypothesis would suggest. They find evidence of both cooperative and rivalrous behaviour between the largest firms across industries and suggest that these interrelationships have a significant impact on average industry performance.

1.2 Aims, Methodology and Structure Plan

The main aim of this thesis is to examine evidence of the traditional SCP and efficiency hypotheses, as well as rivalrous and cooperative behaviour between large banks, across European banking markets between 1986 and 1989. The methodological approach adopted in this thesis is similar to previous studies undertaken by Short (1979), Bourke (1989) and Molyneux and Thornton (1992), where multiple regression analysis is used to investigate the SCP model across different countries' banking systems. This study, however, differs in an important respect. The aforementioned authors primarily focused on explaining the determinants of bank profitability using a measure of market structure as one of the explanatory variables in their equations. These studies placed greater emphasis on explaining bank profitability rather than on the SCP relationship. A concern of this thesis is to place greater emphasis on the structure-performance interactions and to extend analysis of this relationship for banking markets. This is undertaken in two ways. First we develop a model for testing both the traditional SCP and efficiency hypotheses across European banking markets. As far as we are aware there is no other study that provides international evidence of this relationship. Second, a methodology will be analysed for testing for rivalrous and cooperative interactions between the largest banks across European markets from the approach outlined in industrial economics by Kwoka and Ravenscroft (1986).

The thesis is divided into nine chapters. Chapter 2 provides an analysis of current trends in European banking and financial systems. These trends parametise the 'laboratory' of our research into European banking systems. Against the background of this overview, Chapter 3 explores in greater detail some important, relevant structure and performance characteristics of European banking. Particular attention is also paid to the analysis of comparative competitive conditions across European banking markets as provided in the Price Waterhouse/Cecchini study. We note in Chapter 3 that the analysis of the Price Waterhouse/Cecchini study illustrates that different competitive conditions exist across European banking and financial markets and the consumer surplus gains from financial sector integration after 1992 appear to be substantial. Estimates of the economic gains from integration, however, may be overstated because the final estimates did not take into account producer surplus losses. The aforementioned study suggested that a Cournot-Nash model of non-competitive behaviour could be estimated to evaluate evidence of oligopoly profits, from which producer surplus losses from integration would be calculated, although, this was not included in the final analysis. As a result, the Price Waterhouse/Cecchini methodology provides us with an important justification as to why it is useful to examine the structure-conduct-performance relationship across European banking markets - the prevalence of significant oligopoly profits across European banking markets would imply substantial producer surplus losses in the event of financial integration.

The following two chapters examine the theoretical basis of the structure-performance relationship and show how it is empirically evaluated. Chapter 4 examines the relationship from an industrial organisation viewpoint, and Chapter 5 demonstrates how the structure-performance model has been tested for banking markets.

Chapter 6 outlines the methodology this study adopts for evaluating the SCP relationships in European banking. Chapter 7 analyses the variables used, and Chapter 8 reports the results. In the first part of Chapter 8 results are presented for tests of both the SCP paradigm and the efficiency hypothesis with respect to the European banking industry, using pooled and annual data for the period 1986 to 1989. The cross-sectional and pooled results generally support the traditional SCP paradigm as an explanation for the market behaviour of European banks, with little evidence to suggest that the efficiency hypothesis holds. We also find unambiguous evidence that the traditional SCP paradigm holds for the Belgium, French, Italian, Dutch and Spanish banking systems between 1986 and 1989. These results imply that producer surplus losses (a decline in banking industry profitability) brought about by financial sector integration after 1992 could be significant in these banking markets. These results closely confirm the findings of the Price Waterhouse/Cecchini study which suggested that overall price falls in the financial services sector, on the whole, would be the largest in these countries, with the exception of the Netherlands. Our results also show that changes in market demand conditions, the equity-to-assets ratio and the staff expenses ratio appear to be significant and positively related to banking industry performance. In the majority of cases the loans-to-assets ratio exerts a negative influence on banks' profitability.

The second part of Chapter 8 reports the results which test for inter-firm behaviour between leading banks across European banking markets. On first inspection the results indicate that a large leading bank appears on average to promote cooperation with other leaders and this increases banking industry profitability. A large second bank, however, seems, on average, to induce rivalry with leaders rather than cooperation. The impact of more distant rivals does not seem to affect the profitability of banks in the industry. Larger second banks induce rivalrous conjectures which reduce industry profitability, but this reduction is not large enough to bring about a negative relationship between industry profitability and the market concentration variable. Further investigation of these results, however, reveals that there is serious estimation bias brought about by the way in which the interactive market share variables - which test for cooperation and rivalry - are calculated. The nature in which these variables are constructed implies a collinearity bias when the market shares of the largest firms are of a similar size. As a result, the approach adopted to test for cooperative and rivalrous behaviour in European banking may be inappropriate. Further empirical analysis, however, reveals that if we take account of this collinearity problem we still observe evidence of duopoly behaviour in European banking markets.

Chapter 9 is the conclusion which also identifies the limitations and tentatively suggests policy implications of our findings.

Chapter 2

Current Trends in European Banking and Financial Systems

2.1 Introduction

The aim of this chapter is to identify the major trends that have affected European, as well as worldwide, banking and financial systems during the past two decades. These trends parametise the 'laboratory' of our research into European banking systems and set the scene for our later SCP analysis in this area. The chapter is divided into three main sections. Section 2.2 deals with the most important real and financial trends that have helped stimulate change in European banking markets. Section 2.3 is concerned with the influence of the European Community and other international organisations on banking trends. Section 2.4 provides a short history of banking in Europe and briefly examines structural differences between European banking systems.[1]

2.2 Real and Financial Developments: Stimulants of Banking Change

2.2.1 Economic and related sectoral trends

The economic environment of Western Europe has undergone considerable change since the early 1970s. High and volatile rates of inflation experienced in many countries during the early 1970s, together with increased budget deficits and balance-of-payments disequilibria, stimulated European banks to reassess their attitudes towards risk and uncertainty. These factors, coupled with the increased volatility of interest and exchange rates, were clear indicators that the overall macroeconomic environment had become much more uncertain. An OECD (1985) study pointed out that probably the most important 'hangover' from the inflation experienced during the 1970s has been to introduce much greater uncertainty into business and household expectations, be they concerned with prices, market outlets, exchange rates or interest rates.

The high and more volatile rates of inflation and interest, resulting mainly from the agency of changed economic policy, during the 1970s were major contributory forces leading up to the recession years of the late 1970s and early 1980s. The structural slowdown of economic growth and the deep-seated disequilibria of the period strongly affected the size, direction and variability of both domestic and international financial flows. This slowdown is witnessed in Table 2.1, which provides a summary of annual real GDP growth rates for a variety of European countries. The average annual GDP growth for virtually all countries has been lower during the 1980s than in the second half of the 1970s. Only Luxembourg and the United Kingdom (as well as the United States) experienced higher GDP growth in the 1980s.

Throughout Europe the household sector has remained the major surplus sector, although the size of these surpluses has fallen relative to national income. Conversely, although the corporate sector has traditionally been the most important deficit sector in almost all

European countries since the 1960s, it now competes with the government sector for the major debtor status. The increased debtor status of the

Table 2.1 Gross domestic product at constant market prices (percentage change)

	1961-70	1971-80	1981-90
Belgium	4.9	3.2	2.0
Denmark	4.5	2.2	2.1
Germany	4.5	2.7	2.1
Greece	7.6	4.7	1.4
Spain	7.3	3.5	2.9
France	5.5	3.2	2.2
Ireland	4.2	4.7	3.1
Italy	5.7	3.8	2.3
Luxembourg	3.6	2.6	3.4
Netherlands	5.1	2.9	1.8
Portugal	6.4	4.7	2.7
UK	2.9	1.9	2.6
EC12	4.8	3.0	2.3
USA	3.8	2.7	2.9
Japan	10.5	4.6	4.3

Source: European Economy (1991, p.223)

public sector has been primarily a result of increased government spending throughout the 1970s and 1980s, although there has been a reversal of the overall trend in some European countries, most noticeably in the United Kingdom.

It is also the case that debt-to-income ratios of the household and public sectors have risen in the major economies during recent years. The rapid growth of personal sector debt in various European countries has had important policy implications for controlling the money supply. The BIS (1987) notes that the overall growth in sectoral debt since the mid-1970s has aroused concern in many quarters. For the public sector debt, concern focuses on the possibility of 'crowding out', whereas growth in private sector debt raises questions about increased default rates. Davis (1986) finds that the non-financial private sector's portfolio behaviour has become more unstable since the 1960s and he suggests that many of these changes are contemporaneous with innovation and regulation.

While household savings rates declined or remained relatively stable during the 1970s and 1980s, the real stock of consumer credit grew sharply and the ratio of consumer debt to income rose in most major industrial countries. For example, between 1980 and 1989 'total consumer credit in the United Kingdom increased from 4.75 per cent of GDP to 9 per cent, while in France loans to households by financial institutions, excluding real estate lending, rose from 2.25 per cent of GNP to 6 per cent' (IMF 1991, p.109). Stevenson (1986) however, pointed out that the increased in debtedness of consumers could be explained by the fact that household financial assets were growing faster than liabilities in the major European economies and this trend, together with the increasingly more sophisticated demands of the retail bank customer and the change in individuals attitudes towards debt, have been important forces generating change in retail banking markets throughout Europe. In contrast to household debt, corporate debt to equity ratios (leverage) appear to have remained stable in most countries except in the United States and the United Kingdom where they increased dramatically in 1989. In Germany and Italy (and Japan) leverage actually declined during the 1980s as firms used internally generated funds to retire short-term debt. A summary of debt to asset ratios of firms in production industries is shown in Table 2.2. In general it is difficult to evaluate the effects of increased corporate leverage although one can conclude that greater corporate leverage can lead to increased sensitivity of variables such as investment and employment to cyclical downturns (see Cantor, 1990).

There have also been substantial changes in national savings rates over the last three decades in various European countries. Table 2.3 shows that a decline in net national saving between 1960-69 and 1980-89 is evident in all the major industrial countries, with the largest fall in Germany (8.25 percentage points). The average decline for the seven countries shown was 3.75 percentage points. It is clear from this table

Table 2.2 Selected industrial countries: debt to asset ratios of firms in production industries
(In per cent)

	1982	1983	1984	1985	1986	1987	1988	1989[1]
Belgium	64.9	62.4	59.3	56.5	54.6	53.8	54.4	54.1
France	69.2	70.7	76.6	73.3	71.0	70.2	66.4	--
Germany	62.0	60.9	59.7	53.8	57.1	55.6	55.7	--
Italy	70.4	68.2	67.5	67.1	67.3	66.9	68.8	--
Japan	73.4	73.2	72.6	71.5	70.5	70.1	69.6	68.5
Netherlands[2]	55.4	55.1	53.9	54.3	52.4	52.3	52.9	--
United Kingdom[2]	49.6	48.5	48.7	48.3	48.0	48.9	40.8	55.1
United States[2]	--	39.4	40.6	42.1	43.3	44.3	45.3	--

Source: IMF (1991, p.110)

1 The lags involved in collecting and reporting the data on a comparable basis mean that complete figures are not yet available for 1989.

2 Subsidiaries' balance sheets were consolidated with those of parent companies.

Table 2.3 National saving rates in major industrial countries

Countries and periods	Gross national saving[1]	Net national saving	Public[2]	Private: Total	Private: Households	Private: Business enterprises[3]	Memo: General government net lending[1]
		of which — as a percentage of national income					
United States							
1960-69	19.7	10.8	0.8	10.0	6.2	3.8	-0.4
1970-79	19.4	9.1	-1.2	10.3	7.6	2.6	-1.2
1980-89	16.3	4.0	-3.8	7.8	6.0	1.9	-3.4
Japan							
1960-69	34.5	25.2	6.6	18.6	11.9	6.6	1.0
1970-79	35.3	25.6	5.0	20.6	16.5	4.1	-1.7
1980-89	31.6	20.9	5.1	15.7	13.1	2.6	-1.4
Germany							
1960-69	27.3	19.9	6.3	13.5	7.6	6.0	0.7
1970-79	24.3	15.2	3.7	11.5	9.7	1.7	-1.7
1980-89	22.5	11.6	1.5	10.1	8.9	1.2	-2.0
France							
1960-69[4]	26.2	19.2	4.5	11.1	3.6	0.4	
1970-79	25.8	17.0	2.7	14.4	11.9	2.5	-0.4
United Kingdom							
1960-69	18.4	10.9	2.7	8.2	4.3	3.9	-1.0
1970-79	17.9	8.3	1.4	6.8	4.3	2.5	-2.6
1980-89	16.6	5.5	-0.8	6.3	3.7	2.6	-2.4
Italy							
1960-69[4]	28.1	19.8	1.6	18.2	15.9	2.3	-1.9
1970-79[4]	25.9	16.2	-5.2	21.4	21.3	0.1	-7.0
1980-89	21.9	11.0	-7.7	18.7	15.9	2.8	-11.1
Canada							
1960-69	21.9	11.3	2.6	8.7	4.0	4.8	-0.4
1970-79	22.9	13.1	1.4	11.7	6.0	5.6	-0.9
1980-89	20.7	9.9	-3.4	13.3	9.2	4.2	-4.8
Average[5]							
1960-69	22.3	13.8	2.3	11.5	7.4	4.1	-0.3
1970-79	23.4	13.6	0.8	12.8	10.1	2.7	-1.7
1980-89	21.5	10.0	-0.9	10.9	8.8	2.1	-3.2

[1] As a percentage of GNP.
[2] General government
[3] Includes public enterprises
[4] Based on the old system of national accounts
[5] Calculated using GDP weights and exchange rates in 1963 for the 1960-69 period, in 1975
1970-79 period and in 1988 for the 1980-89 period.

Source: Hutchinson (1992, p.9)

that there is a persistent wide variation of the level of national saving across countries. Japan had by far the highest saving rate in the 1980s, at 21 per cent of national income, while the United States had the lowest at 4 per cent. In general, the United States and the United Kingdom were continually at the low end of the spectrum between 1960 and 1990, while Germany, France and Italy have quite similar net national saving rates, falling in the middle of the range. An important point to note is that the decline in national savings in most countries was mainly attributable to the contraction in government net saving. In particular, the contraction in government net saving between 1960-69 and 1980-89 at 3.25 per cent accounted for most of the decrease in national saving, while the fall in private saving accounted for only .25 percentage points. The decline in public sector saving (current revenue less current expenditure) and public finances in general:

> '... was largely concentrated in the middle and late 1970s following the first oil shock, but continued in most cases in the 1980s despite some progress in consolidating budgetary positions in the latter half of the decade (Hutchinson, p.10).

During the 1980s public dissaving was marked in the United States, France, the United Kingdom and Italy and all of the major industrial countries were substantial net borrowers. In short, from this brief analysis it is clear that policies designed to reduce budget deficits on current account would cause the total saving rate to rise.

Morgan Stanley (1991) identified that by the end of the 1980s there was a low level of saving ratios in most developed countries and a world capital shortage of significant proportions, and these factors coincided with world banking capital inadequacy; most noticeably in the Japanese, US and Scandinavian banking markets. They suggest that:

> The overriding need to increase saving rates to finance the global capital shortage inevitably means an era of high real interest rates. This issue is further aggravated by the demographic changes taking place in the world: people are living longer and therefore are spending savings, which means the need to save by the remaining, principally working, population is even greater. Those banking systems which have traditionally been a conduit for savings should be well placed to garner deposits in this type of environment. However, there is another side to the coin; competition for deposits and deregulation will drive the cost of deposits up. Where a banking system has benefited from cheap deposits this is changing; France and Spain are good examples. The cost of deposits will therefore rise, but we believe that the capital constraints on the industry will mean that this will be passed on to the borrower and margins will be maintained. Moreover, any increase in the deposit cost will be limited by a general slackening of loan demand in a number of markets. We anticipate that the main loan demand will be Eastern European driven, with local domestic demand much more modest. Deposits rising faster than lending also tends to be good for margins.
>
> Morgan Stanley (1991) p.5

In the international economic area, the increased scale and volatility of capital flows across countries, coupled with widescale financial liberalisation, has encouraged the integration of international financial markets (see Pecchioli, 1983). The OPEC surpluses generated in the post-1973 era were replaced (up until the late 1980s) by surplus international capital flows mainly emanating from Western European and Japanese savers. The United States has changed its position within twenty-five years from being the largest creditor nation to the largest debtor nation. The US household sector surplus in 1986 was the lowest percentage of GDP since 1963 (see Davis, 1986).

The major methods of international finance have also changed. Rapid economic growth and an even faster rate of expansion of world trade in the late 1960s and early 1970s ensured a continuous demand for funds from the corporate sector as well as many governments and public corporations that had embarked on large investment programmes in both developed and less developed countries. The recycling of funds for balance-of-payments finance as well as the increased management of foreign-exchange reserves also helped to increase international lending activity. Between 1976 and 1989 real activity in the major financial markets expanded at a faster rate than real output in the major industrialised countries (see IMF 1991).

The macroeconomic climate experienced by European banks throughout the 1970s and 1980s has been of a much more volatile nature than that characterised by the economic environment of the 1950s and 1960s. The increased variability of almost all macroeconomic variables - interest rates, exchange rates, budget deficits and surpluses - has produced a much more uncertain environment.

In addition, the greater issuance of debt by households and enterprises, the declining savings rate, increased financial liberalisation and growing evidence of weak earnings and balance sheet positions of major financial institutions, especially commercial banks, have led some commentators (see, for example, Lamfalussy (1991) and IMF (1991)) to suggest that international financial systems are becoming more fragile. In the latter half of the 1980s the poor performance of many international banks have been the result of an extended period of low profits, weak capital positions and, 'most importantly, growing problems with nonperforming loans ... (although) Continental European banks have had fewer problems with non-performing loans than banks in other regions' (IMF, 1991, p.111); see also Leipold (1991) for further details. Table 2.4 provides a snapshot of the change in real profitability of banks in the major industrialised countries, and it shows real profitability declined in all systems between 1988 and 1989, the most marked falls being in the United Kingdom and the United States.

The decline in the performance of the major banks in these respective countries is attributable according to the IMF (1991) to:

- cyclical economic development at the national or regional level
- increased competition brought about by financial liberalisation, such as the breakdown in traditional legal segmentation of financial activities (such as in Japan and the United States), and in continental Europe, where financial innovations (such as the development of commercial paper markets) have created new, nonbank sources of funds.
- securitisation, corporate and sovereign borrowers have found it less expensive to obtain funds from the securities markets.
- increased competition between banks and other deposit-taking institutions.

Table 2.4 Selected industrial countries: financial indicators for banks[1]

(In per cent)

Country (End of latest fiscal year)[2]	Change in Real Profits[3] Current fiscal year	Previous fiscal year
Canada-Oct. 31, 1989	-33.8	13.2
France-Dec. 31, 1989	17.3	20.6
Germany-Dec. 31, 1989	18.2	24.3
Italy-Dec. 31, 1989	4.4	10.6
Japan-March 31, 1990	-17.6	20.5
United Kingdom-Dec. 31, 1989	-36.7	65.6
United States-Dec. 31, 1989	-71.0	130.9

Source: IMF (1991) p.112

[1] Figures in the table represent the average for the largest ten banks in each country. When data are not available for all of the ten largest banks, the average was taken over available data. Aggregate figures such as the ones in this table much be interpreted with caution, owing to differences across national groups of banks and over time in the accounting of bank assets and capital. In particular, provisioning practices vary considerably across these countries as do the definitions of capital. Therefore, cross-country comparisons may be less appropriate than developments over time within a single country.

[2] Note that the figures relate to the latest fiscal years of banks in each country.

[3] Profits deflated by the consumer price index in each country.

- banks responded to the loss of their most creditworthy customers by focusing on financing activities in which they felt they had specialised knowledge (eg. property sector loans) or in the development of new products of activities (eg. leveraged buyouts)
- while problem loans and low earnings have reduced bank capital adequacy, the decline in global equity prices since the beginning of 1990 has also weakened capital adequacy in those banks that have traditionally incorporated unrealised capital gains on

securities holdings in their capital ratios (eg., before the decline in Japanese equity prices in 1990, most large city banks had capital ratios that exceeded the Bank for International Settlements (1988) interim capital adequacy target of 7.25 per cent. However, the nearly 40 percent decline in equity prices in the first three-quarters of 1990 forced Japanese banks to seek additional capital and to restrict asset growth ..)

One of the most widely voiced concerns raised by the current weakness of financial institutions is that it could lead to a credit 'crunch'. Friedman (1989) has also argued that the weakness of financial institutions and the high debt-saving obligations of households and firms could make it increasingly difficult for authorities to tighten monetary policy in order to counter higher inflation without causing widespread corporate failure and a downturn in the economy.

2.2.2 Financial systems and the macroeconomy

The financial services sector is becoming more important to the macroeconomies of individual European countries. The recent EC Cecchini study (Commission of the European Communities, 1988a) noted that the financial services sector contributed 6.5 per cent of total value added and accounted for around 3 per cent of total employment within member countries. A summary of the size characteristics of various financial services sectors in European countries is provided in Table 2.5.

Table 2.5 Economic dimensions of the financial services sector 1985[a]

	Gross value added as a % of GDP[b]	Employment as a % total employment[c]	Compensation of employees as a % of total for the economy
Belgium	5.7	3.8	6.3
Germany	5.4	3.0	4.4
Spain	6.4	2.8	6.7
France	4.3	2.8	3.8
Italy	4.9	1.8	5.6
Luxembourg[4]	14.9	5.7	12.2
Netherlands	5.2	3.7	4.9
United Kingdom	11.8	3.7	8.5
EC8[e]	6.4	2.9	6.2

		% of GDP	
	Insurance premiums[f]	Bank loans[g]	Stock market capitalisation[h]
Belgium	3.9	142[i]	92
Germany	6.6	139	89
Spain	2.5	99	69
France	4.3	93	85
Italy	2.2	96	75
Luxembourg	3.1	6,916	11,125
Netherlands	6.1	130	165
United Kingdom	8.1	208	149
EC 8[j]	5.2	142	116

Source: Commission of the European Communities 1988a, p.87)

Notes:
- a Defined in the narrow sense as credit and insurance institutions
- b Including net interest payments.
- c Employees in employment plus the self-employed.
- d 1982.
- e This aggregate accounted for 95% of total Community GDP in 1985.
- f Average 1978-84.
- g 1984.
- h End-1985.
- i 1982.
- j Weighted average.

In terms of total employment, Germany, France and the United Kingdom have by far the largest amount of workers in the financial sector: estimates range from around 600,000 for France to 800,000 for Germany and the United Kingdom lies somewhere between. In most European countries, banking and finance appears to contribute around two-thirds of the employment of the financial services sector, with insurance making up the remainder. This is also generally confirmed by Gardener and Teppett (1990) who examine the European Free Trade Association's banking and insurance sectors. Two extremes from the EC study seem to be the United Kingdom and Luxembourg. In the United Kingdom the split is nearer fifty-fifty, whereas the employment contribution made by the insurance sector in Luxembourg is around 8 per cent. (Gardener and Teppett (1990)), find employment in banking and insurance is split fifty-fifty in Switzerland and Austria). Employment in the banking and finance sector has increased in all European economies since the late 1970s, with the growth rates experienced in Italy, Luxembourg, Sweden and the United Kingdom being the highest: these are shown in Table 2.6.

The value added figure provides some indication, together with the compensation of employees' data, as to the relative importance of the financial sector. Table 2.5 clearly shows that gross value added as a percentage of GDP (at market prices) is roughly the same for most of the EC countries listed, the two major exceptions being the United Kingdom and Luxembourg, where value added amounts to 11.8 and 14.9 per cent of GDP, respectively. The Gardener and Teppett (1990) study also find that Switzerland's value-added for the credit and insurance sector is atypical at 10.4 per cent for 1985. In terms of compensation of employees, these three countries also stand out.

Table 2.6 Rate of employment growth in banking and insurance by country, 1978-1985

Country	Banking and Finance	Insurance	Total
Austria	5,9	2,8	4,3
Belgium	11,0	8,3	10,2
Germany	15,0	-5,7	8,4
Spain	..	..	0.7
France	8,6	23,9	12,2
Finland	21,0	6,8	17,4
Italy	..	..	25,5
Iceland	9,2	12,3[1]	9,6
Luxembourg	50,0	50,0	50,0
Norway	34,4	36,4	34,8
Netherlands	15,1	11,9	14,2
Sweden	71,4	5,4	47,1
Switzerland	..	..	7,6[2]
UK	24,0	21,3	23,1

Source: Gardener and Teppett (1990)

Notes: PW growth rates are computed using the following method:

$$\frac{\text{Total growth in employment (1978-1985)}}{\text{Total employment in 1978}}$$

1. Employment data excludes pension funds
2. Due to a change in this series, Swiss data prior to 1985 were not comparable.

It seems unusual that three such markedly different financial systems should exhibit similar characteristics. One justification that could be put forward to explain these similarities relates to the comparative advantage of trade in financial services. A recent article by Arndt (1988) examined cross-border bank credit flows of twenty countries from which he identified five main categories:

- industrial countries with relatively small cross-border bank credit flows (United States, Japan, Germany, Italy and Spain).
- industrial countries with more substantial but moderate cross-border bank credit flows (France, Netherlands and Austria).
- industrial countries and newly industrialised countries (NICs) with very large cross-border bank credit flows (United Kingdom, Belgium-Luxembourg, Switzerland, Singapore).
- booking or reporting centres (Bahamas, Cayman Islands).
- oil exporters with surplus petro-dollars (Saudi Arabia, United Arab Emirates).

Arndt suggested that countries in the first two categories have been responsible for bank lending abroad in the same proportion relative to the size of their financial systems, whereas those in the other three categories have, 'in one way or another', specialised in international bank lending[2]. It could well be that this 'specialisation' explains why countries such as the United Kingdom, Luxembourg and Switzerland exhibit markedly higher value added and compensation of employees figures than other European countries.

2.2.3 Banking regulatory and policy trends

Most European governments confined their macroeconomic policy attention towards dampening down inflationary pressures and expectations during the late 1970s and early 1980s. In addition, they also began to aim at reducing market supply-side constraints, thus placing greater emphasis on the allocative powers of the market. Throughout Europe there has been a noticeable rise of market-based methods of economic, financial and monetary control. The 1980s witnessed a liberalisation of worldwide financial markets as well as liberalisation in the traditional banking arena (see IMF, 1991 and Leipold, 1991).

Worldwide financial liberalisation has been characterised *inter alia* by widespread capital market reforms, governments encouraging equity participation, privatisation programmes and the dismantling of the traditional barriers between commercial banking and the securities market. Liberalisation in traditional banking markets has been evident through policies directed at increasing price competition as well as changing officials' attitudes towards the type of business activities in which banks and non-bank financial institutions can engage.

Regulators are finding it increasingly difficult to identify the relevant regulatees (those who are regulated). As the traditional barriers that used to segment financial business undertaken in different currencies and countries break down, so do those characteristics which used to differentiate financial and non-financial institutions. The blurring of distinctions between financial institutions is most noticeable in those countries which attempt (or have attempted) to apply a 'rigid compartmentalisation of financial institutions' (Pecchioli, 1987, p.65), as, for example, in the case of France, Italy and Spain.

This process of change is also at work where banks are already allowed to operate as multi-purpose or universal financial organisations. The blurring of distinctions between financial institutions is usually referred to as the universalisation of banking business, after the universal banking structures found in Germany, Switzerland and the Benelux countries. Even in those countries which were already perceived to have universal banking systems there has been a noticeable shift of emphasis towards capital market activities during the 1980s and more recently a renewed emphasis on 'core' domestic banking business.

In countries like France, where there had been a distinct legal separation between banking and securities business, new laws (see *Economist*, 1986a, 1986b and *Euromoney*, 1988) have enabled banks to participate more actively in capital markets business. Restrictions on securities underwriting are now 'virtually non-existent' (Pecchioli, 1987, p. 58) in European countries, and in the great majority of countries securities business is regarded as an important element of commercial banking. Another example of the decline in traditional demarcation lines in banking relates to the separation of short-, medium- and long-term business. Up until the early 1970s, banking business in France, Italy and Spain was clearly segmented, with different institutions doing the various types of term business. This distinction has almost disappeared in France and Spain.

Throughout the major European economies, 'it is possible to discern a long-term trend towards a regulatory framework which allows more effective competition between the various participants in the financial services industry' (OECD, 1985, pp.21). Nevertheless, a concomitant policy reaction to the liberalisation of both financial and banking markets has been the supervisory re-regulatory response. There has been a general increase in the supervision of financial markets and institutions. The recent international co-ordination of banking supervision and the increased concern of regulators with systemic risk have heightened both regulators' and regulatees' attitudes towards the solvency, liquidity and profitability of financial institutions. As financial institutions continue to undertake a wider range of activities, there is an associated need for co-ordination between banking and financial market supervisors, especially as:

> ... the problem of systemic risk in capital markets may require tighter supervision of market makers' capital and liquidity whether market-making is undertaken as part of a banking conglomerate or not (BIS, 1987, p.87).

In particular, there is still considerable confusion as to which should bear ultimate regulatory responsibility if a bank fails, due to its capital markets business[3].

As European macroeconomic policy attention in the late 1970s and early 1980s concentrated on dampening inflation and price expectations through tight monetary policy methods, experience throughout the 1980s has now convinced policymakers that even the largest countries must take their exchange rates into consideration when formulating monetary policy. The link between exchange rates and monetary policy has become increasingly evident through explicit and implicit exchange-rate targeting. In the area of exchange-rate co-ordination, the European

Monetary System (EMS) has been relatively effective at stabilising member countries' exchange-rate parities (at least up until September 1992 when the EMS was in disarray in the run-up to and after the French referendum on Maastricht). The widespread adoption by governments of co-ordinated exchange-rate intervention on a large scale has been an important feature of recent macroeconomic policymaking. The Plaza Agreement[4] of September 1985 and the Louvre Accord, confirmed by the Group of Seven in September 1987[5] were both directed at the problems associated with current account imbalances and stabilising exchange-rate parities.

International co-ordination has since the early 1980s been dominated by the problems associated with the geographical pattern of payments imbalances between the industrialised countries and the indebtedness of developing countries. There is no doubt that the next few years will experience an ever-increasing movement towards the internationalisation of regulatory frameworks. Nowhere will this be more apparent than in Europe where the EC governments aim to complete an internal market in financial services by the end of 1992. The intentions - as set out in the 1985 EC White Paper on Completing the Internal Market (Commission of the European Communities, 1985) - are to eliminate all restrictions on capital flows[6] and create an internal market in financial services by 1992.

2.3 European Institutions and International Influences

2.3.1 The European Community (EC)

Various institutions and international organisations have had a significant influence in moulding the financial and economic characteristics of European countries over the last thirty years. The establishment of the European Community, the European Monetary System (EMS) and moves toward Economic and Monetary Union (EMU) deserve a special mention, given the possible eventual outcome of an integrated European financial system and the significant impact of such an event on different countries banking systems. The signing of the Treaty of Rome in 1957, establishing the Community, was a watershed in the development of pan-European economic and monetary unification. The common market came into being on 1 January 1958 with six member countries: Belgium, France, Germany, Italy, Luxembourg and the Netherlands. It was this group that established the foundations for the ultimate goal of a unified internal market.

Under the Treaty of Rome the internal market was viewed as one which allowed 'free movement of goods, persons and services'. Throughout the 1960s, however, greater emphasis appeared to be placed on the real sector and intra-industry trade in general, and it was not until the late 1960s that European monetary integration was discussed in substantial detail. The establishment of the Committee of Governors of the Central Banks of the Member States of the European Communities in 1964, however, added a fillip towards these discussions. The most important factor influencing the move towards integration at the end of the 1960s was what various commentators, like Tsoukalis (1977) and Ypersele and Koeune (1984), have referred to as the 'cumulative logic of integration'. That is, the natural consequence of a common market in real goods calls for some form of monetary/financial integration, because the integration of markets makes economies more interdependent. In addition, the idea that EC countries could collectively lessen the adverse impact of external shocks by means of monetary integration was a further important factor supported by proponents of integration.

In early 1968 the Prime Minister of Luxembourg, Pierre Werner, issued a plan containing proposals for fixing exchange rates between Community currencies, a European unit of account and a European Monetary Fund. This led to a flurry of activity which resulted in a series of 'plans' on the co-ordination of economic policies and monetary co-operation within the Community. The Barre Plan (named after Raymond Barre, then the EC Commission's vice-president), submitted to the Council of EC Ministers on 12 February 1969, conspired to reawaken interest in monetary integration by proposing, among other things, that the Community should introduce a system for short-term monetary support as well as examining ways to eliminate fluctuation margins between European currencies. Other plans followed[7] and these formed the basis for examination by the Werner Group and the Werner Report, published in May 1970, which proposed that economic and monetary union should be achieved within ten years (ie. by 1980). A second Werner Report, published in October 1970, reiterated the same points as the first, but introduced some minor qualifications (see Coffey and Presley, 1971, pp.49-56).

At the beginning of 1973, Denmark, Ireland and the United Kingdom joined the European Community, but 'the progress towards economic and monetary union amounted to little over the period 1973 to 1977' (Yperslee and Ioeune, 1984, p.43). At the meeting of the European Council on 6-7 July 1978, the heads of state and government of the member countries decided to create a European Monetary System, whose main operational principles were defined later that year. The EMS had two main concerns: firstly, to stabilise exchange rates via an exchange-rate mechanism and, secondly, thereby to improve monetary integration and thus increase prospects for economic progress[8]. Members of the EMS now include Belgium, Luxembourg, Denmark, Germany, France, Ireland, Italy, the Netherlands, Spain, the United Kingdom and Portugal. Greece joined the European Community in 1981 but is not yet in the EMS.

Although the EMS was introduced as an exchange-rate regime, an intervention system of central banks and a credit and settlement arrangement between central banks and governments, the system does have important implications for commercial banking. It provides a framework which affects:

> ... phenomena and attitudes in several markets in which commercial banks are active, viz the foreign exchange markets, the loan and deposits markets, the bond markets. The EMS bears on the relations between banks and public authorities. It means official interference in some financial markets, which the bankers usually dislike, but it also promises official backing and support for some financial activities and innovations, which the bankers usually like and request (Abraham *et al.*, 1984, p.7)

De Boissieu (1988) provides a detailed analysis of financial liberalisation and the evolution of the EMS.

The ECU (European Currency Unit) is at the heart of the operations of the EMS, and is used to determine central rates in the exchange-rate mechanism as well as a means of settlement between EMS monetary authorities. The increased official usage of ECUs has led to a widespread literature (Moss, 1984; Micossi, 1985; Jager and de Jong, 1988) on developing its private usage as well as proposing that the ECU become an International Currency. By the end of 1989 progress towards a European Monetary Union (EMU) was gathering pace.

The Treaty on European Union, which was agreed at Maastricht on 11 December 1991 and officially signed by the Heads of State and Government of the 12 Member States on 7 February 1992, marks the culmination of two decades of moves to create a single integrated European market. From the point of view of European Monetary Union, the process entails in particular the achievement, possibly by 1 January 1997 and, at the latest, by 1 January 1999 - a of a single monetary policy controlled by an independent European Central Bank (ECB) and, shortly thereafter, the adoption of the ECU as the single currency of monetary union. The blueprint for EMU which was set out in the Maastricht Treaty is the product of a number of reports (for example, the Werner Report (1970) and the Delors Committee Report (1989)), various European Council meetings and an intergovernmental conference.

Table 2.7 The three stages of EMU

	Time period	Objectives
Stage 1	December 1991 to 1 January 1994	Closer economic and monetary co-operation between member states within the existing institutional framework aimed at greater convergence of economic performance. It includes the completion of the Single Market and the strengthening of Community competition policy.
Stage 2	January 1994 to no later than 1 January 1999	Will reinforce economic convergence beyond Stage 1, including the necessary institutional developments: mainly a European Monetary Institute (EMI), with an advisory role, taking over the functions of the Committee of Governors of EC Central Banks. Aims to strengthen the co-ordination of member states monetary policies, while still leaving ultimate responsibility for policy with national authorities, will also involve technical preparations for Stage 3.
(It was agreed by member states at Maastricht that full EMU - known as Stage 3 - should commence for those judged eligible to participate, no later than 1 January 1991. But if the heads of state or government decide, by qualified majority, they may set an earlier date for the start of Stage 3. Stage 3 could begin as early as 1997, or earlier if the necessary conditions are met).		
Stage 3	1 January 1999 at the latest	Full EMU which includes: - irrevocable locking of exchange rates between participating currencies and a single monetary policy leading to the adoption of single currency in due course - the European Central Bank (ECB) and European System of Central Banks (ESCB) will be responsible for issuing and managing the single currency - the ECU - that will replace national currencies - the primary objective of the ECB and the ESCB in undertaking monetary policy will be to maintain price stability - they will also be required to support the general economic policies in the Community.

Note: For a detailed exposition of the three stages, see the *Bank of England Quarterly Bulletin*, February 1992, pp. 64-68

The Delors Report set out three stages leading to EMU, which were included in the Maastricht Treaty, and these are shown in Table 2.7. In general the Maastricht agreement envisaged that the Exchange Rate Mechanism (ERM) would harden progressively into a single currency from the beginning of 1994 and that member states would do all that was possible to reduce their budget deficits and meet the best rates of low inflation and interest rates by the end of 1996, in accordance with the convergence criteria of the treaty. By early 1992 European financial markets had appeared to have accepted the eventual advent of EMU, but had been sceptical about it being achieved within the timetable set. The timetable now seems even more unlikely to be achieved since the Danish electorate cast a 'No' vote on 2 June 1992 on the Maastricht Treaty on European union. Apart from the possibility of a second Danish referendum, the only way EMU can continue on its 'fast track' is for all twelve member states to agree a new treaty with amendments and various opt-out clauses designed to overcome the Danish opposition. This however, would be a practical and political minefield. Despite the 'yes' vote cast by the Irish Republics electorate on 18 June and the French 'yes' vote on 20 September 1992, there is now much greater uncertainty regarding the initial timetable for EMU.

The target date for the beginning of Stage 2 of EMU, which envisages greater stability of exchange rates within the ERM and closer co-ordination and convergence of economic and monetary policy, is 1 January 1994. This, in fact, now seems unattainable, given the hurdles that have to be cleared before the Maastricht Treaty can be ratified by all twelve member states. In addition, the turmoil in foreign exchange markets brought about by the referendum in September which led to; the suspension of sterling and the Italian lira from the ERM; introduction of foreign exchange controls in Ireland and Portugal and capital controls to protect the Spanish peseta. These factors have cast a shadow of doubt over the likelihood of foreign exchange rate convergence within the EMS by January 1994. Despite probable delays to the timetable, however, the institutions and momentum of EMU appear to remain intact.

The commitment to EMU will continue to be driven by both political motives and economic benefits such as lower transaction costs, the elimination of currency risk as a result of the single currency and the policy disciplines aimed at maintaining low rates of interest and inflation. The move towards a single currency will have the most immediate impact on the banking sector. Stage 2 will be the preparatory period for implementing the single currency during which the newly established European Monetary Institute (the forerunner of the European Central Bank (ECB) and European System of Central Banks) (ESCB) will, among its many tasks, be required:

- to facilitate the use of the ECU and oversee the development, including the smooth functioning, of the ECU clearing system;
- promote the efficiency of EC cross-border payments;
- to 'consult' with central banks on issues affecting the stability of financial institutions and markets;
- co-ordinate monetary policy between member states.

Burani (1992) has noted that, during this preparatory phase, banks will have to undertake many changes relating to the integration of the ECU which concern:

- translation of accounting records and systems, monetary instruments, documentation of all kinds;
- drafting of legal rules in contracts;
- software conversion and adaptation;
- changes in hardware, to accept and distribute new ECU notes (ATMs and counting machines);
- training of bank staff;
- provision of information to customers.

These changes, as well as the cost of manufacturing, warehousing and distribution of ECU denominated notes and coins, will impose burdens on the banks and will undoubtedly cause confusion, given that there will be two legal tenders - the ECU and the national currency - in circulation at the same time. Management of notes and coins, in ECU and national currency will cause problems if a dual circulation system develops, this is especially the case if the demand for ECU currency by retail banks customers is negligible. Customers will only shift to ECUs if the benefits of using this currency outweighs the costs of using national currencies. This may well be the case in wholesale and capital markets business where costs and foreign exchange risk can be reduced by using ECU denominated transactions - the appeal to retail customers is far less certain. Obviously, once a single currency is in place, there will be no need for exchange operations between the currencies of countries within the single monetary area and banks will suffer loss of income as a result.

Hislop (1992) shows that the overall loss of revenue for European banks vary widely - from the ECU 8-13 billion per annum estimated by the EC Commission in 1989, to ECU 150-220 million per annum for UK manufacturers alone estimated by the CBI in 1990. The latter estimate, which relates to UK manufacturers' savings on intra European cross-country deals is equivalent to around ECU 1-2 billion on a Europe-wide basis. In addition Hislop (1992) also notes that without any compensating factors, the introduction of a single European currency covering all EC countries, including the Swiss Franc (assuming Switzerland joins the EC) would reduce foreign exchange trading volumes in London by over 30 per cent (in fact Swiss voters voted against closer links with the EC in a referendum held at the beginning of December 1992). Other potential costs to banks include:

- reduction in need for specialist currency teams to advise corporates on EC currency swap and forward transactions.
- the risk of having to undertake greater trading risk in order to make-up for lost income (the adverse selection problem);
- increased competition. At present no single bank has more than a 2 per cent share of the overall European foreign exchange market and no one financial centre currently enjoys a significant competitive advantage;
- diversion of capital flows from outside the EC to intra-community transactions because of the lower risk and attractiveness of the

larger single market;

- risks associated with financial instruments denominated in national currencies whose maturity dates exceed the conversion to single currency date;
- decline in business for banks who dominate the lead management and underwriting of issues denominated in their national currencies. (See Lomax (1992), Wilmot (1992), Hislop (1992), Adlercreutz (1992), and the ECU Banking Association (1992) for further details).

Many of the above factors will primarily affect the larger international banks, although it is these banks that are more likely to benefit from the increased scope of ECU lending and investment opportunities throughout member states brought about by greater intra-EC trade and investment. Larger banks will be more inclined to undertake business throughout the EC, especially given that they will no longer need to match currency denominations or to incur risk on an open foreign exchange position. The benefits accruing to these banks will clearly be closely related to the scale of cross-border provision of services.

Various studies reported in *De Pecunia* (1992) note that moves towards a single currency will also require that efficient arrangements for cross-border payments and settlement are in place. A discussion paper published by the EC Commission in September 1990 called 'Making payments in the internal market' noted that existing cross-border retail payments systems are deficient in transparency (consumers do not know which system is the best), speed, reliability and cost. Further work undertaken by the Commission suggests that electronic funds transfer systems developed by competing private sector networks appear to be the best way to improve cross-frontier payments for consumers. In the case of wholesale payments, the ECU Bankers' Association EC clearing system has been successful in facilitating the growth in the private use of the ECU, but with the increased volume of business envisaged in the run-up to EMU, and given the EMI's brief to develop clearing and settlement systems, it is uncertain as to whether the system should be privately operated or run by the EMI or its successor the ECB. It might even be the case that two systems - one private and one public - evolve. It also needs to be considered as to who will have access and membership to such a system and who decides on these issues. Probably EC competition policy will have influence in determining some of these matters.

At the time of writing, the momentum for the creation of monetary union is moving ahead, yet the optimistic timetable laid-out by the Maastricht Treaty is unlikely to be achieved.

2.3.2 European Free Trade Association and the European Economic Area

The twelve member states of the European Community (EC) and the seven members of the European Free Trade Association (EFTA) (comprising, Austria, Finland, Iceland, Liechtenstein, Norway, Sweden and Switzerland) reached an agreement in December 1991 which would result in the creation of a 19-nation European Economic Area (EEA). The EEA would become the largest free trade area in the world, accounting, by some measures, for nearly half of all world trade. At the time of writing, the parties have postponed the ratification of the final text pending developments at the EC Court of Justice which has been asked to examine the compatibility of the agreement with EC law. The EEA Agreement:

> ... does not automatically extend future EC legislation to the EFTA countries, but rather establishes a procedure under which agreement must be reached between the EC and EFTA countries for incorporation of this future EC legislation in the EEA Agreement.
>
> (Sussmann and Webb (1991 p.24)

In the financial services sectors, the incorporation in the EEA agreement of the rules contained in the EC Treaty regarding the right of establishment and the freedom to provide cross-border services and of much of the related EC legislation implementing it are of significant importance. For banks, this means, for example that the rules and regulations set out in the EC Second Banking Directive (discussed in more detail in Chapter 3) would now enable them to operate throughout the EEA under the supervision of the banking authorities in the EC or EFTA country in which their head office is based. During the transitional stage various EFTA countries can retain certain existing restrictions on foreign investment in domestic financial institutions and in addition the EEA Agreement permits Switzerland certain privileges relating to their bank secrecy laws. The effect of the EEA Agreement on the insurance and investment services sector is unclear because the third non-life and life insurance directives as well the investment services directive has not yet been adopted by the EC. Eventual implementation of these directives by the EFTA countries will require further consultation between the parties. Moves towards EEA were dealt a severe blow when the Swiss electorate voted 'No' to closer

European integration in a referendum held on the 6 December 1992. The planned introduction of the EEA on 1 January 1993 will be delayed for at least six months while other EFTA countries renegotiate the details of EEA entry.

2.3.3 Bank for International Settlements

Another organisation that is increasing in importance in relation to European banking matters is the Bank for International Settlements (BIS). Based in Basle, Switzerland, this organisation is the central bankers' central bank. It has for some time monitored international banking and financial business by obtaining data which banks in different countries report to it[9]. The collapses of Bankhaus I.D. Herstatt and Franklin National Bank in 1974 led to the establishment of the Committee on Banking Regulation and Supervisory practices (better known nowadays as the Basle Committee, but formerly the Cooke Committee and initially the Blunden Committee), under the auspices of the BIS. The principal objective of this committee was to establish detailed supervisory practices to ensure that the foreign operations of banks could not escape the supervisory net.

The Cooke Committee[10] endorsed a concordat on international bank supervisory co-operation in 1975 which indicated the relevant supervisory responsibilities of parent and host country supervisors. During 1978 the Governors of the BIS endorsed the Cooke Committee proposals that banks' capital adequacy should be monitored entirely on a consolidated basis. Nevertheless, the collapse of Banco Ambrosiano

Holdings in 1982 indicated certain failings of the supervisory framework and this led to a revised version of the 1975 concordat. In 1986 the Cooke Committee published a further documentation (BIS, 1986a) concerned with the prudential features associated with off-balance sheet exposures.

The harmonisation of international capital adequacy standards took a further step forward in December 1987 after the BIS outlined proposals to unify capital requirements for banks in the industrialised world. Of these, the European element refers to banks in Belgium, France, Italy, Luxembourg, Netherlands, Sweden, the United Kingdom, West Germany and Switzerland. The role of the BIS as a co-ordinator and standard-setter for bank supervisors will undoubtedly continue as capital adequacy continues to be one of the most important issues facing European banks today.

2.3.4 International Monetary Fund

Finally, we should at least note another prominent international organisation that influences European banking and which has an important role to play in the world financial system. The International Monetary Fund's (IMF) main aim is to promote an international monetary system in which payments adjustment fosters international prosperity. Its objectives are to improve exchange-rate stability, to manage international liquidity and to deal effectively with debt restructuring programmes. Although the IMF provided the forum and staff input for the Plaza and Louvre agreements, and has increasingly stressed the need for structural reform in both developed and less developed countries, it appears to have little influence in the surplus countries (Hains, 1988). Nevertheless, its role as a multilateral lending institution, and the principal co-ordinator of Third World debt, together with the World Bank group, will influence the problems associated with Third World debt and this affects the provisioning responses of European banks.

2.4 Select Perspectives of European Banking Systems

2.4.1 A short history of banking in Europe

History shapes where we are at today and as such it is important to provide a brief history of European banking to illustrate how various systems have developed. The historical development of European countries' banking and financial systems has been moulded by a wide range of diverse socio-economic, political and geographical factors. Nevertheless, it is possible to identify various broad banking trends that have been experienced in many of the industrialised European countries since the seventeenth century.

During the seventeenth and eighteenth centuries all European banking systems were unit-based. Banks were predominantly small private institutions that specialised in serving the needs of local markets. A small proportion of these banks were engaged in financing international trade and these tended to be based in the main financial centres. Revell (1987, pp.17-18) identified that by the first half of the nineteenth century banking systems were characterised by two main banking groups; those based in large towns financing both domestic and international trade and those groups dispersed throughout the country financing local industry, which was predominantly agricultural. Kindleberger (1984, pp.73) argues that, even by this stage, in many cases banking business was no more than an additional activity undertaken by goldsmiths, merchants, notaries, industrialists and tax farmers.

As the Industrial Revolution gained momentum it encouraged the establishment of new, large, joint-stock banks based in metropolitan areas. These banks competed with the unit banks which were country-based as well as with a whole range of (mainly) newly-established mutual bodies such as savings banks, building societies, co-operatives, agricultural credit associations and the like. The private country banks gradually declined in numbers, partially because the larger metropolitan joint-stock banks acquired them, and also as a result of the desire of the larger banks to establish substantial branch networks. As industry began to spread to new areas and also became more concentrated, banks increased their geographical coverage through branching and also grew in size so as to provide the funds required by their large industrial customers. In the last quarter of the nineteenth century nationwide branch networks were created by the large banks in most European countries.

Kindleberger (1984) identified the nineteenth century as also witnessing the rise of 'single financial centres', such as London and Paris, which tended to dominate national finance. The same process was at work in countries like Germany and Italy where 'political unification came later'. It was in these centres that groups of dominant or 'core banks' were based:

> Between about 1880 and 1920 there appeared in all countries a recognisable group of dominant or 'core' banks, recognised both by the authorities and by the general public. They were referred to popularly as the Big Three, the Big Five, or whatever the number may have been (Revell, 1987, pp.21)

As the branch networks of the larger banks became dominant at the turn of the century, there were two main factors that restricted their growth. Firstly, there had been a trend in various Continental European countries, like France, for the local and regional banks to create groups that could compete effectively with the larger national banks in their own region. Secondly, political factors in various countries sought to encourage (protect) competition between regional and national banks. In those countries with Federal governments, like Germany and Switzerland, regional institutions will play a more important role. It is still the case that, up until recently, in countries such as France, Italy and Spain banks registered at a local, regional and national level. In addition, branching restrictions that remained in many European countries up until the 1960s also helped to preserve the status of various regional and local institutions.

Throughout the nineteenth and early twentieth centuries the relationship between banking and commerce differed substantially from country to country. In the United Kingdom banks mainly financed trade, and most industrial finance came via the capital markets or from internal funding. Occasionally UK banks undertook industrial lending but only on a short-term basis. In contrast, Continental banks fostered much closer relations with industry. Kindleberger (1984) notes that industrial banking began in Belgium in the second quarter of the nineteenth century. Banks in Germany, Austria, Sweden and, up until the 1930s, in Italy formed the closest links with industry. The twentieth century has witnessed the polarisation of many of these trends. Banking markets have become more concentrated, sectoral ownership has continued to change and universal-type banking is becoming the 'norm' rather than the exception.

2.4.2 Structural differences between European banking systems

The study of structural development in European banking markets involves an examination of the changes in the size, numbers and comparative significance of banks and other financial institutions within a financial system as well as embracing those institutional changes which alter the ways in which financial services are demanded, used, developed and delivered. Although every European banking system has its distinguishing features, there are various characteristics that help to distinguish Continental banking systems from those based on the British model[11]. Revell (1987) identified five common elements of Continental banking systems:

- the presence of various special credit institutions which are usually publicly owned and provide funds for various sectors such as industry, agriculture and property.
- the increased importance of savings banks, co-operative (popular)

banks and co-operative credit associations, together with their central institutions.

- a long history of commercial banks' participation in the ownership and management of industrial enterprises, 'relics of which still linger on'
- the importance in many European countries of banks and other institutions which are organised on a local or regional basis, 'usually reflecting the prevalence of small enterprises in both industry and agriculture'
- and a degree of similarity between the new banking laws that were enacted in many countries following the crisis during the early 1930s.

Sometimes a distinction is made between the role that commercial banks in different countries play in financing industry. Some commentators (Frazer and Vittas, 1984; Rybczynski, 1984) distinguish between bank-based systems, such as those found in Germany, France, the Netherlands and Sweden, and market-based systems such as those found in the United Kingdom (and the United States). In the former group of countries, commercial banks have traditionally been strongly orientated towards the corporate sector, and this has provided opportunities for public sector and mutual institutions to adopt a more significant role within the banking system, through concentrating their business on the retail customer and small to medium corporate clients.

Frazer and Vittas (1984) explain that commercial banks in Germany, the Netherlands and Sweden made a concerted effort to improve their standing in the retail banking market from the late 1950s onwards. They also found that during the 1960s similar developments took place in

Northern and Central European banking systems. This they have termed as the 'start of the retail banking revolution'. Changes in the competitive environment for retail banking took longer to emerge in Southern Europe (because of regulatory constraints and low standards of living) and in the United Kingdom (where there was less incentive for the clearing banks to move into retail banking business).

With regard to the sectoral ownership of banking institutions in various European countries it can be seen from Table 2.8 that private domestic sector banks accounted for over 60 per cent of total banking sector assets in Denmark, Ireland, and the Netherlands, and around 50 per cent in Spain, Sweden and Switzerland in 1988[12]. On the other hand,

Table 2.8 Summary of sector ownership of European banking institutions, 1988 (% of aggregate total assets

Country	Private	Public (Central & local government)	Mutual	Foreign
Austria	0.4	43.8	55.8	-
Belgium	37.0	16.8	11.0	35.2
Denmark[a]	69.5	1.3	29.2	-
Finland	44.5	10.5	44.2	0.8
France	24.2	42.2	20.2	13.5
Germany	32.0	49.5	16.7	1.8[c]
Greece[b]	11.0	8'.7	-	5.3
Ireland	61.7	4.0	12.9	21.4
Italy	12.3	67.9	16.8	3.0
Netherlands	61.2	8.1	17.7	13.0
Norway	41.2	19.9	38.9	-
Portugal	6.8	87.1	1.9	4.2
Spain	49.0	2.3	37.7	11.0
Sweden	52.9	19.3	24.9	2.9
Switzerland	53.4	19.6	15.8	11.2
United Kingdom	31.8	1.0	14.0	53.3

Source: Gardener and Molyneux (1991, p.21)

Notes:
a Figures for percentage of total deposits.
b Figures for percentage of total credit.
c Branches of foreign banks.

in 1988 public sector organisations[13] controlled over 70 per cent of banking sector assets in Portugal and Greece over 40 per cent in Italy, France (through the wholesale nationalisation in 1981) and Germany. In Germany nearly 50 per cent of banking sector assets are controlled by public sector institutions, but they have a different significance from the same statistical phenomenon evident in France and Italy. Savings banks in Gemany are under the control of local *Länder* governments. Their central institutions, the Girozentralen, are organised on a Federal basis and are very large international banks. Although they are in the public sector, these institutions cannot be regarded as nationalised institutions or under the direct control of the central government.

In Italy the central institutions of the savings banks, co-operative banks and rural banks are less important. The public sector in Italy is dominated by public law banks[14], national interest banks[15] and the savings banks. In Belgium the public sector consists of only three banks[16] which are controlled by central government. In Sweden there is only one state-owned commercial bank and the postal giro. Switzerland has a similar proport.on of public sector banking institutions: these are the cantonal oanks, which have been set up under cantonal law and cccupy a similar position to savings banks in the German system. Finally, with regard to the public sector, Table 2.8 shows that it is relatively unimportant in Denmark, Ireland, the Netherlands and the United Kingdom.

The mutual sector[17] differs in importance and composition across European countries' banking systems, ranging from 1.9 per cent of banking sector assets in Portugal to 55.8 per cent in Austria. In France (through Crédit Agricole) and the Netherlands (through Rabobank), the agricultural credit co-operatives dominate the mutual sector, although savings banks are relatively more important in France. In Denmark, Finland, Spain and Sweden, savings banks tend to dominate.

The relative importance of foreign banks also differs in European banking systems. It can be seen that foreign banks dominate in the UK banking system and also control a large proportion of banking sector assets in Belgium and Ireland. In Luxembourg, foreign banks account for somewhere around 90 per cent of the banking system's assets and most of their capital is held in currencies other than the Luxembourg franc (see OECD, 1987). Foreign bank penetration appears to be very low in Germany and Italy and other evidence suggests it is even lower in Denmark and Austria.

The marked increase in the number of foreign banks and other financial institutions doing business in European .arkets has led to increases in:

- the importance of foreign assets and liabilities of domestic banks (Harrington, 1987, p.24)
- the number and type of foreign institutions operating in domestic banking markets (BIS, 1986b, p.151)
- the assets of foreign banks operating in European banking

markets (BIS, 1986b, p.152)

The outcome of these trends is that foreign banks increasingly pose a threat to domestic banks in European banking markets. Although some commentators may disagree (Arthur Andersen, 1986), there appears to be a definite trend towards outsider penetration in these markets, especially when the incumbent domestic banks are perceived as lacking expertise. Walter and Smith (1990, p.37) suggest that eurocurency banking business will also continue to displace domestic currency banking business in the balance sheets of many European banking sectors.

Table 2.9 illustrates the change in market shares by ownership category between 1983 and 1988. The public sector has declined in virtually all European banking markets. The notable exception being Italy where this sector increased its share by 7.5 per cent. The significant fall in the size of the public sector (and subsequent rise in the private sector) in France is attributable to the privatisation of five large banks in 1986. Private sector banks' share of total banking sector assets has increased in the majority of European countries, the exceptions being Austria, Denmark, Italy, Spain, Sweden and the Netherlands. In all but Italy and Sweden, the private banks lost ground to the mutual institutions. In fact, the mutual institutions, contrary to popular belief, appear to have fared quite well in maintaining market shares throughout the 1980s. Table 2.9 also shows that foreign bank presence has increased in nearly all European banking markets, confirming the internationalisation trend.

Table 2.9 Change[a] in market shares of European banks by ownership category 1983-8(%)

Country	Private	Public	Mutual	Foreign
Austria	-1.2	-0.2	1.4	-
Belgium[b]	1.5	-5.2	2.4	1.3
Denmark[c]	-0.1	-1.0	1.1	-
Finland[b]	1.0	-1.3	1.0	-0.6
France	19.7	-20.3	-2.7	3.4
Germany	0.9	0.4	0.7	-2.0[e]
Greece[c]	2.9	-5.1	-	2.2
Ireland	6.0	-0.2	0.7	-6.5
Italy	-9.1	7.5	1.2	0.4
Netherlands	2.5	1.0	-5.8	2.3
Norway	5.9	-11.6	5.7	-
Spain	-4.3	-5.6	6.2	3.7
Sweden	-1.6	0.7	-2.0	2.9
Switzerlard[d]	2.0	-2.2	1.1	-0.8
United Kingdom	-1.4	0.0	0.8	0.7

Source: Gardener and Molyneux (1991, p.22)

Notes: a Percentage share of total banking sector assets in 1988 minus percentage share of total banking sector assets in 1983.
b 1982-8
c Change in market shares relate to total deposits (Denmark) and total credit (Greece).
d 1985-8
e Foreign bank branches only.

2.4.3 European banking compared to US and Japanese banking

One of the most noticeable differences between European banking systems and those of the United States and Japan is that in the latter two countries banking and securities institutions are separated by law, whereas in most European countries these activities can be undertaken within the same institution. It is also the case that if this institution happens to be a bank, it is subject to a uniform bank supervisory framework. In the United States, however, banking business is supervised by the Federal Reserve, the Federal Deposit Insurance

Corporation and state authorities, and securities business is supervised by the Securities and Exchange Commission. In Japan, banking activities are regulated by the Bank of Japan, whilst securities business is supervised by the Securities Bureau of the Ministry of Finance. Dale (1987) argues that the separation of commercial and investment banking is more artificial in Japan than in the United States. Nevertheless, these mandatory divisions contrast markedly with the universal-type banking undertaken in Germany, Switzerland, the Benelux countries and (to a lesser extent) the United Kingdom.

Similarities may be drawn between the Japanese and various European banking systems bc·ause of Japan's comparable size to the larger European nations. Probably the closest parallel system is that of Gemany where banks _orm close links with industrial customers. The Zaibatsu groups that have dominated commercial activities in Japan for over 40 years often have large banks as their controlling elements. Similarly, in Germany the banks' controlling interests in industry are nurtured through cross-shareholdings and interlinking directorships. The sectoral ownership of the Japanese banking system is different, however, wit the private sector (dominated by the 13 city and 60 or so regional banks) controlling around 50 per cent of banking sector assets. In addition, the mutual sector, through the credit co-operatives, controls around one-third of the banking system. The public sector which dominates in Germany, is less influential in Japan because it consists of only one institution - the Postal Savings Bank. This bank. nevertheless, is the largest deposit-taking institution in the world and controlled arounu 18 per cent of the banking sector's total assets in

1987. The only other similarity to the German system is that foreign banks are relatively unimportant. (See Suzuki (1987) for a detailed account of the Japanese financial system).

In contrast to the relatively concentrated European banking systems, the United States is characterised by a fragmented, unit-based banking system consisting of some 14,130 institutions at the end of 1986 (OECD, 1988). This has been brought about by the dual system of bank chartering and regulation and by various state branching laws. The state branch laws limit inter-state branching and some even restrict intra-state branching. Although these geographic restrictions can be circumvented (to a certain degree) through the establishment of reciprocal agreements, banking holding companies, and corespondent and chain banking activities, no US bank can be said to have a nationwide branch network. The US authorities recently set the legislative wheels in motion to dismantle branching restrictions by the early 1990s. In Europe every country apart from Italy had abandoned branching restrictions by 1988. Italy's branching restrictions were removed in 1991.

The introduction of a single banking licence in the European Community by 1992 and the increased possibility of large cross-border bank mergers may well encourage US legislators to break down the considerable barriers to branching still evident in the United States. In terms of banking structure, the large money-centre banks and the so-called super-regionals have tended to dominate the commercial banking scene over the last five years or so. (See Chew (1991)). The number of banking institutions in Japan has stayed relatively constant since the early 1980s, although there has been a substantial decline in the United States, especially with the demise of the US savings and loans industry.

2.5 Conclusion

It is clear that the environment of European banking is complex and changing. Two major policy trends that have influenced significantly both the structure and strategies of European banks have been the dual forces of structural deregulation and supervisory re-regulation. The former has created a more competitive environment and allowed banks to offer a broader range of products and services by dismantling certain demarcation lines between particular types of business. Banks in most European countries have been able for some time to participate freely in capital markets and investment banking business. On the other hand, the non-bank competitors have been allowed to offer banking-type services creating a major competitive threat, especially in retail banking markets. Financial innovations and technological developments in the provision of financial services have been the main underlying economic motives forcing these changes. Poised on the brink of 1992 and the road to EMU European banking is now at a very important crossroads. Against the background of this overview, the following chapter will explore in greater detail some of the important structure and performance characteristics of European banking.

Notes

1. Note that all references to Germany in this Chapter and the remainder of this thesis refer to W. Germany - pre-unification.
2. Although there are various problems associated with this type of analysis, the pattern indicated by cross-border bank credit flows is 'probably as close as we can get towards identifying the major trade flows'.
3. Fry (1988, p.255) also notes the lack of theory and discussion on the effects of simultaneous deregulation and reregulation in banking markets.
4. The Plaza Agreement was made between the United States, Japan, Germany, the United Kingdom and France, and its aim was to lessen current account imbalances by an agreed change in parities.
5. The Louvre Accord, as confirmed by the Group of Seven, (United States, Japan, Germany, France, United Kingdom, Italy, Canada) aimed to stabilise the dollar vis-à-vis member currencies.
6. As at the beginning of 1990 capital movements are completely free in Denmark, France, Germany, Italy, the Netherlands and the United Kingdom and subject to the application of the two-tier exchange market in Belgium and Luxembourg. Apart from Spain and Portugal, the most recent members to the EC, only Greece and Ireland maintain restrictions.
7. The 'other' plans were, the Schiller Plan for Monetary, Economic and Financial Co-operation, the Second Barre Plan and various suggestions set out by M. Giscard d'Estaing for the creation of a European Reserve Fund.
8. Countries that are members of the EMS are entitled to take part in

discussions on the functions and developments of the system, including the Exchange Rate Mechanism (ERM), and to attend conferences to alter central exchange rates, whether or not they are members of the ERM. All members of the EMS are allowed to join the ERM which obliges them to maintain their exchange rates within certain bands. Each ERM currency has a central rate of exchange against the other currencies in the mechanism. The European Currency Unit (ECU) is used as the *numéraire* where all participating currencies have an ECU-related central rate. Central rates are expressed as a certain quantity of currency per ECU. Currencies are permitted to move up to 2.25 per cent above or below their central rate, although the lira and peseta have a wider margin of 6 per cent. Central banks agree to maintain the value of their currencies within these limits. If exchange rates cannot be maintained within these bands a realignment conference may be called to consider changes in central rates. Central rates can only be altered with the mutual agreement of the members of the mechanism. Up until September 1992, the EMS had experienced eleven such realignments.

9. The BIS includes the Group of Ten (G10) countries (Belgium, Canada, France, Italy, Japan, Netherlands, Sweden, United Kingdom, United States and West Germany) as well as Luxembourg, Austria, Denmark, Finland, ireland, Norway, Switzerland and Spain. It also covers various banks engaged in international business in the Bahamas, Cayman Islands, Hong Kong and Singapore, all offshore banking units in Bahrain, all offshore banks operating in the Netherlands Antilles and branches of US banks in Panama.

10. The members of the Cooke Committee consisted of representatives of

the G10 countries and Luxembourg and Switzerland.

11. The distinction is made between those banking systems that follow the British model: Australia, Canada, Ireland, New Zealand and South Africa and those that have Continental banking system characteristics. The US banking system is viewed as a kind of hybrid.

12. Gardener and Molyneux (1991)

13. Public sector institutions include nationalised commercial banks, postal giros and postal savings banks and specialised banks which deal mainly with export finance and long-term finance to industry.

14. Banca Nazionale del Lavoro, Banco di Sardegna, Istituto Bancario San Paolo di Torino, Monte dei Paschi di Siena, Banco di Napoli and Banco di Sicilia.

15. These comprise Banca Commercial Italiana, Banco di Roma and Credito Italiano, which are state-owned but have a monitory private sector shareholding.

16. The two largest public sector banks are Crédit Communal, which transacts business mainly with provincial and local authorities but has been increasing its general banking business, and Caisses Generales d'Epargne et de Retraite (CGER), the same as a post office or national savings bank, which was made into a public bank in 1980. The Office des Cheques Postaux (OCP) provides postal chequing facilities and is the third major public sector bank.

17. Mutual institutions include savings banks, building societies, co-operative banks. Raiffeisen credit co-operatives and credit unions, together with their central organisations.

Chapter Three

Structure and Performance in European Banking Markets

3.1 Introduction

The preceding Chapter alluded to considerable differences in the structure and performance characteristics of various European banking markets. This Chapter examines some of these major differences and also identifies features that influence the relationship between banking structure and performance. Particular attention is also paid to the analysis of comparative competitive conditions across European banking markets as provided in the Price Waterhouse/Cecchini study.

Section 3.2 examines the regulatory framework in European banking and shows how it impacts on market structure; Section 3.3 describes competitive pressures in the 1990s and focuses on the recent growth of bank cross-border activity. Section 3.4 examines the size and concentration characteristics of European banking markets between 1986 and 1989. This section illustrates some of the market structure variables within the same time period in which the later SCP empirical research of this thesis will be undertaken. Sections 3.5 and 3.6 examine performance and ownership characteristics in European banking. Finally, Section 3.7 examines the competitive environment in European banking and analyses the Price Waterhouse/Cecchini study on EC financial sector integration after 1992. It is illustrated how this latter study incorporated an industrial organisations methodology which was used to provide estimates of oligopoly profits in EC financial sectors and, subsequently, producer surplus losses brought about through integration. This approach, however, was de-emphasised by Cecchini, and only consumer surplus gains were reported in the final analysis; although others have suggested that the corresponding producer surplus loss estimates are also important. The Price Waterhouse/Cecchini methodology, therefore, provides us with an important justification as to why it is useful to examine the SCP relationship across European banking markets: namely, because the prevalence of significant oligopoly profits across European banking markets would imply substantial producer-surplus losses in the event of financial integration.

3.2 Market Structure and the Regulatory Environment

3.2.1 A brief historical and evolutionary perspective on structural developments

One general view (Rybczynski, 1984; 1988) of the modern evolution of banking and financial systems is to identify the broad stages of structural development in a kind of 'logical historical order'. From the bank-orientated stage, a system develops through the market-orientated stage to the so-called securitised phase. In the bank-orientated stage the majority of external funds raised by non-financial companies are obtained from the banking system in the form of loans. An exception to this is countries with universal banking systems, such as in Germany and the Benelux countries, where banks supply risk capital in some form or another. In the bank-orientated era the degree of risk an economy bears is primarily determined by the owners of the productive resources and the banks.

The next stage of development is known as the market-orientated phase. Here external funds obtained by non-financial firms are obtained primarily through the capital markets. These latter markets channel a growing proportion of savings of the personal sector, and non-bank institutions like life assurance companies, investment trusts and other portfolio-type institutions become more important. In the final securitised (or 'strongly market-orientated') phase the majority of external funds raised by non-financial firms are acquired through the capital and credit markets. During this period, non-bank institutions such as finance companies and building societies rely more on funds raised through the open credit markets. Depository institutions move an increasing proportion of assets off their balance sheets and trade in them. Securitisation and the rapid development of sophisticated off-balance sheet (OBS) techniques are characteristic of this stage.

It is argued that as a financial system moves from the bank-orientated to the securitised stage the capacity of an economy to assume risk increases; it is also the active and indispensable ingredient of re-structuring all mature and de-industrialising economies if all its constituent parts (that is primary and secondary capital and credit markets, markets for corporate control and markets for venture capital) function effectively' (Rybczynski, 1988, p.11). In Europe, only the United Kingdom has reached this securitised phase. Regulations have recently been passed in France, Italy and Spain that aim to move the respective financial systems towards more market-orientated systems. Germany's financial system is still heavily entrenched in the bank-orientated phase of development (See Vittas (1986) and Mayer (1987) for a comparison of the major European banking system which also supports this view). Despite these very broad but important differences in the evolution of financial systems, all European countries have experienced marked structural developments during recent years.

3.2.2 The structure and performance relationship

The structure of any market is determined by a broad range of economic as well as non-economic factors. These non-economic factors include various geographical, legal, philosophical, political and social forces which mould the institutional character of banking markets over time. Consequently, European banking systems are characterised by a complex array of institutions, organisational forms and legal frameworks, all of which have contributed to the myriad forces that have created their different market structures.

The aforementioned background begs the question: 'Why does structure matter?'. Industrial economic theory suggests that there is a causal link between market structure and bank conduct and performance. More specifically, it has been argued that, in concentrated markets, banks may earn collusive profits and thus antitrust policy should be aimed at discouraging increases in market concentration (Weiss, 1974; Heggestad and Mingo, 1977; Spellman, 1981; Rhoades, 1982a). A substantial literature has burgeoned that is aimed at testing the theoretical SCP (structure-conduct-performance) relationship. It has been argued, however, that this literature contains too many inconsistencies and contradictions to provide a satisfactory description of the SCP relationship in banking (Gilbert, 1984; Osborne and Wendel, 1983). Contemporary approaches to the explanation of the link between market structure and performance have emphasised an alternative 'efficient structure' hypothesis. This postulates that an industry's structure arises as a result of superior operating efficiency by particular firms. As a result, a positive relationship between bank profits and structure can be attributed to gains made in market share by more efficient banks. Various studies undertaken on the US banking industry (Brozen, 1982; Smirlock, 1985; Evanoff and Forter, 1988) suggest that firm-specific efficiency seems to be the dominant variable explaining bank profitability. (These issues will be covered in much more detail in Chapter 4 and 5 of this thesis).

To date only one study, Ruthenberg (1991) has tested the structure-performance relationship across European banking markets, using a methodology similar to the US studies (See Chapter 5 for a more detailed exposition). Ruthenberg (1991) finds partial evidence of the traditional structure-performance relationship in that performance increases with an increase in concentration for those banking markets that have concentration levels above some critical value. The banking markets which consistently fall above the 'critical level' of concentration are Ireland, Greece, the Netherlands and Portugal. Ruthenberg concludes:

> In sum, it appears that only relatively small, concentrated banking markets; with an Herfindahl index greater than 0.13, that are characterised with relatively few competitors, and high entry barriers can offer banking organisations that expand their activities across borders a potential for decreased profits. (pp.21-22).

The Molyneux and Thornton (1992) study finds stronger evidence that the SCP paradigm holds across European banking markets. Overall, it seems clear that the structure of a market influences the way in which banks operate in that market. With these points in mind, we can examine a number of important factors affecting banking structure in Europe.

3.2.3 Rules and regulations affecting structure

3.2.3.1 Definition of banking business and licensing requirements

The legal and supervisory framework under which banks operate is one of the most important factors influencing the present and developing structure in European banking markets, although there has never been a uniform approach to banking law throughout Europe. Even though the banking laws enacted in most Continental European countries after the widespread banking crises of the 1930s were similar in nature (Revell, 1987), there is currently no legal consensus as to what constitutes 'banking business' and the permissible scope of banking activity. Pecchioli (1987) notes that the banking laws of Austria, France and Germany[1] provide a detailed description of what constitutes banking business, whereas those of Belgium, Denmark, Ireland, Italy and the United Kingdom are very broadly defined. In contrast, the Banking Acts of Switzerland do not provide any precise definition of banking business[2]. This, however, does not necessarily mean that banking systems that have a detailed legalistic definition of 'banking business' are more restrictive: for example, the detailed and wide-ranging German banking laws actively promote banks to operate as universal-type institutions. The largest banks in the United Kingdom have now partially achieved universal bank status, despite a completely different legal framework.

Regulatory bodies can influence the size and structure of the banking sector through their control over access to the banking system via licensing. Compulsory bank licensing systems were introduced in Ireland (1971), the Netherlands (1979), the United Kingdom (1979) and France (1984)[3]. In these countries authorisation procedures are usually based on the fulfilment of specific legal requirements where the supervisory authorities have a certain degree of administrative discretion. Licensing bodies have full discretionary authority in countries such as Greece, Norway, Portugal, Spain and Sweden (see Pecchioli, 1987, pp.46-56 and OECD, 1984, for a detailed examination of licensing and branching regulations in OECD countries). In addition to the granting of licences, the regulatory authorities have the power to control the opening of new domestic branches by authorised institutions. In various European countries the opening of a new domestic branch requires either notification to the relevant supervisory authorities[4] or is subject to non-statutory requirements[5]. On the other hand, in Finland, Greece and Italy[6] prior authorisation by the central bank is required. Since the 1960s, regulations have been modified significantly in only a handful of countries: most notably in France and Italy.

3.2.3.2 EC regulatory environment

Over the last thirty years, the European Community has introduced banking legislation aimed at harmonising regulations and fostering competition. In this regard, Baltensperger and Dermine (1990) identify three distinct regulatory time periods: deregulation of entry to domestic markets from 1957 to 1973; attempts towards harmonisation of banking regulations from 1973 to 1983; and the recent European integration and 'internal market' proposal of freedom of cross-border services, single banking licence, home country control and mutual recognition.

Under the 1957 Treaty of Rome, the internal market was viewed as one which allowed, 'free movement of goods, persons and services' and the objective was to transform segmented national markets into a common single market. In July 1965 the Commission proposed a Directive on the Abolition of Restrictions on Freedom of Establishment and Freedom to Provide Services in Respect of Self-employed Activities of Banks and other Financial Institutions. This was adopted by the EC Council of Ministers in 1973 and aimed to ensure the equal treatment of national and other firms of member states relating to entry into domestic markets and the conditions under which banks are allowed to operate. Subsidiaries of non-member country banks were to be regarded as EC undertakings in every way. From 1973 onwards very little discrimination remained as to entry into member states, although cross-border competition was still severely hampered by capital restrictions. In addition, there was non co-ordination of banking supervision, so banks operating in different countries were subject to different prudential requirements. This led to the second period of attempts to harmonise regulations.

Advances in harmonisation came in 1977 with the adoption of the First Directive on the Co-ordination of laws, Regulations and Administrative Provisions Relating to the Taking up and Pursuit of Credit institutions (hereafter known as the First Banking Co-ordination Directive). This directive established a definition of credit institutions and the principle of home country control, whereby supervision of credit institutions operating in various member countries would be now the responsibility of the home country of the parent bank. A directive on the Supervision of Credit Institutions on a Consolidated basis was adopted in 1983, along with two other directives relating to bank accounting formats and consumer protection in 1986. Baltensperger and Dermine (1990) state that despite the above legislation, European banking markets were still far from full integration. A bank wishing to operate in another country still had to be authorised by the supervisors of the other country. It remained subject to supervision by the host country and its range of activities could be constrained by host country laws. In addition in most countries, bank branches had to be provided with earmarked endowment capital as if they were new banks. Finally, the supply of cross-border services was severely impaired by the restrictions on capital flows.

The difficulty encountered by full harmonisation of national regulations prompted a new approach towards European integration. In

1983 a White Policy Paper on financial integration enunciated clearly a renewed commitment to the Treaty of Rome and in 1985 the EC Commission proposed its White Paper on the completion of the internal market by 1992. In relation to banking, the White Paper set guidelines for a single banking licence, home country control and mutual recognition. These principles were incorporated in the 1988 Second Banking Directive which was passed by the EC Council of Ministers on 15 December 1989. It sets out to eliminate the remaining intra-EC barriers to freedom of establishment in the banking sector and provides for full freedom of banking services across intra-EC boundaries. The main aim of this legislation is to harmonise laws and rules for credit institutions so that they can set up and operate freely across the Community, subject to adequate supervision. To this end the directive provides for minimum capital requirements, the monitoring and vetting of bodies that have substantial bank shareholdings, control over banks' long-term participation in non-financial companies, and the establishment of a single banking 'passport' to permit activity anywhere within the EC.

The principle of the single banking 'passport' is of particular importance. Once a credit institution is authorised to do banking business by its home supervisor (home country control) it will have a 'passport' to sell its products and services throughout the EC as long as there is prior harmonisation of essential supervisory rules (mutual recognition). A vital reinforcing feature of the Second Banking Directive is the associated supervisory arrangements. The Own Funds Directive (1988) was formally passed by the EC Council of Ministers in April 1989, along with the Solvency Ratio Directive in December 1989.

The former aims to harmonise the definition of the capital, whereas the latter harmonises the solvency ratios for EC credit institutions. Other directives harmonising regulations on: larger risk exposures; accounting for foreign branches; re-organisation and winding up procedures; and deposit insurance have also been adopted.

Accompanying all the above legislation is the proposal for full liberalisation of capital flows and all restrictions will be removed by the end of 1992 apart from in Greece and Portugal where restrictions will disappear by 1995. In addition to the above legislation, on the 21 September 1990 the EC Merger Control Regulation came into force. From that date all proposed mergers and acquisitions of a 'Community dimension' have to be notified to the EC Commission for prior approval before becoming effective. Transactions between banks will have a 'Community dimension', according to Ratcliff and Garner (1991, p.232), where:

- The banking/financial groups have total assets exceeding ECU 50,000 million
- The banking/financial groups concerned have a significant level of assets attributable to the European Community. (The value of one-tenth of the total assets of each of the institutions involved when multiplied by the ratio of loans and advances made by them to EC banks and customers, to the total of all loans and advances to banks and customers, should exceed ECU 250 million)
- Each of the groups to which the companies involved belong must have significant assets attributable to more than one EC Member State.

> A transaction is exempt from notification where more than two-thirds of the EC assets of the parties concerned are attributable in one and the same EC Member States.

Given that in various EC countries the banking market is highly concentrated, the above legislation aims to monitor the build-up of EC-wide market concentration. Most national legislation, in fact, has arrangements in place which either formally limit participations in banks - Netherlands and Norway for example - or which allow the monitoring of any incentives for change in substantial participations in banks including mergers and takeovers (this is the case in Belgium, France, Germany, Greece and the United Kingdom). As the OECD (1989) point out:

> The authorities generally use merger (and ownership) policies in the financial sector in a flexible manner and integrate them with general policies towards improving the efficiency and functioning of financial systems (p. 68)

National mergers policy during the 1980s has mainly been used to deal with banks that are in difficulty and to encourage consolidation in the mutual sector. Some countries regulators have encouraged bank mergers (as in Spain) as a view to strengthening the international competitiveness of the domestic banking market (see Revell (1991) for an analysis of recent mergers in Spanish banking).

Given this brief review of the legislation, it is clear that the main objectives of the European Commission has been threefold: to establish free entry and provisions of financial services throughout the

EC, the establishment of a fair level playing field with a single banking licence; and finally, consumer protection. These factors, coupled with EC merger control regulations applicable to bank mergers should combine to improve competition between and within EC banking markets.

3.3 Competitive Pressures in the 1990s

The European banking system will change considerably in the next few years in response to the creation of a single internal market and European Economic Integration. It is generally believed that a handful of large European multinational operators will emerge. Of the 14,000 or so banks in Western Europe the vast majority will have to 'settle for whatever pickings are available, either in products or regional specialisation. The minnows will be swallowed up by the bigger fry or scatter for shelter in bigger boutiques' (Jones, 1988, pp.56).

Various large European banks already own foreign branch networks, for example Deutsche Bank's purchase of Banca d'America e d'Italia in 1986. Deutsche has also purchased a Portuguese merchant bank, holds a 50 per cent stake in H. Alfred de Bory (a Dutch investment bank), and has increased its holding in Banco Comercial Transatlantico, a $1.7 billion Spanish bank. Recent moves by Deutsche Bank confirm its avowed interest in the French and UK market (see Gardener and Molyneux (1990) pp.208-213). Banks in Germany and the United Kingdom have already made clear their wider European interests by recently forging links with Spanish, Italian and French banks. In fact, many large European banks appear to be focusing their attention on the United Kingdom, Spain and Italy. As Morgan Stanley (1990) identifies, the relatively high margins that can be earned in Spain and the considerable growth in consumer lending (mainly housing finance) experienced in recent years in the United Kingdom are also of noticeable interest to the large Swiss and German banks. This 'interest', of course, has been somewhat dissipated since the collapse of the UK property market.

3.3.1. Cross-border activity

Salomon Brothers (1990) have identified that cross-border acquisitions to date have involved large banks acquiring much smaller banks. There is, however, no general view as to what form of cross-border activity is the most common and which will be the most successful. Molyneux (1991) examines the type and scale of cross-border activity currently being undertaken by the world's largest banks and draws some interesting observations about developments in the European market place. Table 3.1 shows the cross-border operations of the world's top 150 banks between January 1989 and April 1991. It shows that the two most common forms of cross-border activity relate to the opening of new branches or subsidiaries and acquisitions. Co-operation agreements and alliances are still not as popular as the traditional modes of international expansion. This is because, although co-operation agreements and alliances cost less than substantial acquisitions, the general perception is that they are difficult to manage because they require the co-operation of different organisational and managerial structures operating on an equal footing.

In addition, the advantages and returns accruing to each partner may not always be clearly evident. Some say the forging of such relationships are based on the herd instinct of senior managers who will not last long enough to see any positive benefits. Having said this, however, joint ventures (which account for some 14 per cent of all operations) seem a popular method of cross-border activity. This is

Table 3.1 Cross-border activity of the world's top 150 banks January 1989 to April 1991

Types	Numbers	%
Opening of new branches or subsidiaries	94	21.7
Acquisition of a controlling interest	87	20.1
Acquisition of a minority interest	63	14.5
Reciprocal equity shareholdings	12	2.8
Joint ventures	61	14.1
Co-operation agreements	42	9.7
New foreign non-bank shareholders	25	5.8
Disposals or closures of operations abroad	49	11.3
Total	433	100.0

Sources: Agence Europe 'Economic interpenetration in Europe and the rest of the world' 1989-90, *Financial Institutions Review*, Issues 11-16 Salomon Brothers (1990): 'Multinational money center banking: the evolution of a single European banking market', Istituto Bancario San Paolo di Torino: Gardener, E.P.M. and P. Molyneux (1990), *Changes in Western European Banking* (London: Allan Unwin)

because it is easier to share responsibility (and profits) if a new joint-owned business unit is created.

An interesting point to note is the number of new non-bank shareholders that have emerged. Some of these shareholdings relate to insurance companies which have taken stakes in banks, but others relate specifically to links between industry and banks. The relationship between the industrial sector and banks is strong in countries where banks still hold large participations in the shares of industrial companies, as in Spain, Germany, France and Japan. In some countries, mergers in industry are inextricably linked with mergers in the financial services sector. For example, holding companies that seem likely to arise resulting from a merger of industrial companies will, in many cases, include a bank or a financial services company of some sort. This was a factor in the siege laid by De Beneditti and the Compagni Financière de Suez against Société Générale de Belgique, since that group contained one of the largest Belgian banks, Générale Bank (see Salomon Brothers, 1990). It has also been argued that the ownership of a bank by an industrial group protects the group from predators by acting as 'poison pill' to discourage or delay take-over through the need to secure central bankers approval of the acquisition of the bank.

The trend of non-bank financial institutions and industrial companies to take cross-border shareholdings in banks will probably continue, and this may encourage regulatory authorities to allow banks to undertake reciprocal activity, especially in countries such as the United Kingdom where equity ownership of industrial companies is positively discouraged.

Table 3.2 provides a breakdown of the cross-border acquisitions and new openings of the world's top 150 banks between January 1989 and April 1991 according to business area. Controlling acquisitions and the opening of new operating units account for about 75 per cent of all

Table 3.2 Cross-border activity: controlling and minority acquisitions and new openings

January 1989 to April 1991

		Business area					
	Number	Commercial banking	Investment banking	Leasing	Insurance	Fund Management	Others
Controlling acquisitions	87	47	16	10		5	9
Minority acquisitions	63	26	12		3		22
of which 10%	41	16	13		2		10
Openings	99	53	32	2	5	5	

		Geographic location				
		Europe		Outside Europe		Main countries of expansion
	Number	Reinforcement*	New entry	Reinforcement*	New entry	
Controlling acquisitions	87	52	13	14	8	France 12
Minority acquisitions	63	29	20	10	4	Italy 14
of which >10%	41	22	11	7	1	
Openings	99	24	44	9	22	Germany 16
						E. bloc 15

*'reinforcement' is used to identify expansion in countries where the bank is already represented

Source: As Table 3.1

operations. Most controlling acquisitions are in the area of commercial banking, followed by investmen banking. A similar pattern is illustrated for minority acquisitions, although minority investments are consistently channelled towards non-traditional sectors.

These strategic stakes according to Molyneux (1991, p.25) generate a number of benefits for the banks concerned:

- they enable partners to rationalise their businesses;
- they help the institutions concerned to build-up cultural links prior to the advent of a possible merger or continuing joint venture;
- they make it cheaper for banks to acquire majority control. Limited evidence to date suggests that moves to actual majority control do not tend to require a higher premium to be paid than on the original stake;
- premiums are rarely paid for nominal stakes acquired to forge alliances, apart from cases where shares are closely held by a small number of investors. However, minority stakes large enough to provide the purchaser with substantial influence and which block potential counter-bids generally have to be acquired at substantial premiums over market value;
- they protect the buyer, to a certain degree, from potential competitive offers.

Direct expansion involving new branches and subsidiaries is still a popular form of cross-borer activity, especially in the area of investment banking. There is, however, a majo difference between acquisitions and new operating units, particularly in terms of geographical location.

In the case of controlling acquisitions, 76 per cent indicate expansions in countries where the bank is already represented, and most of these have taken place in Europe with France being the most popular area of expansion. Banks appear to be choosing acquisition as a means of expansion in markets already known.

With minority acquisitions banks have also tended to enter markets in which they are already represented, although there is a slightly greater preference for entering new markets. The opening of branches and subsidiaries appears to be the preferred method of breaking into new markets, and Table 3.2 shows that this type of expansion has been most common over the past couple of years in Germany and in Eastern bloc countries. It makes sense that in markets which are difficult to enter, a gradual approach starting with the opening of a new branch or subsidiary is the most suitable strategy for cross-border expansion.

Alliances represent a relatively low cost way of creating international networks without becoming involved in substantial capital investments. It is probably the simplest method of overseas expansion. Agreements involving exchanges of shares between companies or their subsidiaries (such as the Crediop/San Paolo share swap and the sale of CIC stock by the French Government for GAN equity) are viewed by many as an ideal defensive agreement and an excellent way to encourage management to develop the benefits of co-ordination. Equity cross-shareholdings are generally viewed as precursors to the forging of stronger relationships and possible future rergers - they are unique to the European market. Other types of asset swaps, such as the subsidiaries exchanges between Banco Bilbao Vizcaya and Banque Nationale de Paris, have aimed to consolidate business operations and, in general, lead to further collaboration between the groups concerned.

Despite the perceived benefits accruing from cross-equity holdings, Table 3.3 shows that these types of agreements are an uncommon form of cross-border operation, probably because of the difficulties associated with developing a constructive and long-lasting relationship with a major foreign partner and shareholder. Joint ventures and co-operation agreements appear to be the preferred route for building cross-border alliances. Joint ventures fall into three main categories:

- those between large banks and smaller institutions which are set up to enter new markets, such as the recent Cariplo/Zentralsparkasse and Kommerzialbank venture in Hungary and the Banque Nationale de Paris/UOB Holding SA in Switzerland;
- those aimed at developing new business sectors, for example, the Cariplo/French Caisse Nationale de Providence/British Trust Company operation aimed at selling life assurance in Italy;
- agreements between large banks seeking access to new markets, such as the joint holding company to be set up by DG Bank, Crédit Agricole and Rabo Bank in Luxembourg.

Many of the joint ventures in late-1990 and early-1991 have been concerned with establishing new operations in Eastern bloc countries. The recent co-operative agreement and reciprocal investments between Z-bank (Zentralsparkasse and Kommerzial bank Aktiengesellschaft, Wien) and Cariplo are typical of such developments. These two banks have decided to develop a common central European strategy. As part of the broad co-operation agreement, Cariplo has taken a 5 per cent participation in Z-bank's share capital, and the latter is expected to take a reciprocal

Table 3.3 Cross-holdings, joint ventures and co-operation agreements January 1989 to April 1991

	Number	Business area					
		Commercial banking	Investment banking	Leasing	Insurance	Fund Management	Others
Cross shareholding	12	9				2	1
Joint ventures	61	12	18	6	9	6	10
Co-operation	42						

	Number	Geographic location					
		Europe		Outside Europe		Main countries of expansion	
		Reinforcement*	New entry	Reinforcement*	New entry		
Cross shareholding	12	8	4			France	6
Joint ventures	61	28	14	10	9	France	24
						E. bloc	13
Co-operation	42					France	13
						Italy	9
						Spain	6

*'reinforcement' is used to identify expansion in countries where the bank is already represented

Source: As Table 3.1

stake after 1992. The banks have already established a joint venture bank, Europa's Kereskedelmi Bank Rt (EKB) in Hungary.

Finally, Table 3.3 shows that agreements involving co-operation in the broadest sense accounted for 37 per cent of alliances between 1989 and 1991. Their most common characteristic relates to the sharing of national networks for product/distribution alliances or for collaboration in specific sectors. Gardener (1991) notes that 'These often involve a comparatively sophisticated product provider from Northern Europe and a distribution network in the South. Probably the most explosive growth in this area has been in the bank distribution of life and pension products'. (p.14)

So in conclusion, the cross-border activity of the world's largest banks between 1989 and 1991 illustrates the diverse nature of international bank expansion and shows that the bulk of activity is taking place in Europe. The acquisition of controlling or minority interests, as well as the opening of new operating units, is the most-favoured form of cross-border operation. Acquisitions generally appear to take place in countries where banks already have a presence, whereas the opening of new branches or subsidiaries is the most popular route for entering new markets.

It should also be mentioned that despite the, 'wave of bank arrangements, which rolled all over Europe in 1988-89, no single significant cross-border bank merger has materialised' (Abraham and Lierman (1991, p.15), although important mergers between the largest or 'core' banks have occurred in a limited number of countries: Spain, the Scandinavian systems, Netherlands and Italy. Overall, given the authorities' desire to harmonise bank regulations and to bring about a 'level playing field' by the end of 1992, coupled with the above corporate restructuring, this one would expect to lead to a more competitive European banking environment.

3.4 Size and Concentration

Every banking system in Western Europe has a group of dominant or 'core banks' which are recognised by both the authorities and the general public[7]. In many European countries, especially those whose government is based on a Federal system, there has been a trend for local and regional based banks to form groups that could effectively compete against the national 'core' banks. Those countries with a large number of mutual and co-operative banks, such as Germany, France, Italy, Spain and the Scandinavian countries, tend to have a stronger regional focus than countries which have a small number of relatively large private banks.

If we take the size of individual economies into consideration the relative importance of bank assets in relation to gross national product can be analysed. Table 3.4 shows that deposit banks' assets as a percentage of GNP for almost all European countries have increased substantially between 1981 and 1989. This measure is sometimes used to gauge the degree of financial depth in an economy. If we accept this as an acceptable measure then it would be fair to say that the financial systems of Ireland and Portugal hardly deepened between 1981 and 1989 whereas those of Germany and the United Kingdom certainly did.

Table 3.5 illustrates various structural characteristics of European banking markets at the end of 1989. (See Appendix 1 for tables for 1986 to 1988). It shows that the German, UK, French and Italian banking systems are by far the largest banking sectors, out of which Italy and France have the most concentrated systems. In all but Germany, the United Kingdom and Luxembourg the five-firm concentration ratios exceed 30 per cent and for the deposits ratio increases to over

Table 3.4 Deposit bank assets as a percentage of GNP

	1981	1985	1989
Austria	148.0	169.7	189.4
Belgium	137.7	172.8	172.1
Denmark	52.9	84.2	95.6
Finland	57.1	76.9	102.4
France[a]	109.7	(80.5)	130.2
Germany	144.0	181.6	220.4
Greece	91.8	110.2	120.3
Ireland	110.2	94.0	115.4
Italy	113.5	115.2	134.4
Luxembourg	2520.4	2664.6	2774.1
Netherlands	193.4	214.1	283.3
Norway	115.8	132.5	152.4
Portugal	91.5	-	101.5
Spain	113.2	127.9	135.6
Sweden	135.9	136.6	152.1
Switzerland	188.1	224.9	248.4
UK	130.1	165.5	[illegible]
USA	95.2	104.0	129.3
Japan	202.3	208.5	272.1

Source: Calculated from various editions of IMF, *International Financial Statistics*

Notes: [a]French data are for bank assets as a percentage of GDP and figures for 1985 and 1986 understate the situation because they exclude claims on other banking institutions

70 per cent in Belgium, Finland, Netherlands and Sweden. It is interesting to note that, of the four largest banking markets, it is those in which regulations have, in their recent history been the most restrictive - France through nationalisation and Italy through branching restrictions and government ownership - which are the most concentrated.

Table 3.5 Market concentration and size of banking sectors in Europe 1989

Number of banks	Country	Size of banking sector (Assets $ bn)	Concentration % of total market			
			Assets		Deposits	
			10-firm	5-firm	10-firm	5-firm
1,226[a]	Austria	324.2	55.3	35.8	61.9	42.0
117	Belgium	321.0	81.8	70.9	96.0	87.8
156	Denmark	169.0	64.2	47.6	65.6	50.1
502	Finland	172.0	68.7	64.5	77.8	73.8
1,897[b]	France	2,204.3	48.4	30.4	50.7	33.1
4,247[c]	Germany	2,519.4	42.1	26.3	30.2	21.8
42	Greece	85.6	n.a	n.a	71.2	68.9
49	Ireland	44.5	87.6	66.2	88.9	67.5
1,059	Italy	1,100.0	58.4	35.8	63.9	43.3
177	Luxembourg	317.8	43.2	26.7	43.0	26.5
180	Netherlands	463.3	72.9	67.5	83.0	77.3
267	Norway	162.4	61.1	51.8	62.2	51.1
33	Portugal	70.9	77.5	53.7	83.9	59.4
482	Spain	519.3	60.3	37.3	60.9	[illegible]7.9
655	Sweden	215.5	88.1	76.0	71.9	73.9
625	Switzerland	1,031.5	59.5	51.5	62.5	54.9
66	Turkey	42.2	n.a	n.a	n.a	n.a
774	UK	2,280.2	38.6	28.7	36.9	27.5

Notes:
a. Includes 780 credit co-operatives
b. 1,009 Special Finance Intermediaries included
c. Including 3,225 credit co-operatives
d. Concentration ratios calculated from individual bank data taken from IBCA Credit Rating Agency (London) database

Sources: See Appendix 2

Table 3.6 shows the change in various structural characteristics between 1986 to 1989. Overall it can be seen that, for the majority of European banking markets, the number of banks declined between 1986 and 1989 with the noticeable exceptions of Luxembourg, Portugal, Netherlands and Spain. The increase in Luxembourg was wholly attributable to an influx of 57 foreign banks between 1986 and 1989, the same was the case for Portugal which increased its number of foreign banks by seven over this period. In the Netherlands, there was an increase in the number of savings banks and commercial banks (especially foreign) and the growth of banks in Spain can be attributed to the increase in foreign banks and money market intermediaries. (Over this period, Spain actually experienced a decline in the number of credit co-operatives). In general, the reason for increased bank numbers in particular markets was mainly the result of greater foreign bank presence.

Table 3.6 Change in structural characteristics of European banking markets between 1986 and 1989

% change in number of banks 1986-1989	Country	% change in size of banking sector 1986-1989	% change in concentration of total banking market 1986-1989			
			Assets		Deposits	
			10-firm	5-firm	10-firm	5-firm
- 1.7	Austria	44.4	-8.0	-6.5	-10.2	-8.1
- 2.5	Belgium	43.9	-1.8	-1.3	0.6	2.5
- 1.3	Denmark	47.7	16.3	8.4	14.1	-5.8
-19.2	Finland	115.8	-4.7	-6.4	-8.8	-8.2
- 8.8	France	33.3	-1.6	-17.2	-5.8	[illegible]
- 8.2	Germany	37.7	8.2	6.9	9.0	13.5
7.7	Greece	92.4	n.a	n.a	-12.5	9.7
- 9.3	Ireland	56.1	-1.7	-8.4	-0.4	-4.1
- 4.4	Italy	53.4	1.2	3.2	15.8	22.0
47.5	Luxembourg	60.4	-2.5	-6.3	-1.8	-4.[illegible]
16.9	Netherlands	56.3	-2.7	-4.7	0.6	-0.3
-18.8	Norway	81.5	-0.5	-4.6	-10.4	-15.3
26.9	Portugal	42.4	n.a	7.2	n.a	3.5
9.3	Spain	81.8	9.8	1.1	29.9	48.0
-12.1	Sweden	66.9	2.6	2.8	-7.3	15.1
2.3	Switzerland	97.5	-2.3	-3.0	-3.7	-4.2
8.2	Turkey	38.8	n.a	n.a	n.a	n.a
0.5	UK	47.6	13.2	1.8	17.1	6.2

Note: n.a not available

Source: See Appendix 1 and 2

Looking at those markets which experienced a decline in the number of banks, the main reason for this can be attributed to the fall in number of mutual banks such as savings banks and co-operative banks. For example, in Finland, Norway and Sweden (the markets which experienced the largest proportional declines in bank numbers) the reduction was almost entirely due to rationalisation in the savings banks sector. Austria experienced a substantial decline in the number of rural credit co-operatives (from 940 in 1986 to 860 in 1989) as did France, Germany and Italy.

The change in concentration over the period under question varies across countries, although it is noticeable that both assets' and deposits concentration ratios increased in three out of the four largest European banking markets (for a more detailed treatment of the structural characteristics of individual European banking markets see Gardener and Molyneux 1990, Appendix One).

Simple correlation coefficients relating change in market size, number of banks and concentration ratios are shown in Table 3.7. It can be seen from Table 3.7 that change in market size is negatively correlated with all changes in concentration measures, whereas the relationship between the change in number of banks and concentration is ambiguous. This is not surprising, given that if only very small banks enter or leave markets, the concentration ratios are hardly affected. It is only when large banks merge, or new ones enter the market, that concentration ratios can noticeably change.

The concentration of European banking markets has been an important feature of structural change. Concentration is by no means a recent phenomenon, and many countries' banking systems have been dominated by a handful of large banks for at least half a century or so. The way we measure concentration is also important. If it is measured on a

Table 3.7 Correlation coefficients: change in bank numbers, market size and concentration ratios in European banking, 1986 to 1989

	% change in number of banks	% change in market size
% change in market size	-0.181	*
% change in 10-firm assets concentration ratio	-0.105	-0.411
% change in 5-firm assets concentration ratio	-0.079	-0.518
% change in 10-firm deposits concentration ratio	0.123	-0.359
% change in 5-firm deposits concentration ratio	0.056	-0.127

Source: Calculated from data in Appendix 1

'consolidated groups basis' then the Netherlands and France appear to be the most concentrated systems, whereas Germany and the United Kingdom appear to be the most dispersed (Revell, 1987, pp.27). Other results (Baer and Mote, 1985) indicate that the French banking system has become twice as concentrated since the 1930s, whereas the degree of concentration in the German banking market has fallen by some 50 per cent.

From the information provided in this section, it is difficult to appraise accurately either the efficacy or extent of increased concentration within individual banking systems, that is why the structure-performance model is used to further investigate this relationship. It is also becoming much more difficult to measure concentration by contemporary measures, because of the blurring of demarcation lines between banking and other financial markets. It is clear, however, that there appears to be a current preference for larger size in many banks within different European countries. The desire to obtain economies of scale and scope appear to be the main driving force behind the trend towards larger-sized institutions, which is another reflection of the so-called conglomeration movement.

3.5 Performance and Ownership Characteristics of Europe's Largest Banks

The relative performance of industrial countries' banking systems can be gauged by the distinguishing characteristics of the major banks that operate in these markets. It is also the case that the degree of change in market size, concentration and ownership resulting from major reforms, such as the 1992 proposals, will be determined primarily by the ability of the larger banks to discover and exploit new profitable opportunities within domestic and across country boundaries. An analysis of the major structure and performance characteristics of top banks operating in the EC (between 1985 and 1987) has been undertaken by Molyneux (1989). The most important findings were as follows:

- Top French banks were on average the largest in the EC, but employed considerably less staff than their UK counterparts.

- The major UK banks had the largest branch networks and employed considerably more staff than their counterparts in other EC countries. The labour-intensive nature of the UK payments system and the different production functions of UK banks compared with EC banks are usually cited as important causal factors in this differentiation.
- Comparing the relative performance figures for top banks in the bigger banking markets it was found that Italian and Spanish banks had the highest ROAs (return on assets) and the highest ROC (return on capital) ratios. Italian banks had quite small branch networks.
- The performance figures for the top [illegible] German, 33 Italian and 13 Spanish banks were less dispersed than compared with similar figures for the top 15 UK and 20 French banks.
- The biggest banks in Germany and France had markedly lower capital:assets ratios than banks in the United Kingdom, Spain and Italy. The top German banks had quite similar capital:assets ratios. Some of these points can be explained by the role of hidden reserves and attitudes to loan capital in Germany and the role of the state in France.

The above observations were consistent over time as illustrated in Molyneux (1989).

It has already been mentioned that an important feature distinguishing Continental European banking systems from British-based systems is that publicly controlled banks (whether by central or local government) are much more important in EC countries. Table 3.8 shows that out of the 162 EC banks listed in the 1987 *Banker* 'Top 500', 69 were privately owned and 67 publicly owned. The mean performance figures for the public banks were marginally worse than those for private banks, although it could be fair to say that both sectors exhibit remarkably similar characteristics, apart from the average number of employees. The average public bank employed half as many staff as the private banks. The reasons for this are not immediately clear, but it could be the case that central management costs and staffing levels of some public banks are hidden in government accounts.

Credit co-operatives found in the group under study tend to be larger than their public and private bank counterparts, and this is because they are central institutions representing thousands of small operations. The mutual institutions (savings banks) are the smallest category and tend to be much smaller in size, even though their ROA (return on assets) and ROC (return on capital) statistics are comparable with those of private and public banks. It is interesting to note that, of the top 162 banks in the EC, 93 are not run for a commercial profit or to satisfy the requirements of private shareholders. These institutions cannot be acquired through hostile takeover. Even though various countries, such as Denmark and the United Kingdom have established legislation enabling mutual societies to convert to

Table 3.8 Statistical summary of the ownership of top banks in the EC, 1987.
Arithmetic means and standard deviations

No. of EC banks in *Bankers* Top 500		Assets $m.	PTP/	PTP/ Assets	PTP/ CAP	CAP/ Assets	NINT/ Assets	Employees
				%				
Private	69	37,601	207.2	0.77	16.36	4.81	3.01	15,948
		(1.15)	(1.61)	(0.89)	(0.80)	(0.48)	(0.59)	(1.36)
Public (Central & local govt.)	67	31,133	158.9	0.61	14.30	3.70	2.14	7,261
		(1.09)	(1.43)	(1.1)	(0.66)	(0.54)	(0.60)	(1.48)
Co-operative	14	41,402	242.8	0.89	17.31	5.16	2.06	12,124
		(1.36)	(0.95)	(0.60)	(0.40)	(0.58)	(0.62)	(1.69)
Mutuals	12	10,421	77.5	0.81	14.78	6.14	3.99	4,419
		(0.50)	(0.64)	(0.46)	(0.52)	(0.39)	(0.29)	(0.56)

Source: Molyneux (1989, p.528)

Notes: a Classification after Revell (1987). Large German savings banks are controlled by local government organisations and therefore are classified as public rather than mutual organisations.
b Figures in parentheses are standard deviations/means
c PTP = pre-tax profits, CAP = Capita, NINT = net interest income.

corporate status, Molyneux (1989) envisaged that there would not be a great deal of merger activity between these groups until widespread conversion from public to private ownership took place. Many public, co-operative and mutual banks, however operate in the same way as private banks and their ownership status does not preclude them from being aggressive acquirers of private banking institutions. Molyneux (1989) concluded that of the top EC banks, 93 could not be acquired and 25-27 were too large and nationally too important to allow any foreign predator to acquire them. This left about 42-44 large size banks that were potential acquisition targets; in fact, at least 25 of them were already controlled by other institutions or groups of institutions. The corollary of this was that, if widespread acquisitions were to take place, it would be mainly medium-to small-sized local and regional banks that became foreign-owned. The limited takeover opportunities available to large banks have subsequently accelerated the move of large banks to form joint ventures, alliances and co-operation agreements with other financial institutions as discussed earlier in this chapter.

3.6 A Note on Performance Characteristics.

Two reports (OECD, 1987 and 1988) indicated a number of important trends that have been occurring in European banking systems since the early 1980s.

An interesting trend identifiable from the OECD (1987) study was that, with regard to average interest margins of commercial banks, low interest margin countries tend to reflect the relative importance of wholesale banking compared to retail activities. European countries such as Luxembourg and Switzerland tended to have the lowest interest margins, whereas banks in Spain, Italy and the United Kingdom had the highest margins (this trend is also confirmed by interest margin estimates for the largest European banks in 1991 given in Morgan Stanley (1992, Table 7, p.12)). High interest margins tend to be translated into high net income ratios[8], but if one considers operating expenses to gross income figures this provides a more satisfactory measure for making international comparisons[9]. Table 3.9 shows that in the early

1980s banks in Luxembourg and Switzerland appeared to be the most profitable in Europe, whereas those in Belgium, Finland and the United Kingdom were the least profitable. Other measures of performance from

Table 3.9 Gross income as a multiple of operating expenses for commercial banks (1980-85 averages).

Country	Multiple
Luxembourg	3.33
Switzerland	1.78
Portugal	1.64
Sweden	1.60
Netherlands	1.56
Germany	1.53
Italy	1.52
Spain	1.52
France	1.47
United Kingdom	1.44
Finland	1.28
Belgium	1.20

Source: Gardener and Molyneux (1989, p.38)

the OECD study indicated that, in the two systems which had experienced widespread nationalisation prog ammes (France and Portugal), ROA had fallen dramatically between 1980 and 1985, whereas the largest increase oc urred in Germany and Switzerland. In general, ROA figures were higher for those countries which had experienced some form of structural deregulation.

Table 3.10 provides a brief indication of how ROA estimates for the main European banks have altered since the above OECD estimates. It is clear that Spain stands out with an ROA of above 2 per cent, which is nearly three times better than the second best ROA, which is that of the

German banks. The figure for Spain is mainly attributable to the high net interest margins in this banking system (4.21%) more than double that of net interest margin in Germany (1.80%). France and Belgium were, in 1991, relatively unprofitable banking markets and the Scandinavian countries (as well as the UK's) ROA's have been severely affected by heavy loan-loss provisioning and inadequate earnings capacity as a result of downturns in their respective economies.

Table 3.10 Return on assets

%	1991	1992E	1993E
Belgium	0.40	0.46	0.48
Denmark	(0.05)	0.57	0.64
Finland	(0.49)	0.10	0.24
France	(0.49)	0.10	0.24
Germany	0.70	0.71	0.74
Italy	0.65	0.72	0.75
Netherlands	0.58	0.59	0.61
Norway	(3.76)	(1.12)	0.07
Spain	2.01	2.04	2.02
Switzerland	0.68	0.75	0.81
UK	0.43	0.70	1.00

Source: Mo· ;an Stanley (1992, p.16)

Notes: E stimates; figures in brackets are losses

3.7 Competitiv Environment in European Banking

3.7.1 Competition and competitcrs

Over the last decade or so Revell (1985, p.47) has identified three overriding competitive trends in European banking systems: competition has increased between commercial banks; competition has incr?ased between financial institutions; and competition has increased in the market for financial services. This more competitive environment has encouraged banks and financial service firms of all kinds to broaden and improve the quality of their services and hence their customer bases.

The OECD (1989, p.12) has also noted that national authorities in OECD countries have undertaken a wide range of measures designed to promote competition and strengthen the role of market forces. These measures include:

- Widening the scope for price competition through deregulation of interest rates and fees and commission for financial services;
- Increasing the number of competitors in various sectors of the financial service markets through providing more scope for despecialisation and diversification and by removing obstacles to the domestic and cross-border expansion of banking networks;
- Increasing investor and borrower-choices through encouraging the creation of a wide range of new financial asset and debt instruments;
- Removing obstacles to free lending and investment decisions of banks and other financial institutions by abolishing, or easing, direct lending controls and mandatory investment regulations;
- Improving the visibility of financial service markets through better information; and
- Forestalling anti-competitive concentration movements in

banking and finance by merger and ownership control.

In the area of retail banking Stevenson (1986, p.2) noted that customers were becoming relatively older, wealthier and financially more sophisticated. As retail demands become more sophisticated, customer loyalty decreases. Retail customers now demand more services, better information, and most importantly value for money. As a result, banks have to be able to identify their markets. Through market segmentation, product differentiation and accurate packaging, banks are now able to offer services in designated 'target' markets - one-parent families, high net worth individuals, house buyers and the like. Maintaining a strong hold on the payments mechanism is a crit·cal factor in preserving customer bases within the retail banking market (as identified by Vittas *et al* (1988)).

The OECD (1989, pp.20-26) identifies a substantial increase in competition in retail banking markets which has resulted in:

> ...a considerable widening of the range of products and instruments amongst which the private aver can choose according to his preferences ... (p.26)

This report notes that during the 1980s, competition in OECD retail banking markets has led to the expansion of distribution networks as well as an increase in the use of consumer credit facilities, especially, different types of housing finance. Innovation and technological advances, spurred by competition, has, it is suggested, improved the level of service provision by the banking sector as a whole.

In an early review of trends in European banking, Arthur Andersen (1986) predicted that corporate customers would continue to demand highly specialist products and would expect to pay competitive, cost-based charges for them. As the demand for traditional corporate banking services from the largest of corporations was predicted to decline with the securitisation phenomenon, banks would increasingly focus on the small to medium-sized corporate customer. Only the larger savings and mortgage institutions, the study suggested, were likely to compete aggressively with the commercial banks for a portion of this market.

The later OECD (1989, pp.27-31) study confirmed these earlier predictions about competition in the corporate banking sector and identified a substantial increase in competition for medium-term enterprise financing:

> In some countries, new competitors in the form of finance companies specialised in industrial hire purchase finance, leasing or factoring, have entered this market. Sometimes, the banks themselves have set up such finance companies in order to be able to compete more effectively for medium-term funds ...(p.29)

The aforementioned study, however, also notes that as far as term lending to small-and medium-sized enterprises is concerned, it is less clear whether banks and their competitors have satisfied the financing requirement of this part of this business sector.

Revell (1985) suggested that financial services would mainly be supplied by various types of corporate entity: conglomerates, specialists, agents and franchisers, groups and associations. Conglomeration is probably the most important of these trends applicable to European banking. It refers broadly to the provision of a range of financial services by a collection of financial service firms under common ownership or control. The conglomeration movement is characterised by the desire of the larger European banks to maintain a global presence as well as to offer a universal range of bank products and services (see Gardener (1990) for a more detailed analysis of the conglomerate trend). At the present time only a few European countries - Germany, Luxembourg, Spain, Switzerland and the United Kingdom - do not apply specific restrictions on the interests of commercial banks in other corporate entities, and as such it seems likely that conglomeration will be a more important phenomenon in these countries. This view has been supported by the large number of mergers and takeovers in the European financial services marketplace which have taken place since 1986, as reported by de Jonquières (1988).

The conglomerate trend is expected to continue as long as larger institutions wish to expand their multi-product and geographical coverage and as long as the predators have sufficient excess capital to swallow their victims. Partnerships and cross-shareholdings in the financial services marketplace are now widely being used as either insurance policies against the threat of takeover or as a prelude to a possible full merger. The main impetus towards a conglomerate trend during the past decade has been the perceived growth in importance of investment banking and securities markets activities.

3.7.2 The Price Waterhouse/Cecchini findings

The first and most important empirical study investigating comparative competitive conditions across EC banking and financial systems was undertaken by the Cecchini study (see Commission of the European Communities (1988a)). This set out to analyse the economic consequences of 1992, completing the EC internal market, on various economic sectors. The microeconomic study of the financial services sectors was undertaken for Cecchini by Price Waterhouse Management Consultants (Dublin), whose results were published in detail by the Commission of the European Communities (1988b). The following three sections examine the aims and methodology of this important study and also discuss its main findings and limitations.

3.7.2.1 Aims and Methodology of the Price Waterhouse/Cecchini Study

The main aim of the Price Waterhouse/Cecchini study was to assess the economic impact of 1992 on the financial services sectors in eight EC countries (Belgium, France, Italy, Luxembourg, Netherlands, Spain, United Kingdom and West Germany) under the assumption that the law of one price prevails. In other words, the main assumption being that after 1992 EC financial marketplace prices would settle at (or at least move towards) some uniform level for each financial product/service, thereby bringing about economic gains from EC integration.

The Price Waterhouse study, firstly, examined in detail the economic dimensions of the three main financial services sectors - banking, insurance and securities business - across the eight EC countries under study. The study then focused on comparative price

Table 3.11 List of standard financial services or products surveyed

Name of standard service	Description of standard service
Banking services	
1. Consumer credit	Annual cost of consumer loan of 500 ECU. Excess interest rate over money market rates
2. Credit cards	Annual cost assuming 500 ECU debit. Excess interest rate over money market rates
3. Mortgages	Annual cost of home loan of 25,000 ECU. Excess interest rate over money market rates
4. Letters of credit	Cost of letter of credit of 50,000 ECU for three months
5. Foreign exchange drafts	Cost to a large commercial client of purchasing a commercial draft for 30,000 ECU
6. Travellers cheques	Cost for a private consumer of purchasing 500 ECU worth of travellers cheques
7. Commercial loans	Annual cost (including commissions and charges) to a medium-sized firm of a commercial loan of 250,000 ECU
Insurance services	
1. Life insurance	Average annual cost of term (life) insurance
2. Home insurance	Annual cost of fire and theft cover for house valued at 70,000 ECU with 28,000 ECU contents
3. Motor insurance	Annual cost of comprehensive insurance, 1.6 litre car, driver 10 years experience, no claims bonus
4. Commercial fire and theft	Annual cover for premises valued at 387,240 ECU and stock at 232,344 ECU
5. Public liability cover	Annual premium for engineering company with 20 employees and annual turnover of 1,29 million ECU

(contd)

Table 3.11 (continued)

Name of standard service	Description of standard service
Brokerage services	
1. Private equity transactions	Commission costs of cash bargain of 1,440 ECU
2. Private gilt transactions	Commission costs of cash bargain of 14,000 ECU
3. Institutional equity transactions	Commission costs of cash bargain of 288,000 ECU
4. Institutional gilt transactions	Commission costs of cash bargain of 7,2 million ECU

Source: Commission of the European Communities (1988, Table 5.1.4, p. 91) differences (obtained mainly by field survey) of sixteen financial products or services, spread over the three main financial services sectors. This dataset was posited by Price Waterhouse to be representative broadly of the three financial sectors, and Table 3.11 shows the standard financial products and services they surveyed. Price Waterhouse then estimated price falls, hypothesised from completing the internal market, on this 'standard' set of (sixteen) financial products and services: prices were simulated to fall to the average of the four lowest prices for each product/service. It is these hypothesised price falls that are the basis of the calculation of the economic gains from integration. These economic gains are the consumer surplus (CS) gains under these simulated pricefall scenarios.

The calculation of economic gains, however, brought about by an integrated European financial sector, is further complicated by the issue of corresponding producer losses. Whilst price falls clearly increase CS gains, they have a corresponding negative impact on producer surpluses. The rationale for this, as noted in Gardener and Teppett (1991) is that:

> .... producers may experience internal economies of scale leading both to inefficient small-scale production when the market is restricted within national boundaries, and to an oligopolistic market structure. Within a non-integrated Europe, therefore, average costs are unnecessarily high; the mark-up of prices over marginal cost is also higher than necessary to cover fixed costs. This economic perspective suggests the consequences of opening up trade are : (1) to lower unit costs by facilitating more use of the economies of scale, (2) and (probably) lower the mark-up of prices over marginal costs to the extent that oligopoly is weakened. Whilst the consumer will gain (increased consumer surplus); there will also be reductions in excess profits (reduced producer surplus). (p.116-117).

In their first report on the economic gains to integration, Price Waterhouse (1987) noted that the economic gains from EC financial sector integration can be calculated according to two main 'cases'. Case 1 (pure cost differential) is concerned only with CS estimates and producer-surplus losses are ignored. In Case 1, the CS gains brought about by financial sector integration and reported in the Cecchini study were calculated on the basis of the following equation:

$$CS = \frac{1}{1-e} \; p\, X(p)\; (1-(1-\lambda)^{1-e} \tag{1}$$

where CS = consumer surplus

e = elasticity of demand

$1-\lambda$ = the respective price differential compared with the lowest cost country

X(p) = the demand curve i.e. assumed to be P^{-e}

Case 2 (where price differentials reflects costs differences as well as oligopoly) deducts the loss of producer surplus from the CS gains. Price-Waterhouse used the Cournot-Nash model of non-competitive behaviour to provide an estimate of the pure oligopolistic profits prevailing:

$$\Pi + K = (H/e)\, px \tag{2}$$

where Π = pure profits

k = fixed cost

H - Herfindahl index

e - price elasticity of demand

p - price

x - output

From this model one can construct a measure (derived in Appendix B of Gardener and Teppett (1991)) to compute changes (losses) in producer surplus brought about by financial sector integration.

The estimates undertaken by Price Waterhouse and eventually published in the Cecchini Report (Commission of the European Communities (1988a), Table 5.1.5) concentrated on the Case 1 scenario, i gains only. The argument for focusing on these results appeared to be that the dynamic, longer-term benefits flowing from completing the EC financial services market are so considerable that they easily outweigh any shorter-term losses in producer surplus. It has, however, been suggested by Gardener and Teppett (1991) that one (of many) of the major limitations of the analysis was the omission of producer surplus losses from the overall estimated gains.

Overall, the Price Waterhouse microeconomic exercise involved making assumptions about the following:

(1) likely level of price changes

(2) value added in financial services

(3) elasticity of demand for financial services (e)

(4) estimates of the Herfindahl index (H) (in Case 2).

These data comprise the 'base case dataset' used by Price Waterhouse and are reproduced in Table 3.12.

The following section discusses the main findings of the study.

3.7.2.2 Results of the Price Waterhouse/Cecchini study

The results of the economic analysis of completing the internal market in financial services after 1992 (published in detail in the Commission of the European Communities (1988(b)) provides a broad indication of the kind of competitive forces that may be released when the 1992 market is completed. Table 3.13 summarises the estimated price falls, hypothesised from completing the internal market, on the standard set of (sixteen) financial products as reported by the EC 'Cecchini' study. The estimated gains from 1992 are reflected in the corresponding differences between the prices in individual countries compared with the level at which overall prices are estimated to fall when the internal market is completed. Although the data are not forecasts and have been estimated subject to strong assumptions, they represent a heroic attempt to suggest possible post-1992 developments.

The theoretical, potential price reductions shown in Section 1 of Table 3.13 indicate the different competitive conditions that exist in the three main financial services sectors for eight countries. It can be seen that price falls for banking products are expected to be the largest in West Germany, Spain, France, Italy and the United Kingdom. Section 2 adjusts the theoretical potential price reductions to reflect

Table 3.12 Assumptions used in base case estimate of economic integration

Country	Value Added in Credit & Insurance (1)	Value Added in Credit Institutions (2)	Value Added in Insurance Institutions (2)	Elasticity of Demand	Herfindahl Index	Assumed Percentage Price Reductions	Assumed Percentage Price Reductions
	ECU mn					PW 1987	PW 1988
B	5966	3979	605	0,75	0,119	10-30	6-16
D	44417	33902	797?	0,75	0,046	10-15	5-15
E	13929	8638	49.	0,75	0,086	10-40	16-26
F	29277	27046	14.6	0,75	0,086	10-15	7-17
I	26998	23861	1166	0,75	0,050	10-30	9-19
L	535			0,75	0,086	10-15	3-13
NL	8537	6244	1963	0,75	0,177	10-20	1-9
UK	70240	21666	8338	0,75	0,036	10-15	2-12

Source: Commission of the European Communities (1988a, Table 6.26)

Notes: 1. 1985 data except Luxembourg which is 1982
2. 1983 data except Luxembourg which is 1982
B = Belgium, D = West Germany, E = Spain, F = France, I = Italy, L = Luxembourg, NL = Netherlands, UK = United Kingdom

Table 3.13 Estimate of potential falls in financial product prices as a result of completing the internal market (per cent)

	Belgium	West Germany	Spain	France	Italy	Lux-embourg	Nether lands	UK
1. Theoretical, potential price reductions[1]								
Banking	15	33	34	25	18	16	10	18
Insurance	31	10	32	24	51	37	1	4
Securities	52	11	44	23	33	9	18	12
Total	23	25	34	24	29	17	9	13
2. Indicative price reductions[2]								
All financial services								
Range	6-16	5-15	16-26	7-17	9-19	3-13	0-9	2-12
Centre of range	11	[illegible]	21	12	14	8	4	7

Notes: 1. These data show the weighted averages of the theoretical potential falls of selected financial product prices

2. Indicative price falls are based upon a scaling down of the theoretical potential price reductions, taking into account roughly the extent to which perfectly competitive and integrated conditions will not be attained, plus other information for each financial services, sub-sector, such as gross margins and administrative costs as a proportion of total costs.

Source: Commission of the European Communities (1988a, Table 5.1.4, p.91)

more accurately expected price falls and shows that price falls for financial services as a whole are expected to be the largest in Spain, Italy, France and Belgium.

The price falls computed by Price Waterhouse in Table 3.13 are used to model the impact on value-added and the gains in CS that are hypothesised to result from the law of one price assumption. Table 3.14 summarises the results and shows that the largest gains in CS, as a proportion of GDP, will accrue to Spain (1.5 per cent), Luxembourg (1.2 per cent) and the United Kingdom (0.8 per cent). Overall, the gain in CS to the eight EC countries under study will amount, on average, to 0.7 per cent of GDP.

Table 3.14 Estimated gains resulting from the indicative price reductions for financial sectors

	Average indicative price reduction	Direct impact on value-added for financial services		Gain in consumer surplus as a result of average indicative price reduction[1]	
	%	Mn ECU	% of GDP	Mn ECU	% of GDP
B	11	656	0,6	685	0,7
D	10	4442	0,5	4619	0,6
E	21	2925	1,4	3189	1,5
F	12	3513	0,5	3683	0,5
I	14	3780	0,7	3996	0,7
L	8	43	1,2	44	1,2
NL	4	341	0,2	347	0,2
UK	7	4917	0,8	5051	0,8
EUR - 8	10	[illegible]0617	0,7	21614	0,7

Source: Commission of the European Communities (1988a, Table 5.1.5 p.92)

Note: 1. Based on the assumption that the elasticity of demand for financial services is 0,75

3.7.2.3 Limitations of the Price Waterhouse/Cecchini study

Various commentators, such as Gardener and Teppett (1990) and (1991), Neven (1990) and Vives (1991) have investigated the Cecchini findings and the impact of European integration on the competitive conditions in banking and financial markets. Whilst they all agree that there are different competitive conditions existing across EC banking systems and that the Price Waterhouse/Cecchini exercise was a useful exercise, they all have serious reservations about the methodology and assumptions used.

The microeconomic gains from completing the internal market are hypothesised to result from the elimination of barriers to trade and the increased stimulus to competition. They include cost reductions, increased efficiency in financial sectors, a higher rate of financial innovation and, generally, increased competition. These factors are then believed to have positive influences on important EC macroeconomic variables. This is an extremely positive picture of advantage for 1992. There is major scepticism, however, relating to the microeconomic methodology which is used to model these effects.

The microeconomic approach adapted to estimate the economic gains from integration was strongly influenced by the work of Venables and Smith (1986) which, 'had the advantage, alongside their academic respectability, of producing comparatively high welfare gains' (Gardener and Teppett (1991), p.159). The marginal analysis adopted to evaluate the gains accruing to integration may be distorted, for example, according to the relative speeds at which various countries adjust. For example, the implicit assumption that price uniformity will be achieved by the establishment in high-price countries of institutions from low-price countries or by the delivery (offer) of cross-border services. This argument sounds straightforward and in full accord with economic theory, yet it begs many questions when one considers it as a practical process in the market.

Another criticism relating to the Price Waterhouse/Cecchini methodology focused on the role of economies of scale. The Centre for Business Strategy (1989) noted that trade liberalisation of the type envisaged for 1992 had its primary effects on supply and not demand. This study cautioned that the scale economy argument was far from unambiguous, and they note:

> It is puzzling that economies of scale are so widely touted as a source of competitive advantage when there is so little evidence of their significance. (p.104)

and they go on to argue;

> Successful operators in an integrated financial market will be those who correctly exploit the scale of scope economies that do exist without sacrificing the specialisation that can also be very important. (p.104)

The Centre for Business Strategy (1989) study was also critical of Price Waterhouse/Cecchini for ignoring important factors such as consumer/customer behaviour, cultures, habits and strategic issues in their analysis. They also noted that in the shorter-term other major environmental factors (such as different legal, regulatory and fiscal systems) would prevent financial sector integration - especially in the retail and lower segments of the corporate banking market.

Focusing on the specific methodology, a major undesirable characteristic of the overall analysis relates to the strong 'upward bias' in the interpretation of economic gains. Gardener and Teppett (1991) note that the calculation of economic gains published in the Price Waterhouse/Cecchini study, exclude the cases where some financial product prices are hypothesised to rise. They argue that price rises for specific financial products suggest possible credit rationing and/or the existence of cross-subsidies. Under both of these scenarios, it is likely that prices will rise under the law of one price assumption and, 'ignoring these possible price rises, therefore, may be unrealistic unless a strong, rigorous case can be made for this approach' (p.160). The same authors also note that the calculated economic gains are overstated because the findings downgrade estimates of the hypothesised losses in producer surplus. A short-term drop in profits for firms may have more negative economic effects than were emphasised by the Price Waterhouse/Cecchini findings. Gardener and Teppett (1991, p.170) suggest that the results should be re-computed to include producer surplus losses. The methodology suggested to compute these producer losses, however, does not escape criticism. We noted earlier in Section 3.7.2.1 tha' the Cournot-Nash oligopoly model was suggested by Price Waterhouse to calculate the relevant producer-surplus losses. This approach included the use of a uniform elasticity of demand measure (also used in the consumer surplus only estimates) and a Herfindahl index. Both measures have been criticised for their crudity in accurately describing different demand and competitive market conditions, respectively.

Despite the above limitations and the major data problems associated with such an analyses, the Price Waterhouse/Cecchini exercise incorporates international trade theory with industrial organisations theory, in a static framework, to provide us with the first step towards attempting to evaluate all of the benefits and costs of financial sector integration. We have already noted, however, that the study played down the producer surplus side of the analyses and provided no producer surplus loss estimates; although the Cournot-Nash model of non-competitive behaviour was stipulated by Price Waterhouse (not Cecchini) to provide estimates of oligopolistic profits. The focus of the remaining chapters in this thesis aims to investigate the SCP relationship across and within European banking markets. Our analysis, will enable us to evaluate whether oligopoly profits are prevalent across banking systems and if they are, this may indicate that producer surplus losses have an important negative impact on the economic gains estimated by Price Waterhouse/Cecchini in the event of financial sector integration from 1992 onwards.

3.7.3 Other evidence of competitive conditions in European banking

Gardener and Teppett (1990 and 1991) replicate the Cecchini methodology to evaluate the impact of EFTA integration in the EC and they find the gains in CS are highly significant for all of the EFTA countries. In fact, the results suggest generally that larger CS gains (as a percentage of GDP) may be realised for EFTA countries under certain scenarios than were originally hypothesised for the EC-8 (see Table 3.12) countries by Price Waterhouse/Cecchini:

> PW/Cecchini suggested a gain of 0.7 per cent of GDP on average for the EC-8. The range of results for our EFTA Integration Scenario,

> where EFTA financial sectors globalise between themselves but independently of the EC-8, are similar. However, the other two scenarios investigated, Bilateral Integration and EEA Integration, support the view that some EFTA countries could potentially achieve even higher gains. (Gardener and Teppett, 1991, p.155)

Furthermore, EFTA integration with the EC suggests even greater price falls than the Cecchini study. Despite the authors strong reservations about the Price Waterhouse/Cecchini methodology, they find that average indicative price reductions in the financial services sector for the EC countries under a European Economic Area (EC plus EFTA) scenario would be 24 per cent. Price reductions would range between 34 per cent in Spain to 17 per cent in the Netherlands.

A quite different approach is undertaken by Molyneux *et al* (1993) who investigate competitive conditions in five major European countries; Germany, the United Kingdom, France, Italy and Spain. They use the Rosse-Panzar (see Rosse-Panzar, 1977) statistic to assess quantitatively the competitive nature of the respective banking markets. This statistic measures the sum of elasticities of total revenue with respect to input prices, and Rosse and Panzar show that this sum cannot be, positive if a firm is a profit-maximising monopoly. Using a sample of banks from each country for the years 1986 through to 1989 their results indicate that monopolistic competition is prevalent in Germany, the United Kingdom, France and Spain, 'and given relatively free access to those banking markets, our findings are consistent with contestable markets theory' (p.24). The results for Italy suggest that domestic banks are earning revenue as if under monopoly conditions.

3.8 Conclusion

The structure of European banking markets has changed markedly over the last decade or so. The banking sector in almost all European countries has grown in size relative to GNP. Banking markets have also become more concentrated in some countries with public ownership still playing an important role in many financial systems. The level of employment in the banking sectors has increased in all the major European countries during the 1980s, despite the indication that this trend might have reversed in the late 1980s. There has been an increase in the number of foreign operators doing business within Europe, and many non-bank financial institutions have sought to compete in markets that were once the sole preserve of banks. Despite these factors and the moves to harmonise structural deregulation and supervisory re-regulation, we can still identify substantial 'country-specific' characteristics relating to banking markets. For example, UK large banks tend to employ many more staff than their German and French counterparts and Spanish banks are noticeably more profitable than their European counterparts. Certain countries' banking systems are much more concentrated than others, and banks perform much better in some countries compared with others.

The analysis of the Price Waterhouse/Cecchini study illustrates that different competitive conditions exist across European banking and financial markets and the CS gains from financial sector integration after 1992 appear to be substantial. Estimates of the CS economic gains from integration, however, may be overstated because the final estimates did not take into account producer surplus losses. The aforementioned study suggested that a Cournot-Nash model of non-competitive behaviour could be estimated to evaluate evidence of oligopoly profits, from which producer surplus losses from integration would be calculated, although, this was not included in the final Cecchini (published) analysis. As a result, the Price Waterhouse/Cecchini methodology provides us with an important justification as to why it is useful to examine the SCP relationship across European banking markets, namely because the prevalence of significant oligopoly profits across European banking markets would imply substantial producer surplus losses in the event of financial integration.

The following two chapters examine the theoretical basis of the structure-performance relationship and show how it is empirically evaluated. Chapter 4 will consider the relationship from an industrial organisations viewpoint and Chapter 5 will demonstrate how the structure-performance model has been tested for banking markets.

Notes

1. In 1978 a specific definition of 'banking activity' was introduced into Finnish legislation. It may be noted that a very detailed description is also enshrined in Japanese banking law and banks' allowable business powers are well documented by regulations in Canada and the United States.
2. However, in the case of the United Kingdom and other countries the central bank is responsible for making sure that a bank's business

is undertaken in such a manner that it does not jeopardise the position of depositors.

3. Also in Luxembourg (1981) and Portugal (1983)

4. In Austria, France, Germany, Spain, Sweden

5. As in Belgium, Denmark and the Netherlands

6. As well as Luxembourg, Norway and Portugal

7. As identified by Revell (1987), for example, in the United Kingdom, Barclays, National Westminster, Midland, Lloyds; in France, Crédit Agricole, BNP, Crédit Lyonnais, Société Générale, Paribas; in Italy, Banca Nazionale del Lavoro, Istituto Bancario San Paolo, Monte dei Paschie die Siena; and in Germany, Deutsche Bank, Dresdner Bank, Commerzbank.

8. Net income ratio equals pre-tax profits as a percentage of assets.

9. This is because net income measures do not take into account the difficulties associated with bad debts, taxes, different countries' accounting policies, hidden reserves and profit-smoothing techniques.

Chapter Four

The Structure-Conduct-Performance (SCP) Model and its Applications in Industrial Organisations Literature

4.1 Introduction

We have seen from the previous chapter that the Price Waterhouse/Cecchini methodology on 1992 experimented with an aspect of industrial organisations' literature - a Cournot-Nash competitive model - to investigate empirically evidence of oligopoly profits in EC financial systems. This model is at the heart of SCP analysis. This chapter examines the SCP model and its applications in the industrial organisations literature. Section 4.2 describes the traditional SCP paradigm and formally discusses the link between economic theory and the SCP relationship. Section 4.3 considers measures of market structure, focusing on concentration measures and inequality indices. Section 4.4 outlines the determinants of the level of concentration, and Section 4.5 briefly discusses measures of conduct and performance. Section 4.6 is a literature review of the empirical evidence of the concentration-performance relationship and distinguishes between two hypotheses - the traditional SCP paradigm and the efficiency hypothesis. Section 4.7 covers the policy implications of the SCP relationships, and Section 4.8 assesses the role of the SCP model in the light of the new game-theoretic industrial economics literature. The last section is a conclusion.

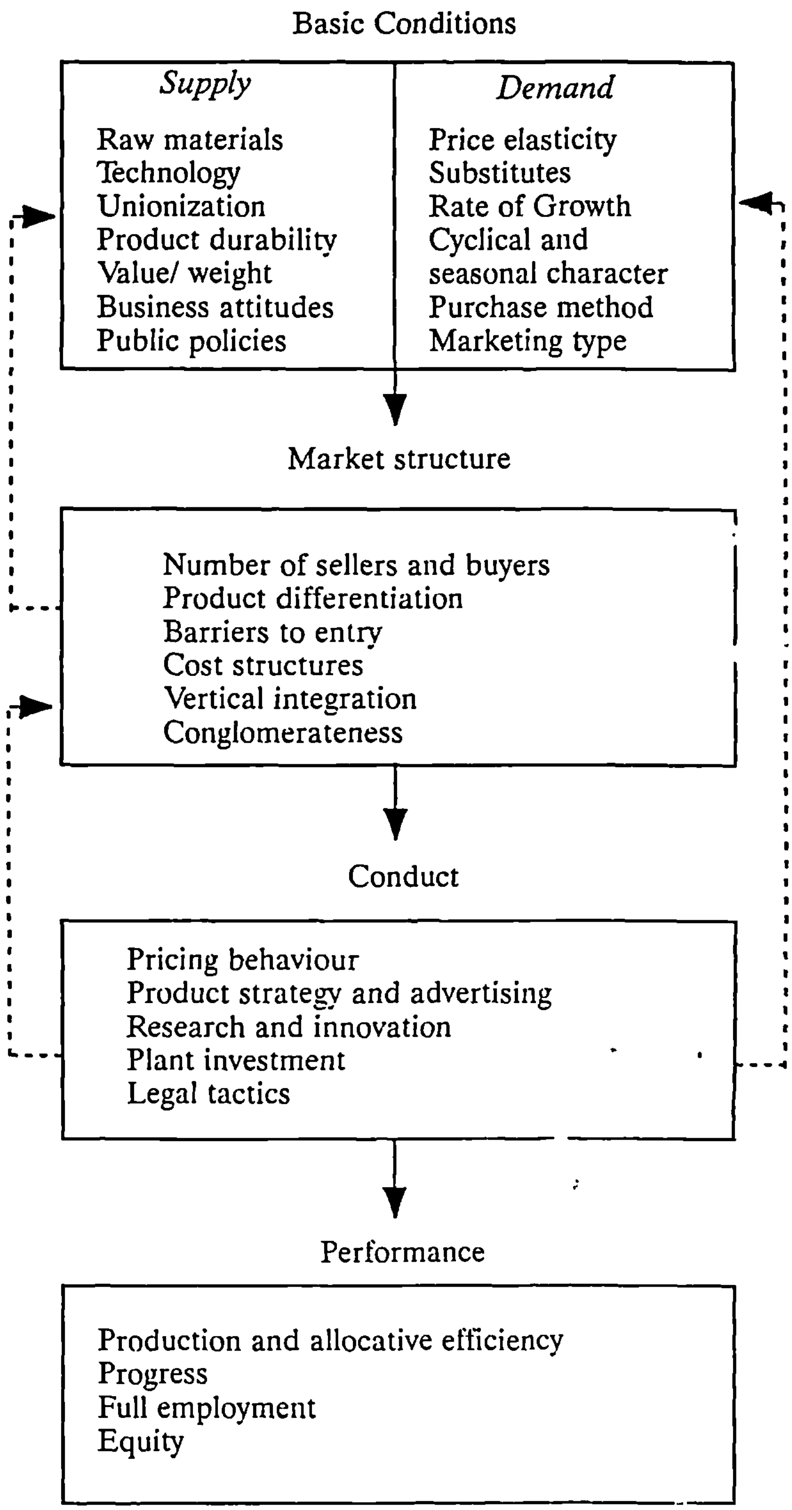
4.2 The Structure-Conduct-Performance (SCP) Paradigm

4.2.1 The SCP relationship

The structure-conduct-performance (SCP) approach - based upon neoclassical theory - has long been the predominant methodology in the study of industrial economics. Simply stated, the conduct or rivalry in a market is determined by market structure conditions, especially the number and size distribution of firms and the condition of firm entry to the market. This rivalry leads to unique levels of profits, prices, advertising and other aspects of market performance. Through the link of conduct, the performance of firms in a particular market is tied to the structure of that market. Industrial economists have sought to identify sets of attributes or variables that influence economic performance and to develop theories describing the links between those attributes and end performance. The general descriptive model of these relationships was conceived by Mason (1939, 1949) and his model of industrial organisation analysis, nowadays referred to as the SCP approach, is shown diagrammatically in Figure 4.1.

The performance in various industries or markets is said to depend upon the conduct of sellers and buyers in such areas as pricing policies and practices, inter-firm co-operation, product line and advertising strategies, research and development, and so on. 'Conduct', therefore, relates to the behaviour of the firms in a market; to the decisions these firms make and also to the way in which decisions are taken. In

Figure 4.1 – A model of industrial organization analysis



Source: Scherer [1980 p.4]

general, 'conduct' focuses on how firms set prices, whether independently or in collusion with others in the market. 'How firms decide on their advertising and research budgets, and how much expenditure is devoted to these activities, are also typical considerations' (Ferguson, 1988, p. 8). The conduct of firms depends on the structure of the relevant market including such features as the number and size distribution of sellers and buyers, the extent of physical or subjective differentiation existing among competing sellers products, the ease of entry into the market, the ratio of fixed to total costs in the short-run for a typical firm, the level of vertical integration in the industry, and the amount of diversity or conglomeration characterising individual firm's product lines (see Scherer 1980, p. 4).

The linkage between structure, conduct and performance then turns to identifying structural characteristics against models of firm and market behaviour, namely, perfect competition, monopoly, monopolistic competition and oligopoly. Take, for example, the structures of two different markets as shown in Table 4.1.

Table 4.1 Structural differences between two hypothetical markets

Structural characteristics	Market A	Market B
Number of firms	Large number of firms with a small market share	Five firms with equal equal market share
Number of buyers	Many	Few
Type of product	Homogeneous	Differentiated
Entry barriers	Low	High

Market A displays characteristics analogous under perfect competition and, therefore, in this market we can make certain deductions about firm conduct. For example, in A, firms are likely to act independently in setting price and output levels. Individual firms will be price-takers - they will be unable to influence the price established by the market. Economic theory tells us that, in such a market, prices will tend towards marginal costs, and, in the long-run, all firms in the market will earn normal profits. Production is allocatively as well as productively efficient, thus increasing economic welfare. In Market A, analysis of conduct is actually unnecessary because firm and industry performance can be directly predicted from market structure conditions: that is, the structural conditions (perfectly competitive market) yield enough information to deduce how firms must behave.

Market B displays characteristics of an oligopolistic market which suggests that price and other aspects of firm behaviour are likely to be determined collusively. This would yield a higher price (price greater than marginal cost) and a lower level of output than under perfe·t competition. In this case, however, the structure of the market dc.es not guarantee collusive behaviour - oligopolists may compete for market share and price may be close to a perfectly competitive level. As such, in markets which are characterised by oligopolistic structure, conduct is a critical part of the SCP methodology.

So far we have noted that the direction of causality in the traditional SCP approach flows from market structure through conduct to performance in a unidirectional manner. This rests on the view that market structure is exogenously determined. In reality, however, f' m performance and conduct affect market structure. For example, if market structure permits conduct which increases prices and enhances profits, this would attract new entry into the market, changing the structure of the market. Conversely, aggressive pricing strategies could force firms to leave the market.

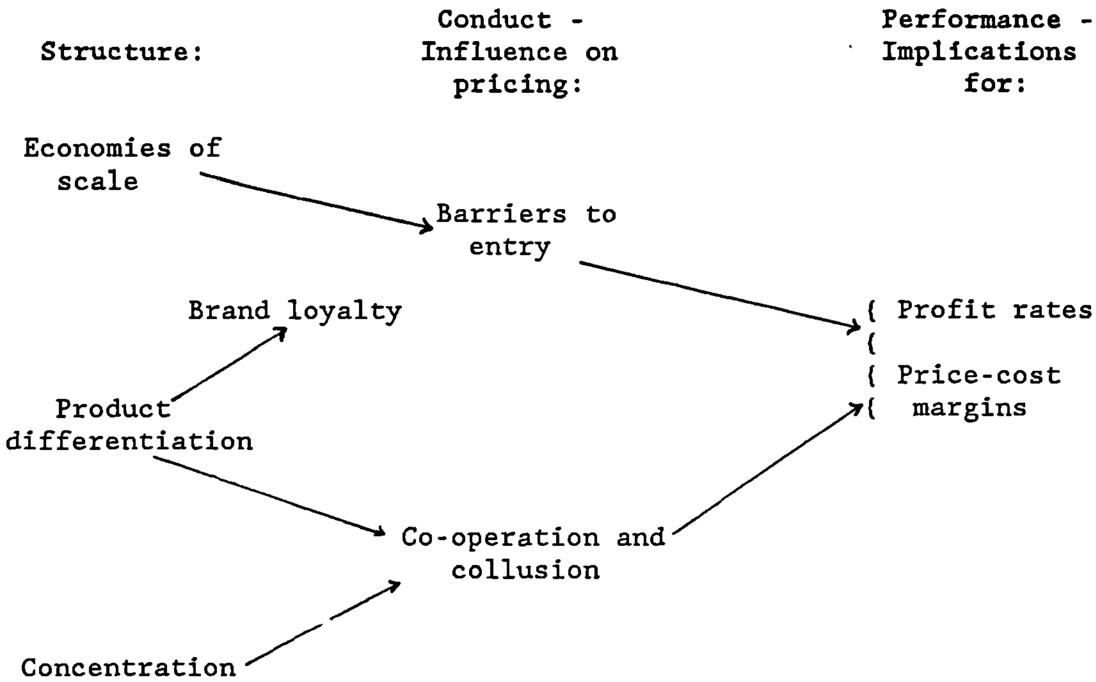
Concentration may influence performance, not only directly, say through collusion, but indirectly through its impact on advertising, research and development, and product differentiation. Non-price forms of competition may become more intense in concentrated markets that find it profitable to limit price competition. Performance (profitability) may be an important determinant of advertising, research and development and (through investment) of scale economies and costs. Figure 4.2 illustrates how the SCP relationship can be adapted to incorporate these more complex relationships. Part a) of the figure shows the traditional SCP relationship, and Part b) shows the various interactions that exist between structure, conduct and performance. Note, however, that despite these more complex relationships, the main causality still runs from the structural criteria.

4.2.2 Economic theory and the SCP paradigm

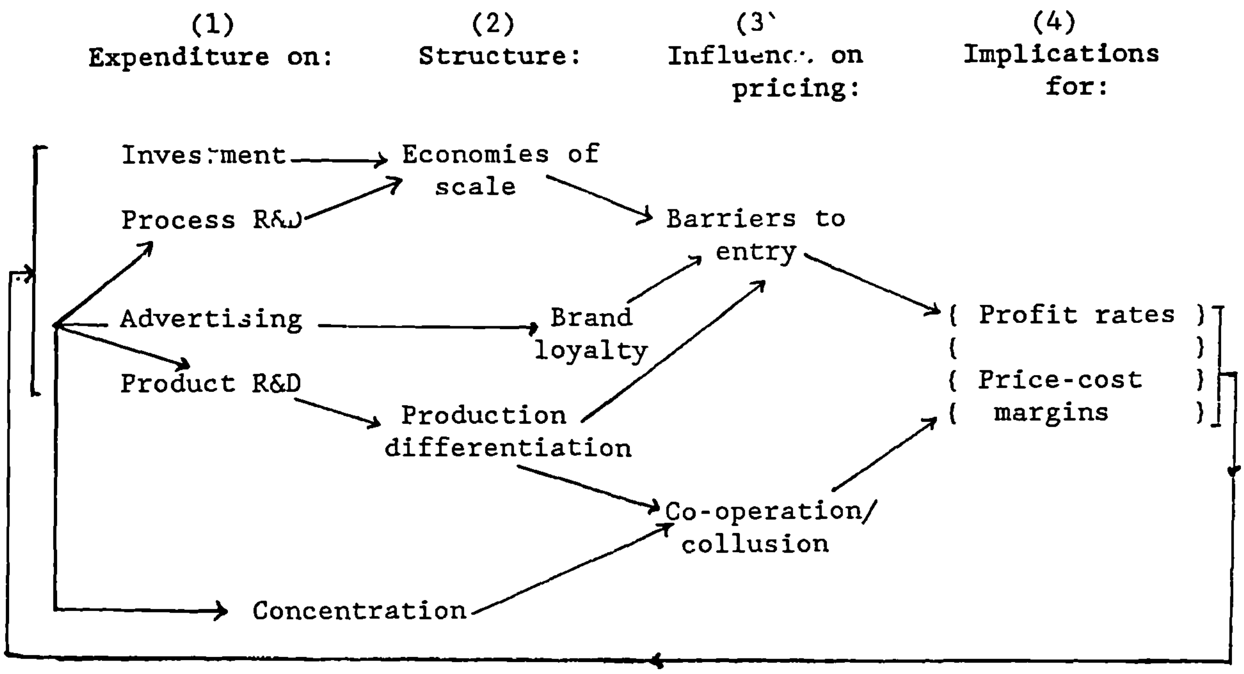
In a perfectly competitive environment, firms' prices are equal to marginal cost, firms face perfectly elastic demand curves and they operate in a socially optimal manner. In an environment characterised by imperfect competition, on the other hand, firms are likely to depart from marginal cost pricing which may lead to inefficiency and monopoly profits. The seminal works of Robinson (1933) and (more importantly in

Figure 4.2 The traditional SCP approach and SCP interrelationships

a) The traditional SCP approach



b) SCP interrelationships



Source: Hay and Morris (1990), pp. 206 and 240 the case of the SCP relationship) Chamberlin (1933) initiated formal study of markets falling between perfect competition and monopoly. The distinguishing feature of Robinson's work was to establish that, under 'imperfect competition' (a term first used by Robinson) firms face downward sloping demand curves as compared with the perfectly elastic demand curves in the perfectly competitive case. Chamberlin focussed on what he called 'monopolistic competition' and his approach was to assume that firms operating under monopolistic competition would wish to achieve jointly the same price-output configurations as would a monopoly firm. Chamberlin's approach provided a theory about how the number and size of firms affect industrial performance. He argued that, given perfect knowledge, and given that each seller is big enough to affect significantly the market, 'If sellers have regard to their total influence on price, the price will be the monopoly one' (Chamberlin 1946, p. 54). In addition, he states:

> If sellers are three or more, the results are the same, so long as each of them looks to his ultimate interest. There is no gradual descent to a purely competitive price with increase in numbers, as in Cournot's solution. The break comes when the individual's influence upon the price becomes so small that he neglects it.
>
> (Chamberlin 1946, p. 48)

Chamberlin's theory can be interpreted that, with perfect information, markets in which only a few firms operate will be practically equivalent to monopoly.

Chamberlin's analysis of monopolistic competition was extended by Fellner (1949) whom, unlike his predecessor, emphasised oligopoly. Fellner theorised that noncollusive oligopolies 'partially' achieve joint-profit maximisation. In general, maximising total profits for the industry appears a sensible objective: it should be possible to make every firm better off by first getting, then dividing the largest possible total market revenue. Fellner (1949) notes, however, that even colluding firms may fail to maximise their joint profits because of such things as: arguments about how to split profits; uncertainties and mistakes; cost and product differences; inter-firm differences in risk appraisal; difficulty in harmonising preferences of shareholders and managers; and so on. In fact, such differences may actually result in price competition. Noncolluding oligopolists are likely to miss the goal of 'partial' joint-profit maximisation still further. Nevertheless, Fellner argues that oligopolies are very similar to cartels except in degree. Overall, Fellner's theory suggests that it is differences among firms (and their managers) that restrict joint-profit maximisation most. Variations among firms will rise with their numbers, but it is not clear how much of an effect should be expected as the number of firms in a particular market vary.

The works of Chamberlin and Fellner are 'highly indefinite about how the number of firms affects competition' (McGee 1988, p. 86). An important question, therefore, becomes under what type of market structure firms will be able to co-ordinate their operations to produce monopoly price-output configurations. For example, even if it is in the interests of all firms to set the monopoly price, individual firms may feel that they can do better by reducing their price relative to the group. Stigler (1964) has outlined the conditions that lead to such price cutting behaviour by providing, 'a systematic account of the factors governing the feasibility of collusion, which like most things in this world is not free' (Stigler 1964, p. 44). In general, assuming imperfect information, Stigler investigates how the incentive secretly to reduce price changes alter with changes in the size and number of buyers; number of sellers; and the likelihood that customers who buy from a given seller in one period will do so in the following period in the absence of price cutting. According to Stigler, when price exceeds marginal cost, there is always an incentive for each cartel member to cut its price and, according to his findings, the incentive secretly to cut prices:

> ... increases roughly in proportion to the number of rivals ... falls as the number of customers per seller increases ... [and] rises as the probability of repeat purchases falls, but at a decreasing rate. [p. 51]

From the above, it can be seen that the larger the number of firms, the harder it is to detect and prevent price cutting. In addition, the difficulty of detection is affected by the number of buyers, market growth, consumer loyalty and product differentiation. Put simply, Stigler's model suggests that prices will be higher (and performance worse) in markets with a small number of firms, many customers, low customer turnover, substantial product differentiation and in markets with lower growth rates.

Stigler's model did not consider the impact of actual and potential entry in oligopolistic markets, but this also limits the ability of incumbent firms to maintain monopoly positions. An industry generating high profits will attract new entrants, so incumbent firms may post entry-forestalling or limit prices[1] that make it unprofitable for new firms to enter. On the other hand, they may continue to charge the monopoly price, thus attracting new firms which will eventually push prices and profits down. In either case, barriers to entry into a market influence the equilibrium price and performance.

From the above it can be clearly seen how economic theory relates market structure to firm performance, especially price performance. The following section will provide a formal model, widely illustrated in industrial economic texts, to show this relationship.

4.2.3 Competition theory and the SCP paradigm - a formal approach

This section aims to explain formally the linkages between the attributes of competition theory and the SCP paradigm. The basic analysis is clearly illustrated in Reekie (1989) and his approach can be easily extended to show the relationship between industry performance, market structure, demand elasticity and any degree of collusive behaviour ranging from totally non-cooperative (Cournot-Nash) equilibrium to complete collusion.

The relationship between competition theory and the SCP paradigm can be analysed by using two cases:

1) The case where the number of competing firms alone is of crucial importance
2) The case where numbers are not important, but where views about the ease of collusion between alleged competitors are

We will use Reekie's (1989, pp. 39-40) example to illustrate the former. The first case starts with the Cournot-Nash theory of oligopoly[2] where each firm believes that others will not change their output even if the original firm does alter its output.

Let the industry demand curve be:

$$P = a + bQ \tag{1}$$

where P = industry price

Q = industry output

q = firm output

where $Q = f(q)$

Let the profits of firm i be:

$$\Pi_i = Pq_i - Cq_i \tag{2}$$

where C is constant average (and hence marginal) cost. To find the profit maximising situation we differentiate (using the multiplication rule) to obtain:

$$\frac{d\Pi_i}{dq_i} = \frac{Pdq_i}{dq_i} + \frac{q_i dP}{dq_i} - C = P + q_i \frac{dP}{dq_i} - C = 0 \tag{3}$$

Similarly, differentiating equation (1) we have:

$$\frac{dP}{dq_i} = 0 + b\frac{dQ}{dq_i} \qquad (4)$$

By substituting (4) and (1) into (3) we arrive at the profit-maximising condition of:

$$\frac{d\Pi_i}{dq_i} = a + bQ + bq_i\frac{dQ}{dq_i} - C = 0 \qquad (5)$$

Given that the Cournot-Nash assumption that i believes others will not alter output, if he does, then any change in output Q (i.e. dQ) = dqi, so $dQ/dq_i = 1$.

Thus:

$$\frac{d\Pi_i}{dq_i} = a + bQ + bq_i - C = 0 \qquad (6)$$

for firm i in the profit maximising situation.

For all n firms, the industry's maximising situation can be arrived at by multiplying equation (6) by n to obtain:

$$Q = n(c-a)/(n+1)b \qquad (7)$$

Rememberinr that in equation (1) P= a + bQ, by substitution of (7) into (1):

$$P = a + n(c-a)/(n+1) \qquad (8)$$

$$= (a+nc)/(n+1)$$

In perfect competition price (P) equals marginal cost (c) then:

$$P = c = (a+nc)/(n+1) \qquad (9)$$

$$= cn + c = a + nc$$

$$= c = a \quad \cdot P)$$

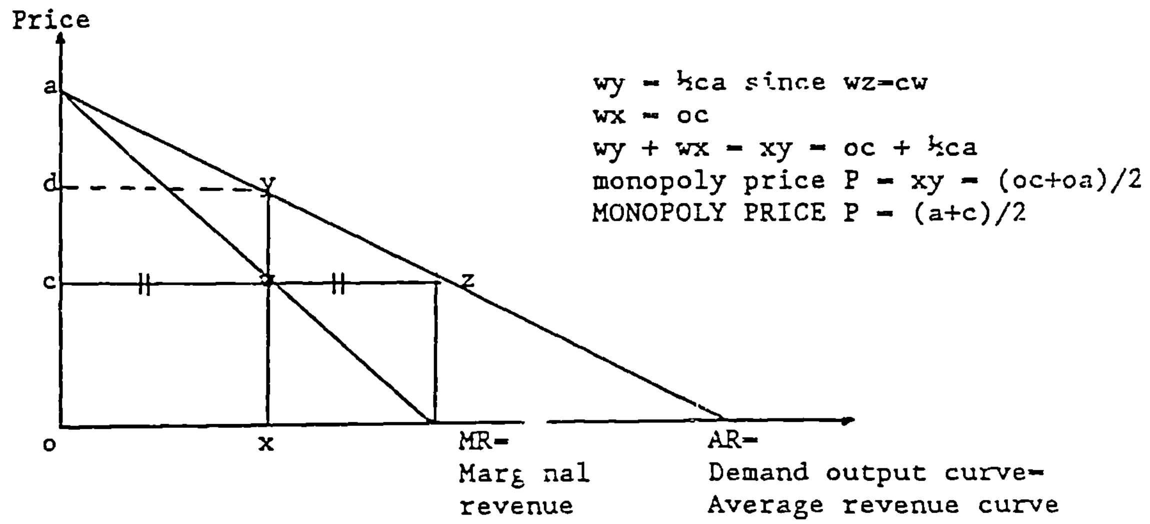
While in monopoly:

$$P = (a+1.c)/(n+1) \tag{10}$$

$$= (a+c)/2$$

From the above two cases, one can see that as the number of firms (n) changes from one to infinity and market structures from monopoly to perfect competition price falls from (a+c)/2 to c where (a+c)/2 is the monopoly price. This can also be represented by a simple diagram as shown in Figure 4.3.

Figure 4.3 Price under monopoly and perfect competition



The above example only focuses on the case where the number of competing firms is of importance. However, the analysis can be extended to include the degree of interfirm collusion and firms elasticity of demand.

In the second case, to illustrate the relationship between competition theory and the SCP paradigm, we drop the Cournot-Nash assumption (that each firm assumes all other firms maintain output constant in relation to its own output changes) and therefore the output of other firms will change as output of firm i changes. Using a slightly adapted formal analysis from Hay and Morris (1991, p. 220-21) we can show how collusion and elasticity of demand can be incorporated into the SCP framework.

If the profits (performance) of the ith firm are given by:

$$\Pi_i = Pq_i - TC_i \tag{11}$$

where Π = profitability of firm i
P = industry price
q_i = output of firm i
TC = total costs of firm i

then profit maximisation requires:

$$\frac{d\pi_i}{dq_i} = q_i \frac{dP}{dQ} \frac{dQ}{dq_i} + P - \frac{dTC_i}{dq_i} = 0 \tag{12}$$

$$\frac{dQ}{dq_i} = \frac{dq_i}{dq_i} + \frac{d\sum_{j \neq i} q_j}{dq_i} = 1 + \lambda$$

where $\lambda = d\sum_{j \neq i} q_j / dq_i$

λ is known as the CONJECTURAL VARIATION OF FIRM i. This term measures the competitive reaction of all firms in the industry ($d\sum_{j \neq i} q_j$) to the output decision of firm i, as subjectively perceived by firm i, and it is the determination of this which is at the heart of oligopoly analysis. The second guessing of competitors' reactions can be expressed formally as that of specifying a value of the derivative

$$\left[\frac{d\sum_{j\neq 1} q_i}{dq_i}\right].$$

Because this derivative relates to variations in output and, 'since its value must be guessed at or conjectured by firm i, it is known in the literature of oligopoly theory as the conjectural variation of firm i'.

(Gravelle and Rees 1981, p. 311)

Following from equation (12), assuming constant costs (marginal cost = average cost) the profit maximising margin is given as:

$$m_i = \frac{P - AC_i}{P} = -\frac{q_i}{P}\frac{dP}{dQ}\frac{dQ}{dq_i} \qquad (1$$

where m_i = profit maximising margin of firm i

P = industry price

AC_i = average cost of firm i, which is equal to marginal cost of firm i in a constant cost case

Multiplying by Q/Q and rearranging, we get

$$m_i = \frac{-q_i}{Q}\frac{QdP}{Pdq}\frac{dQ}{dq_i} \qquad (14)$$

$$m_i = (s_i)\left[\frac{1}{e}\right](1 + \lambda) \qquad (15)$$

where s_i = market share of firm i

e = elasticity of demand

$(1 + \lambda)$ = one plus the conjectural variation of firm i.

Thus,

$$m_i = \frac{s_i}{e}(1 + \lambda) \tag{16}$$

which is a derivation of the Lerner index of monopoly power (see Lerner [1934], and Kwoka and Ravenscraft [1986, p. 352] under a conjectural variation environment)[3].

Equation (16) gives us the firm's profit maximising mark-up and does so in terms of its market share, its demand elasticity and the degree to which it can forecast competitive reactions (conjectural variation). If firms behave in a totally non-collusive manner (the Cournot-Nash case) then $\lambda = 0$. If behaviour is perfectly collusive, then any change in the output of the ith firm will generate a response so as to keep market shares constant. Under this scenario,

$$\frac{\sum_{j\neq i} q_j + d\sum_{j\neq i} q_j}{q_i + dq_i} = \frac{\sum_{j\neq 1} q_j}{q_i} \tag{17}$$

Cross multiplying gives

$$q_i \sum_{j\neq 1} q_j + q_i d\sum_{j\neq 1} q_j = q_i \sum_{j\neq 1} q_j + dq_i \sum_{j\neq 1} q_j \tag{18}$$

Therefore, the conjectural variation is:

$$\lambda = \frac{d\sum_{j\neq 1} q_j}{dq_i} = \frac{\sum_{j\neq 1} q_j}{q_i} = \frac{\sum_{j\neq 1} q_j/Q}{q_i/Q} = \frac{1 - s_i}{s_i} \tag{19}$$

Hay and Morris (1991, p. 221) show that if we let the extent of collusion be β, where β ranges from 0 to 1, then λ is generally given by

$$\beta\left[\frac{1 - s_i}{s_i}\right] + (1 - \beta)0 = \beta\left[\frac{1 - s_i}{s_i}\right] \tag{20}$$

Substituting this into equation (16) for the profit maximising firm margin m_i gives:

$$m_i = \frac{s_i}{e}\left[1 + \beta\left[\frac{1 - s_i}{s_i}\right]\right] \tag{21}$$

The average **industry** mark up over marginal cost can be found by using equation (21) for each firm, weighting it by the relevant market share and summing across firms. Industry average margin is:

$$M = \sum_i s_i m_i = \sum_i \frac{s_i^{\,2}}{e} + \frac{\beta\left(\sum_i s_i - \sum_i s_i^{\,2}\right)}{e} \tag{22}$$

where $\sum_i s_i = 1$ and $\sum_i s_i^{\,2}$ is the Hirschmann-Herfindahl index H; so

$$M = \frac{H}{e} + \frac{\beta}{e} - \frac{\beta H}{e} \tag{23}$$

$$= \beta\left[\frac{1}{e}\right] + (1 - \beta)\,\frac{H}{e}$$

Equation (23) is the most general expression for the relationship between industry margin (industry performance) and market structure as measured by the Hirschmann Herfindahl index (which will be discussed later in this chapter). This elegant formulation allows for any market structure, any demand elasticity, and any degree of collusive behaviour

- from totally non-cooperative (Cournot-Nash) to complete collusion. If there is no collusion, then β becomes zero and the expression reduces to H/e. With complete collusion, $\beta = 1$, then it reduces to 1/e, which is the value when firms act as a monopoly and, in fact, is equivalent to the Lerner index of monopoly power.

4.3 Measurement of Market Structure

4.3.1 Desirable properties of measures of market structure

Market structure can be described by examining (either jointly or separately) the number of firms, the extent of product differentiation, entry conditions, and the level of integration within the market. The most commonly used measure is market concentration. A concentration measure shows the level to which the production of a good or service is restricted to a few large firms. If a market has a small number of firms, or a great disparity in size between firms, the more concentrated and so less competitive the market will be. Ferguson (1988) notes why concentration measures are the most widely used measures of market structure:

> The attraction of this measure is easily understood. Differences in the number and size distribution of firms are key factors distinguishing the theoretical models of perfect competition, oligopoly, monopoly and monopolistic competition. Market concentration is easily estimated since published data on the number and size distribution of firms are generally available. For other structural variables, published information is rare ...
> (pp. 23-24)

There are a wide range of statistical measures of concentration and it is important to analyse these measures because if they provide us with contradictory rankings of industry concentration then this has implications for how we interpret findings of empirical work on concentration. Before we consider the various concentration measures we should first discuss what constitutes a desirable property of a concentration measure. Hall and Tideman (1967) identified the following desirable properties:

(1) The measure used must yield an unambiguous ranking of industries.

(2) The measure should be independent of the size of an industry but be a function of the combined market share of firms.

(3) Concentration should increase if the market share of any firm is increased at the expense of a smaller firm, that is, the 'principle of transfers' should hold.

(4) If all firms are divided into a given number of equal parts, the concentration measure should fall in the same proportion. For instance, if all firms are divided into two equal parts, the concentration measure should halve.

(5) The concentration measure should be a decreasing function of the number of firms.

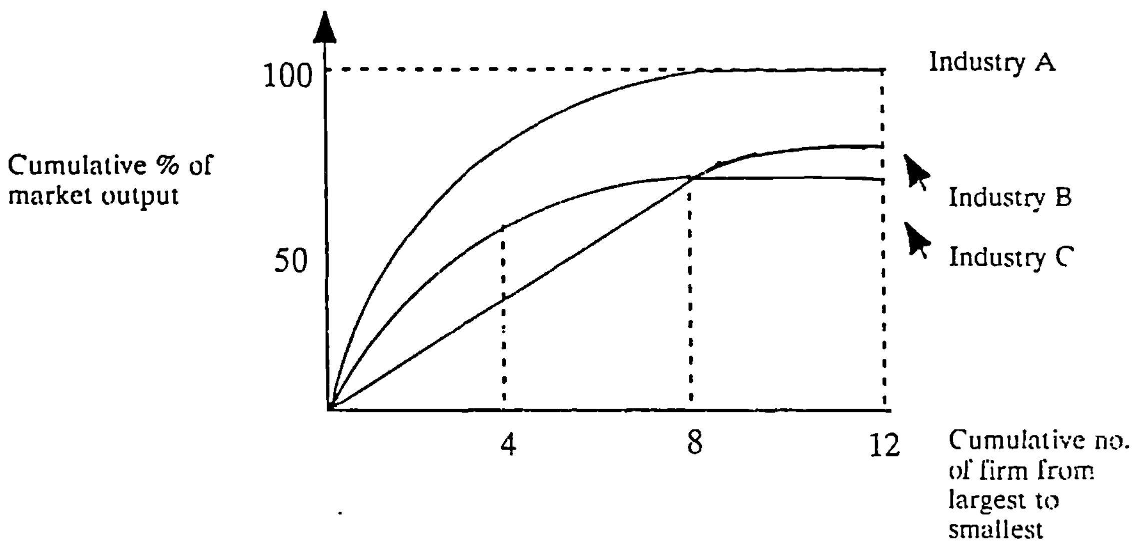
(6) The limits of a concentration ratio measure should be zero and one. (Some proposed measures do not exhibit this property *per se* but can be normalised to do so by expressing them as a proportion of their maximum value.)

Subsequently Hannah and Kay (1977) have proposed several other criteria that concentration indices should meet:

(1) If one concentration curve lies entirely above another, it represents a higher level of concentration. An example of a

concentration curve is shown in Figure 4.4 and shows the cumulative shares of market output attributable to the largest firs in the market.

Figure 4.4 – Concentration curves



On the above criterion, industry A is more concentrated since a given number of firms accounts for a higher proportion of output in A than in either B or C. The case is ambiguous for industries B and C because the four firm concentration ratio shows industry C to be more concentrated than industry B, whereas the twelve firm concentration ratio suggests the opposite. If the concentration curves do not intersect, the ranking of industries is unaffected by the number of firms chosen to calculate the concentration ratio.

(2) If a large firm wins a customer from a small firm, concentration has increased. This is what is known as the 'principle of transfers'. A transfer of output from a smaller to a larger firm, which will increase the degree of inequality, should increase the value of the concentration index.

(3) The entry of a new firm below some significant size reduces concentration. The entry of a new firm increases the number of firms in the industry and, therefore, decreases concentration, but if the new entrant has a sufficiently large market share, it could move the concentration curve upwards and, therefore, increase concentration.

(4) Mergers increase concentration

(5) The contribution of a firm to the concentration measure tends to zero with its market share.

Given these criteria and bearing in mind that there is no general consensus as to the relative importance of the above requirements, the following will examine the actual measures.

4.3.2 Concentration ratios

A simple measure of market structure is the concentration ratio which is defined as the percentage of total industry output (or sales, or capacity, or employment, or value added) contributed by largest firms, ranked in order of market share. The cumulative market share of the largest firms are ranked in descending order of size to give:

$$CR_x = \sum_{i=1}^{x} S_i \qquad (24)$$

where CR_x = the X firm concentration ratio

S_i = the percentage market share of the ith firm

The most commonly used concentration ratio used in American studies (according to Scherer 1980, p. 56) of market structure is the percentage of total industry sales made by the four largest firms - the four-firm concentration ratio. The concentration ratio is a popular measure because it is relatively easy to obtain information to calculate the ratio. Data on market size and shares of the largest firms are frequently published. The United States government also provides concentration ratio estimates for manufacturing industry through the Department of Commerce Census for Manufactures[5].

Concentration measures are generally subject to two main criticisms. Firstly, the choice of an arbitrary number of firms on which to calculate a concentration ratio may yield ambiguous results as illustrated above in Figure 4.4. There is also no theoretical reason for preferring a four-firm to a ten-firm or thirty-firm concentration ratio. The second criticism is that concentration ratios do not take into account the number of firms in the industry. For example, two industries may have identical ten-firm concentration ratios, but one may have thirty smaller firms and the other 300 smaller firms in their respective industries. If industry performance is determined by the ten largest firms, then this may not be a problem, but if the number of firms included in the concentration ratio does not relate to the number that influences industry performance, then it may be. In general, the concentration ratio measure meets all the Hannah and Kay (1977) criteria so long as changes in the industry structure affect the largest firms as measured by the concentration ratio.

4.3.3 Hirschmann-Herfindahl index

The Hirschmann-Herfindahl index (Hirschmann 1964), hereafter known as the H-index, is a summary index of market structure which takes account of the size distribution of firms. It was heavily promoted by Stigler (1964) as a good structural index for oligopolistic markets. The index is the sum of the squares of the sizes of firms in a market in which sizes are expressed as a proportion of the total market size. It is shown as follows:

$$\text{H index} = \sum_i \left(\frac{X_i}{M} \right)^2 \qquad (25)$$

where $i = 1, 2, 3, \ldots, n$

M = total market share

X_i = firm i's share of the market

n = number of firms in the market

Under perfect competition the index would equal zero and under monopoly it would equal 1. If all firms in the market were of equal size the H-index would be 1/n. As the number of firms in the market increases, the H-index tends towards 0. The advantages of the H-index are that it takes into account both the absolute numbers as well as size inequalities of firms simultaneously. It also meets all the Hannah and

Kay criteria as a desirable market structure measure. We have also shown in Section 4.2.3 of this chapter that if industries are oligopolistic and behaviour is of a Cournot-Nash nature, then the Herfindahl index is related to industry price-cost margins. To recall briefly, the price cost margin for a firm with constant costs is:

$$m_i = \frac{s_i}{e} \tag{26}$$

m_i = firm price-cost margin $\left(\frac{\text{price - average cost}}{\text{price}}\right)$

s_i = market share of firm i

e = elasticity of demand

The industry profit margin is the weighted sum of firms' profit margins where the weights are market shares so:

$$M = \sum_i m_i s_i \tag{27}$$

$$= \sum_i \left(\frac{s_i}{e} \right) s_i$$

$$= \sum \frac{s_i^2}{e} = \frac{H}{e}$$

where M = industry price-cost margin

H = Hirshmann-Herfindahl index

This illustrates that industry profit margins should vary directly with the H-index and inversely with the elasticity of demand. The H-index is frequently expressed as a 'number equivalent' measure of concentration, which is just the inverse of the H-index:

$$\text{Numbers equivalent measure of concentration} = \frac{1}{H}$$

An H-index of 0.10 would give us a numbers equivalent of ten, that is, the degree of concentration in the market is equivalent to having ten equal-sized firms. In its favour, the H-index and its numbers equivalent fulfils all the Hannah and Kay criteria and it is a theoretically elegant measure. On the other hand, its major criticism is that any value of H is not unique - different size distributions of firms can yield the same H statistic. In addition, obtaining information on all firms in a particular industry may be difficult, although Adelman (1969) has pointed out that this is not necessary to get a reasonable approximation to the H-index (see also Schmalensee 1977, p. 188).

4.3.4 Entropy indices

Entropy Indices of market concentration involve a more complex weighting scheme for firm size than the H-index. The basic entropy measure developed by Theil (1967), analysed in detail by Jacquemin and de Jong (1977), is:

$$E = - \sum_{i}^{N} s_i \log s_i \tag{28}$$

where E = entropy

s_i = firm size relative to market structure

The weight applied is minus the logarithm (usually to the base 2) of the market share (because $s_i<1$, $\log s_i<0$, therefore the negative sign gives a positive entropy, E, measure). The index measures the degree of uncertainty or disorder in the market. If all firms were of equal size, then $E = \log N$ and when firms are unequal in size, E will tend towards zero. E is an inverse measure of concentration[6]. The advantage of this type of measure is that it can be broken down to illustrate how various sub-groups contribute to the overall level of concentration. It is generally subject to the same criticisms as the Hirschmann-Herfindahl index.

4.3.5 Rosenbluth or Hall-Tideman index

Another general class of indices are those represented by the Rosenbluth or Hall-Tideman indices[7] and are illustrated as follows:

Rosenbluth or Hall Tideman index =

$$1 / \left[2 - \sum_{1}^{N} i s_i - 1\right] \tag{29}$$

where i is the firm ranking

s_i is the market share of the ith firm measured as the output of the ith firm divided by total output

The index will equal one in the case of monopoly and will equal zero where all firms have equal market shares. A closely related index is the dominance index develop d by Kwoka (1977):

$$\text{Dominance Index} = \sum_{1-1}^{n} (s_i - s_{i+1})^2 \tag{30}$$

where s_i is defined as above

In the case of the dominance index, the differential market share between firms is ranked by firm size. A monopoly situation obtains a dominance index of unity and the index ranges from zero to one.

4.3.6 Hannah and Kay index

This index devised by Hannah and Kay (1977) is similar to the Hirschmann-Herfindahl index and, in fact, can be regarded as a special case of the latter. The Hannah and Kay index is:

$$\text{Hannah and Kays number equivalent index} = \left[\Sigma s_i{}^a\right]^{1/1-a} \qquad (31)$$

Market share is raised to the power (a), which is left up to the researcher. Hannah and Kay suggest that the range 0.6 to 2.5 gives the best results, and one can see that if one chose a = 2 then the index becomes the Hirschmann-Herfindahl index.

4.3.7 Gini co-efficient and variance of logs of firm size

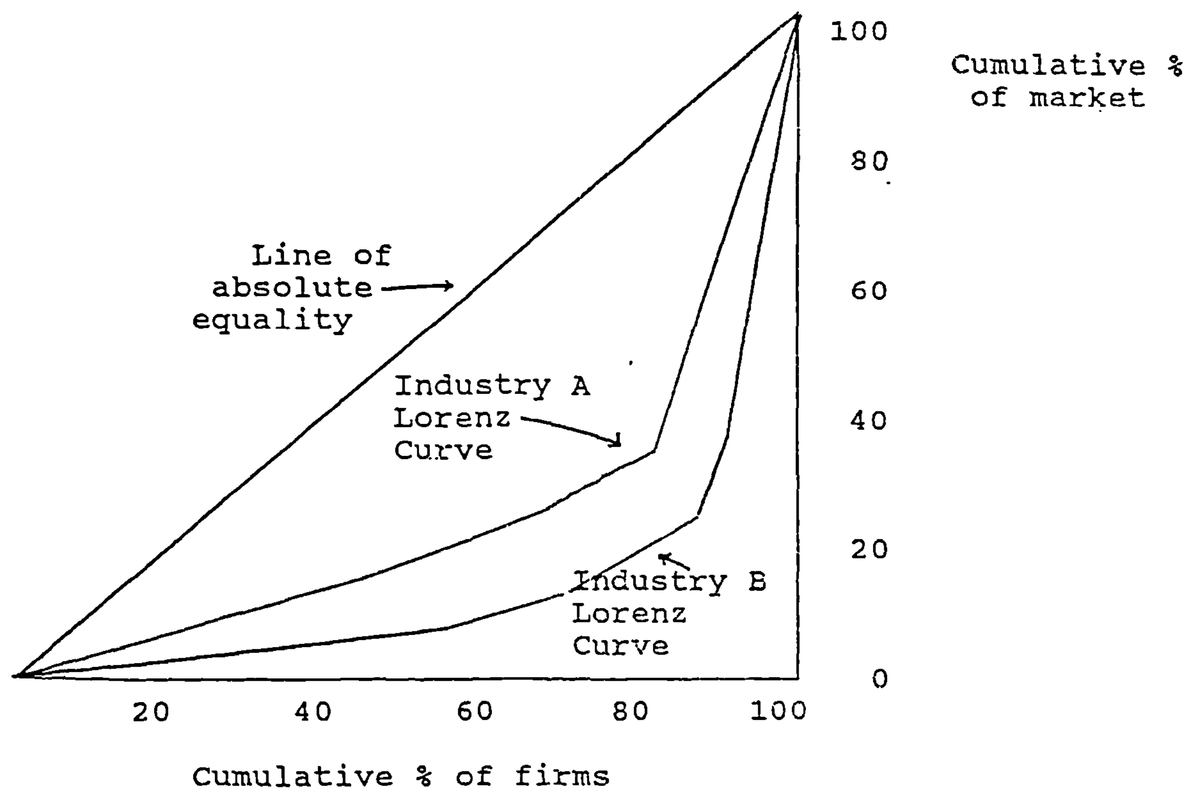
The Gini co-efficient is a measure of rela.ive concentration and is really a measure of inequality rather t] an concentration. It has, however, been widely used in the industrial economics literature to measure market structure. The Gini co-efficient is derived from the Lorenz curve which is shown in Figure 4.5.

The Lorenz curve shows that proportion of the market which is held by the relevant x per cent of firms. If all firms are of equal size, then the Lorenz curve will be equal to the diagonal, otherwise known as the line of absolute equality. Figure 4.5 illustrates two Lorenz curves for industries A and B. The Gini co-efficient is derived from the Lorenz curve as follows:

$$\text{Gini co-efficient} = \frac{\text{Area between Lorenz curve and diagonal}}{\text{Total area under diagonal}}$$

Absolute values of the Gini co-efficient vary between zero and one, the lower the value, the less the degree of inequality. One of the major criticisms of this measure is that it is only a measure of relative size and does not take into account the numbers of firms in the

Figure 4.5 The Lorenz Curve



Source: George and Joll (1988, p. 114)

industry. For example, if there are 500 firms of equal size or just a monopoly, the Lorenz curve will follow the line of absolute equality and yield a Gini co-efficient of zero. This measure, therefore, does not satisfy the Hall and Tideman fifth criteria that a concentration measure should be a decreasing function of the number of firms in the industry[8].

Another widely used measure of inequality (or relative concentration) is that developed by Hart and Prais (1956) known as the variance of the logarithms of firm size (v) where:

$$v = \frac{1}{N}\sum_{i=1}^{n} (\log s_i)^2 \frac{1}{2} \left[\sum_{i=1}^{n} \log s_i\right]^2 \qquad (32)$$

where s_i is the market share of the ith firm

The measure is close to zero if firms are of a similar size, irrespective of the number of firms in the market. It is, therefore, subject to the same criticisms as the Gini co-efficient and can generate ambiguous concentration measures[9].

4.3.8 Other indices

We have discussed above the measures of market structure most widely used in the industrial economic's literature. There are, however, a variety of other measures that have been used, the most important of which (as far as we are aware) include: the Linda class of indices (see Ferguson [1988, p. 171]); and the share stability indices simply illustrated by Hymer and Pashigian (1962) and developed by Grossack (1965) and Salley (1972). The Linda class of indices are based upon the concentration ratio, but allow for inequalities between large firms[10]. Share stability indices (sometimes known as dynamic concentration measures) relate the market share of firms in a given base year with its share of the market at the end of the period under study[11].

4.3.9 Practical problems associated with concentration measures

There are three main practical problems associated with measuring market structure. Firstly, the market share of individual firms can be measured by using a whole range of variables, for example, total assets, output, value added, employment, etc. Different variables are quite likely to yield different concentration rankings and therefore it is up to researchers to provide both empirical and theoretical justification for the choice of the market share measure.

Secondly, different concentration indices may yield conflicting measures of market structure. Jacquemin and de Jong (1977) in a study of European manufacturing industries estimated rank correlation coefficients to different concentration measures. They found a high correlation between rankings using the four and eight-firm concentration ratios, the H-index and the entropy coefficient, but the correlation between these measures and the Gini coefficient was much lower. George and Ward (1975) have also shown that change in the measure of concentration can affect empirical results. In a study of the change in concentration among the top European Community companies between 1962 and 1972, the Herfindahl and entropy measures showed that concentration had declined, whereas the variance of logs method recorded an increase in concentration. Other studies by Bailey and Boyle *et al.* (1971), Aaronovitch and Sawyer (1975) and Vanlommel (1977) have found various concentration measures to be highly correlated with one another. From this literature, it appears that four- and eight-firm concentration ratios, H-index and entropy measures are all highly correlated, and thus provide similar concentration ratings. Inequality measures of concentration, such as the Gini coefficient, variance of logs method and the Linda indices appear to be less closely correlated and also provide conflicting rankings to the aforementioned concentration measures.

A third major problem in calculating the relevant measure of market structure relates to how one defines the market. Sometimes the size of the market is difficult to define, especially if there are a large number of firms providing close substitutes. Asch (1983, pp. 186-9) has argued that consumer substitutability is the main criterion for defining the market but, 'in practice, a great deal of judgment must be used in classifying firms, and the researcher must always be alert to the possibility that empirical results may be sensitive to the particular industry grouping that have been used'. (George and Joll, 1988, p. 118).

4.4 Determinants of the Level of Concentration

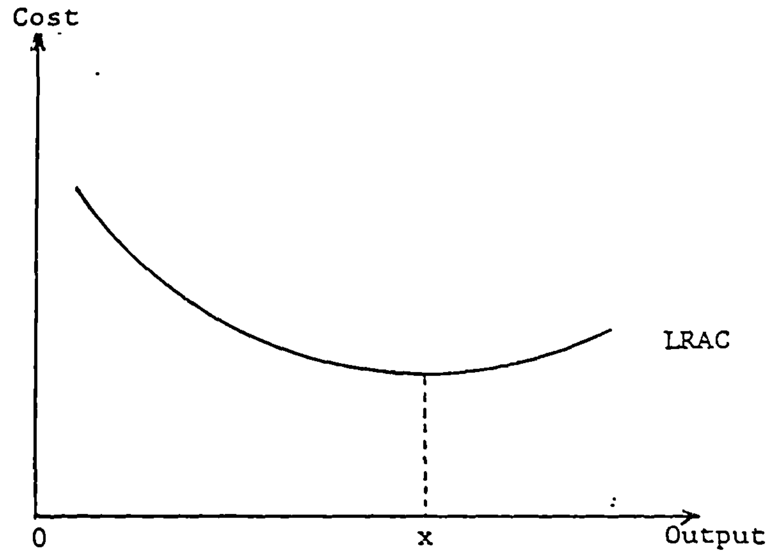
4.4.1 Economies of scale

The area that has probably received the most attention from industrial economists as a determinant of the level of industry concentration is economies of scale. As Scherer (1980) notes:

> One condition that could lead to concentrated market structures is the existence of substantial scale economies, permitting relatively large producers to manufacture and market their products at lower average cost per unit than relatively small producers
>
> (p. 81)

Figure 4.6 illustrates a long-run average cost curve and economies of scale are shown on the downward sloping part of curve.

Figure 4.6 The long-run average cost curve and economies of scale



Economies of scale are present along the output range OX, where long-run average cost is falling. OX represents the minimum optimal size of the firm in the particular industry because it is the smallest size of firm that can benefit from all the economies of scale and thus minimise long-run average cost. In analysing the structure of a market, it is important to know how large the minimum optimal size of firm is in relation to the size of the market. For example, if OX is a third of the market size, then the market can support only three firms of optimal size; if it is one-hundredth, then the market is large enough to have 100 firms of optimal size, etc. In addition, the steepness of the cost curve is also of interest because this can indicate the cost disadvantages suffered by firms which are of suboptimal size.

There is an enormous literature on economies of scale which is well beyond the scope of this thesis to tackle[13]. Scherer (1975) and (1980, Chp. 4) gives a comprehensive review of the literature. The latter cites over 230 sources relating to the subject of economies of scale. In his 1980 study he discus es five main types of scale economies that could impact on the level of concentration:

1. Product-specific economies - cost economies generated by the specialisation of production relating to individual products
2. Plant-specific economies - cost economies coming from the expansion in size of individual processing units
3. Multi-plant economies - 'the multi plant enterprise can employ a more richly specialised array of accounting, licence, marketing, production process, research and legal talent than a single plant firm, all else being equal. This

may be reflected in lower administration costs and/or higher productivity' (Scherer, p. 84)

4. Capital raising and other pecuniary economies - cost economies encountered when firms raise capital through common stock issues, borrowing and such like - based on the view that the larger the amount raised, the lower those costs are per dollar of capital raised

5. Economies of large-scale promotion - cost economies generated through large scale promotion and marketing campaigns, for example, one possible source of scale economies is the need to attain a certain minimum level of TV advertising before reaching maximum effectiveness (see Scherer, p. 108)

In general, the link between economies of scale and concentration is non-contentious. Market concentration is expected to increase as economies of scale increase. If market concentration reaches a level dictated by available economies of scale, then it would be futile for policy makers to influence the level of market concentration because, in the long-run, market concentration will move towards the level as dictated by the cost function.

Various studies, such as Scherer, *et al.* (1975) have sought to estimate various industries minimum efficient scale (OX in Figure 4.6) and compare this with the observed levels of market concentration. In this study for the United States, they find that the four-firm concentration ratios are much larger than the operation of minimum efficient scale plants would suggest. A similar study reported by

Silberston (1972) on economies of scale across 25 UK manufacturing industries found that the minimum efficient scale of production of aircraft, diesel engines and certain types of machine tools was greater than the size of the UK market! Overall, the literature suggests that, in the case of the United States, 'national market concentration in most industries appears to be much higher than it needs to be for leading firms to take advantage of all but slight residual scale economies' (Scherer [1975, p. 54]). The case is not so clear-cut for industries in other countries.

In relation to the SCP framework, this result is not so surprising; one might expect that leading firms will maintain positions of market power (through entry deterring tactics), even if market shares are much larger than those necessary for efficient operation. Some economists, referred to in the industrial organisations literature as the Chicago School[14], in fact argue that estimates of scale economies and minimum efficient scale are irrelevant, because the market structure observed in the real world is efficient:

> I see little reason to spend much more time estimating optimum plant or firm size except, perhaps, in a completely centralized and governmentally controlled economy in which the State tries hard to keep markets from working and consumers from expressing preferences. When property and markets are at work, and consumers are permitted to choose what and from whom to buy, it is, as far as I am concerned, a trivial matter what the facts of technical economies are, or what economists and engineers have to say about them. Consumers will choose products and firms will offer what is, to their tastes, the best deal. Consumers will make the trade-off between prices and product qualities. The prices they pay for the qualities they buy are signals to anyone who would do better by them. Such economies as there are will assert themselves, and no-one need be concerned how large or small they are.
>
> (McGee, 1974b, p. 84)

4.4.2 Barriers to entry

Bain (1951), in the first quantitative study of the relationship between industry concentration and profitability, (discussed in more detail later in this chapter) identified that industrial concentration is higher than can be justified by superior performances or economies of scale. He argued that concentration is preserved by various types of entry barriers. The concept of entry barriers was extended in Bain (1956) where he defined barriers to entry as any constraint which puts potential entrants at a competitive disadvantage compared with established firms and which enables established firms to generate abnormal profits in the long-run. The level of entry barriers determines the level of profits. Bain (1956) identified four main types of entry barriers: absolute unit cost differences; product differentiation; capital cost requirements; and economies of scale.

The first type of barrier identified by Bain (1956) relates to absolute cost advantages of established firms: that is, for any given level of output, incumbent firms can produce and market their product at a lower cost per unit than newcomers. This situation may arise because new entrants may have to pay more for scarce raw material, use inferior production technologies, the cost of capital may be higher, or they may not be able to have access to relevant marketing outlets.

A second type of barrier relates to product differentiation and, in particular, differenciation supported by heavy sales promotion. Bain (1956) concluded that product differentiation was: 'of at least the same general order of importance ... as economies of large-scale production and distribution' (pp. 142-43) in providing the largest firms a price or cost advantage over rivals and especially over new entrants. A later study by Scherer *et al.* (1975) found that, although product differentiation was important, firms with only a single plant of efficient scale could promote their products on equal terms by directing their promotional campaigns at specific market segments. The reason for the interest in advertising and product differentiation in general is typified by the findings of Mueller and Rogers (1980) who noted that consumer goods industries that spent especially large sums on TV and radio advertising have also experienced high increases in concentration over the period 1947 to 1977. Consumers goods industries that spent heavily on newspaper advertisements or did not advertise at all and producer goods industries experienced either falls or no increase in their respective industry concentration levels. The role of advertising and product differentiation as forming a barrier to market entry is discussed in substantial detail in Bain (1968), Simon (1974, Chapter 1), Comanor and Wilson (1974), Lambin (1976), Brown (1978), Ferguson (1988, Chapter 4) and Hay and Morris (1991, Chapter 5).

A third type of entry barrier relates to capital cost requirements. Potential entrants may find the capital needed to enter an industry may be a considerable barrier, but for existing firms in the market, this may not be a constraint. For example, if the industry is identified as having a large minimum efficient scale of operations, this may necessitate a large capital cost outlay. The deterrence of this barrier, however, depends on the nature of the potential entrant as well as the type of industry being entered. If a major potential entrant is already a large firm, then capital costs may not pose a serious problem.

The final barrier to entry, as identified by Bain (1956), are economies of scale which we have already discussed in the previous section. To restate the main issue - if the minimum efficient scale of firm is large in relation to the size of the whole market, and if operating at suboptimal costs yields significant cost disadvantages, then there will be a major barrier to the entry of new firms.

4.4.3 Other determinants of concentration

There are a wide range of other causes that are believed to have an impact on the type of market structure and hence the level of concentration. These are shown below:

4.4.3.1 Size of the market

The size of the market can have an impact on the level of market concentration because smaller markets would tend to support a smaller number of firms and thus the likelihood of collusion and anti-competitive practices may be more likely. In addition, many studies of concentration have focused on national markets, yet many industries have strong regional markets, the national concentration measures tend to understate the degree of concentration. Weiss (1972), for example, noted that the average four-firm concentration ratio for a variety of thirteen industries (ranging from cigarette producers to cement manufacturers) increased from 19.6 per cent when viewed in a national context to 35.7 per cent after adjustment for regional markets.

4.4.3.2 Market growth rate

When economies of scale are tending to increase concentration, this effect will be weakened by an increase in the size of the market. It is likely that slow growth industries become monopolised more easily.

4.4.3.3 Government policy

Government policies such as: antitrust legislation; regulations governing patents, licences, tariffs and quotas; procurement policies; and other regulations specific to various industries, such as public utility regulation and banking regulation have an impact on concentration. With regard to antitrust legislation, governments have created various laws to limit or prohibit excessive concentrations of market power. On the other hand, Greer (1984, p. 120) notes that various anticompetitive government policies such as: licences - restrict the entry of firms into particular markets; franchises - grant monopoly rights to bus companies, water companies and other business; tariffs and quotas - inhibit the free flow of imports; and patents - award x-year monopolies over the use of new inventions and processes. In the case of public procurement programmes governments may show a bias in favour of large firms, mainly because of the nature of the products that they purchase, e.g. defence equipment, transport, etc. All the above policies could lead to increased concentration in the market place.

4.4.3.4 Business policies

Business policies such as mergers, restrictive practices and product differentiation (which we have already discussed) are all deemed to have an impact on market concentration. As George and Joll (1988) state:

> The single most important cause of increases in concentration is undoubtedly merger activity ... It need not be the case that all, or even the majority of, mergers are the results of attempts to monopolise industry. But whatever the precise causes of merger there can be no doubt that they have contributed massively to increases in concentration. (p. 132)

The first systematic study examining the impact of mergers on industry concentration was undertaken by Weiss (1966) who traced the effects of mergers on four-firm and eight-firm concentration ratios in six US manufacturing sectors between 1930 and 1960. Changes in concentration were categorised according to merger, internal growth, entry and exit of firms and a value described as displacement, which allowed for changes in the identity of the major firms in each time period. Weiss found that mergers contributed the largest components to increased concentration.

Various similar studies of mergers and concentration for the United Kingdom undertaken by Hart, Utton and Walshe (1973), George (1975) and Hannah and Kay (1977) arrived at similar findings.

Restrictive practices, which include such things as collective rebates, predatory price discrimination, exclusive dealing, and barrier pricing have no immediate effect on concentration although, over a long period of time, they might help consolidate market power.

4.4.3.5 *Stochastic processes or 'luck'*

The extreme alternative to the view that concentration is determined by economies of scale, barriers to entry and so on is based on the assertion that it is brought about by pure (statistical) chance. A casual inspection of data on firm size across countries reveals that in many industries the data exhibit a similar pattern, 'the size distribution of firms is highly skewed, with a few large firms, rather more medium-sized firms, and a large 'tail' of small firms' (Hay and Morris [1991, p. 537]). Such distributions can be approximated by a number of related skew distributions - of which the most widely used is the lognormal. These distributions can be generated by a stochastic process in which the variable (in the case above, the size of firms) can be subjected to cumulative random shocks over time. The size distribution of firms in an industry is, therefore, related to a series of random growth patterns in the history of the particular market. This process of random growth which generates a lognormal distribution was first identified by Gibrat (1931) and his formulation is known as Gibrat's Law of Proportionate Effect.

Various researches, such as Hart and Prais (1956) and Simon and Bonini (1958), identified that such stochastic processes could be used to explain concentration. This is clearly illustrated using a simulation experiment reported in Scherer (1980, p. 146). Scherer simulated sixteen separate histories of a market under the following assumptions:

1. In the first period the market consists of fifty firms each with \$100,000 in sales and a 2 per cent market share. The four-firm concentration ratio is then at 8 per cent.
2. The chance for growth of each firm is identical. The chances are specified by each firm annually drawing a year's growth from an identical probability distribution.
3. The probability distribution from which the annual growth rates are obtained provides for an average annual growth rate of 6 per cent, but a variance of growth rates around this average, such that the distribution is normal with standard deviation of 16 per cent.

These assumptions also conform to Gibrat's Law of Proportionate Growth.

Table 4.2 reproduces Scherer's (1980) simulation exercise and shows that concentration rises dramatically over the first twenty years and more slowly thereafter. Why is this the case? Well, as Scherer (1980) states:

> The answer: in a word, is luck. Some firms will inevitably enjoy a run of luck, experiencing several years of rapid growth in close succession. Once the most fortunate firms climb well ahead of the pack, it is difficult for laggards to rally and rectify the imbalance for, by definition, each firm - large or small - has an equal chance of growing by a given percentage amount. (p 146)

If a firm has managed to become one of the market leaders, its position will be enhanced if it continues to be luckier than average (as in fact it will be in roughly half the cases).

A number of studies have sought to compare the actual distribution of firms with that predicted by similar forms of stochastic process.

Quandt (1966) and Silberman (1967) found that the distribution generated by stochastic processes were generally a rather poor fit. More recent studies, such as that of Davies and Lyons (1982) have sought to integrate the traditional (deterministic) and stochastic approaches

Table 4.2 Four-firm concentration ratios resulting from sixteen simulation runs of a stochastic growth model

Simulation	Four-firm concentration ratio at year: 1	20	40	60	80	100	120	140
Run 1	8.0	19.5	29.3	36.3	40.7	44.9	38.8	41.3
Run 2	8.0	20.3	21.4	28.1	37.5	41.6	50.8	55.6
Run 3	8.0	18.8	28.9	44.6	43.1	47.1	56.5	45.0
Run 4	8.0	20.9	26.7	31.8	41.9	41.0	64.5	59.8
Run	8.0	23.5	33.2	43.8	60.5	60.5	71.9	63.6
Run 6	8.0	21.3	26.6	29.7	35.8	51.2	59.1	72.9
Run 7	8.0	21.1	31.4	29.0	42.8	52.8	50.3	53.1
Run 8	8.0	21.6	23.5	42.2	47.3	64.4	73.1	76.6
Run 9	8.0	18.4	29.3	38.0	45.3	42.5	43.9	52.4
Run 10	8.0	20.0	29.7	43.7	40.1	43.1	42.9	42.9
Run 11	8.0	23.9	29.1	29.5	43.2	50.1	57.1	71.7
Run 12	8.0	15.7	23.3	24.1	34.5	41.1	42.9	53.1
Run 13	8.0	23.8	31.3	44.8	43.5	42.8	57.3	65.2
Run 14	8.0	17.8	23.3	29.3	54.2	51.4	56.0	64.7
Run 15	8.0	21.8	18.3	23.9	31.9	33.5	43.9	65.7
Run 16	8.0	17.5	27.1	28.3	30.7	39.9	37.7	35.3
Average	8.0	20.4	27.0	33.8	42.1	46.7	52.9	57.4

Source: Scherer (1980, p. 146)

relating Gibrat's Law of Proportionate Change to minimum efficient scale 'economies of scale).

4.5 Measures of Conduct and Performance

Conduct relates to the way in which firms behave in a market including the nature of decisions these firms take and the way in which they are taken. It, therefore, focuses on such issues as firm price setting behaviour, how firms decide on advertising and R&D activities and such like. These factors are difficult to evaluate empirically compared with structure and performance characteristics. Industrial organisations literature primarily focuses on the measurement of firm performance from which conduct is implied. The usage of the terms 'conduct measures' and 'performance measures' tend also to be used in an interchangeable manner[15] confusing the issue. For ease of exposition, we will refer to them from now on as performance measure.

In the formal analysis of the SCP relationship undertaken in Section 4.2.3 of this chapter we assumed that the profit maximising margin of firm i, mi = (Price-Mar~inal Cost)/Price, was the main perf›rmance measure. Because of its analytical elegance and the way it can be used to illustrate different competitive environments, it is relativeıy simple to incorporate in the SCP paradigm. This measure, known as the Lerner index, equals zero under perfect competition (because price equals marginal cost) and under monopoly it is positive, the larger the margin between price and marginal cost, the greater the firm's degree of monopoly power. The Lerner index is also equivalent to the inverse of elasticity of demand, so as elasticity of demand tends towards infinity (the competitive case) monopoly power tends to zero. This measure is subject to three criticisms. Firstly, the index depends on .ıe level of costs, yet high marginal cost may produce a low index even if monopoly power was significant. Secondly, the index takes no account of the size of the market. Finally, the index depends on price elasticity which is only partially determined by industry structure because it is also influenced by the type of goods being sold.

It is, however, difficult to obtain data on firms' marginal costs or the ratio of marginal costs to prices, so researchers have chosen proxy measures. By assuming marginal costs could be approximated by average variable cost, we arrive at what is sometimes referred to as the profits-revenue ratio:

$$\text{Profits-revenue ratio or return on sales} = \frac{\text{Profits attributable to shareholders}}{\text{Sales revenue}}$$

There are two main other measures of performance: return on shareholders equity and return on capital assets employed and these are shown as:

$$\text{Return on shareholders' equity} = \frac{\text{Profits attributable to shareholders}}{\text{Shareholders equity (book value)}}$$

$$\text{Return on capital assets employed} = \frac{\text{Profits attributable to shareholders}}{\text{Total assets (capital assets employed)}}$$

The latter two ratios are ambiguously referred to in the industrial economics literature as return on capital ratios or the 'accounting rate of return'.

All the above ratios are subject to criticisms relating to how firms arrive at their accounting profits, for example, how costs (such as operating costs and depreciation) are measured. In the latter two ratios, the valuation of capital (however defined) is also important[16].

4.6 Concentration and Industry Performance - An Overview of the Empirical Findings

The SCP model suggests that market performance will be closer to monopoly, the more concentrated the market, the greater the barriers to entry, the greater the level of product differentiation and the larger the extent of economies of scale. This section primarily focuses on empirical tests of the relation between concentration and industry performance. Because of the extent of this literature[17] it is not within the scope of this section to provide a comprehensive survey, instead, we will focus on the seminal studies and also cite the main findings of the survey literature.

4.6.1 Bain (1951) and (1956)

The earliest empirical works on the relationship between market structure and performance was undertaken by Bain (1951) and (1956) and is viewed as the foundation of modern empirical work in the industrial organisations literature. Bain set out to test the influence of concentration on market power. For his 1951 study he analysed a sample of 42 US industries and used eight firm concentration ratios to divide his sample into concentrated and unconcentrated industries. He found that industries with eight-firm concentration ratios greater than 70 per cent averaged return on equity (after-tax profits as a percentage of shareholders equity) of 11.8 per cent. Those industries with concentration ratios less than 70 per cent averaged a 7.5 per cent return.

Bain's (1956) study extended his analyses to include the effects of both concentration and entry barriers on industry performance:

> This predicted influence on the condition of entry on the size of price-cost margins and profits is clearly subject to the concomitant influence of the degree of seller concentration within the industry. Specifically, it is expected to be evidenced in a verifiable simple association of the condition of entry on profits mainly as far as seller concentration throughout is high enough to support effective collusion in industries with both high and medium entry barriers. (p. 191)

In this study Bain chose twenty industries to analyse rates of return in 1936 to 1940 and in 1947 to 1951. He classified industries as having very high, substantial, or moderate to low entry barriers, as well as into concentration groups. This study yielded two main results. Firstly, large firms operating in industries with high entry barriers earn higher returns than large firms in industries with either substantial, moderate or low entry barriers. Secondly, there is a positive relationship between market concentration and profitablility.

The higher the entry barriers and the greater the concentration, then the greater large-firm profitability.

4.6.2 Weiss (1974)

Weiss undertook a detailed literature review of structure-performances studies undertaken since Bain's seminal work up to the early 1970s. He was able to evaluate critically 46 concentration-profitability studies (36 in the USA or Canada, 3 in the UK, and 7 in Japan) and to refer to 8 others. The majority of these studies use regression analysis on industry level data to test to see if concentration was a statistically significant determinant of profitability (however measured). The general form of these linear regression equations is given as follows:

$$\Pi_i = f(C_i, B_i, OS_i, X_i, e_i) \tag{33}$$

where Π_i = profit index for the ith industry

C_i = industry's concentration ratio

B_i = set of entry barrier measures (including measures of minimum efficient scale, capital requirements, product differentiation, advertising intensity)

OS_i = set of other structural indicators (including measures of growth, diversification, geographical dispersion, risk, market share, firm size, buyer concentration, imports and exports)

X_i = non-structural indicators (including measures of strategic groupings, R and D intensity, price fixing agreements)

e_i = statistical error term

Overall, the majority of the studies analysed by Weiss confirmed the structure-performance relationship, that is, concentration is a statistically significant determinant of profitability. (The notable exceptions being studies undertaken by Brozen [1971] and Stigler [1963]).

As Weiss (1974) concludes:

> ... the theory of the dominant firm unequivocally points to high prices and suggests high profit rates for dominant firms ... Our massive effort to test these predictions has, by and large, supported them for "normal" years such as the period 1953-1967, though the concentration profits relationship is weakered or may even disappear completely in periods of accelerating inflation c...

> directly following such periods. By and large the relationship holds up for Britain, Canada, and Japan, as well as in the United States ... Altogether, there is still plenty of reason to believe on both theoretical and empirical grounds that high concentration facilitates tacit or explicit collusion.
>
> (Weis 1974, pp. 231-32)

In general, the early literature, therefore, supported the view that more concentrated industries earn monopoly profits.

4.6.3 Demsetz's efficiency hypothesis

A major criticism of the traditional structure-performance relationship espoused by the Chicago school is associated with the work of Demsetz, who argued that the explanation for the relation between market structure and the performance of firms related to efficiency[18]. If a f m enjoys a higher degree of efficiency than its competitors, that is, if it has a relatively low cost structure, it can adopt one of two strategies: it can maximise profits by maintaining the present level of prices and firm size; or it can maximise profits by reducing prices and expanding firm size. f a firm adopts the latter strategy, the most efficient firms will gain market share and firm efficiency will be the driving force behind the process of market concentration. Firms will also reap higher profits from their efficiency. In any event, given that industry profits are a size-weighted average of individual firm profits, concentrated industries will tend to be more profitable even if there is no causal link between concentration and profitability as a result of collusion.

Demsetz (1973) indirectly tested efficiency explanations of concentrated industries by examining the pattern of 1963 earnings within

95 US industries. He sorted firms in each industry into four different asset-size classes and calculated accounting rates of return for each class. In the regressions estimated, he used differences in profitability between the largest firms and smaller classes of firms in the same industry. The independent variable used was the four-firm concentration ratio. Demsetz's most significant results are illustrated by profit differences between the largest and smallest firms as illustrated in the regression equation below:

$$\Pi_{L-S} = -1.4 + \underset{(3.0)}{0.21}\ CONC \qquad \bar{R}^2 = 0.09 \qquad (34)$$

where Π_{4-1} = differences in profitability between the largest (4) and smallest (1) class of firms

CONC = Four-firm concentration ratio

Figures in parentheses are the t-statistic and are significant at the 99 per cent level.

The regression equation shows that concentration is a significant determinant of differences in profitability between large and small firms Demsetz also finds that there is a tendency for the rate of return to rise with concentration for the largest firms but not for the smaller firms. This obviously conflicts with the traditional view that firm profitability in a concentrated industry will be higher for all participants because of collusive/market power reasons. On the basis of this evidence, Demsetz concluded that leading firms are larger and more profitable because they are more efficient and, as a result, policies designed to reduce the level of concentration in industries would probably reduce efficiency. As Demsetz (1974) states:

> A phenomenon that is likely to generate fairly persistent differences in accounting rates of return is the fact that some products are more efficiently produced by firms possessing a large share of the market, while in other industries large market shares are not necessary for efficiency. Those firms that first act on the belief that large scale is an advantage, and that invest in the marketing and production technique prerequisite to executing the move to large scale, will possess a competitively secured advantage in timing and in obtaining early consumer acceptance that will be difficult to overcome in a short period. The market may not have grown large enough to accommodate more than a handful of such firms. These firms can produce at lower unit cost than smaller firms. They are superior in this respect, and they command an economic rent for achieving primacy. This rent will be measured as profits by accountants. (pp. 176-77)

In support of Demetz's efficiency hypothesis subsequent studies by Carter (1978), Porter (1979), Chappel and Cattle (1985) amongst others have also found that the profitability of market leaders in US manufacturing is positively related to concentration whereas the profitability of firms with small market share is not. Schmalensee (1989, p. 983), however, notes that this may not be the case outside the United States[19]. Other studies have sought to discriminate between the collusion and efficiency hypothesis by including both concentration and market share variables as independent variables in a regression equation explaining accounting rate of return. If the collusion hypothesis is correct, then all firms in a concentrated industry will tend to have higher profits, irrespective of whether they have large or small market share. If the efficiency hypothesis is observed, then only firms with larger market share will generate higher profits. US studies undertaken by Ravenscraft (1983), Smirlock *et al.* (1984), Schmalensee (1985), Smirlock (1985) and Kessides (1987), for example, have all found evidence of the efficiency hypothesis by observing market share strongly correlated with profitability and a negative or insignificant concentration relationship[20]. In fact, the majority of empirical work that tests the two hypotheses tends to confirm the efficiency hypothesis, although others (such as Clarke, Davies and Waterson [1984] and Kessides [1987]) find that profitability is not generally strongly related to market share. Others, such as Peltzman (1977) have found evidence that the two hypotheses are correct, that is, higher profits can be generated out of either superior efficiency or monopoly pricing, or both. Peltzman, however, did state that superior efficiency was mainly responsible for the increase in profitability. In a comment on this literature, Scherer *et al.* (1987) concluded that:

> ... individual market share effects are ... much more powerful than the traditionally emphasized concentration effects in explaining profitability. With most specifications, concentration coefficients turn out to be negative [but] the positive and significant market share relationship alone cannot discriminate between monopoly power and efficiency or cost advantage hypotheses.
>
> (p. 206)

Because the empirical evidence suggests that concentration in an industry will have some elements of market power and of efficiency, empirical tests have increasingly focused on firm level performance. For example, recent work by Mueller (1986), Kwoka and Ravenscraft (1986), Cotterill (1986) and Scott and Pascoe (1986) find complex firm-specific effects (e.g. rivalry between the top firms) which are not easily explained by either the collusion or the efficiency hypothesis (see Scherer *et al.* [1987] for an overview of this literature). All the above has sought to weaken belief in the traditional structure-performance paradigm[21].

4.6.4 Other studies

The above has mainly focussed on empirical evidence of the concentration-profits relationship. However, studies of the structural determinants of profitability go beyond just concentration and also consider other market structure features such as entry barriers (advertising, economies of scale, research and development), market growth, firm diversification, geographical dispersion, strategic groupings, risk and foreign trade. In empirical studies that analyse the concentration-profits relationship these 'other market structure' variables enter as control variables. Many studies, however, have directed their attentions away from the concentration-profits relationship to focus on the impact these other variables have on performance. For example, Comanor and Wilson (1967 and 1974) examine the relationship between advertising and profitability, Connoly and Hirschey (1984) identified that research intensity contributed to firm profitability, Bradburd and Caves (1982) note that market growth is positively related to profitability and so on. These studies are examined in critical detail in Schmalensee (1988) and Hay and Morris (1991) of which the latter conclude:

> ... the growth characteristics of an industry, advertising intensity, buyer concentration and probably international trade, are all important influences (on profitability) which must not be omitted from empirical work.
>
> (p. 261)

4.7 Policy Implications of the Structure-Performance Relationship

The traditional SCP paradigm suggests that in oligopolistic markets, protected by barriers to entry, all firms in an industry are able to price substantially above marginal cost and, therefore, earn higher profits than in competitive markets. The implication of this is that oligopolistic industries impose welfare losses on the economy. The policy implications of such is that society would be better off if dominant firms were broken up, large scale mergers prohibited and barriers to entry reduced or abolished. McGee (1988) argues that the main thrust of US competition policy especially in the 1970s was influenced by the traditional paradigm, although Reekie (1989) notes that the traditional rationale for policy rested on market structure rather than on performance:

> American anti-trust policy has tended to emphasise the structure of industry. "Unreasonable" and "undue" concentrations of market power are discouraged by either merger prevention or by divestiture of assets ... The objective has been to maintain a "substantial" number of competing firms and hence to minimize monopolistic behaviour.
>
> (p. 199)

Competition policy in the United Kingdom has focussed more on the 'public interest' argument and there is considerable power of discretion with the authorities. Brozen (1982, pp. 370-76) notes that the general industry policy in the European Community and the United Kingdom is favourable to the growth of firm size and focuses more on the abuse of market power (price discrimination, joint buying and selling, etc.) rather than on structure and performance *per se*.

The efficiency hypothesis states that firm efficiency dictates market concentration and, therefore, any attempts by competition policy to reduce industry concentration levels would be potentially damaging to society's welfare because it would 'prevent the rise of more efficient firms and lower the efficiency level of market lenders' (Rose, 1987, p. 178)

4.8 The Structure-Conduct-Performance Model and its Place in the New Industrial Economics

From the above we have shown that the SCP paradigm lies at the heart of the established, mainly empirically based, industrial economics literature. This paradigm suggests that a variety of basic economic and other conditions determine market structure - factors such as barriers to entry, the extent of product differentiation, the number of buyers and sellers and so on. Structure in turn determines firm conduct which includes such things as pricing behaviour, investment, research strategy and product innovation. Finally, structure and conduct together determine the performance of the industry under investigation - in terms of measures such as profitability, factor employment and consumer welfare.

Academic study of this paradigm progressed either by case study or through large-scale cross-section econometric analysis and from this, 'a series of insights were gained and a series of stylised facts identified' (Norman and La Manna, 1992, p. 1). Indeed, Schmalensee (1988) cites many of these stylised facts in his review of structure and performance studies and he concludes that:

> ... inter-industry research in industrial organisation should generally be viewed as a search for empirical regularities, not as a set of exercises in structural estimation. And I have attempted to show that research in this tradition has indeed uncovered many stable, robust, empirical regularities. Interindustry research has taught us much about how markets <u>look</u>, especially within the

> manufacturing sector in developed economies, even if it has not shown us exactly how markets <u>work</u>.
>
> (p. 1000)

The SCP approach, however, suffers from a number of serious deficiencies. In particular, while empirical investigation of an industry may reveal a positive correlation between industry profitability and concentration this tells us little about the direction of causality, and we illustrated in Section 4.2.1 of this chapter the various interrelationships that may exist. The traditional industrial organisation literature identified the 'problem' of causality but the main model and area of investigation still focussed on the causal link from structure through conduct to performance.

Over the last decade, however, the industrial organisations literature has experienced a radical change. This change, as identified by Sutton (1991, p. xiii) has involved the reformulation of many traditional arguments within the subject area in terms of explicitly game-theoretic oligopoly models. A key distinctive feature of this type of modelling is the appreciation of the strategic dimension of firms' decisions. This makes it possible to construct models that have the direction of causation of the SCP relationship going in either direction, or in both simultaneously:

> What this points to is a difficulty in the traditional approach in identifying which of the relevant economic phenomena are exogenous and which are endogenous. Developments in the new industrial economics suggest that most of the factors that enter into market structure, conduct and performance are endogenous. They are derived from the basic economic conditions that characterise the markets under investigation and the strategic interactions of the players in those markets. As a consequence, many of the factors that enter into the various parts of the structure-conduct-performance paradigm are simultaneously determined.
>
> (Norman and La Manna, p. 2)

In the recent game-theoretic literature, various authors have sought to examine the issues surrounding the determination of industrial structure (see Dasgupta and Stiglitz [1980], Shaked and Sutton [1982] and Vickers [1986]). One characteristic basic to this game-theoretic literature, however, is that the results of such analyses tend to depend heavily on the precise form of the underlying game. In addition, since there are many ways of designing strategic game-theoretic models, which appear reasonable *a priori*, within any model there may be a whole range of equilibrium outcomes.

This 'new' approach has, therefore, made it relatively easier to provide a theoretical rationale for a wide range of observed phenomenon in industrial economics. There is a difficulty with this approach, however, in that the results of game-theoretic analyses are highly sensitive to a range of factors that are impossible to identify or proxy empirically. This has led empirical research in the 'new' industrial economics to focus on some particular industry or range of similar markets for which a tailor-made specific oligopoly model can be constructed. Examples of such 'ultra-micro' work include, Hendricks and Porter (1988) on the auctioning of offshore leases, and Slade (1987) on gasoline price wars. The specific game-theoretic oligopoly modelling approach has, 'led to a growing scepticism about the value of searching for statistical regularities that hold across a broad run of different industries' (Sutton 1991, p. 6). This, of course is counter to the traditional approach where both individual industry and cross-industry empirical work has been undertaken to search for empirical regularities, as in the case of the SCP paradigm.

Overall the empirical work in the 'new' industrial economics is still in its infancy, compared with the traditional approach, and the analysis is predominantly predicated on oligopoly game-theoretic modelling. The analysis in the following chapters aims to evaluate the SCP relationship in European banking from the traditional standpoint as no game theoretic oligopoly model is developed. Our analysis of co-operative and rivalrous behaviour between leading banks, however, focuses on large bank conduct and these areas, which are empirically investigated in Chapter 8, could clearly lend themselves to some form of game-theoretic model. It is not, however, within the scope of this thesis to do so.

4.9 Conclusion

This chapter has examined both the theoretical rationale and empirical findings of the structure-conduct-performance (SCP) model from industrial organisations literature. We have shown that theory indicates that firms with market power can price above marginal cost and, therefore, generate higher profitability than in the competitive case. Early empirical work by Bain supported the view that concentration and entry barriers increased market power and therefore generated collusive profits. This spawned a massive (mainly US) literature testing the SCP paradigm, and the majority of studies up to the early 1970s supported the traditional view that higher levels of profitability in concentrated industries reflected collusive activities. During the 1970s there arose an alternative interpretation which argued that the concentration-profits relationship was a reflection of large firm efficiency - not collusion. As a result, more recent empirical work has sought to distinguish between the two hypotheses, and has increasingly focussed on the role of firm market share and its relationship to market power. Despite the development in the 'new' industrial economics, the analysis in the following chapters aims to evaluate the SCP relationship from the traditional standpoint as no game theoretic oligopoly model is developed. The following chapter examines the banking SCP literature which mainly concentrates on testing the traditional hypothesis.

Notes to Chapter Four

1. See Bain (1954 and 1962) which both discuss in detail the types of barriers which may exist in an industry. Waterson (1984, Chapter 4) also provides a good review of barriers to entry and limit price formulation

2. Gravelle and Rees (1981, pp. 312-16) provide an excellent exposition of the Cournot oligopoly model

3. Lerner (1934) identified that the divergence of price from marginal cost under monopoly can be regarded as a measure of the degree of monopoly power. The index is written as such:

$$\frac{\text{Price - Marginal cost}}{\text{Price}} = \frac{1}{e} \qquad 1<e<\phi$$

where e is the elasticity of demand. Thus, as $e > \phi$ (the competitive case) monopoly power tends to zero

4. See Curry and George (1983) for a detailed review of the range of concentration measures that are available

5. For example, see United States Department of Commerce, Bureau of the Census (1977) and Census of Manufacturers (1972). For a summary of earlier US concentration ratios sources, see Nelson (1963, pp. 17-19)

6. Because the entropy measure E is an inverse measure of concentration, a 'redundancy' measure R has been defined as R-log N-E for ease of interpretation. Ferguson (1988, p. 169) also notes that there is a relative first order entropy measure E/log N and an associated redundancy measure 1-(E/log N). The numbers equivalent would be defined as antilog E

7. See Waterson (1988, pp. 169-170) and Rose (1987, p. 182)

8. In addition, it is also sensitive to data on small firms. If an industry was comprised of ten firms, five large and five very small, if the five very small firms left the industry, leaving the remaining with 20 per cent market share each, the Gini coefficient would fall dramatically to zero because inequality of size had disappeared. Such an event, however, would probably have little effect on market behaviour

9. See Hay and Morris (1991, p. 213) who state that if a smaller firm gets smaller, concentration measured by the variance of logs method increases, but if the small firm disappears altogether, concentration decreases. It is also possible to identify cases where a merger reduces the number of firms in an industry and where the concentration ratio rises and yet the variance of logarithms declines. The logarithmic transformation significantly reduces the importance of the growth of large firms

10. The Linda index for the *n* largest firms (from Ferguson [1988, p. 171]) is:

$$Ln = \frac{1}{n(n-1)} \sum_{i=1}^{n-1} \frac{n-i}{i} \frac{CRi}{CRn-CRi}$$

It is a popular measure used in European Community studies of ir Justrial concentration

11. A simple example is the Hymer and Pashigian index:

$$\text{HP index} = \sum_{i=1}^{n} Si_t - Si_{t-j}$$

12. See Ferguson (1988, p. 171) for a theoretical example of how different indices can provide conflicting rankings. Chapter 4 of Scherer (1980, pp. 81-150) provides one of the most comprehensive analyses of the economies of scale literature

13. Robinson (1958) provides a classic reference on the logic of scale economies. Also see Moore (1959), and Haldi and Whitcomb (1967) for an insight into early empirical studies on plant size economies. Scherer *et al.* (1975) provide an excellent international comparison of economies of scale studies, see also McGee (1974) for a critique of the economies of scale literature

14. See McGee (1974a) and Bork (1979) for example

15 Reekie (1988, p. 54) for example

16. Hay and Morris (1991, pp. 216-220) provide a comprehensive analysis of these issues, as does Scherer (1980, pp. 269-73)

17. Weiss (1974) surveyed 54 empirical tests of structure-performance relationships and Hay and Morris (1991, pp. 223-69) analyse a further 55. Both of these provide excellent reviews of the empirical literature

18. For earlier studies espousing the same views, see Brozen (1971) and McGee (1971)

19. For example, Waterson (1984) on the United Kingdom, and Neumann, Bobel and Haid (1979) on West Germany, find no such relationship

20. As have studies undertaken by Bothwell and Keeler (1976), Gale and Branch (1982), Martin (1983), Harris (1984), and Mueller (1986)

21. See Brozen (1982) for a book-long account voicing support for the efficiency hypothesis and its implications for public policymaking in the United States

Chapter 5

The SCP Relationship in Banking - a Literature Review

5.1 Introduction

This chapter provides an overview of how the SCP relationship has been investigated in primarily US banking markets. Section 5.2 explains the rationale for testing this relationship in banking and section 5.3 describes how the structure-performance debate emerged in US banking at the end of the 1950s to early 1960s. Section 5.4 examines the general form of the structure-performance model and also describes the variables, together with problems associated with definition and measurement, that are used in this literature. Section 5.5 reviews the findings from over seventy US studies that have examined the concentration-performance relationship (further details of each of these studies is provided in Appendix Three). Section 5.6 investigates the empirical evidence from international studies which examine concentration and bank performance issues. Section 5.7 notes the limitations of bank SCP modelling, and 5.8 is the conclusion.

5.2 The Rationale for Testing the SCP Relationship in Banking

As we saw in the last Chapter, the SCP model is a general statement on the determinants of market performance. Simply stated, the conduct or rivalry in a market is determined by market structure conditions, especially the number and size distribution of firms and the condition of entry. This rivalry leads to unique levels of price , advertising, profits, and other aspects of market performance. Through the link of conduct, the performance of firms in a market is tied to the general structure of the market. The rationale for testing the SCP relationship in banking markets, as identified by Heggestad (1979, p.450), is to address three main issues:

1. Does market structure matter in banking markets, or is the industry so highly regulated that market structure is not an important/relevant factor in determining market performance?
2. Which aspects of market structure are the most important, and, therefore, which type of regulations or regulatory reform have the greatest impact?
3. What aspects of bank performance are most sensitive to differences in market structure?

Analysis of the SCP relationship in banking is used to help evaluate the main policy issue of which type of banking structure best serves the public in terms both of the cost and the availability of banking services. In general two main objectives have been sought; *firstly* the attainment of an 'efficient' banking system which in some way, *secondly*, minimises the likelihood of bank failure.

We have seen from the previous chapter that 'efficiency' is associated with competition. Under perfect competition firms price equal to marginal cost, maximise their profit, and achieve levels of output which bring about an optimum allocation of resources. The other extreme is monopoly which leads to a suboptimal allocation of resources. In general, the more competitive a market, the more 'efficient' it is.

Other factors, however, make it difficult to choose between the objectives of 'efficiency' and 'soundness' in banking markets. Under a competitive environment 'inefficient' firms are forced to leave the market because they cannot maintain prices high enough to cover costs. On the other hand, under monopolistic conditions high-cost firms are to a certain extent immune from the forces of competition which allows them to operate in an efficient manner and yet still survive. As such, a monopolistic industry is more compatible with the policy objective of maintaining a failure-proof banking system, while competition is more consistent with the goal of 'efficiency'.

The existence of substantial economies of scale makes the choice between the two market regimes even more difficult as Edwards (1965) notes:

> Since economies of scale occur as bank size increases, there is usually a reduction in the number of competitors. Thus, another dimension is added to efficiency, one that cannot be equated with competition in the narrow sense of number of competitors. As long as economies of scale exist, a judgement has to be made about the extent to which diminished competition is offset by the benefits of lower costs. (p.2)

In general there are a range of views concerning the application of the above to the problem of competition in banking markets. Those who believe that failure of a bank should be avoided at all cost due to the serious repercussions on the financial system and economy at large would probably be willing to sacrifice 'efficiency' for 'soundness'. In other words, the gains from increased competition (efficiency) would be small in relation to the costs associated with bank failure. At the polar extreme there would be those who believe that the cost of bank failures is small (given that deposit insurance arrangements and flexible monetary policy arrangements could be capable of preventing panics induced by failures) and these observers would be willing to sacrifice 'soundness' for greater competition and therefore efficiency.

Another viewpoint originally espoused by Phillips (1964) and Holland (1964), amongst others, is that because (the US) banking markets are inherently oligopolistic, conventional antitrust or regulatory policy aimed at changing market structure would be unable to increase competition or the quality of bank performance. As Phillips (1964) states:

> It would be possible and, within limits, it probably is desirable to improve the performance of commercial banking markets. It appears, however, that the rule of conventional antitrust policy-the prevention of mergers and combinations in restraint of trade - in achieving this result is an extremely limited one, because of the continuing necessity for some public regulation and supervision and also because of the impossibility of altering substantially the oligopolistic structure of the typical banking market. (p. 43)

In short, if bank performance is not affected by changes in the structure of banking markets then regulatory authorities need not be concerned about bank mergers. If evidence from the SCP literature found this to be the case then it would suggest that it is the organisation, rather than market structure, of the industry which is the major determinant of bank performance. It would then follow that the main means of altering performance was through changing the organisation (for example by altering bank participation in organisations such as clearing houses and trade associations), especially that part which emanates from bank regulation.

There are two important rationales for testing the SCP hypothesis in European banking markets. First, very little empirical work has been undertaken investigating the competitive behaviour of European banking systems and as such an empirical investigation may yield interesting insights that could be of interest to academics, bankers and policymakers. Secondly, the Price Waterhouse/Cecchini study on completion of an EC internal financial market drew attention to the fact that aspects of the SCP framework could be used to evaluate the evidence of oligopoly profits in EC banking systems. If oligopoly profits are significant in those banking systems, then producer surplus losses would be substantial post integration. An analysis of the SCP relationship in European banking may help us to shed light on these issues.

5.3 The Emergence of the SCP Debate in the US Banking Market

The emergence of the SCP debate in the United States is based on the view that the performance of the banking system - that is, its effectiveness in serving the deposit and credit needs of the country - is in some way related to its structure and organisation.

Prior to 1950 there were only two studies which examined the competitive situation in banking - Chandler (1938) and Berle (1949). Chandler (1938) applied Chamerlin's (1933) theory of oligopoly and monopolistic competition to the structure and behaviour of banking markets and noted that:

> ...important elements of monopoly exist in the commercial banking system, even in the absence of collusive agreements, and that it is the theory of monopolistic competition, rather than the theory of pure competition, that is the more useful in explaining the rates of interest on bank loans to customers, the rates of interest paid to bank customers on time and savings deposits, and the prices paid by customers for other banking services (p.1)

In particular Chandler focused on the case that banks are sellers of differentiated products. Customers deal with one bank rather than another for a variety of different reasons which include: age of the bank and its record of honesty, fair dealing, and safety; location, size and architecture of the bank building; personalities of the bank staff and so on. Because of customer preferences arising out of the variations in these factors, the demand for bank services will not be perfectly elastic, 'and each bank has some degree of freedom in determining the prices and rates which it will pay or charge' (p.3). In general Chandler concluded that the lack of pure competition in the US banking market helped to explain many 'phenomena' in the field of commercial banking.

Berle (1949) examined the application of competition laws to banking and he concluded that competition (or antitrust) policy was thought to have very limited applicability to banking because of its regulated character. This widely held view set the scene for the lack of research into banking structure during the 1950s (with the exception of *Alhadeff (1954)*[1] as identified by Smith (1964):

> The previous indifference of economists, even those in the industrial organisation field, to research into banking structure stemmed principally from the view that banking was a regulated industry and that its major problem was one of overbanking and excessive competition rather than one of monopolistic markets and imperfect competition. In the atmosphere of the 1930s the safety and liquidity of the banking system became an overriding concern and bank mergers were welcomed as a means of shoring up weak situations in an overcrowded industry. After the sharp reduction in a number of banking offices during the depression years, concern with overbanking largely subsided and was replaced by emphasis on the need to maintain vigorous competition in banking markets. (p. 489)

According to Philips (1964) the average annual number of bank mergers and holding company formations in the 1940s was 81, during the 1950s it was 150 and in the three years after 1960 it was around 160 a year. Gradual public concern in the United States over decreasing competition resulting from a 'wave' of bank mergers and holding company formations in the 1950s led to the Bank Holding Company Act of 1956 and the Bank Merger Act of 1960. The aforementioned laws required policy makers to focus their attentions on the economic issues in bank holding company and merger cases, and the Federal bank supervisory agencies had to consider the competitive implications as well as the 'public interest' matters.

By the early 1960s competition in banking had emerged as an ostensibly relevant public policy consideration and this, 'stimulated academic interest in the problems of banking structure' (Smith, 1966, p.489). Further academic interest was generated by the landmark US Supreme Court decision in the United States versus Philadelphia National Bank case in 1963 when it was found that commercial banking was to be treated as any other industry under the basic antitrust laws. In short, the ruling emphasised the need to preserve and promote competition in banking within the boundaries established by Federal and State regulation. As Rose (1987) notes:

> The result .... was a veritable explosion of bank market structure and competition studies mirroring earlier industrial studies. Overwhelmingly, these studies have concentrated on the relationships among bank market structure, the key prices in banking - the rate of interest on loans and the promised rate of return on deposits, and bank profitability as barometers of how well or how poorly the public is being serviced by American banks (p.59).

5.4 The SCP Model Applied to the Banking Industry

Heggestad (1979 p.467) states that in general, a model of the structure-performance relationship in banking would make the equilibrium price of any product a function of the following:

1. The level and elasticity of market and firm demand
2. The firm's cost function
3. The prices and quantities of related financial products, and their interactions with the firm's demand and cost functions
4. The objective function of firms in the market
5. The interaction among firms in the market

Every firm would simultaneously or 'iteratively' obtain the equilibrium price and market structure influences this process by its effect on the interaction among firms. As a way of modelling this process, the US structure-performance studies have mainly used multiple regression analysis as a means of relating structure to performance in banking markets. The general form of the structure-performance model [see Rhoades (1977), Heggestad (1979) and Gilbert (1984)] is as follows:

$$P = f\ (CR,\ S,\ D,\ C,\ X) \qquad (1)$$

where P = a performance measure

CR = a measure of market structure (usually a concentration measure)

S = other market structure variables, such as proxies for barriers to entry

D = set of variables to reflect market demand conditions

C = a set of variables to reflect differences in costs across firms

X = a variety of control variables related to a specific products characteristics

Multiple linear regression analysis 'is a statistical technique concerned with variations in one dependent variable when all the other independent variables vary together' (Johnston, 1972, p.176). The term linear means that the parameters of the model are linear coefficients, while the variables can be linear or not (quadratic, logarithmic, exponential etc.). This technique which has been used for testing the SCP relationship in banking markets tries to determine whether there is a statistically significant relationship between bank performance, which is the endogenous variable, and market structure, which is one of the exogenous variables.

5.4.1 Measurement of bank performance

There are various approaches to measuring the performance of a banking firm. Traditionally there have been two main types of measures of bank performance. The first type of measure generally relates to the price of a particular product or service; the second type of performance measures are profitability measures. Table 5.1 provides a classification of performance measures used in 73 US SCP studies between 1964 and 1991, the details of which are set out in Appendix three. It can be seen from the table that the most common type of price measures are as follows:

- Average interest rate on loans, calculated as interest and fees on loans during the yea_ divided by the volume of outstanding loans at a given point in time.
- Average interest rate paid on deposits, estimated as the total amount of interest paid over the year divided by the volume of deposits at the end of the year.
- Average service charges on demand deposits, which is calculated as the annual service charge revenue over the volume of demand deposits at a specified point in time.

Several commentators [see Gilbert (1984), Smirlock (1985) and Evanoff and Fortier (1988), for example] have criticised the use of average deposit and loan rate ratios as measure of bank performance for the following reasons. Firstly, average measures combine flow variables (ie. interest on loans over one year period) with stock variables (ie. loans outstanding at the end of the year). It is unclear as to whether prices should be defined using average or year-end values; depending on the criteria chosen the value of the ratios will be different.

Table 5.1 Performance measures used in the US SCP literature[1]

Performance measures	Number of times the respective performance measures have been used in the SCP literature	Number finding the performance measure to be unambiguously significantly related to market structure[2]
Loan Interest Rates		
Interest and fees on loans/Total loans	19	7
Interest rate on business loans	6	3
Interest rate on new car loans	3	2
Interest rate on residential mortgages	2	2
Total	30	14
Deposit Interest Rates		
Interest payment on time and savings deposits/ total time and savings deposits	16	5
Interest rates on Money Market Deposit Accounts	2	2
3,6,12 and 30 month CD rates	2	1
Interest rate on Super-Now accounts	1	1
Interest payment on time deposits /Total time deposits	1	1
Interest rate on time deposits	1	0
Interest rate on passbook savings	1	0
Interest rate on $1000 CD	1	0
Total	25	10

continued ....

Table 5.1 (continued)

Service Charges		
Revenue from service charges on demand deposits/ Total demand deposits	14	3
Revenue from service charges on demand deposits	5	2
Monthly service charge on demand deposits	1	1
Charges for returned cheques	1	0
Service charges on a standardised account	1	0
Total	22	6
Profitability measures		
Return on Assets	24	12
Return on Capital	14	8
Total	38	20
Other measures		
Lerner index	2	0
Elasticity of loan demand	2	1
Number of bank employees	1	0
Standard deviation of return on equity	2	2
Concentration measures	1	0
Market share stability indices	2	2
Portfolio selection	2	2
Senatorial votes	1	0
Service quality measures	1	1
Labour expenses	2	2
Other expenses	2	2
Total	133	62

Notes: 1. These performance measures were found to be used in a review of 73 US SCP studies

2. Many studies use a variety of performance and market structure measures covering different time periods. Figures included in this column relate to those studies that find regression coefficients on measures of market structure with t-statistics greater than 1.95 and which unambiguously report a significant result.

Source: See Appendix Three.

Secondly, some studies have used average interest paid on deposits as a performance measure when regulation Q, which imposed ceilings on interest payable on deposits in US banking, was in existence. Given this restriction, average interest rate paid on deposits 'is more likely to be a function of the maturity distribution of a bank's deposits and their denomination than a function of market structure' Gilbert (1984, p.632). Finally, average service charges on deposit accounts do not take into account the fact that service charges vary according to such things as account activity, minimum balance requirements and so on.

These measurement problems can be avoided by using survey data to obtain information on interest rates and service cost for particular categories of loans and deposits as illustrated in Table 5.1. A much simpler and more widely adopted approach, however, has been to use profitability measures. As Gilbert (1984) observes:

> The only measures of bank performance derived from the report of income and report of condition that do not have major measurement problems are bank profit rates. If banks in areas with higher market concentration charge higher interest rates on loans, set higher service charges on deposits and pay lower interest rates on deposits, these effects will be reflected in the pattern of bank profit rates ..... (p.632).

Brown (1985), Rhoades (1985c) and Evanoff and Fortier (1988), to name a few, provide support for the use of a profitability measure to account for the performance of the firm. The two major advantages of such a measure are its simplicity and the fact that it consolidates information about a multi-product firm into one single figure. The major disadvantage of profitability measures is that they combine flow variables (ie. profits) with stock variable (ie. assets or capital).

The most commonly used profitability measures as shown in Table 5.1 are net income divided by total assets (return on assets) and net income divided by capital (return on capital)[2]. Studies that have used profitability measures have also been more successful in finding a significant relationship between market structure and industry performance.

5.4.2 Definition of a market and measurements of market structure

Because banking is a multiproduct industry, a simple all-inclusive market area is difficult to delineate and no single measure of structure precisely reflects the degree of monopoly, nor does economic theory help choose which measure is most important (see Edwards (1965) and the section on measures of market structure in Chapter 4.). As we have shown in the previous chapter, measures of market structure that are available suffer deficiencies which may lead to erroneous conclusions. Vernon (1971) points out that because banking markets are mainly categorised into the 'modestly' concentrated regions:

> There are no monopolies and no highly competitive market forms. This being the case, concentration ratios relating to the local banking markets may be rather insensitive indicators of monopoly performance ...... The connection between structure and performance is tenous even where a wide range of structures is present' (p. 623)

In addition, without a control group of banks existing in a perfectly competitive environment, there is not an absolute standard for comparing the influence of alternative bank structures.

To account for the multiproduct nature of banking markets the majority of US research studies on bank structure and competition, 'usually choose between studying the market for one banking service or viewing banks as offering a bundle of services within the boundaries of a single market area', (Rose, 1987, p.52). Banking markets have been approximated in most studies by the Standard Metropolitan Statistical Area (SMSA) for urban banks and counties for other banks[3]. Gilbert (1984) notes that:

> There is empirical support for such market area designations. Surveys of where bank customers obtain banking services indicate that the relevant market area for banking services are substantially smaller than states or nations ......These surveys indicat that the geographic areas over which customers shop for banking services are different for various banking services.

This definit_on of banking markets, however, may not be entirely appropriate because as Tolley (1977, p.5) identified, bank regulatory agencies frequently employ SMSAs and counties as 'approximations' for banking markets, mainly because deposit data is readily obtainable for these geographic areas.

ost US banking markets - as identified in studies undertaken by Hergestad and Mingo (1977), Savage (1982), Rhoades (1985a) and Rhoades (1985b) - have historically been highly concentrated. For example, Rhoades (1985b) shows that in 1983 the 25 states that permitted statewide branching had, on average, 5-bank deposit concentration ratios of 72 per cent. In local (SMSA) markets, Savage (1982) reports 5-bank deposit concentration ratios ranging from 76.7 per cent (for SMSA's in unit bank_ng states) to 83.7 per cent (in limited branching states). As

Rose (1987) notes:

> ....across the United States as a whole the top three banks in each of the nation's urban centres (SMSAs) appear to control about 70 per cent of local deposits.....' (p. 177).

As typified by the above, concentration has been most widely used as a measure of market structure in the SCP literature. Table 5.2 provides a summary of market structure measures used in this literature.

Heggestad (1979) identifies three major problems of measuring monopoly in banking markets, 'choosing the appropriate general index of monopoly power, choosing the appropriate economic variable with which to measure differences in bank size, and accounting for differences in institutional competition (or for competition between banks and nonbank financial institutions)' (p. 469). In virtually all the cases referred to in Table 5.2, the measure of market structure is based on total bank deposits. This may well be relevant when studying general bank performance, but may be less appropriate when evaluating the SCP relationship in say the consumer loan market where measurement of monopoly power should ideally be related to the distribution of consumer loans among banks. This may seem to be a serious error in many studies, but Heggestad goes on to suggest that because various measures of monopoly in banking are likely to be highly correlated and because all measures are only approximations for monopoly, using a commonly available deposits based measure can be viewed as satisfactory.

Table 5.2 Market structure measures used in the US SCP literature

Measures of Market Structure	Number of times the respective market structure measures have been used in the SCP literature
Concentration ratios	
5 Firm Deposits	2
3 Firm Deposits	37
2 Firm Deposits	3
1 Firm Deposits	9
Herfindahl Index (H) Deposits	17
Numbers Equivalent (1/H)	2
Number of firms in the market	16
Gini Coefficient	2
Entropy	2
Hall-Tideman Index	2
Dummy variable for markets with relatively high 1-firm or 3-firm concentration ratios	1
Herfindahl index (H) multiplied by a dummy variable for markets with relatively low H	1
Change in H	1

Notes: 1. These market structure measures were found to be used in a review of ‹3 SCP studies, see Appendix Three for further information

Source: See Appendix Three.

As we have already noted in the previous Chapter, choosing the appropriate measure of market structure is also important. Most US studies have used a simple concentration ratio, but this type of measure does not take account of the dispersion of bank size in the market and also does not reflect the number of competing firms. The Herfindahl index is responsive to the number and dispersion of firms in the market and is therefore generally viewed as a superior measure. It has been suggested, however, that these measures are actually so highly correlated (see Rose and Fraser, 1976) that the choice of market structure measure is 'not of critical importance for testing structure-performance hypotheses' (Heggestad, 1979, p. 470).

5.4.3 Other Market Structure Variables

5.4.3.1 Entry barriers

Economic theory implies, *ceteris paribus*, that the entry of new firms into a given market will necessarily increase rivalry. This is because the entry of such firms has long been regarded as a stimulus to competition. If the number of firms in a market increases, it will become more competitive and less concentrated (see Bain (1956) and Scherer (1970)). Rhoades (1980) points out:

> In addition, particularly in the short run, new entry will tend to increase uncertainty among the firms in a market with respect to their views of the actions and reactions of their rivals as well as to their views of the action of new entrants (p.424)

In US banking markets, many decisions that affect the number of competitors in various markets are made by Federal and State regulatory agencies. These authorities have the power to approve or deny applications for new bank charters or branches, and therefore they can determine the number of competitors in banking markets. Public policy of this nature seeks to protect the public interest by avoiding excessive competition. This role of the authorities is based on the view that unrestricted competition would not safeguard the public interest: consequently, competition should be restricted as Phillips (1964) observed, in order to, 'preserve the liquidity of the payments mechanism, and to provide safety for depositors' (p.41).

In contrast to this view, there are other commentators who believe that entry barriers into banking markets should be relaxed in order to foster competition. King (1979) notes that in order to evaluate the costs and benefits of Federal and State entry barriers (eg. branching versus unit banking states, liberal bank holding company (LBHC) legislation versus restricted BHC regulations) one must evaluate whether decisions that loom so important in theory have any influence in practice. In other words, entry conditions are included in the SCP model in order to evaluate the impact they have on bank performance as well as to see how they relate to concentration levels.

The majority of US studies that account for entry barriers do so by assuming that lower entry barriers - the ability to undertake branching- enter the performance equation only as a shift parameter (see Rhoades (1980, 1981, 1982a); Rhoades and Rutz (1982), Berger and Hannan (1989), to name but a few). The findings of these studies, though not conclusive, suggest that higher entry barriers result in greater profits. In other words, in unit banking states it should be easier for banks to exert market power than in areas where there is always the threat of potential entry: these areas are termed liberal branching states[4]. Evanoff and Fortier (1988) suggest that the use of a binary variable to take account of entry barriers may distort the influence of other explanatory variables, given that determinants of market performance may be quite different across the two types of banking markets. As a result, they suggest that it is better to estimate separate equations for unit banking and liberal branching states - they do however use a binary variable to account for whether 'liberal' holding company expansion is allowed or not.

We have discussed (see above) the regulatory barriers to entry. There are also, of course, non-regulatory barriers to entry, such as the relative-minimal-efficient-size-of firm, and SCP studies usually account for this by including a variable for the size of the market, since most studies in US banking assume the minimum efficient size of firm is the same in all markets. In addition, production differentiation may be achieved through a proliferation of branches (see Stolz, 1976 and White, 1976) or, high levels of advertising expenditure (see Edwards, 1973). Only a few studies, however, control for product differentiation.

5.4.3.2 Other market structure variables

Other market structure variables included in the SCP models are used to control for other structural factors that are believed to impact on bank performance. For example, number of bank branches; market share of banks; binary variables to account for competition between bank and non-bank financial intermediaries; binary variables to capture differences in bank behaviour attributable to holding company affiliation; binary variables indicating banks located in Metropolitan Statistical Areas; and so on.

5.4.4 Market demand conditions

All the SCP studies use some variables to proxy for market demand conditions, the most popular being measures of market size and market growth. Market size, either total bank deposits or assets in respective markets, is used as a proxy for market potential on the basis that the larger the market the greater the likelihood of new entry and potential for increased competition (see Evanoff and Fortier (1988) and Hannan (1991a), for example). Growth in market deposits is also often used as a proxy to account for change in local demand conditions. Other variables that are used to control for market demand conditions include: per capita income or wage levels in the relevant markets (see Rhoades (1981) and Berger and Hannan (1989)); coefficient of variation of per capita income in the market to capture variation in the demand for bank services); population density to control for demographic differences across markets; and the rate of in-migration into specific markets to account for changes in demand.

5.4.5 Cost differences

The most common variable used in the SCP literature to account for cost differences across banks is a measure of individual bank size, namely total assets. This is included in virtually every model that has been tested and is included to account for size-induced differences between banks, such as scale economies. Other measures, such as local banking wage rates (a proxy for the cost of labour: see Calem and Carlino, 1989) and interest paid on deposits (a proxy for the cost of funds: see Berger and Hannan, 1989) are also used to account for cost differences across banks. Many studies also use the ratio of demand deposits to total deposits as a crude proxy for the relative cost of funds on the grounds that demand deposits are a relatively inexpensive source of funds.

5.4.6 Other control variables

SCP studies that adopt loan and deposit rates as a measure of bank performance use a variety of other variables to account for their characteristics such as the type, size and maturity of these items. In addition, all the studies also utilise a variety of variables to control for different risk characteristics associated with individual banks. For example, the loans-to-assets ratio is sometimes used as a rough proxy of portfolio risk based on the view that loans tend to be risky relative to other assets typically held in a commercial bank's portfolios[5]. Studies, particularly in the 1980s, tended also to incorporate a capital-to-assets (or equity-to-assets) ratio to account for differing risk levels between banks - lower ratios implying a more risky position. Clark (1986b) introduces loan-loss reserves to total loans as an indicator of default risk.

5.5 Concentration and Performance - The Empirical Evidence from the United States

Details of all the studies cited in the following section are provided in Appendix Three. This appendix provides information on the: sample used; measure of bank performance; R^2 or adjusted R^2 ($\bar{R}^2$), measures of market structure and shows whether the coefficient on the measures of market structure are statistically significant. It covers US SCP studies from 1960 to 1991.

5.5.1 Concentration and loan rates

In the earliest SCP study of banking markets, Schweiger and McGee (1961) came to the conclusion that the smaller the number of banks in a region, the higher the level of automobile and installment loan rates. The sample was taken from 11 large cities for 1960, but unfortunately the study did not provide adequate statistical tests to determine whether differences detected were other than random.

Edwards (1964) in his study of 49 SMSA's found that for data provided by the Federal Reserve Survey on business loan rates these were found to be significantly related to concentration levels in 1955 but not for 1957 (these conflicting results, it was suggested, may be due to different monetary policies pursued by the central authorities in those years). The positive relationship between individual business loan rates, obtained through survey data, and concentration has been substantiated by the majority of subsequent studies (see Phillips

(1967), Jacobs (1971), Hannan (1991a), for example).

Fleschig (1965), however, used a similar dataset to Edwards (1964) in order to undertake two tests of the SCP relationship and found that concentration had no effect on those rates in 1957 and only a marginal impact for 1955 data. He concluded:

> Although concentration in metropolitan areas in some instances appears to be directly associated with bank rates on these loans it is not significantly related to loan rates when adequate account is taken of the differences in loan characteristics and in the supply and demand conditions in local and regional markets. (p.310)

The studies mentioned above all used individual loan rates as a measure of performance. The data were usually obtained from Federal Reserve Surveys of business loan rates or individual researchers' surveys. Average loan rates, calculated by dividing interest and fees on loans by total loans, however, have been the most widely used measure in the US SCP literature. This is because data on average loan rates are much easier to obtain. The difficulty arising from using this measure is that 'average' loan rates make no allowance for major differences in risk and types of loans held by banks. This problem, however, has not restricted the amount of studies using this specific performance indicator as illustrated in Table 5.3.

The results from those studies have been very mixed. Ware (1972), so as to avoid problems associated with variations in regulations across states, restricted his study to markets within the state of Ohio (see Fraser and Rose (1971) and Kaufman (1966) for examples of other studies). Ware concludes that concentration has no significant affect on any of his measures of performance, average loan rates included. Conversely, Beighley and McCall (1975) found that concentration had an important effect on average loan rates:

> The results clearly provide a firm basis for the conclusion that competitive market structure is statistically significant in explaining variations in the market power of individual banks in large and medium-sized local instalment loan markets. (p.466)

Studies by Edwards (1965), Kaufman (1966), Fraser and Rose (1971), Whitehead (1978), Savage and Rhoades (1979), Rhoades and Rutz (1979), Rhoades (1979), Rose and Scott (1979), Rhoades (1981) and Hanweck and Rhoades (1984) all substantiate the case that concentration does have a significant effect on average loan rates. However, the remaining studies do not find any significant link between the level of concentration and average loan rates.

A study by McCall and Peterson (1980), focusing on 155 SMSA's and counties in 14 unit banking and limited branching states, is of particular interest because it uses the Lerner index (i.e. the spread between average loan and deposit rates) as the main bank performance indicator, and tests for non-linearity in the structure-performance relationship. Using a switching regression technique, the authors find evidence of a critical level of concentration in business loan markets. This finding of a critical level of market concentration above which the

Table 5.3 Concentration and loan rates

Study	Individual Loan Rates	Average Loan Rates	Coefficient on the Measure of market structure are statistically significant[a]
1. Schweiger and Mcgee (1960)	Automobile loan rates Instalment loan rates	- -	Higher rates with fewer banks
2. Edwards (1964)	Business loan rates	-	Yes 1955 No 1957
3. Edwards (1965)	-	IL - TL	Yes
4. Fleschig (1965)	Business loan rates	-	Yes 1955 No 1957
5. Kaufman (1966)	-	IL - TL	Yes
6. Phillips (1967)	Rates on short-term business loans	-	Yes
7. Taylor (1968)	-	IL - TL	No
8. Aspinwall (1970)	Rates on residential mortgages	-	Yes
9. Fraser and Rose (1971)	-	IL - TL	No 1966 Yes 1967
10. Jacobs (1971)	Business loan rates	-	Yes
11. Fraser and Rose (1972)	-	IL - TL	No
12. Ware (1972)	-	IL - TL	No
13. Yeats (1974)	-	IL - TL	No
14. Fraser and Alvis (1975)	-	IL - TL	No

continued .....

Table 5.3 (continued)

15. Beighley and McCall (1975)	-	IL - TL	Yes
16. Heggestad and Mingo (1976)	Interest rate on new car loans	-	Yes
17. Whitehead (1977)	-	IL - TL	No
18. Whitehead (1978)	-	IL - TL	Yes
19. Graddy and Kyle (1979)	-	IL - TL	No
20. Harvey (1979)	-	IL - TL	AMBIGUOUS
21. Savage and Rhoades (1979)	-	IL - TL	Yes
22. Rhoades (1979)	-	IL - TL	Yes
23. Rhoades and Rutz (1979)	-	IL - TL	Yes
24. Rose and Scott (1979)	-	IL - TL	Yes
25. McCall and Peterson (1980)		IL - TL	Yes
26. Rhoades (1981)	-	IL - TL	Yes (in 5 out of 7 years)
27. Marlow (1982)	Rates on residential mortgage loans	-	Yes
28. Hanweck and Rhoades (1984)		IL - TL	Yes
29. Hannan (1991a)	Commercial loan rates	-	Yes in only 1 out of 8 cases for 1984 Yes in 5 out of 8 cases in 1986

Notes: [a]: where t-statistics on the market structure coefficient are greater than 1.95.
IL = interest and fees on loans
TL = total loans

Source: See Appendix Three

market power of leading firms exerts a significant effect on performance supports similar findings by Rose (1976), Rhoades (1980) and Daskin and Wolken (1989).

Hanweck and Rhoades (1984) and Rhoades (1985a) evaluate whether market share has an effect on bank prices, loan rates included. Hanweck and Rhoades (1984) examine 147 SMSAs and 112 country-wide banking markets and Rhoades (1985) analyses 6,500 banks both during the 1970s:

> The underlying hypothesis of their studies is that some banks, may be so large relative to their competitors, possessing markedly superior resources and diversification, that they are able to intimidate smaller banks into adopting the larger institutions pricing schemes. (Rose, 1987, p.196)

This predatory pricing thesis is generally supported in both studies, especially for loan interest rates (as well as service charges on deposits and non-interest operating expenses).

In general we can make two main conclusions about the concentration/loan rate relationship. Firstly, as Gilbert (1984 p.631) has observed, average loan rates are poor measures of bank performance and studies that use individual loan data obtained through survey avoid measurement problems and yield satisfactory results. As we have noted, virtually all of these suggest that the traditional structure-performance relationship holds. Secondly, even when the relationship between concentration and loan rates is found to be significant, there is a quantitatively small impact. The range of estimates of effects of a 10 per cent increase in market concentration on loan rates (individual or average) vary between 18 basis points (Edwards, 1964) and

0.1 basis points (Rhoades, 1981) In addition, the R^2 for the equations in most of the market structure studies on bank loan rates vary between 0.15 and 0.60, suggesting that there are important omitted variables in these equations. The estimated effects of concentration on loan rates may therefore be biased if the measure of market concentration is correlated with the omitted variables.

5.5.2 Concentration and deposit rates

Interest on time and savings deposits has also been used as a performance indicator in the structure-performance studies. As in the case for loan rates, the majority of studies have used average deposit rates (mostly interest payment on time and savings deposits divided by time and savings deposits) as a performance measure. This measure is subject to the same criticisms as average loan rates because the numerator is an annual expense flow (income flow in the case of loans), but the denominator is a balance sheet item recorded at a point in time, which may be different from the average deposit balance (or loan) over the year.

Despite these problems, it can be seen from Table 5.4 that all but five of the 23 studies that use deposit rates as a performance measure employ average rates. Most studies that use average deposit rates find that there is no significant relationship between market structure and these rates. The earliest work using individual deposit rates (Klein and Murphy (1971) and Heggestad and Mingo (1976)) also find no significant relationship. One should note, however, that US pre-1980

Table 5.4 Concentration and deposit rates

Study	Individual deposit rates	Average deposit rates	Coefficient on the measure of market structure are statistically significant[a]
1. Edwards (1965)	-	IT - TS	Yes
2. Kaufmann (1966)	-	IT - TS	Yes
3. Fraser and Rose (1971)	-	IT - TS	No for 1966 Yes for 1967
4. Klein and Murphy (1971)	Interest rate on time deposits	-	No
5. Fraser and Rose (1972)	-	ITD - TI	No
6. Ware (1972)	-	IT - TS	No
7. Fraser and Alvis (1974)	-	IT - TS	No
8. Yeats (1974)	-	IT - TS	No
9. Heggestad and Mingo (1976)	Interest rate on passbook savings Interest rate on 1 year $1000 CL	-	No
10. Fraser and Rose (1976)	-	I - TS	No
11. Rose and Fraser (1976)	-	IT - TS	No
12. Stolz (1976)		IT - TS	No
13. Whitehead (1977)	-	IT - TS	Yes
14. Whitehead (1978)	-	IT - TS	No
15. Graddy and Kyle (1979)	-	IT - TS	No
16. Harvey (1979)	-	Interest	Yes

continued ..

Table 5.4 (continued)

		payments on TD - TD	
17. Savage and Rhoades (1979)	-	IT - TS	Yes
18. Rhoades (1979)	-	IT - TS	No
19. Rose and Scott (1979)	-	IT - TS	No
20. Rhoades (1981)	-	IT - TD	Yes in 4 out of 7 cases.
21. Hannan (1983)	Passbook savings rate	-	Yes (from Tobit Maximum Likelihood estimates)
22. Hanweck and Rhoades (1984)		IT - TD	Yes
23. Berger and Hannan (1989)	Money Market Deposit Account rate 3,6,12 and 30 months CD rate	-	Yes in 8 out of 10 equatio ;
24. Calem and Carlino (1989)	Money Market Deposit Account rate 3 and 6 month CD rates	-	MMDA's Yes 6 month CD Yes 3 month CD No

Notes: [a]: where t-statistics on the market structure coefficient are greater than 1.95
IT - interest payment on time and savings deposits
TS - time and savings deposits
ITD - interest payments or time deposits
TD - time deposits

Source: See Appendix Three

studies using deposit rates as a performance measure give a biased picture of performance, because in most periods studied Regulation Q was in force. It is, therefore, more sensible to consider briefly the literature that uses sample data from outside this period.

Berger and Hannan (1989) examine 470 banks in 195 local banking markets observed quarterly over a two and a half year period between September 1983 and December 1985. They use as performance measures, interest paid on Money Market Deposit Accounts (MMDAs), Super-Now (Negotiable Order of Withdrawal) Accounts, and 3,6,12 and 30 month CDs. These price data were obtained from the Federal Reserve's Monthly Survey of Selected Deposits and other Accounts. Their findings are strongly consistent with the implications of the structure-performance hypothesis:

> '... banks in the most concentrated local markets in the sample are found to pay MMDA rates that range from 25 to 100 basis points less than those paid in the least concentrated markets, depending on the time period examined. Similar results are found for Super-NOWs and shorter-term CDs' (pp.298-299)

These results are also unusual because their equations have much higher R^2 than other studies - ranging between 0.33 and 0.88.

Calem and Carlino (1989) use a sample of 466 commercial banks and Federal savings banks insured by the Federal Deposit Insurance Corporation (FDIC) in 1985 covering 145 SMSAs. Using MMDA's and 3 - and 6 - month CD rates as performance measures, they find that a 10 per cent increase in concentration creates a fall in MMDA rates by 5.9 basis points and for 6 - month CDs a fall of 3-4 basis points - (the relationship was not significant for 3 - month CDs). One should also mention that despite individual deposit rates being a better measure of performance, the explanatory power of these models (R^2 ranging for most between 0.01 and 0.25) is lower than those that use average rates (R^2 ranging between 0.2 and 0.5 in most cases)

To conclude, individual deposit rates are a better measure of bank performance than average deposit rates, although the majority of studies provide biased results because of the impact of Regulation Q in the 1960s and 1970s. The most recent studies, using individual deposit rates, find strong evidence of the traditional structure-performance hypothesis.

5.5.3 Profitability and concentration

Most bank concentration studies have examined the relationship between bank market structure and profitability ratios, either using ROA (net income divided by total assets) or ROC (net income divided by total equity capital). Table 5.5 provides the findings of those studies that examine the profitability-concentration relationship, and it illustrates that ROA is the most popular profitability measure. Edwards (1965), Kaufman (1966), Fraser and Rose (1976), Heggestad (1977), Rhoades (1979), Glassman and Rhoades (1980), Rhoades (1982a), Kwast and Rose (1982) and Rhoades and Rutz (1982) all find a statistically significant relationship, suggesting that ROA for banks operating in more concentrated markets is higher. Studies undertaken by Yeats (1974) and Rhoades and Rutz (1979) however, find no such relationship. Early studies using ROC as a measure of performance also tended to find no such relationship, although later studies (such as Clark 1986b) provide a little more evidence that the traditional structure-performance relationship holds.

Table 5.5 Concentration and profitability

Study	Profitability measure	Coefficient on the measure of market structure one statistically significant[a]
1. Edwards (1965)	NI - TA	Yes
2. Kaufman (1966)	NI - TA	Yes
3. Fraser and Rose (1971)	NI - C	No
4. Vernon (1971)	NI - C	Yes
5. Emery (1971)	Deviations from the capital market line	No
6. Fraser and Rose (1972)	NI - TA	No
	NI - C	No
7. Ware (1972)	NI - C	No
8. Edwards (1973)	NI - C	No
9. Yeats (1974)	NI - TA	No
10. Fraser and Alvis (1975)	NI - TA	No
11. Fraser and Rose (1976)	NI - TA	Yes
12. Mingo (1976	NI - TA	No
13. Heggestad (1977)	NI - TA	Yes
14. Whitehead (1977)	NI - C	No
15. Whitehead (1978)	NI - C	No
16. Harvey (1979)	NI - C	Yes

continued ......

Table 5.5 (continued)

17. Savage and Rhoades (1979)	NI - C	Yes
18. Rhoades (1979)	NI - TA	Yes
19. Rhoades and Rutz (1979)	NI - TA	No
20. Glassman and Rhoades (1980)	NI - TA	Yes
21. Rhoades (1981)	NI - TA	No
22. Rhoades (1982a)	NI - TA	Yes
23. Kwast and Rose (1982)	NI - TA	Yes
24. Rhoades and Rutz (1982)	NI - TA	Yes
25. Smirlock (1985)	NI - E NI - C NI - TA	Yes when market share not included as an explanatory variable. (No when included)
26. Wall (1985)	NI - TA NI - C	No No
27. Clark (1986a)	NI - E	No
28. Clark (1986b)	NI - E	Yes
29. Evanoff and Fortier (1988)	NI - TA	Yes (but only in 2 equations when market share is not included as an explanatory variable). No otherwise

Notes: a where t-statistics on the market structure coefficient are greater than 1.95.
NI = net income
TA = total assets
C = capital
E = equity

Source: See Appendix Three

Conventional economic theory links concentration to individual firm profitability, but it can be seen from the above results that there is no clear agreement on the concentration-profitability connection. Wall (1985) in a study of independent SMSA banks finds that neither market concentration nor bank size has a major impact on profits, and he suggests that bank profits are dominated by asset and funds management strategies and by management's ability in reducing non-interest expenses, not by market structure or regulation.

Other negative results for banking concentration were reported by Smirlock (1985) and Evanoff and Fortier (1988) who both argue that the major linkage is between market share and profitability, which are positively related. In testing Demsetz's (1973) efficiency hypothesis they both find that once the market share of individual banks is controlled for, concentration provides no additional explanatory power in influencing variations in bank profits. A study undertaken by Hanweck and Rhoades (1984), which examined 259 metropolitan and country-wide banking markets, contradicts the above findings when applied to the market share of the major banks in each market. They find that the presence of 'dominating' banks affe :ts service prices but not profitability. Rhoades (1985c), in a st'.dy of 3777 commercial banks in 372 markets across the United States for 1976 to 1980, finds that profits tend to be higher where there wer' relatively few fringe banks (those ranked 4,5 and 6 in markec share). As Rose (1987) has identified:

> This finding clashes with the conventional argument that mergers among fringe banks should be encouraged in order to create new market lenders to challenge the dominant banks. (p.198).

Finally, although Gilbert (1984, p.632) h is state' that bank profit rate is an appropriate measure of bank perf(mance, is these studies that have the lowest explanatory power with R^2 or adjusted R^2 ($\bar{R}^2$) typically ranging between 0.01 and 0.15.

5.5.4 Service charges and concentration

Demand deposit service charges have also been used as a performance indicator for assessing the effects of concentration. Heggestad and Mingo (1976) find that these charges increase with concentration in a nonlinear fashion. Stolz (1976), in a study noted for its good survey data, analysed the effect concentration had on demand deposit service charges in 333 banking offices in 75 rural countries. Using a novel 'area of convenience' approximation to banking markets, Stolz found that these service changes were not influenced by concentration.

Weiss (1969), in his study of 25 SMSAs, noted that higher concentration is related to the absence of 'free checking'. Not only does the study identify this finding, but it also mentions the need to observe mutual interdependence on the part of major competitors in the market:

> When this condition exists, a decision-maker in the market explicitly considers the reactions of his competitors to any market action he may take ... If this situation goes undisturbed, unilateral price reduction is not likely to occur. (p. 105)

Average service charges have been the most commonly used measures of performance. Table 5.6 illustrates this point. The problems associated with this choice of performance indicator are similar to those associated with the average loan and deposit rate indicators, as mentioned earlier. In general, however, studies that use individual service charge measures tend to be no more conclusive in their findings than those that use average measures.

Table 5.6 Service charges and concentration

Study	Service Charge Measure	Coefficient on the measure of market structure one statistically significant[a]
1. Bell and Murphy (1969)	Estimated service charge on demand deposits	Yes
2. Weiss (1969)	Offering of no service charge on demand deposit accounts	Concentration related to the absence of free chequing a/c
3. Fraser and Rose (1971)	SC - DD	No
4. Klein and Murphy (1971)	Service charge revenue divided by: 1. No. of DD accounts 2. No. of debits to DD accounts	 No No
5. Fraser and Rose (1972)	SC - DD	No
6. Ware (1972)	SC - DD	No
7. Fraser and Alvis (1975)	SC - DD	No
8. Heggestad and Mingo (1976)	Service charge on standardised account charge for returned cheque	No No
9. Fraser and Rose (1976)	SC - DD	No
10. Rose and Fraser (1976)	SC - DD	Yes

continued ...

Table 5.6 (continued)

11.	Stolz (1976)	SC - DD	No
12.	Heggestad and Mingo (1977)	Monthly service charge on demand deposits (based on a survey)	Yes
13.	Graddy and Kyle (1979)	SC - DD	No
14.	Savage and Rhoades (1979)	SC - DD	Yes
15.	Rhoades (1979)	SC - DD	Yes
16.	Rhoades and Rutz (1979)	SC - DD	Yes
17.	Osborne and Wendel (1981)	SC - DD SC - Number of DD accounts Explicit SC for 20 cheques Price per number of cheques written (6, 20, 42 or 84)	Yes No Yes (Opposite si to the SCP paradigm) No in all 4 case
16.	Rhoades (1981)	SC - DD	Yes (in 5 out oi 7 years tested)
17.	Hanweck and Rhoades (1984)	SC - DD	Yes

Notes: a where t-statistics on the market structure coefficient are greater than 1.95

SC = revenue from service charges on demand deposits
DD = demand deposits

Sor ce: See Appendix Three

5.5.5 Extra-market structure and communication

Extra-market factors are those 'structural considerations outside the market that influence behaviour in the market' (Heggestad, 1979, p.483). Only a handful of studies have been centred on these peripheral effects. Rose (1976), using 90 senatorial votes as his sample and the vote on the Helm's Amendment to the Financial Institutions Act of 1975 as the performance measure, attempted to see whether large banking organisations could influence the passing of legislation. The study concluded that concentration had no effect on the legislation passed by government.

As mentioned previously, other effects of an inter-institutional kind have been identified in various studies. Heggestad and Rhoades (1978) attempted to evaluate empirically the performance of 'links between the dominant banks' in markets throughout a State. They concluded that collusion between banks was apparent, and that multi-market meetings between dominant banks do adversely affect the degree of rivalry within markets.

Edwards (1965) also identified this interaction and noted that, if firms have close contact with each other in many markets, they may develop interdependence, thus forming a type of oligopoly within the banking system (see Stolz 1976).

5.5.6 Non-price competition and concentration

Edwards (1973) studied the effects of concentration on advertising intensity, using 36 of the largest American banks in 23 SMSAs as his sample. He found that concentration had no effect on his performance measure.

From previous, major reviews of the SCP literature (see Heggestad, 1979 and Gilbert, 1984), it is generally accepted that the strongest non-price competition results are obtained by Stolz (1976), White (1976) and Heggestad and Mingo (1977). White (1976) assesses the linkage between concentration and service quality; he measures quality of service by the number of branch offices in each of 40 SMSA's in statewide branching states based on the view that more branches imply greater convenience to customers. The expected negative relationship between concentration and number of branches is found to be statistically significant and quantitatively important - a 0.1 decrease in the Herfindahl index is associated with a 14.4 per cent average rise in the number of bank offices in each SMSA.

5.5.7 Behavioural models of banking structure

5.5.7.1 Expense-preference behaviour

Behavioural models of banking structure aim to observe the managerial objectives of banks. Edwards (1977) in his study on expense preference behaviour in banking suggests 'that managers of regulated firms may be utility maximisers rather than profit maximisers'. His findings, using a sample of banks based in 44SMSAs for 1962, 1964 and 1966, indicate that expense - preference behaviour better explains the performance of regulated firms than does a profit-maximising framework. Edward's model found that wage and salary expenditures in banking increase with monopoly power.

Hannan's (1979a) study, using 367 banks based in 49 local banking markets in the State of Pennsylvania, finds that banks' wage and salary expenditures and the number of bank employees are significantly related to the market-structure measure, leading him to support strongly evidence of expense-preference behaviour in local banking markets. In a similar study, Hannan and Mavinga (1980) studying banks operating in Pennsylvania in 1970 also find strong evidence of expense preference behaviour:

> Consistent with the implications of expense preference behaviour (and inconsistent with those of profit maximisation), manager-controlled banks operating in non-competitive markets are found to spend more on inputs likely to be preferred by managers than do owner-controlled banks in the same situation (p.680).

Of all the studies that test the structure-performance relationship those studies which find evidence of expense-preference behaviour have (by far) the highest explanatory power. Other studies, however, reject the expense-preference hypothesis: for example, Rhoades (1980) finds bank expenses to be lower in more concentrated than in less concentrated markets. Smirlock and Marshall (1983) argue that if the market share of individual banks is included in the type of equations used by Edwards (1977) and Hannan and Mavinga (1980) to control for bank size, there is no evidence of a relation between market concentration and expense preference behaviour by managers.

5.5.7.2 Market power and risk reduction - the quiet life hypothesis

A few studies during the 1970s and 1980 have tested the relationship between market power and risk reduction, otherwise known as the Quiet Life Hypothesis. This hypothesis was developed by Hicks (1935) who suggested that, 'the best of all monopoly profits is a quiet life' (p.8). This hypothesis suggests that a bank with greater market power will be more risk-averse, and thus will be able to achieve some combination of both higher return and lower risk than firms possessing lesser power in the market.

Edwards and Heggestad (1973), in their study of 'uncertainty avoidance' within the banking system found evidence that profit maximisation may not necessarily be the objective of some banks. The study indicated that 'uncertainty avoidance' increased with high concentration, implying that banks become more risk-averse the fewer competitors they have. Edwards and Heggestad measure risk as the coefficient of variation in bank profit rates. Using this as the dependent variable, the significant independent variables are market concentration (negative sign) and bank size (negative sign). Their equations explain about 12 to 17 per cent of the variability of profit rates. Heggestad (1977), using a similar measure of risk, also found that banks (from a sample of 238 in SMSAs between 1960 and 1970) became risk-averse the higher the level of concentration.

Rhoades and Rutz (1982) use a sample of 6,500 unit banks operating between 1969 and 1978 to test the Hicksian *Quiet Life Hypothesis*. They use four performance measures to account for risk: coefficient of variation of ROA (overall risk measure), equity to assets ratio (balance sheet risk measure), loans to assets ratio, and the net-loan-losses to total loans ratio. The measures are regressed against the three bank concentration ratio along with variables to control for bank size, market size, growth and deposit volatility. For all performance measures (apart from net-loan-losses to total loans) they find a statistically significant relationship with the concentration variable, which suggests that risk is associated with higher levels of concentration. These findings, however have to be qualified as the $\bar{R}^2$ for all five equations range between 0.003 and 0.06, and as such one could alternatively state that no meaningful relationship between concentration and risk-aversion was found in this study.

Clark (1986a and 1986b) uses two approaches to test for the concentration-risk relationship in banking markets. Both studies use the same dataset, 1857 banks located in 152 SMSAs in unit or limited branching states operating between 1973 and 1982. Clark (1986a) uses ordinary least squares regression procedures and the standard deviation of return on equity as the risk measure and finds that, even when controlling for bank size,there is no statistically significant relationship between concentration and risk. The explanatory power of this model is also weak with an $\bar{R}^2$ of 0,05. In his second paper (Clark 1986b) shows how simultaneous estimation using a two-stage least squares (2SLS) procedure generates more satisfactory results. He finds evidence supporting the traditional structure-performance hypothesis on profitability and risk, and also rejects the efficiency hypothesis.

Gilbert (1984, p.633) notes that influences other than risk affect the variance of bank profits: such as capital gains and losses on securities and the incidence of loan-losses. He suggests that more 'direct' indicators of risks undertaken by banks can be obtained by examining the composition of assets held by banks. Mingo (1976) tests the hypothesis that banks in areas with higher concentration hold less risky assets. He finds no significant relation between market concentration and the percentage of bank assets invested in US government securities, but does find that banks in areas with relatively high market concentration hold relatively high percentages of their assets in commercial loans.

These results obviously contradict the hypothesis that banks hold less risky assets in more concentrated markets.

5.5.8 Other studies

Various studies focus on inter-institutional competition in banking markets, and there is evidence to suggest that this factor may be important in explaining performance. Heggestad and Mingo (1977) find that service charges on demand deposits are cheaper ($1.52 per month) in markets where Savings and Loan (S&Ls) institutions are allowed to offer NOW (Notice of Withdrawal) accounts. White (1976) shows that the presence of S&Ls increases the number of commercial bank branches within SMSAs. Curry and Rose (1984) test for the relationship between bank holding company presence and banking market performance: the results suggest that outside banking holding company presence leads to increased bank lending, particularly in the real estate and consumer loan market. Berger and Hannan (1989) note that the presence of S&Ls has no significant affect on deposit rates charged in concentrated commercial banking markets.

5.6 Concentration and Performance - Empirical Evidence from Individual European Countries

As far as we are aware there have only been two SCP studies on individual European banking markets; Lloyd-Williams, Molyneux and Thornton (1993) on Spain and Mooslechner and Schnitzer (1992) for Austria. The reason for the scarcity of European SCP studies relates to the lack of publicly available regional banking market data. As a result it is much more difficult to define banking markets in Europe. The US studies, on the other hand, are able to obtain data on a large number of banks which operate in statistically identified local and regional markets according to Metropolitan Statistical Areas and non-Metropolitan Statistical Area county boundaries. Concentration ratios and market share values are calculated on the basis of these local markets This is the standard approach adopted in the US studies. This poses problems for the researcher who wishes to study the SCP paradigm for individual European countries, because it is very difficult to define and obtain data on local banking markets: publicly available data generally only allow the researcher to calculate national concentration ratios.

Various studies (which will be discussed later in Section 5.7.3) such as those undertaken by Short (1979) and Bourke (1989), have examined the relationship between bank profitability and concentration across different countries which has enabled them to avoid this problem. These studies, however, tell us little about the SCP relationship in individual countries. To counter this problem, Lloyd-Williams, Molyneux and Thornton (1993) pool their data over the period 1986 to 1988 so that they can include both concentration ratios and market share variables to test two competing hypotheses - the SCP paradigm and the efficiency hypothesis. Their results for the Spanish banking market tend to support the traditional SCP hypothesis whilst rejecting the competing efficiency hypothesis.

A more detailed study undertaken by Mooslechner and Schnitzer (1992) on the Austrian banking system examines the SCP and efficiency hypothesis over the years 1988 and 1989. As Mooslechner and Schnitzer (1992, p.14) note:

> One of the major problems of the structure-performance literature is how to measure market structure. Market structure is usually approximated by market-share and concentration. But it is extremely difficult to define a meaningful (relevant) market area and a reasonable measure of concentration under universal banking and nationwide banking conditions because banks are operating in many different product and geographical markets.

To deal with this problem Mooslechner and Schnitzer (1992) categorise the Austrian banking market into various districts, each bank has a relevant market of its own, ranging from at least one district for a local bank to nationwide banks which serve many districts. They classify the number of districts relevant to an individual bank according to the grographical distribution of each banks' branch network. They point out that: 'Because there are in general no balance sheet data for bank branches, market structure is measured empirically within the relevant market of each bank separately, including the balance sheet totals of all banks headquartered in one of the districts of the relevant markets' (p. 15)

Using cross-sectional estimates on a sample of 956 banks for 1988 and 1989 they find almost no significant influence of market share and market concentration variables on indicators of profitability. On the other hand, pooled time-series calculations for 13 large banks produce significant impacts for both variables. These findings lead them to conclude that:

> those results point to the fact that it is rather difficult to apply the standard US-approach of structur. performance to European universal and nationwide banking conditions. Very poor data availability and severe problems in geographical market delineation limit the empirical possibilities. (p.24)

5.7 Concentration and Performance - Empirical Evidence from International Studies

5.7.1 Concentration in international b nking

In general there are two types of study that compare concentration in international banking. Firstly, there are those that focus on changes in concentration levels between the world's largest banks, such as Aliber (1975), Tschoegl (1982), Rhoades (1983) and Thornton (1991a). Secondly, other studies have examined the relationship between the relative size of banks and industrial firms across countries (Rhoades

(1982b) and Thornton (1991b).

Aliber (1975) found that concentration in international banking had altered little between 1964 and 1974. The measure of concentration used was the percentage of total deposits of the world's largest 100 banks accounted for by the largest (top 10,20 etc.) banks. Tschoegl (1982) presents evidence that concentration in international banking decreased over the period 1969 to 1979 and suggested that it would continue to decrease. The study used both static and dynamic measures[6] applied to asset data for the world's 100 largest banks and the top 20 medium-term Euroloan syndicators (1977 to 1979). Both the static and dynamic measures of concentration indicate that for the 100 largest banks concentration fell between 1969 and 1973 but remained relatively stable up to 1979. Results for the top 20 syndicators of Euroloans suggest, 'dramatic' falls in the level of concentration between 1977 and 1979.

In contrast to previous findings, Rhoades (1983) found that concentration in international banking markets had increased steadily since 1956. The study used deposit data for the world's 100 largest banks between 1956 and 1980 and found:

> The five largest banks in the world have steadily lost their share of the deposits controlled by the top 100. It declined from 22.6 per cent to 13.3 per cent between 1956 and 1979. It is worth noting that since 1975, the decline in share of the five largest was much smaller than in the previous period - while the banks ranked 1-5 lost share, banks ranked 6-10 and 26-50 held there own. The greatest gains within the 100 largest banks were made by banks ranked 26-50 as their share of the top 100 deposits rose from 20 per cent in 1956 to 25.9 per cent in 1979. (p. 431)

This study also revealed that the importance of US banks within the world's largest banks had declined dramatically since 1956. It was argued that this trend was the result of re-adjustment to, 'The distortions of World War II, the rise of the commercial paper market in the United States, and the large number of US banks compared to other countries'. (p.427).

Thornton (1991a), using asset data on the world's 100 largest banks obtained from *The Banker*, replicated Rhoades' (1983) study for the period 1979 to 1989. He found that the percentage of banking assets accounted for by the world's 100 largest banks had generally declined since 1979, but the five largest banks experienced a marked increase in their share of world bank assets. Thornton also noted that banks within the top 100 have become less equal in size, a finding which conflicts with those of Rhoades (1983) who reported an increase in the share of world assets controlled by the top 100 banks and a tendency for the banks to become more equal in size. The results also reveal that Japanese banks have become more dominant within the world's largest banks, mainly at the expense of US and German banks. Thornton suggests that the preeminence of Japanese banks in the top 100 banks, 'could not be accounted for by greater bank asset concentration in Japan than in other countries, since Japan has a large number of relatively large banks' (p.271). He suggests that advantages due to the lower cost of capital in Japan may be the reason for the noticeable growth of Japanese banks during the 1980s.

Rhoades (1982b) examines the relative size of banks and industrial firms in the United States and other major industrialised countries for

1978. Using deposits as a measure of bank size and total sales as a measure of the size of large corporations, he shows that US large banks are small in relation to large industrial corporations in comparison with other countries. For example, the deposits to sales ratio for the five largest banks to five largest corporations is estimated to be 1.09 for US organisations in 1978 which compares with 5.15 in France, 4.27 in Germany and 4.58 in Japan. A study using similar methodology (Thornton 1991b) examines the size relationship between large banks and corporations in Japan, United States, France, Germany, United Kingdom and Italy for 1989. The results indicate that, with the exception of the five largest French banks, banks in Japan are much larger in relation to industrial corporations than in other countries. The difference is especially notable with respect to the United States which has by far the lowest assets-to-sales ratios, for example; the five largest banks assets to five largest corporations sales ratio is 1.40, compared with 8.49 in Japan, 8.62 in France, 4.29 in Germany; 4.85 in Italy and 4.15 in the United Kingdom. Even when one considers the '20 largest bank to 20 largest corporate ratio' the Japanese figure of 9.44 compares extremely with the 1.75 for the United States. Thornton suggests that the largest Japanese banks have such a significant size advantage over their major competitors, that US and EC banks may find it difficult to compete against them in the international market place.

5.7.2 Bank concentration across countries

There have been a variety of studies which examine concentration across different banking markets, IBRO (1976), Honohan and Kinsella (1982), Smith and Quinn (1983) and Baer and Mote (1985), but by for the most detailed and authoritative has that been undertaken by Revell (1987). Revell undertakes an extensive country-by-country study examining concentration levels (3,5 and 10 firm deposits and assets) on an unconsolidated and consolidated groups basis in 14 countries for 1983. A summary of his findings is shown in Table 5.7.

Table 5.7 illustrates some of the difficulties in calculating concentration ratios for banking systems. In the table it can be seen that ratios are reported for three groups. The ones based on unconsolidated figures are for individual banks registered in the country, incl ding in the case of Spain and France business of their branches situated outside the country, '... it is the nearest that we can get to a . .asure of concentration within a domestic banking system, although much international business is conducted from domestic offices', (p.26). At the other extreme, the consolidated group figures cover the worldwide business of the institutions. The table clearly illustrates the different concentration ratio that can be arrived at depending on whether one uses consolidated or unconsolidated data, this of course can also b strongly influenced by data availability.

Revell (1987) also identifies various statistical problems in interpreting concentration measures across countries:

1. When considering concentration within a population of commercial banks there is the problem of the different definition of a commercial bank in each country.

Table 5.7 Summary of 1983 concentration ratios

Percentages of total assets of category

Country	Coverage	Commercial banks			All banking institutions		
		3	5	10	3	5	10
		Unconsolidated					
Germany	A	43.0	60.7	69.4	16.6	24.0	38.2
Italy	A	28.0	40.8	61.3	17.5	25.5	40.4
Spain	A+B	28.3	42.6	57.9	17.6	26.3	35.7
Japan	A	22.6	36.3	58.1	22.9	29.6	41.5
Australia	A	66.9	92.3	99.1	30.4	46.4	65.5
France	A+B	48.5	57.4	..	33.1	47.3	60.9
Belgium	A	51.6	75.0	97.5	35.8	52.1	67.7
Ireland	A	48.0	..	..	40.0	..	..
Switzerland	A	70.6	74.7	79.8	44.8	51.5	59.3
Sweden	A	76.4	88.8	97.4	52.0	60.4	67.5
		Partly consolidated or combined					
UK	A+C	18.9	25.2	..	16.3	21.7	..
Australia	A+C	65.1	87.2	98.2	46.3	62.0	69.8
Ireland	A+B+C	76.0	..	..	66.9	..	..
		Consolidated groups					
Germany	E/H	44.5	60.3	68.8	15.0	22.0	35.0
UK	H	24.4	34.0	38.8	21.3	29.7	37.1
Spain	H	38.4	59.7	77.9	23.8	37.2	58.2
Italy	E	..	..	45.4	..	..	41.3
France	H	51.8	68.7	..	35.1	53.6	70.5
Netherlands	H	69.3	83.9	89.0	58.7	72.9	81.5

Source: Revell (1987, p.27) Table 2.2

Notes:
(1) Belgium 1982; Spain 1985
(2) Commercial banks include foreign banks (branches and subsidiaries).

TERMS:
A = parent bank offices in home country
B = branches in other countries
C = bank subsidiaries in home country
D = bank subsidiaries in other countries
E = Consolidated banking group
F = non-bank subsidiaries in home country
G = non-bank subsidiaries in other countries
H = consolidated group

2. Problems arise when one includes public and mutual banks within the population because they may not compete in 'strictly' the same market.

3. Definition of all banking institutions (ie. the market) depends ultimately on subjective judgements.

4. The paucity of ratios on fully consolidated accounts is unfortunate because there are considerable differences between countries and between individual banks in the proportion of the activity of the banking group conducted through subsidiaries, both at home and abroad. 'For all these reasons like is rarely being compared exactly with like'. (p.26)

Revell (1987) identifies that every banking system appears to have a group of dominant or 'core banks' recognised by both the authorities and by the general public:

> The main significance of the core group (or the group of a few large banks if there is a divergence in membership between the two groups) is that they are highly visible. We have already seen that they attract special attention from the central bank, but they also act as the focus of attention to the general public. In all countries there is a latent populist feeling arising out of a largely unconscious fear of finance and banks. This feeling has been behind anti-Semitism in some countries, behind persecution of Asians in African countries, and behind the dislike of the financial power of the Eastern states of the United States felt by those further to the West. In its less lucid moments the general public finds it difficult to distinguish between bankers and moneylenders. In most countries the populist feeling takes the form of an expressed fear of banking monopoly, which means that an alleged monopoly of banks is pursued with far more vigour than the alleged monopoly of industrial empires. (p.256).

There are two consequences for banks as soon as it is recognised that a group of 'core' banks has emerged. Firstly, when large banks in the group wish to become even larger by merging among themselves, they need to provide public plausible reasons for doing so. Secondly, mergers between core banks becomes a public policy issue, and the approval of the authorities is nearly always required.

Mention should also be given to the Honohan and Kinsella (1982) study which provides a critique of cross-country comparisons of traditional measures of concentration (although this study will also be discussed in the following section). This study notes that when one compares concentration across countries one must take into account the effects of market size on the, 'minimum practicable degree of concentration having regard to the desirability of an efficient scale of production'. (p.262). They develop, with the help of a theoretical model, a measure which takes account of market size - essentially Herfindahl indices scaled-up by an amount proportionate to the level, or the square root of GDP. Their study, using data obtained from Short (1979) for 1973, shows that if their measures are used, Japan which had the least concentrated market as measured by the Herfindahl index would have almost the highest degree of concentration of any country if either of their measures were chosen. Belgium and Sweden which appeared among the most concentrated according to the Herfindahl index would seem to have the 'minimum feasible level' of concentration across countries if the Herfindahl multiplied by GDP measure was used.

5.7.3 International evidence of the SCP relationship

A handful of studies have appeared in recent years testing the relationship between concentration and bank performance across individual countries. The earliest was a paper by Short (1979) that links profit rates of 60 banks in Canada, Western Europe, and Japan to concentration in their national banking systems over a three-year period (1972 to 1974). Bank profitability is measured by the ratio of after-tax profits to shareholders equity. Because of the lack of information on system-wide profitability or capital scarcity measures, Short chooses the central bank discount rate and the yield on long-term government securities to represent these features of each national economy. Individual bank profitability is regressed against variables measuring bank leverage (assets to equity ratio), bank size, asset growth, whether each bank is privately or state owned, and concentration measured by the Herfindahl index, numbers equivalent and 1,2 and 3 bank concentration ratios. Short finds that state ownership, market concentration and capital scarcity dominate the regression equations. Concentration, however, is the least important of these variables and its effect is quantitatively small: for example, one equation indicates that nearly a 30 per cent reduction in the 3 bank concentration ratio is necessary to reduce individual bank profit rates by about one per cent. Short (1979) concludes:

> 'Nevertheless, even very small reductions in banks' lending rates or increases in their borrowing rates may in aggregate result in substantial redistribution of income to bank customers'. (p.214)

A recent study by Bourke (1989) on the determinants of international bank profitability replicated and extended the earlier work undertaken by Short (1979) and found support for the view that concentration was positively and moderately related to profitability. The data used in Bourke's study were based on the financial statements of 116 banks each year from 1972 to 1981 in 15 countries or territories (Australia, New Zealand, California, Massachusetts, New York, Canada, Ireland, Scotland, England and Wales, France, Belgium, Holland, Denmark, Norway and Spain). The banks included in the sample were every bank in these countries which fell within the Top-500 banks in the world in June 1980, ranked by total assets. Bourke used a pooled time-series approach to estimate a linear equation, regressing performance measures (ROA, ROC - before and after tax) against a variety of internal (staff expenses, capital ratios, liquidity ratios) and external (concentration ratios (3 bank), government ownership, interest rates, market growth and inflation) determinants of bank profitability. His results find support for the view that concentration was positively and moderately related to profitability. The results also provide some evidence for the Edwards - Heggestad - Mingo hypothesis (Edwards and Heggestad (1973) and Heggestad and Mingo (1976)) of risk avoidance by banks with a high degree of market power.

Molyneux and Thornton (1992) replicate Bourke's methodology in order to evaluate the determinants of European bank profitability. A sample of European banks; 671 for 1986, 1,063 for 1987, 1,371 for 1988 and 1,108 for 1989 are taken across eighteen countries. Standardised accounting data for the banks were obtained from International Bank

Credit Analysis Ltd. (IBCA), a London-based bank credit-rating agency and the variables used were as follows:

Dependent variables

(NPBT = Net profit before tax; NPAT = Net profit after tax)

BTCR : NPBT as % of capital and reserves

ATCR : NPAT as % of capital and reserves

BTCRTB : NPBT as % of capital and reserves and total borrowings

BTTA : NPBT as % of total assets

BTSETA : NPBT + staff expenses as % of total assets

BTSEPLTA : NPAT + staff expenses + provision for loan losses as % of total assets

Independent variables

GOVT : A binary variable representing government ownership, one - when a bank is owned by a government, national or provincial, zero otherwise

CONC : Ten bank asset concentration ratio

INT : The long-term bond rate for each country for each year (IMF)

MON : Growth in money supply for each country for each year (IMF)

CRTA : Capital and reserves as % of total assets

CBINVTA : Cash and bank deposits + investment securities as % of total assets

CPI : Percentage increase in consumer price index for each country for each year (IMF)

SE : Staff expenses as % of total assets

As with previous studies, Molyneux and Thornton (1992) estimate a simple linear equation using a pooled sample of European banks between 1986 and 1989[7]. Results are shown in Tables 5.8 and 5.9

Table 5.8 estimates the relations between return on capital and various independent variables and these are more or less similar to the equations estimated by Short (1979). As with Bourke, Molyneux and Thornton (1992) find an, 'almost total lack of correspondence' (p. 75) between their ROC results and those of Shorts. For European banks they find a statistically significant positive relationship between ROC and concentration and a positive relationship for nominal interest rates (which is used as a capital scarcity proxy variable). Unlike Short and Bourke, however, who both find a statistically significant inverse relationship between ROC and government ownership, Molyneux and Thornton find a statistically significant positive relationship, suggesting that state-owned banks generate higher ROC than their private sector competitors. In one way this result is surprising because it conflicts with earlier findings, but it is not unexpected because state-owned banks generally maintain lower capital ratios (because the government implicitly underwrites their operations) than their private sector

Table 5.8 Estimates of the relation between return on capital and selected independent variables for 1986-1989

		Intercept	GOVT	CONC	INT	MON	R^2	F
1.	BTCR	90.0629	0.0007	0.0007[a]	0.0019[a]	-0.0007[a]	27.6	246.25
		(-0.74)	(0.02)	(3.44)	(24.42)	(-3.93)	-	-
2.	BTCR	-0.2830[a]	0.0070	0.0092[a]	-	-	1.1	18.59
		(-3.10)	(0.14)	(5.99)	-	-	-	-
3.	BTCR	-0.1630	-0.0297	0.0071[a]	-	0.0025[a]	10.8	105.29
		(-1.76)	(-0.64)	(4.80)	-	(16.53)	-	-
4.	ATCR	-0.3090[a]	0.0905[a]	0.0075[a]	0.0010[a]	-	10.9	125.60
		(-4.49)	(2.38)	(6.47)	(17.56)	-	-	-
5.	BTCRTB	-0.8150[a]	0.4050[a]	0.0168[a]	-	0.0003	2.2	20.32
		(-5.41)	(5.34)	(7.01)	-	(1.19)	-	-
6.	BTCRTB	-0.6620[a]	0.2990[a]	0.0156[a]	0.0003[a]	-	2.4	26.45
		(-5.47)	(4.54)	(7.77)	(2.61)	-	-	-

a = significant at the 5 per cent level

t - statistics in parentheses

Source: Molyneux and Thornton (1992, p.1175)

Table 5.9 Estimates of the relation between return on assets and selected independent variables for 1986-1989

		Intercept	CRTA	CBINVTA	GOVT	CONC	INT	MON	CPI	SE	R^2(adj)	F
1.	BTTA	-0.0146[a]	0.1200[a]	-0.0122[a]	0.0056[a]	0.0004[a]	0.00002[a]	-	-	-	13.6	97.39
		(-6.18)	(14.23)	(-4.66)	(5.05)	(12.07)	(10.41)	-	-	-	-	-
2.	BTTA	-0.0153[a]	0.1150[a]	-0.0113[a]	0.0050[a]	0.0004[a]	-	-	0.0003[a]	-	10.8	75.46
		(-6.44)	(13.35)	(-4.25)	(4.47)	(11.90)	-	-	(3.32)	-	-	-
3.	BTTA	-0.0153[a]	0.1190[a]	-0.0125[a]	0.0052[a]	0.0004[a]	-	-	-	-	10.5	91.27
		(-6.43)	(13.92)	(-4.70)	(4.63)	(12.92)	-	-	-	-	-	-
4.	BTTA	0.0064[a]	0.1200[a]	-0.0107[a]	0.0021	-	-	-	-	0.00002[a]	9.9	84.27
		(4.22)	(13.67)	(-3.93)	(1.89)	-	-	-	-	(12.14)	-	-
5.	BTTA	0.0051[a]	0.1120[a]	-	-	-	-	-	-	-	4.9	160.99
		(6.35)	(12.69)	-	-	-	-	-	-	-	-	-
6.	BTSETA	0.0664[a]	0.09[illegible]0	-0.035[illegible]	-0.0333	-	-	-	-	-	0.1	1.65
		(2.96)	(0.70)	(-0.85)	(-1.94)	-	-	-	-	-	-	-
7.	BTSETA	-0.1570[a]	0.1390	[illegible].0420	0.0051	0.0039[a]	-	0.00004	-	-	1.2	7.34
		(-3.25)	(0.88)	(-0.81)	(0.23)	(5.56)[a]	-	(0.53)	-	-	-	-
8.	B[illegible]	-0.0739	0.2150[a]	-0.0615	-0.0236	0.0036[a]	-	0.00003	-0.0128[a]	-	1.7	8.09
		(-1.37)	(2.36)	(-1.18)	(-1.00)	(5.12)	-	(0.38)	(-3.42)	-	-	-
9.	BTSETA	-0.1160	0.1250[a]	-0.0344	-0.0060	0.[illegible]319[a]	[illegible].00006[a]	-	-	-	1.4	9.70
		(-3.10)	(2.94)	(-0.83)	(-0.34)	(5.94)	(2.30)	-	-	-	-	-
10.	BTSEPLTA	-0.1890[a]	0.0540[a]	-0.1630[a]	0.0686[a]	0.0059[a]	-	-	-	-	3.4	20.86
		(-3.74)	(2.32)	(-2.73)	(2.41)	(8.47)	-	-	-	-	-	-
11.	BTSEPLTA	-0.2710[a]	0.1120[a]	-0.1870[a]	0.1200[a]	0.0068[a]	-	0.00001	-	-	3.0	12.06
		(-4.12)	(2.55)	(-2.32)	(3.49)	(7.23)	-	(0.10)	-	-	-	-
12.	BTSEPLTA	-0.3410[a]	0.1090[a]	-0.1750[a]	0.1200[a]	0.0073	-	0.00001	0.0076	-	3.0	10.33
		(-3.98)	(0.54)	(-2.16)	(3.50)	(7.21)	-	(0.17)	(1.27)	-	-	-
13.	BTSEPLTA	-0.1860[a]	0.0520	-0.1620[a]	0.0695[a]	0.00583[a]	0.00005	-	-	-	3.4	16.96
		(-3.68)	(0.31)	(-2.70)	(2.44)	(8.30)	(2.17)	-	-	-	-	-

Notes: a = significant at the 5 per cent level
t - statistics in parentheses

Source: Molyneux and Thornton (1992, p.1176) counterparts. A simple explanation for their findings could be that, because their sample comprises a much larger proportion of state-owned banks (for example, over 200 in 1988), these results are more representative than the two aforementioned authors who only included the largest government-owned banks in their much smaller samples (eg. Bourke (1989) used 200 banks over ten years, of which there were only thirty or so government-owned institutions).

The results shown in Table 5.9 use asset-based returns and, in general, show that capital ratios and nominal interest rates are positively related to profitability. These findings are to be expected and are confirmed in the Bourke (1989) study. Government ownership also appears to have a positive impact on bank profitability. In the case of liquidity ratios, Molyneux and Thornton find a weak inverse relationship with profitability which is also to be expected as liquidity holdings (particularly those imposed by the authorities) represent a cost to the bank. Molyneux and Thornton find that concentration shows a positive, statistically significant correlation with pre-tax ROA, which is consistent with the SCP paradigm. When the value-added measure used to test for the expense preference theory, one would expect the sign on the CONC variable to be positive and strengthen. This is because the measure of value added largely removes the possibility of either managerially-induced expenditure or labour union-negotiated wage demands appropriating excessive proportions of net income. Their results appear to find evidence of expense preference behaviour in European banking. Another value added measure (BTSEPLTA) is used to test for the Edwards-Heggestad-Mingo risk aversion effect: using this as a dependent variable one would expect the sign on the CONC variable to be negative and the relationship strengthen, which illustrates that higher levels of concentration are associated with lower loan costs. Molyneux and Thornton (1992) find no evidence of the risk aversion effect.

In general, Molyneux and Thornton's analysis of the determinants of European bank profitability conflict with the earlier findings of Short (1979), yet the main results on asset-based returns confirm Bourke's (1989) findings, apart from the relationship between government ownership and profitability. The results are in agreement with the traditional concentration and bank profitability (SCP) studies for the US market, and they find no support for the Edwards-Heggestad-Ming hypothesis. Support, however is found for the expense preference expenditure theories in European banking.

Finally, Ruthenberg (1991) employs a transcendental logarithmic function (translog) to estimate the structure-performance relationship using 1984 to 1988 data on the EC and several non-EC banking markets (Israel, Finland, Norway, Sweden, Australia, Canada, Switzerland, Japan and the United States). The dataset employed was obtained by questionnaires responded to by the central bankers in the countries listed above. The data, therefore, relate to aggregate commercial banking markets. In order to test the relationship between structure and performance, Ruthenberg uses the general form of the performance equation:

$$\pi ij = (Hij,\ PCij,\ NNIij,\ Rij,\ Vij) \qquad (2)$$

where πij - performance measures, Lerner index [the differences between price (interest rate on loans) and marginal cost (rate paid on deposits) divided by price] and Net interest margin.

Hij - Herfindahl index

PCij - proxy for potential competition. The two measures used are (1) population per number of branches and (2) population per number of banks

NNIij - non-interest income (overhead expenses less fees and commissions).

Rij - risk measures which include; (1) loans to assets ratio, (2) equity to total loans ratio (3) loan-loss reserves to total loans (4) standard deviation of the return on equity.

Vij - vector of control variables to account for banking market and/or economy specific characteristics.

Two types of binary variable were also included to (a) account for the time trend effect between 1984 and 1988 and (b) to account for intercountry differences in size (zero if GNP per capita is less than $10,000 and one otherwise). The performance function estimated was as follows:

$$\ln \pi = \alpha o + \alpha_1 \ln H + \alpha_2 l\ n\ NNI + \alpha_3 \ln PC + \alpha_4 \ln R + \alpha_5 \ln V + \frac{1}{2} [\beta_1 (\ln H)^2 + \beta_2 (\ln NNI)^2 + \beta_3 (\ln PC)^2 \quad (3)$$

$$+ \beta_4 (\ln R)^2 + \beta_5 (\ln V)^2] + T_1 \ln H \ln NNI + \ldots\ldots$$

$$.. + T_4 \ln H \ln V + \ldots . T_{10} \ln R \ln V.$$

αo; αi $i=1, \ldots 5$, βi $i=1, \ldots 5$; T_i $i=1, \ldots\ldots 10$ are the parameters to be estimated.

Despite reservations about the nature of the data obtained, aggregate data for each country that yields only 54 observations for SCP estimates for EC countries between 1984 to 1988, the study has some interesting findings.

Ruthenberg finds that (at the sample means) there is a statistically significant relationship between the concentration measure (the Herfindahl index) and one of the performance measures (Lerner index) when the European Community is considered, but not when the larger sample of countries is used. When they deviate from the sample means of the Herfindahl index, empirical results suggest the existence of a 'critical level' of concentration (consistent with earlier US findings by McCall and Peterson (1980)). In the EC, the banking markets which consistently fall above the 'critical level' of the Herfindahl index are Ireland, Greece, Netherlands and Portugal.

Ruthenberg (1991) concludes:

> In sum, it appears that only relatively small (probably with the exception of Canada), concentrated banking markets: with an H greater than 0.13, that are characterised with relatively few competitors, and high entry barriers can offer banking organisations that expand their activities across borders a potential for decreased profits. We arrive at this conclusion because in that group of countries the positive effect of structure on performance is most profound. (p. 21-22).

It should be noted that in a study of this nature it might have been better to use a weighted Herfindahl index as suggested by Honohon and Kinsella (1982), so as to control for the effects of relatively small concentrated banking markets.

5.8 Limitations of Bank SCP Modelling

A positive relationship between concentration and performance has been found in some, but far from all, of the empirical studies investigating bank market structure and performance. The lack of consistent results have lead some researchers (noticeably Gilbert (1984)) to argue that the literature contains too many inconsistencies and contradictions to establish a satisfactory SCP relationship in banking. In addition, despite there being numerous empirical studies, these have not been based on an explicit model of the banking firm (see Hannan, 1991b).

The defects of trying to quantify empirically the relationship between commercial bank performance and market structure are numerous and (some might say) obvious. We have already mentioned that because banking is a multiproduct industry, a simple all-inclusive market area is difficult to delineate and no single measure of structure precisely reflects the degree of monopoly, nor does economic theory help choose which measure is most important.

Adequate standards of performance measurement have also not been developed, as can be seen from the variations noted previously. In many past studies it is difficult to argue that output was a homogeneous measure, i.e. all banks do not offer the same services (see Bell and Murphy (1969)), and while banks are multiproduct firms, the majority of studies have been limited to analysing the prices of a single product, thus underestimating the total impact of monopoly power on performance.

To illustrate this argumen· Klein and Murphy (1971) developed a model to test whether an individual bank faces different markets for different activities. They stat.: 'the possibility that local market structure may have a differential impact on bank performance in different activities, seems to have escaped systematic investigations' (p.747). This study points to the limitations of other 'non-differentiated' investigations. In addition fe studies have empirically considered the possibility that banking competition is best reflected in non-price di·ensions. These factors could be of paramount importance in determini:g performance.

The functional form of the structure-performance model will now be briefly reiterated. It is quite possible that the relationship will be non-linear, so that changes in concentration would have different impacts on performance at different levels of concentration. Heggestad and Mingo (1976) point out:

> 'Specifically, a given increase in concentration will have a greater impact on prices (services), the less concentrated is the market initially' (p.108)

Studies undertaken by McCall and Peterson (1980) and Daskin and Wolken (1989) using switching regression and maximum likelihood estimation procedures have been used to examine this issue. In addition, the one-way causality assumption of the SCP relationship has been clearly identified by many authors (see Britton, Clark and Ball 1992, for example) but has rarely been empirically addressed (see Clark, 1986b).

The statistical results obtained from a large number of the SCP studies cannot confirm the hypotheses of central relationships which they aim to show. Taylor (1968) notes that: 'No regression ever produces definitive answers about cause or effect', and that 'This study reinforces the scholar's conclusion that, no matter how sophisticated the techniques that are applied to poor data, the results are likely to be poor'. (p.803)

Another important factor (see Phillips (1967)) is the weighting problem involved in aggregating within and among banks. Previous studies on banking have also been criticised for assuming that banks behave as profit maximisers under condition of complete certainty. As Edward and Heggestad (1973) noted:

> Implicit in this argument is the assumption that the managements of large firms are insulated from the kind of stockholder pressure that would prevent them from pursuing objectives other than the maximisation of the value of the firm. (p.148)

They argue that if managerial objectives vary systematically with firm size and market power, the findings of past studies may be biased and therefore fail to disclose the true structure-performance relationship.

Furthermore, these studies, by isolating one sector from the rest of the economy, fail to examine interactions between sectors (any distortion away from a perfectly competitive order may be necessary to maintain a 'second-best' position).

Rhoades (1982a) claims that many of the equations are mispecified, thus biasing the estimated coefficients on the concentration measure. For example, if one does not take account for bank management risk-return preferences operating in different concentrated markets then one is ignoring the possibility of trading off potential profits for lower risk. Thus it is important to account for differences in risk-taking across the observations. Clark (1986b) goes further and suggests that risk and profitability should be determined simultaneously.

Others suggest that many of the studies have ignored the existence of potential competitors to the relevant markets. This ommission was justified on the grounds of technological conditions, and the existence of strict regulation either on the type and variety of services offered and/or the ability to expand geographically. Therefore, even if concentration is high in a particular market, the threat of competition (potential entry) can lead to lower profits than otherwise. Evanoff and Fortier (1988) have shown that accounting for differences in entry barriers across markets adds significantly to the impact of structure on profits.

Demsetz (1973) Brozen (1982) and others have argued that an industry's structure may exist as a result of a superior efficiency in production by some firms which enables them to increase market share thus increasing market concentration. This efficiency hypothesis suggests that it is not collusion which leads to higher than normal profits but rather economies of scale and scope. Smirlock (1985) and Evanoff and Fortier (1988) find that once firm-specific efficiency is accounted for in banking markets, market concentration adds nothing in explaining performance. Conversely, Clark (1986a) and (1986b) and Berger and Hannan (1989) find no evidence to support the efficiency hypothesis.

Gilbert (1984) notes that one of the major criticisms of this type of methodology for investigating banking markets is that it neglects the role of regulation. There may be strong interactive effects between regulation and other variables which have a significant impact on market concentration and performance. Heggestad (1984), however, notes that the importance of this problem is overstated and he argues that, 'Regulation does still permit market forces to work but may change the intensity of their effect. For example, liability rate ceilings may make collusion less difficult, as may high entry barriers. Consequently, markets with low concentration may exhibit collusive behaviour. On the other hand, competition may be enhanced by regulatory oversight', (p. 648). In general, rates of return are not directly regulated and firms treat regulation as an operational constraint. They maximise some objective function within the environment in which they do business. Different regulatory regimes may lead to different relationships between structure and performance but as Heggestad (1984) states,'... it is highly likely that structure will have an impact on performance' (p.648). The empirical biases resulting from regulation may also be overstated because most bank SCP studies are cross-sectional and in general they control for important cross-sectional changes in regulation.[8]

Overall, despite the generally low explanatory power of many of the SCP studies, frequently 20 per cent or less of the performance variability from bank to bank and market to market is explained by concentration or other market structure variables, Gilbert (1984) points out that,

> ... the pattern that emerges from this analysis is that the bett-r studies report a significant influence of market concentration on the performance measures, with signs implied by the structure-performance hypothesis, more consistently than the other studies. (Gilbert, 1984, p.636).

5.9 Conclusions

This chapter has examined the empirical literature on SCP modelling in b nking markets. The bulk of these studies investigate the structure-performance relationship in US banking markets, although there have been recent attempts to investigate the relationship across countries. In general one can conclude that statistical studies of structure and performance reveal the existence of important relationships, whose presence stands out more sharply the better is the quality of the data and methodology employed.

In addition, there are public policy reasons for undertaking more research in the bank concentration area, especially in European banking. With the advent of the single European banking market after 1992, it is of interest to know how strongly or weakly the SCP relationship holds in established markets so one can evaluate how things will change in the new, broader markets and in markets linked by common competitors after 1992. The following chapters will attempt to evaluate these features.

Notes to Chapter Five

1. The development of models of imperfect competition led various researchers, notably Alhadeff (1954), Hodgman (1961) and Shull (1963), to apply these models to the commercial bank as a multiproduct, price-discriminating firm and to banking markets where there were elements of monopolistic behaviour. Alhadeff (1954) analysed economies of scale by relating total operating costs per thousand dollars of loans and securities to different deposit-size banks. The data were obtained from operating ratio statistics published by the Federal Reserve Bank of San Francisco for the period 1938 to 1950. Hodgman (1961) examined the deposit relationship of commercial bank investment behaviour in the United States and found that competition for deposits may take the form of lower rates on loans to depositors. Shull (1963) provided a theoretical exposition of how commercial banks could be analysed as multiple-product price discriminating firms.
2. Smirlock, Gilligan and Marshall (1984) suggest on alternative to profitability measures of bank performance; namely Tobin's Q ratio, which is defined as the ratio of the current market value of the firm divided by the current market value of its productive assets. This, they argue, provides a precise bound on the monopoly and firm-specific rents of the firm. If the Q ratio is higher than 1, it implies that the firm is earning monopolistic rents.
3. The main exceptions being Stolz (1976) and Hannan (1979b)
4. In a review of 38 studies that examine differences in state branching restrictions, Gilbert (1984) notes that results are

'inconsistent across studies' (p.629) although Evanoff and Fortier (1988, p.279) do find some support for the expected relationship.

5. See Edwards and Heggestad (1973) for an early analysis of the relationship between bank risk-taking and market structure, as well as Rhoades and Rutz (1982)
6. The static measures were: Herfindahl index, Theils entropy measure and a dominance index. The dynamic measures used were the Hymer and Pashigian index of market share instability and two stochastic growth measures.
7. Cross-sectional equations for individual years were estimated and yielded similar results, so these were not reported in the paper.
8. Fry (1988, p.255) has also noted that there has been virtually no discussion of what he terms, 'the second-best dilemma' that arises when controls in some areas are dismantled (such as structural deregulation) but controls in other areas (supervisory re-regulation say) are strengthened.

Chapter 6

The SCP Relationship in European Banking - the Methodology

6.1 Introduction

This Chapter examines the methodology that is to be used to evaluate the SCP relationship across European banking markets. The chapter can be divided into two main sections. The first section outlines the variable choice, model specification and estimation procedures which will be used to test two competing hypotheses - the SCP paradigm and the efficiency hypothesis. The second section explains a methodology which evaluates rivalrous and cooperative behaviour between market leaders in an industry. This methodology will be adopted to illustrate the influence of market leaders on industry performance in European banking, thus providing a greater insight into the concentration-profits relationship.

6.2 Testing the Traditional SCP and Efficiency Hypotheses in European Banking

The methodological approach adopted in this thesis is similar to previous studies undertaken by Short (1979), Bourke (1989) and Molyneux and Thornton (1992), but it differs in one main respect. The aforementioned studies primarily focused on explaining the determinants of bank profitability using a measure of market structure as one of the explanatory variables in their equations. The studies placed greater emphasis on explaining bank profitability rather than on the SCP relationship. The concern of this thesis is to place greater emphasis on the structure-performance interactions and to extend analysis of this relationship for banking markets. This will be undertaken in two ways. First, a methodology for testing both the traditional SCP and efficiency hypotheses across European banking markets will be discussed; as far as we are aware there is no other study that provides international evidence of this relationship. Second, a methodology will be analysed for testing for rivalrous and cooperative interactions between the largest banks across European markets from the approach outlined in industrial economics by Kwoka and Ravenscroft (1986).

6.2.1 The general model

The general form of the structure-performance model used in the US literature estimated using multiple regression analysis, and discussed in the previous chapter is as follows:

$$P = f\ (CR,\ S,\ D,\ C,\ X) \tag{1}$$

where
- P - a performance measure
- CR - a market structure measure (usually a concentration measure)
- S - other market structure variables, such as proxies for barriers to entry
- D - a set of variables to reflect market demand conditions
- C - a set of variables to reflect differences in costs across firms
- X - a variety of control variables related to a specific product's characteristics

A variation of this type of model specification has been used by Short (1979), Bourke (1989) and Molyneux and Thornton (1992) to test the SCP relationship in an international context.

It has already been noted that the later US studies focus on specific products and market characteristics relating to those specific products - such as different deposit services, loans and such like. The international studies, however, do not use such micro data because of availability problems. As a result, the (X) control variable in the international studies relates to other firm specific characteristics rather than different product characteristics.

The international studies examine the SCP model by estimating the relationship between market structure and bank performance in an aggregate fashion, using total banking sector assets or total banking sector deposits as the size measure for the market, and calculating concentration ratios on this basis. This approach is subject to criticism because banks as multi-product firms may not operate in all markets, and concentration ratios based on this crude definition of market size may be misleading. Concentration ratios for different product-line markets may be significantly different than those estimated on the basis of total banking sector assets and/or deposits. The reason why relatively crude market structure measures are used in the international studies is because specific product market data - for example on standard loan or deposit products across countries - are difficult to obtain. Bearing this in mind, the following will illustrate how the aforementioned general model will be used in this thesis to estimate the SCP relationship across European banking markets.

6.2.2 Variable choice

The model used to estimate the SCP relationship in European banking is strongly influenced by the data availability across countries. A sample of balance sheet and income statement data of European banks - 759 data items for 1986, 1201 for 1987, 1541 for 1988 and 1268 for 1989 - was taken across nineteen European countries. Standardised year-end accounting data for the banks were obtained from International Bank Credit Analysis Ltd (IBCA), a London-based bank credit-rating agency, and the variables chosen were classified into groups according to the specification of the general model discussed above (see Chapter 7 for a detailed discussion of the data).

6.2.2.1 Performance Measures

The two main performance measures used for our analysis are before-tax return on assets (ROA) and before-tax return on equity (ROE). These accounting measures are used in favour of market-value measures for two main reasons. First, many of the banks in our sample do not have publicly quoted equity on which market-based estimates could be made. Secondly, ROA and ROE are generally regarded as the most appropriate overall bank performance measures (see Sinkey 1992, p.269-289 for further details). In the previous chapter we noted that Gilbert (1984, p.632) identified that the only measures of bank performance obtained from bank financial accounts that do not have m^jor measurement problems are bank profit rates. Others, such as Rhoade‹ (1981) and (1985a) and Evanoff and Fortier (1988), provide support for the use of profitability measures to account for the performance of banks For example, Evanoff and Fortier (1988) suggest a number of reasons why the ROA measure is preferable to other profit measures. Firstly, although some studies have used bank product prices as the dependent variable, banking is a multiproduct business and individual prices may be misleading. Prices can only be used if costs directly associated with these prices are explicitly accounted for as an explanatory variables, 'Even then, given the regulatory constraints on the industry, the expected structure-price relationship may not be realised for a particular service because of differing pricing strategies among banks' (Evanoff and Fortier, 1988, p.281). Secondly, the potential for significant cross-subsidisation between products obviously exist and pricing strategy would differ across markets. As a result, the use of profit measures should eliminate many of these potential problems.

We also use ROE as a second performance measure although ROA is generally regarded as a more satisfactory measure because of the significant discretion that individual banks in different countries have in dividing capital between debt and equity. Equity values may not be comparable across countries between banks, therefore bank assets is a more 'common' denominator. Short (1979) uses ROC as his performance measure, whereas Bourke (1989) and Molyneux and Thornton (1992) use both ROA and ROC, the latter two studies yielding significantly different results according to the performance measure used. Smirlock (1985), on the other hand, found somewhat similar results employing either of these profit measures - ie. return on assets, equity and capital.

Of course, neither of the above measures are ideal. For example, if banks with monopoly power have higher capital-to-asset ratios, because they are more conservative or they have generated larger absolute profits over time and have retained these funds, their ratios of profits to capital may be low, even though their net return on assets is high.

6.2.2.2 Measures of market structure

This study uses two main types of market structure measure - concentration ratios and firm-specific market shares. The concentration ratios include: the five-firm deposits and assets concentration ratio; the ten-firm deposits and assets concentration ratio; and the Herfindahl index measured using both firm-assets and firm-deposits. We use these six measures in order to evaluate whether results differ according to the choice of concentration measure used. Theory indicates a relationship between the level of output controlled by a few of the largest firms and performance, although it offers no information about the absolute number or size distribution of firms necessary to exercise market power.

In previous SCP studies, the majority of authors appear to have chosen arbitrarily a three-firm concentration ratio. This implies equal impact by the three leading firms, although nothing in theory suggests that the behaviour of the largest three firms is all-important to market performance or that their relative impact is uniform Kwoka (1979), in a study of nationwide US manufacturing data, found that the four-firm concentration ratio, widely used in studies of these industries, included superfluous firms. Using a range of concentration measures may help us to identify the number of large firms that do have a significant impact on market performance. The Herfindahl-index takes into account all firms in the sample, but tells us little about the counterveiling power of the largest firms (a methodology for investigating cooperative and rivalrous behaviour between the largest banks in Europe will be discussed in the second part of this Chapter).

As well as the concentration measures, firm-specific market share, defined as bank assets divided by total market assets, is used to capture firm efficiency so as to enable us to test for both the traditional SCP and efficiency hypotheses.

6.2.2.3 Other market structure variables

This study utilises a binary or 'dummy' variable to account for the prevalence of state-owned banks in European markets. As mentioned in the previous Chapter, Short (1979), Bourke (1989) and Molyneux and Thornton (1992) all examine the relationship between government ownership and profitability; the first two studies finding a significant inverse relationship and the latter a positive relationship. Given the importance of state-owned banks in France, Italy, Greece and Portugal and their existence in many other European countries, it was felt that state ownership may have a significant impact on bank performance so this was included as an explanatory variable in the model. This variable was also introduced in order to confirm or reject the findings of the Molyneux and Thornton (1992) study which found that state ownership and bank profitability were positive and statistically significantly related in European banking markets.

6.2.2.4 Demand conditions

As noted in the previous chapter, all the SCP studies use some variables to proxy for market demand conditions of which the most common are measures of market size and market growth. Total banking sector size is used as a proxy for market potential on the grounds that the larger the market, the greater the likelihood of new entry and potential for increased competition. Growth in market size is also often used as a proxy to account for change in local demand conditions.

So as to take account of changing demand conditions a change in money supply variable is used. We use the narrow money definition from the International Monetary Funds International Financial Statistics publication (Vol. XLIV, No. 5, May 1991) taken from line 34. As they state, '...the data in line 34 are frequently referred to as M1', (p.12) and consists of currency outside banks and demand deposits other than those of the central government. Bourke (1989) also uses change in the money supply to account for market demand conditions as do Molyneux and Thornton (1992). Prior to estimation, the impact of the market growth variable is difficult to predict. If market growth can be exploited without fear of rival entry, profitable opportunities should occur for incumbent banks. If growth encourages entry, profitability may be depressed.

6.2.2.5 Cost differences

The explanatory variable most commonly used to account for cost differences across banks is a measure of bank size, namely total assets. This is included to take account of size-induced differences between banks, such as scale economies. Other studies also suggest other explanatory variables which proxy for the cost of funds and labour. As such, we chose the three following variables to account for cost differences between banking institutions:

(i) Total assets of individual banks

(ii) Interest paid/total funds (proxy for the cost of funds).

(iii) Staff expenses/total assets (proxy for the cost of labour)

The effect of the total assets variable prior to estimation is indeterminant, because any positive influence on profits generated from economies of scale may be offset by larger banks being able to diversify their portfolios resulting in lower risk and a lower required return.

One would expect the proxy for the cost of funds variable to have a negative effect on bank profitability as increased funding cost would reduce profitability. Finally, the explanatory variable that accounts for the cost of labour, staff expenses divided by total assets, is expected to have a negative impact on profitability. Bourke (1989) and Molyneux and Thornton (1992), however, find a strong positive relation with ROA. Given that these two studies find that the traditional SCP paradigm holds, this result implies that banks in concentrated industries may have a larger proportion of their expenses appropriated in the form of higher payroll expenditures, and this suggests evidence of expense preference behaviour across banking markets.

6.2.2.6 Other control variables

Since the performance measures, ROA and ROE, used in the analyses are not risk-adjusted, we employ three variables to account for firm-specific risk. The loans-to-assets ratio provides a measure of risk since loans are riskier and generally have a greater expected return than other bank earning assets, like government securities. Thus, one would expect a positive relationship between this variable and the performance measures. It could be the case, however, that banks that are rapidly increasing their loan books have to pay a higher cost for their funding requirements and this could reduce the positive impact on profitability.

The equity-to-assets ratios is also included to account for different risk levels between firms. As lower ratios suggest a relatively risky position one would expect a negative coefficient on this variable although it could be the case that high levels of equity suggest that the cost of capital is relatively cheap and therefore this variable may have a positive impact on profitability. We treat the equity-to-assets ratio as indeterminant prior to estimation.

Finally we use loan-loss reserves divided by total loans as a default-risk measure - the implication being the higher the ratio the more risky (poorer quality) the banks loan-portfolio. Conversely, it could be the case that more conservative banks make excessive provisions against poor loans and therefore it is not unambiguously clear as to the effect on bank performance (see Clark 1986a and b).

6.3 Model Specification

Following Weiss (1974) and Smirlock (1985), the traditional SCP paradigm and efficient structure hypotheses can be tested by estimating the profit equation shown below:

$$\pi ij = a_o + a_1 CR + a_2 MS + \sum_{ai} Xi \qquad (2)$$

where πij is a profit measure, CR is a measure of market structure (usually a concentration measure), MS is a measure of individual-firm market share, and X is a vector of control variables which are included to take account of firm-specific and market-specific characteristics.

The traditional SCP hypothesis can be verified by finding $a_1 > 0$ and $a_2 = 0$; and the efficiency hypothesis by finding that $a_1 = 0$ and $a_2 > 0$. (Or the two hypotheses may be complementary as found by Evanoff and Fortier (1988) where $a_1 > 0$ and $a_2 > 0$).

So, given the general model and the variables specification from above we can show the linear multiple regression model we estimate as follows:

$$\begin{aligned} ROA_{ij} \text{ or } ROE_{ij} = {} & a_0 + a_1 (CR_j) + a_2 (MS_{ij}) + a_3 (NARMON_j) \\ & + a_4 (ASSETS_{ij}) + a_5 (IPAY/FUND_{ij}) + a_6 (LOANS/ASSETS_{ij}) \\ & + a_7 (EQUITY/ASSETS_{ij}) + a_8 (STAFF/ASSETS_{ij}) \\ & + a_9 (LLR/LOANS_{ij}) + a_{10} (GOVT)_j \end{aligned} \tag{3}$$

where:

ROA_{ij} = banks i's profits measured as before tax return on assets in $market_j$

ROE_{ij} = bank i's profits measured as before tax return on equity in $market_j$

CR_j = concentration ratio in $market_j$ (5 and 10 firm assets and deposits concentration ratios and Herfindahl indexes)

MS_{ij} = individual banks asset market share in $market_j$

$NARMON_j$ = narrow money supply growth in $market_j$

$ASSETS_{ij}$ = bank i's asset size in market $_j$

$IPAY/FUND_{ij}$ = interest paid divided by total funds for bank i's in $market_j$

$LOANS/ASSETS_{ij}$ = loans-to-assets ratios for bank i's in $market_j$

$EQUITY/ASSETS_{ij}$ = equity-to-assets ratios for bank i's in market $_j$

$STAFF/ASSETS_{ij}$ = Staff expenses divided by total bank assets for bank i's in market $_j$

$LLR/LOANS_{ij}$ = loan-loss reserves divided by total loans for bank i's in $market_j$

$GOVT_j$ - binary variable equal to one if government owned or zero otherwise

The SCP literature has provided the framework from which the above model has been derived but inspection of the above specification and data availability problems create certain difficulties. First, the test of market share may be nullified by the inclusion of bank assets (ie absolute bank size) as well as market share in the regressions. Therefore the model needs to be estimated by dropping assets from the regressions. Secondly, data for the LLR/Loans variable is not available for various countries (namely Austria, Belgium, Switzerland and Liechtenstein), and there is also a substantial number of missing observations for other countries in the sample. Estimating a model which includes LLR/LOANS would only evaluate the SCP relationship across a subset of European countries. As a consequence, we estimated the model with and without the LLR/LOANS variable to see if the explanatory power of the equations altered. There are also substantial missing values for the IPAY/FUND and STAFF/ASSETS variable.

6.3.1 Estimation Procedure

6.3.1.1 Multiple Regression Analysis

As mentioned in Section 5.4 of this thesis multiple regression has been the method most widely used to evaluate the SCP relationship in banking markets. A multiple regression equation describes the extent of linear relationships between the dependent variable and a number of other independent variables for example:

$$Y_t = \beta_1 + \beta_2 X_{2t} + \dots + \beta_j X_{jt} + \dots + \beta_k X_{kt} + U_t; \; t=1 \dots n \qquad (4)$$

The assumptions are that the variables on the right-hand side of equations are nonrandom, and that the disturbances have zero mean, constant variance, either zero covariance or independence between distinct disturbances U_s, U_t and, for inferences in small samples, that U_t has a normal distribution. In short we have:

(a) 'fixed X': X_{jt} nonrandom; j=1, ...d; t=1, ...η

(b) 'zero mean': $E(U_t) = 0$; t=1, ...η

(c) 'constant variance': var(at) = σ^2; t=1 ....η (Homoscedasticity)

(d) 'zero covariance': cov $(U_t, U_s) = 0$; $S \neq t$; S, t=1, ...η or
'independence': U_t, U_s independent; $S \neq t$; S, t=1, ...η

(e) 'normality': $U_t \sim N($ $)$; t=1, ...η

The error term follows the normal distribution with mean zero and homoskedastic variance.

To ensure that the normality assumption is correctly stated, one combines assumptions (b), (c), the independence version of (d) and (e) by writing $U_t \sim NID(0, \sigma^2)$. This indicates that the U_t are normal and independently distributed, with $E(U_t) = 0$ and var $(U_t) = \sigma^2$.

Equation (4) above is a single equation model with fixed (nonrandom) values for the X variables. The model expresses Y as a linear function of the X variables, but a random disturbance is added to this function (U_t), so observations on Y have a random component. This type of model is described as a multiple regression model in order to distinguish from the two variable model of elementary statistics.

In equation (4), β_2, β_j β_k etc. are designated as partial regression coefficients and represent the slope of the regression line for each independent variable, controlling for the other. Thus, β_2 reflects the amount of change in Y_t associated with a given change in X_{2t}, holding all other independent variables constant, and the same interpretation can be given for the other β coefficients apart from β_1 which is the constant. The coefficients of the multiple linear regression equation are estimated so as to minimise the average square error in prediction. This is achieved by using the least squares criterion to obtain the best fit to the data (see Frankfort-Nachmias and Nachmias (1992, p.414) for a more detailed exploration).

We have noted above that the standardised regression coefficients - the betas - allow us to assess the independent effect of each variable in the regression equation on the dependent variable. To examine the combined effect of the independent variables, we compute a measure of the coefficient of determination, denoted R^2. This measure designates the percentage of the variation explained by all the independent variables in the multiple regression equation.

The R^2 is calculated by dividing the sum of squares of the regression by the total sum of squares corrected for by the mean. A more useful measure used to account for goodness of fit is the adjusted R^2 or R^2 (adj.). This is simply the R^2 adjusted for degrees of freedom. If a variable is added to an equation, R^2 will get larger even if the added variable is of no real value. R^2 (adjusted) is an approximately unbiased estimate of the population R^2 and is calculated by the formula:

$$R^2(\text{adj}) = 1 - \frac{\text{SS Error}/(\eta\text{-p})}{\text{SS Total}/(\eta\text{-1})}$$

where SS error = residual sum of squares
SS total = total sum of squares corrected for the mean
η = number of observations
p = number of parameters

We utilise the MINITAB statistical package to undertake multiple regression analysis on our data sample for European banks. This provides; an F test which is a measure of the overall significance of the estimated regression line, a table of coefficients; the estimated standard deviation about the regression line; R-sq and R-sq (adjusted) measures; analysis of variance (including the regression sum of squares; residual sum of squares; mean squared residual and the total sum of squares corrected for the mean); table of predicted Y value, ($\hat{Y}$) and the relevant residuals.

6.3.1.2 Test for heteroscedasticity

The assumption of homoscedastic residual variance is often violated by the use of cross-section data. To investigate whether there is evidence of heteroscedasticity in the residual variance we use the Lagrange Multipli r (LM) test. The LM test is described in detail in Griliches and Intrilgator (1984) and its application to matters of heterosceuasticity is relatively uncomplicated. The test is performed by regressing the residuals onto the predicted values from which they were obtained. Calculating n R^2, where 'n' is the sample size and the R^2 obtained from this regression gives the test statistic. Its distribution will be chi-squared with s degrees of freedom, where 's' is the number of restrictions in the model. The critical chi-square values are 3.84146 (at the 5 per cent level) and 6.63490 (at the 10 per cent level). Values below this would reject the null hypothesis of heteroscedastic residual variance. Note that heteroscedasticity does not destroy the unbiasedness property of ordinary least square estimators, but these estimators would no longer be efficient. In other words, ordinary least squares estimators would no longer be best linear unbiased estimators (BLUE) (see Gujarati (1992) for a more detailed explanation).

6.3.1.3 Test for multicollinearity

An important problem in the application of multiple regression analysis involves the possible multicollinearity of the independent variables. This is when explanatory variables are highly correlated with each other. In such situations collinear variables do not provide new information and it becomes difficult to separate the affect of such variables on the dependent variable.

One method of measuring collinearity (and provided by the MINITAB package) uses the variance inflationary factor (VIF) for each explanatory variable. The VIF is defined as :

$$VIF_j = \frac{1}{1-R^2_j} \qquad (6)$$

where R^2_j represents the coefficient of multiple determination of explanatory variable X_j with all other X variables. In the case when there are only two explanatory variables, then R^2_j is the coefficient of determination between X_1 and X_2. If, for example, there were three explanatory variables, then R^2_1 would be the coefficient of multiple determination of X_1 with X_2 and X_3. If the explanatory variables are uncorrelated, then VIF_j will equal to 1. Marquardt (1980) has suggested that if VIF_j is greater than 10 there is too much correlation between variable X_j and the other explanatory variables .

6.3.1.4 Test for normality

Another important problem in the use of multiple regression analysis involves the assumption of normally distributed error terms (or residuals). Non-normality of the residuals would cast doubt on the validity of the linear model. To test for normality we use a procedure provided in MINITAB which is essentially the same as the Shapiro-Wilk (1978) test.

We calculate normal scores for the residuals (which are mainly used to produce normal probability plots) and then correlate these with the residual values. A very powerful test of normality can be based on this correlation. A very high correlation is consistent with normality. The hypothesis of normality is rejected if the correlation falls below the appropriate values in Table 6.1.

6.3.1.5 Cross-section and pooled time-series estimates

The size of our data sample allows us to estimate variations of the model in equation (3) using both cross-section and pooled time-series data. The estimation sequence followed in this thesis is as follows:

1. Cross-section estimates of the model are undertaken for each year, 1986 to 1989, across countries. These estimates are used to adopt the most appropriate form of the model.

2. Pooled time-series cross section estimates are undertaken using time series dummy variables. F-tests on the pooled data are used to evaluate evidence of seasonality in the results.

Table 6.1 Critical values for the Shapiro-Wilk equivalent test

N	0.10	0.05	0.01
4	0.8951	0.8734	0.8318
5	0.9033	0.8804	0.8320
10	0.9347	0.9180	0.8804
15	0.9506	0.9383	0.9110
20	0.9600	0.9503	0.9290
25	0.9662	0.9582	0.9408
30	0.9662	0.9582	0.9490
40	0.9767	0.9715	0.9597
50	0.9807	0.9764	0.9664
60	0.9835	0.9799	0.9710
75	0.9865	0.9835	0.9757

Source: MINITAB Manual, p.46

3. Pooled time-series cross section estimates of the model are made for each individual country's banks, ie., an equation is estimated for each country. (One has to pool data for individual countries because only one market structure measure is available in any one year, pooling the data provides variance in the concentration measure despite there only being four different values).

6.4 Testing for Rivalry and Cooperation in European Banking

The concentration measures which have been used in the above analysis and previous studies have no apparent theoretical superiority over alternative measures. As such, the appropriateness of such measures should be empirically verified. Employing a five-firm concentration ratio, for example, also implicitly assumes equal influence by each of the top five firms in the market. This may be a tenable assumption, but it also should be empirically verified. In Section 4.2.3 of this thesis we showed how the firm Lerner index of monopoly power can be derived as:

$$m_i = \frac{S_i}{e} (1+\lambda) \qquad (7)$$

where M_i = Lerner index
S_i = market share of firm i
e = elasticity of demand
λ = conjectural variation of firm i. $\left[\lambda = \frac{d\Sigma_{v\neq 1} qj}{dqi}\right]$

Subsequently the Lerner index for the industry can be written as:

$$M_{ij} = \frac{S_{ij}}{e_j} (1+\lambda_{ij}) \qquad (8)$$

If firm behaviour is totally non-collusive (the Cournot-Nash case) then $\lambda_j = 0$. If behaviour is perfectly collusive then

$$\lambda_{ij} = \frac{1-S_{ij}}{S_{ij}} \qquad (9)$$

Hay and Morris (1991, p.221) show that if we l :: the extent of collusion be β, where β ranges from zero to one, then λ is generally given by:

$$\lambda_{ij} = \beta_j \left[\frac{1-S_{ij}}{S_{ij}}\right] \qquad (10)$$

The variance β_j represents the degree of industry wide co-operation. It is natural to represent β_j as an increasing function of the level of concentration in the market, therefore the higher level of concent ation the greater the degree of indust.y-wide co-operation. All firms gain from the higher prices that result from co-operation, therefore, profitability is assumed to be some positive function of industry-wide concentration. Using summary indexes of market structure - like five-firm concentration ratios for example - imposes a variety of restrictions on the role of individual firm market shares and, by implication, on inter-firm behaviour. For example, the η firm concentration ratio sums the top η market shares with equal weight and ignores all other firms . The Herfindahl index weights each firm by itself, and then sums those terms. This measure precludes the possibility of a negative rivalry effect from any firm.

The industrial economics literature has sought to investigate firm behaviour between the largest firms by examining the relationship between market share of the largest firms and price-cost margins. Studies undertaken by Kwoka (1979), Lamm (1981) and Kwoka and Ravenscroft (1986) investigate the relationships between firstly, the four-firm concentration and price-cost margins, and secondly, the market shares of the top four firms and price-cost margins.

Kwoka (1979) and Lamm (1981) find that there is a positive relationship between price-cost margins for the top two or three firms' market shares followed by a negatively signed share. The latter finding is interpreted as possibly reflecting pro-competitive rivalry by third or fourth-rated firms, since when such firms are large then industry margins decline. Kwoka and Ravenscroft (1986) examine price-cost margins line of business in US manufacturing industry. Their traditional SCP estimates suggest that the four-firm concentration ratio is negatively related to price-cost margins (a finding counter to the SCP paradigm). When they examine the relationship between the market shares of the leading four firms and price-cost margins, however, they observe that larger leading firms generally lower margins. In addition they find:

> The market shares of non-leading firms do not, in general seem to affect the price-cost margins of firms in the industry, while the leading firms acts as a strong rival to the smaller firms. Thus, it is the negative effect of S1 (market share of the largest firm in the line of business) that underlies and explains the negative impact of CR4 (four-firm concentration ratio) ....
>
> (Kwoka and Ravenscroft 1986, p.357)

This study also finds that a larger leading firm lowers follower margins in high-scale industries, but has little effect where scale economies are not important. They also find that larger second-ranked firms can significantly lower leaders' margins. One can see from above that the aforementioned studies investigate cooperative and rivalrous behaviour between the largest firms in the market to gain a better insight to the concentration-price-cost margin relationship.

As far as we are aware, only Evanoff and Fortier (1988) have investigated the relationship between the market shares of the largest firms and industry performance in the banking literature. Using a sample of 6,300 unit banks located in 30 US states, which permit either unit banking only or statewide branching, they estimate the following equation:

$$\begin{aligned} ROA_{1j} = {} & a_o + a_1 MSI_j + a_2 MS2_j + a_3 MS3_j + a_4 CAPAST_{ij} \\ & + a_5 MKTDEP_j + a_{10}\ MGROW_j + a_7\ POPD_j + a_8 ASSET_{ij} \\ & + a_9 HCLAW_j + a_{10}\ DDTODEP_{ij} + a_{11}\ LTOAST_{ij} \end{aligned} \tag{11}$$

where

ROA_{ij}	=	return on assets
MSI_j, $MS2_j$, $MS3_j$	=	first, second and third largest banks deposit market share
$CAPAST_{ij}$	=	capital-to-asset ratio
$MKTDEP_j$	=	market deposits
$MGROW_j$	=	market growth rate (growth rate in market deposits)
$POPD_j$	=	population density
$ASSET_{ij}$	=	bank assets
$CLAW_j$	=	binary variable equal to one if liberal holding company expansion is allowed, zero otherwise
$DDRODEP_{ij}$	=	ratio of demand deposits to total deposits
$LTOAST_{ij}$	=	loan-to-asset ratio

They estimate the above equation for both unit banking and liberal branching markets. 'Results are presented in a stepwise manner to show that the marginal impact of additional market shares is the same whether entered in the stepwise fashion or in one equation ...' (p.282). The results for banks in unit markets imply that the share of the leading bank is 'apparently' the main influence on profits. For the second and third largest firms the impact is small and insignificant suggesting no systematic role in determining bank profits. In these unit banking markets with relatively high entry barriers there appears to be potential for a single dominant firm. Evanoff and Fortier (1988) find for liberal branching markets that the market share controlled by the largest firm has a significant positive influence on market profit rates, the second firm has no influence whereas the third firms share enters positive and significant. They state:

> While the reasons for this are not obvious, it may result as the leading firms find it advantageous to cooperate if all three are relatively equal-sized competitors. Whereas a leading firm may dominate if it has superior market share compared to all but one other rival, a more equal distribution of shares may lead market leaders to decide that cooperation is most profitable. In any case, whereas it is relatively clear that CR1 is the most appropriate measure of market structure for banks in markets with entry barriers, it is not as clear in the subsample with few entry barriers. (p.283)

Surprisingly, Evanoff and Fortier (1988) do not make reference to Kwoka and Ravenscroft (1986) who provide an elegant theoretical and empirical exposition of cooperation and rivalry between the largest firms in the market (although they do refer to Kwoka's earlier (1979) study). The major difference between the above two empirical approaches is that Evanoff and Fortier use market shares of the three largest firms to estimate their model whereas the latter use an interactive market-share term to account for the differences in size between the largest four firms and all other firms in the market.

6.4.1 Kwoka and Ravenscroft (1986) methodology

In this thesis we intend to follow the approach taken by Kwoka and Ravenscroft (1986) to investigate the profits-concentration relationship estimated in the series of equations discussed in the first part of this chapter. This will provide greater insight into the concentration-profits relationship and should illustrate the conduct of market leaders and their influence on European banking industry performance.

Kwoka and Ravenscroft (1986) relax the assumption of a uniform degree of industry-wide co-operation by letting β_j be a simple, linear function of the ordered sequence of market shares in that industry, so:

$$\beta_j = \sum_{m=1}^{k} \alpha_m S_{mj} \tag{12}$$

where k is an empirically determined variable, $1 \leq k \leq N$, represents the number of firms where shares 'matter', in the sense of having a significant impact on margins. S_{mj} is the M^{th} firm market share in the industry, ranked from the largest to the smallest; thus, $S1_j$ represents the share of the largest firm in the market; $S2_j$ the second largest and so on. If co-operation characterises the relationship between the leading firms, then $\alpha_m>0$. If the second or third firms, say, are strong rivals, co-operation breaks down and all firms' margins are reduced. In the presence of such rivalrous firms, β_j is smaller as the consequence of some $\alpha_m<0$. If firms other than the leader do not matter, then margins are determined independently of them and their α_m in equation (10) equals zero.

Clarke and Davies (1982) have noted that there is no reason to believe in identical β_j for all firms in an industry. They state that, 'smaller firms may feel more able to get away with output changes undetected than would larger firms' (p.280). Kwoka and Ravenscroft (1986) also note that different oligopoly theories (dominant firm, price leadership, limit pricing, 'strategic groupings') would also suggest important differences between leading and non-leading firms.

In addition, the role played by market leaders may be expected to differ depending on various factors influencing the firms' environments. Leading firms may benefit from substantial economies of scale resulting in lower price setting. This may reduce the price-cost margins for non-leaders' which may suffer from distinct cost disadvantages. In low scale industries larger leaders are less likely to have an adverse impact on non-leaders' margins. Kwoka and Ravenscroft test for this and find it to be the case for US manufacturing although it is beyond the scope of our study to examine the economies of scale issue.

To test for evidence of co-operative and rivalrous behaviour between the largest firms, Kwoka and Ravenscroft start with the simplest case where industry-wide co-operation (β_j) depends on K market shares according to equation (10) above. They assume K=2, so only the largest firm (S1) and the second largest firm (S2) are important to co-operation and rivalry. They provide the following equation:

$$L_{ij} = (1/\eta_j)\ \{MS_{ij} + \alpha_1\ S1_j\ (1-MS_{ij}) + \alpha_2\ S2_j\ (1-MS_{ij})\} + \alpha X + \varepsilon_{ij} \quad (13)$$

where L_{ij} = Lerner index
η_j = industry's elasticity of demand
MS_{ij} = market share of individual firms
S1, S2 = market share of the largest and second largest firms in the industry
X = vector of control variables
E_{ij} = random disturbance term

MS_{ij} is included to evaluate whether the market share of individual firms is related to industry margins - i.e. a test of the efficiency hypothesis. The interactive term $S1_j$ $(1-MS_{ij})$ is used to account for differences in the market share of the largest firm in the industry relative to the market shares of all other firms in the industry. The same interactive term is used for the second largest firm, $S2_j$ $(1-MS_{ij})$. As mentioned previously, the co-operation hypothesis implies that $\alpha_1>0$;

rivalry, that $\alpha_1<0$; and 'independent' behaviour; that $\alpha_1 = 0$.

From the above Kwoka and Ravenscroft estimate the following model:

$$\begin{aligned} OPINC/SALES_{ij} = {} & a_o + a_1\ S1DMS_{ij} + a_2\ S2\ DMS_{ij} + a_3\ S3\ DMS_{ij} \\ & + a_4 S4DMS_{ij} + a_5 MS_{ij} + a_6 MES_j + a_7 GROW_j \\ & + a_8 DS_j + a_9 IMP_j + a_{10} ADV_j + a_{11} RD_j \\ & + a_{12} CAP_j + a_{13}\ CU_{ij} \end{aligned} \tag{14}$$

where $OPINC/SALES_{ij}$ = Line of business operating income divided by sales

$SnDMS_{ij}$	=	Variables denoting interaction of $S1_j$, $S2_j$, $S3_j$, $S4_j$
MS_{ij}	=	firm market share
MES_j	=	industry minimum efficient scale measure
$GROW_j$	=	industry growth
DS_j	=	industry distance shipped measure
IMP_j	=	industry import penetration measure
ADV_j	=	industry advertising intensity measure
RD_j	=	research and development intensity measure
CAP_j	=	industry capital intensity measure
CU_{ij}	=	line-of business capital utilisation measure

The estimation procedure involves first the evaluation of the effect of the $S1DMS_{ij}$ variable by itself. Then, $S2DMS_{ij}$ is added to the equation with $S1DMS_{ij}$; then $S3DMS_{ij}$ is added and so on. Two-tail (F) tests were performed on an ordered sequence of the SnDMS coefficients, testing to see whether the second, third or fourth firms had a significant impact on industry margins. For their data source comprising 3186 line-of-business observations for US manufacturing in 1975 Kwoka and Ravenscroft (1986) find:

> The coefficient on $S1DMS_{ij}$ is negative and significant, implying that larger firms generally lower LB (line-of-business) margins. The estimated coefficients on $S2DMS_{ij}$ and $S3DMS_{ij}$ are neither stable in sign nor anywhere near conventional levels of statistical significance. $S4DMS_{ij}$ is positive but also insignificant. The F-statistic on $S2DMS_{ij}$ and $S3DMS_{ij}$ taken together is 0.09, far below the 5 per cent F-value of 3.00. The addition of $S4DMS_{ij}$ to this group raises the F statistic slightly to 0.27, but still below the critical F-value of 2.60. The market shares of non-leading firms do not, in general, seem to affect the price-cost margins of firms in the industry, while the leading firm acts as a strong rival to the smaller firms. Thus, it is the negative effect of S1 that underlies and explains the negative impact of CR4 (four-firm concentration ratio) ... (pp.35 -357)

6.4.2 Estimating cooperative and rivalrous behaviour in European banking - the model

Following the methodology outlined above we estimate a model including the $SnDMS_{ij}$ variables for our sample of European banks. We examine the relationships between the five leading banks in each individual market. The equation to be estimated is as follows:

$$\begin{aligned} ROA_{ij} = {} & a_o + a_1\ MSASS_{ij} + a_2 NARMON_j + a_3 IPAY/FUND_{ij} \\ & + a_4 LOANS/ASSETS_{ij} + a_5 EQUITY/ASSETS_{ij} + a_6 STAFF/ASSETS_{ij} \\ & + a_7 GOVT_j + a_8 S1DMS_j + a_9 S2DMS_j + a_{10} S3DMS_j + a_{11} S4DMS_j \\ & + a_{12} S5DMS_j \end{aligned} \tag{15}$$

where:

ROA_{ij}	=	bank i's profit measured as return on assets in $market_j$
MS_{ij}	=	bank i's asset market share in $market_j$
$NARMON_j$	=	narrow money supply growth in $market_j$
$IPAY/FUND_{ij}$	=	interest paid divided by total funds for bank i's in $market_j$
$LOANS/ASSETS_{ij}$	=	loans-to-assets ratios for bank i's in $market_j$
$EQUITY/ASSETS_{ij}$	=	equity-to-assets ratios for bank i's in $market_j$
$STAFF/ASSETS_{ij}$	=	staff expenses divided by total bank assets for bank i's in $market_j$
$GOVT_j$	=	binary variable equal to one if government owned or zero otherwise
$SnDMS_j$	=	Variables denoting interaction of $S1_j$, $S2_j$, $S3_j$, $S4_j$ and $S5_j$ with the difference between unity and own share

Cross-sectional estimates of the above equation are undertaken for each year from 1986 through to 1989 and pooled time-series estimates are also undertaken. As in the Kwoka and Ravenscroft study, two-tail F-tests are performed on an orderr sequence of the SnDMS coefficient testing to see whether the relative market share of the second, third, fourth or fifth largest firms have a significant impact on industry margins. These results can then be compared with the results obtained from the equations outlined in section 6.2.3 which use the five-firm assets concentration ratio.

Overall this analysis will provide greater insight into the concentration-profits relationship and should illustrate the influence of market leaders on industry performance in European banking markets.

6.5 Limitations of the Methodology

The main limitations of the SCP modelling approach have been discussed in Section 5.7 of this thesis and these in general apply to the methodology outlined in this Chapter. In particular, a major econometric difficulty lies in specifying the functional form of the estimating equation. Our methodology adopts a linear functional form that assumes a given change in market structure will have the same absolute effect on performance. Studies undertaken by Heggestad and Mingo (1976) and Heggestad and Mingo (1977) show that, at least for some bank products the concentration-price relationship is non-linear. Linear equations, therefore, may be a misspecification and result in biased estimates.

The specification of the models outlined in Sections 6.2 and 6.3 of this thesis evolve from both the banking and industrial economics SCP literature. Typically the explanatory power of these models are relatively low. The coefficient of determination (R^2) in most of the studies is less than 20 per cent. This poor explanatory power may be the result of three factors. First, there may be omitted variables that are important in explaining the variation in prices of performance across markets. Second, as mentioned above, the linear model may be inappropriate - the functional form may be misspecified. Third, the majority of SCP studies are undertaken on cross-sectional data, low R^2 may reflect the random nature of such data.

Another limitation relating to the econometric specification in equations (3) and (14) is that unidentified country-specific characteristics may create estimation bias. The country-specific variables: concentration ratios (CR_j), narrow money supply growth ($NARMON_j$) and the government ownership binary variable ($GOVT_j$) may not take account of all country-specific characteristics. If we find that the country- pecific variables have strong effects on performance, while the firm-specific variables turn out to be insignificant, this implies that country specific effects are important as determinants of profits of European banks. To the extent that the unidentified country-specific characteristics are correlated with say, CR_j, $NARMON_j$ and $GOVT_j$, the estimated coefficients for these country-specific variables may be biased due to the omitted variables. In addition, country specific factors may also create the difference in the average level of profits between the banks originating from one country and the banks from another country. Thus, the average level of profits may vary from one country to another due to the country-specific factors. Those factors should be borne in mind when interpreting the results.

Other limitations relate to the definition of market size in calculating the market structure variables. Regional data are very difficult (if not impossible) in some cases to obtain across European banking markets, so for simplicity sake we assume 'the market' in each country as either total banking sector assets or deposits. Banks, as multiproduct firms, have different market shares in various product markets and some commentators (such as Gilbert 1984) suggest that it may be better to undertake a methodology that incorporates this factor - so like the later US SCP studies we could examine the price/performance-concentration relationship for a particular product across European markets. This, however, presents us with substantial data availability problems. Examining the price-performance relationship for a particular product or service also has its drawbacks because of the problem of cross-subsidisation.

6.6 Conclusions

This chapter examines the methodology that is to be used to evaluate the SCP relationship across European banking markets. The first part of the chapter shows how we derive our model specification from the SCP framework and explains the estimation procedure. This enables us to test the two competing hypotheses - the traditional SCP paradigm and the efficiency hypothesis. The second part of this Chapter provides a methodology which enables us to investigate the performance-concentration relationship further. Using the approach outlined by Kwoka and Ravenscroft (1986) we can investigate the cooperative and rivalrous behaviour of leading banks in each market which will yield further insight into the performance-concentration relationship in European banking.

Chapter 7

European Data Sample - An Analysis

7.1 Introduction

This chapter analyses the variables used in our methodology to investigate the SCP relationship across European banking markets between 1986 and 1989. It is essentially an exploratory data analysis (variable by variable analysis) of our data set. Section 7.2 describes the source and the format of data used, and section 7.3 investigates the sample size as a proportion of the total population, in terms of both the number of banks and banking sector assets. The remainder of the chapter focuses on the variables outlined in the previous chapter which are used in the detailed empirical analysis reported in Chapter 8. Section 7.4.1 analyses the two banking industry performance measures; before-tax ROA and before-tax ROE. Section 7.4.2 investigates the market structure variables; concentration measures and firm-specific market share. Section 7.4.3 describes the government ownership binary variable which is used to account for the presence of state-owned banks. Section 7.4.4 examines the market demand conditions variable, section 7.4.5 the cost variables and section 7.5.6 other control variables. Section 7.5 is the conclusion.

7.2 Source and Format of the European Bank Data

The balance sheet and income statement data used for our sample of European banks were obtained from the IBCA Ltd Database[1]. This database provides information in four types of format: summary data, full spreadsheet data, reduced spreadsheet data and raw data. Examples of the data formats are shown in Appendix 4. Accounting information on European banks (759 banks in 1986; 1201 banks in 1987; 1541 in 1988; and 1268 in 1989), across nineteen countries, were obtained from the full spreadsheet and raw data files. This information was read into MINITAB compatible files. Where possible the researcher used non-consolidated bank accounting data so as to make the information as country-specific as possible. The raw bank accounting data on the IBCA database are obtained from the annual accounts of the banks in question. Spreadsheets are prepared by IBCA analysts who define accounting values into comparable categories and definitions of the spreadsheet data are provided in database instruction manuals[2].

The data sample for all the European banks was read into MINITAB compatible files and then coded according to the year and the country. This enables us to undertake analysis of yearly and country differences in the data sample. Finally, it should be noted that in the data sample, accounts for foreign bank subsidiaries were also included. We did not omit these data on foreign bank subsidiaries for the following reasons. Firstly, we noted in Section 5.4.2 of this thesis that one of the major problems with SCP analysis is defining the extent of the market. As there is no sub-market data officially available for different European countries, we chose the simplest and broadest market definition - total banking sector assets in each particular country. As we aim to evaluate banking industry performance across different European markets, and as our market definition includes the assets of both domestic and foreign banks, it seems justifiable to include information on these two types of banks in our analysis. If we ignore the presence of foreign banks we would be neglecting the competitive influence they have in the banking marketplace, as OECD (1989) notes:

> With the presence of large foreign banks in many national financial systems the concentration of financial power in the hands of a few large banks which previously may have existed has been considerably diluted even if this is not easily measurable (p.68)

The majority of individual bank data for Luxembourg, Switzerland and the United Kingdom is on foreign bank subsidiaries. In the case of the United Kingdom it should be noted that the IBCA Ltd database does not provide staff expense ratios nor funding cost ratios for foreign banks, and because these are used in our model, these data are excluded from our SCP analysis in Chapter 8.

7.3 Sample Size as a Proportion of the Total Population

Table 7.1 illustrates the number of banks in the various European countries which are used in our data sample. It can be seen that the largest banking markets (Germany, United Kingdom, France, Italy, Switzerland) provide us with the most observations, and that the data for 1988 contains the largest number of banks. This, however, tells us little about the relative importance of these banks in their respective banking markets.

Tables 7.2 and 7.3 provide a better indication of the representative nature of this sample of European banks. Table 7.2 shows the sample size as a proportion of the total number of banks in each country's banking systems. It can be seen from this table that despite there being data available for 162 banks in Germany in 1988, this only accounts for 3.7 per cent of the total number of banks operating in that country's banking system. Similarly for France, the sample of 179 banks for 1988 only accounts for 9.0 per cent of the total number of banks in

Table 7.1 Country breakdown of banks in European data sample

Country	Number of banks				Total
	1986	1987	1988	1989	
Austria	27	41	47	48	163
Belgium	26	37	38	33	134
Denmark	22	25	27	26	100
Finland	9	10	12	12	43
France	96	142	179	138	555
Germany	115	149	162	149	575
Greece	9	9	10	3	31
Ireland	9	16	17	17	59
Italy	65	170	318	169	722
Liechtenstein	3	3	3	3	12
Luxembourg	61	84	87	74	306
Netherlands	23	30	36	29	118
Norway	26	28	29	27	110
Portugal	6	17	18	18	59
Spain	37	105	165	156	463
Sweden	19	22	24	23	88
Switzerland	88	138	170	160	556
Turkey	9	18	21	12	60
UK	109	157	178	171	615
Total	759	1201	1541	1268	4769

Source: IBCA Ltd

TABLE 7.2

SAMPLE SIZE AS A PROPORTION OF TOTAL POPULATION
NUMBER OF BANKS [%]

Country	1986	1987	1988	1989
Austria	2.2	3.3	3.8	3.9
Belgium	21.7	29.1	31.7	28.2
Denmark	13.9	15.4	16.4	16.7
Finland	1.4	1.6	2.0	2.4
France	4.6	6.9	9.0	7.3
Germany	2.5	3.3	3.7	3.5
Greece	23.1	22.5	24.4	7.1
Ireland	16.7	30.2	36.2	34.7
Italy	5.9	15.2	28.9	16.0
Luxembourg	50.8	63.6	60.8	41.8
Netherlands	14.9	19.1	21.3	16.1
Norway	7.9	9.5	10.1	10.1
Portugal	23.1	65.4	66.7	54.5
Spain	8.4	22.2	33.6	32.4
Sweden	2.6	3.1	3.5	3.5
Switzerland	14.4	22.5	27.0	25.6
United Kingdom	14.0	20.1	22.7	22.1
Liechtenstein	n.a.	n.a.	n.a.	n.a.
Turkey	14.8	29.0	32.8	18.2

NOTES

Sources of information for banking sector size obtained from individual countries banking asociations and central banks.

Concentration ratios calculated using data taken from the IBCA Credit Rating Agency [London] database.

Source: Authors own estimates

TABLE 7.3

SAMPLE SIZE AS A PROPORTION OF TOTAL POPULATION BANKING SECTOR ASSETS [%]

Country	1986	1987	1988	1989
Austria	69.7	71.8	74.2	74.6
Belgium	93.6	93.9	96.7	96.5
Denmark	60.8	67.8	71.8	66.2
Finland	72.1	69.9	68.3	75.7
France	60.3	67.1	70.8	60.0
Germany	71.2	74.8	78.7	78.5
Greece	77.2	77.5	76.2	46.7
Ireland	80.0	91.6	92.8	93.5
Italy	64.0	75.4	84.0	70.3
Luxembourg	86.4	93.0	93.3	88.0
Netherlands	86.9	84.0	83.3	87.0
Norway	70.3	71.2	65.7	69.1
Portugal	45.2	86.0	89.1	89.2
Spain	50.0	89.4	92 3	87.4
Sweden	72.8	75.9	78.5	78.2
Switzerland	80.0	84.9	87.2	86.2
United Kingdom	48.3	59.0	64.6	65.5
Liechtenstein	n.a.	n.a.	n.a	n.a.
Turkey	58.9	80.6	91.6	62.7

Source: Authors own estimates

the system. The figures for 1988 for the other large banking systems - United Kingdom (22.7 per cent), Italy (28.9 per cent), Switzerland (27.0 per cent) and Spain (33.6 per cent) - also indicate that in terms of the number of banks operating in respective countries banking systems, the data sample appears to be relatively small. The most representative data sample appears to be for Luxembourg and Portugal where, in at least three years, the number of banks in our sample accounts for over 50 per cent of the total number operating in the respective systems.

Table 7.3, however, provides a clearer indication of the relative importance of the IBCA data sample for European banks. This table shows the proportion of total banking sector assets for each individual country accounted for by our sample. It is clear that for virtually every country across the four years the banks in the sample account for more than 70 per cent of total banking sector assets. For the largest banking systems, the only noticeable exception is the United Kingdom where our sample ranges between 48.3 per cent of total banking sector assets in 1986 to 65.5 per cent in 1989. Returning to the example of Germany, we can see that despite our sample only accounting for 3.7 per cent of the number of banks operating in that country in 1988, the banks actually accounted for 78.7 per cent of total banking sector assets. This indicates that the data set for German banks predominantly includes the country's largest banks and this, in fact, can be generally said for our data sample as a whole (apart from the possible exceptions of Luxembourg and Portugal).

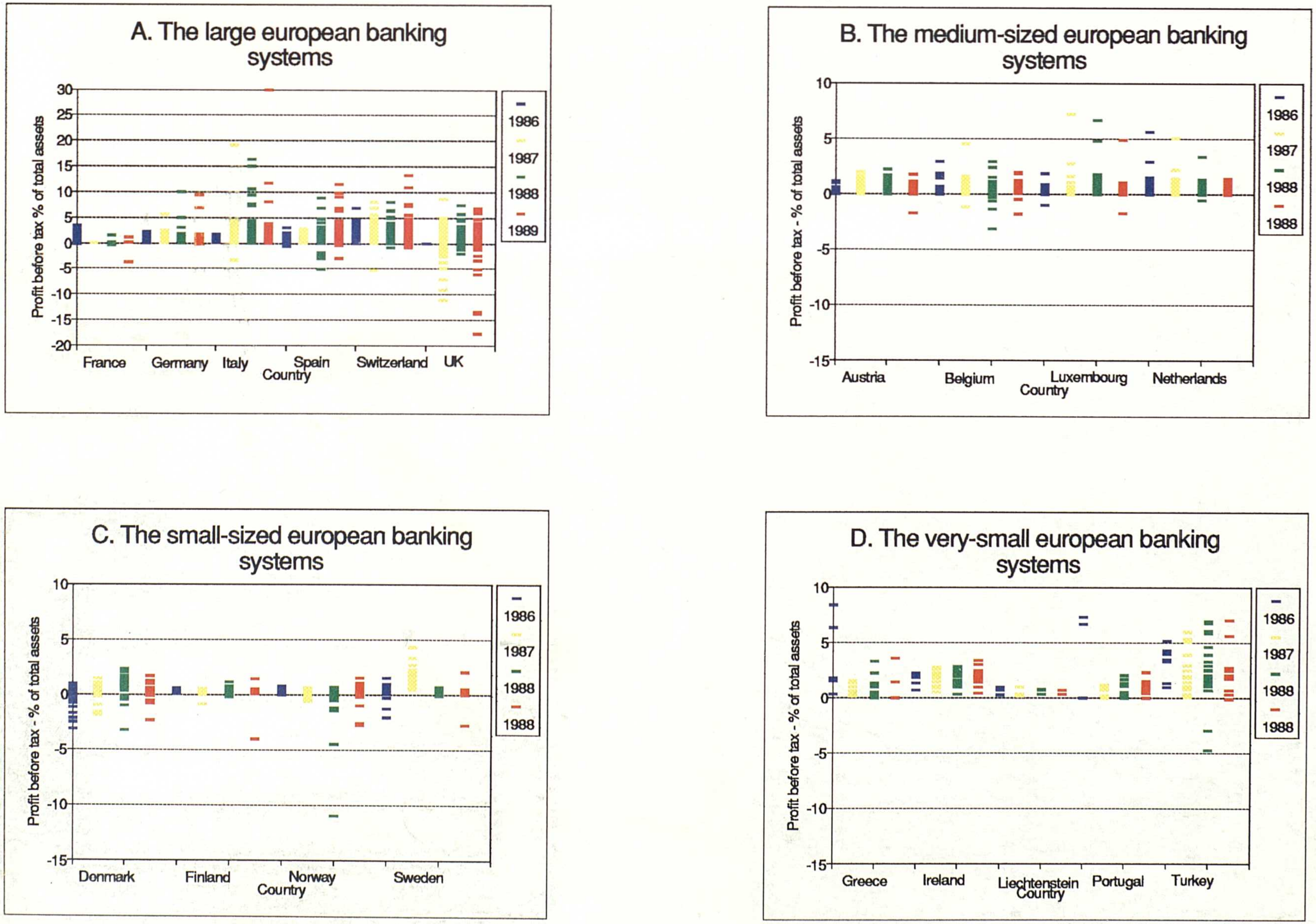
7.4 Variable Description

7.4.1 Performance variables

7.4.1.1 Before-tax return-on-assets

Figure 7.1 illustrates the before-tax ROA variable for all banks in the data sample across 19 European countries (summary descriptive statistics are provided in Appendix 5). Viewing the figure for the largest European banking market, one can see that over the period studied the largest losses were experienced by banks operating in the UK market. In addition, returns to banks in the German market appear to be relatively stable and this is in fact confirmed if we consider the dispersion of before-tax ROA statistics as reported in the descriptive statistics in Appendix 5. The variability of before-tax ROA for our UK bank sample is also substantial for 1987 and 1989 and out of the largest European banking markets the standard deviation divided by the mean, or dispersion statistic, for the United Kingdom (2.82 for 1987 and 3.21 for 1989) is the greatest. Although it is difficult to draw precise conclusions from these observations, one may tentatively suggest that the marked difference in the variability of performance of UK banks compared with banks operating in the other large European systems may be brought about by one or more of the following factors: markedly different operating conditions in the United Kingdom *vis-à-vis* other large banking markets and perhaps a more competitive environment; accounting and other regulations may provide less opportunity for profit smoothing than in other countries; the large number of foreign banks may add to the variability of returns[3].

Figure 7.1 Profit before tax as a percentage of total assets



Viewing the figures for the other European banking markets one can see that for the medium-sized systems the before-tax ROA for most banks ranged between zero and two per cent, the mean figures in most cases being around 0.5 per cent. In the case of the small European banking systems, the poor performance of Scandinavian banks in recent years is highlighted by the substantial number of banks which report losses across the period under study.

7.4.1.2 Before-tax return-on equity

The second measure of banking industry performance used in our analysis is before-tax ROE. Table 7.4 reports the descriptive statistics for this variable for 1986 and 1989 (descriptive statistics for 1987 and 1988 are reported in Appendix 6). If we consider the largest banking markets, it can be shown that for 1986 and 1989 Italian banks, on average, had the highest before-tax ROE. This is a general reflection of reasonable profitability yet low equity ratios of banks operating in this market. (The state-owned commercial banks have lower capital ratios than their private sector competitors). One would also expect the same relationship to be borne out on the data for French banks but the statistics do not confirm this view. ROE figures, however, do appear to be higher in other systems where state-owned banks are important, such as in Greece, Portugal and Turkey.

TABLE 7.4 BEFORE TAX RETURN ON EQUITY 1986 AND 1989 [%]

Country	Year	Number of Banks in Sample	N° Missing Observa-tions	Mean	Median	Standard Deviation	Dispesion Standard Deviation / mean	Minimum	Maximum
1. Austria	1986 1989	27 48	0 1	18.23 9.64	13.28 8.61	20.19 8.75	1.11 0.91	4.04 -18.26	109.14 42.39
2. Belgium	1986 1989	26 33	0 0	18.04 10.79	15.47 13.10	10.89 11.40	0.60 1.06	0.24 -30.43	40.11 29.41
3. Denmark	1986 1989	22 26	0 0	-4.72 3.04	-0.45 3.74	12.44 8.44	-2.64 2.78	-33.64 -25.93	8.69 16.36
4. Finland	1986 1989	9 12	0 0	10.72 2.20	10.53 7.00	6.93 9.26	0.65 4.21	1.12 -31.01	24.69 25.25
5. France	1986 1989	96 138	2 6	19.47 13.00	19.04 13.50	12.64 15.16	0.65 1.17	-23.94 -17.11	57.66 78.84
6. Germany	1986 1989	115 149	7 14	16.48 11.57	17.33 10.26	8.52 12.15	0.52 1.05	0.79 -10.56	39.11 112.89
7. Greece	1986 1989	9 3	0 0	25.49 27.50	22.46 20.00	21.67 31.70	0.85 1.15	0.26 0.10	65.78 62.30
8. Ireland	1986 1989	9 17	7 9	16.01 20.88	16.01 20.27	8.47 9.34	0.53 0.45	10.02 9.24	22.00 39.66
9. Italy	1986 1989	55 169	0 0	22.44 36.02	24.05 25.23	8.73 42.38	0.39 1.18	10.76 7.03	30.88 223.72
10. Luxembourg	1986 1989	61 74	1 0	12.76 10.26	10.88 9.36	11.08 13.28	0.87 1.29	-2.21 -72.87	57.56 48.63
11. Netherlands	1986 1989	23 29	0 0	17.20 10.01	14.96 9.98	12.97 5.91	0.75 0.59	1.05 0.92	53.01 19.59
13. Norway	1986 1989	26 27	2 1	7.83 -1.62	7.68 7.29	4.12 34.14	0.53 -21.07	0.62 -117.11	17.25 32.00
14. Portugal	1986 1989	6 18	0 0	19.04 19.90	13.20 15.18	12.98 10.90	0.68 0.55	0.23 0.75	75.37 129.79
15. Spain	1986 1989	37 156	3 8	16.66 21.32	14.85 21.28	12.01 10.42	0.72 0.49	-12.30 -12.33	44.83 48.32
16. Sweden	1986 1989	19 23	0 2	13.72 4.20	16.99 10.50	14.63 52.00	1.07 12.38	-47.92 -215.50	89.41 53.60
17. Switzerland	1986 1989	88 160	1 1	10.97 10.69	9.09 8.92	6.46 8.46	0.59 0.79	0.88 -5.54	35.46 55.26
18. United Kindgom	1986 1989	109 171	13 19	14.91 21.20	15.76 16.00	10.43 18.10	0.70 0.85	-34.40 -44.14	35.33 54.12
18. Liechtentein	1986 1989	3 3	0 0	8.30 6.86	7.98 6.53	1.32 0.67	0.16 0.10	7.16 6.41	9.74 7.62
19. Turkey	1986 1989	9 12	0 0	35.61 22.75	32.83 28.46	14.48 12.58	0.41 0.55	10.24 -0.87	52.09 37.87

Source: Authors own estimates

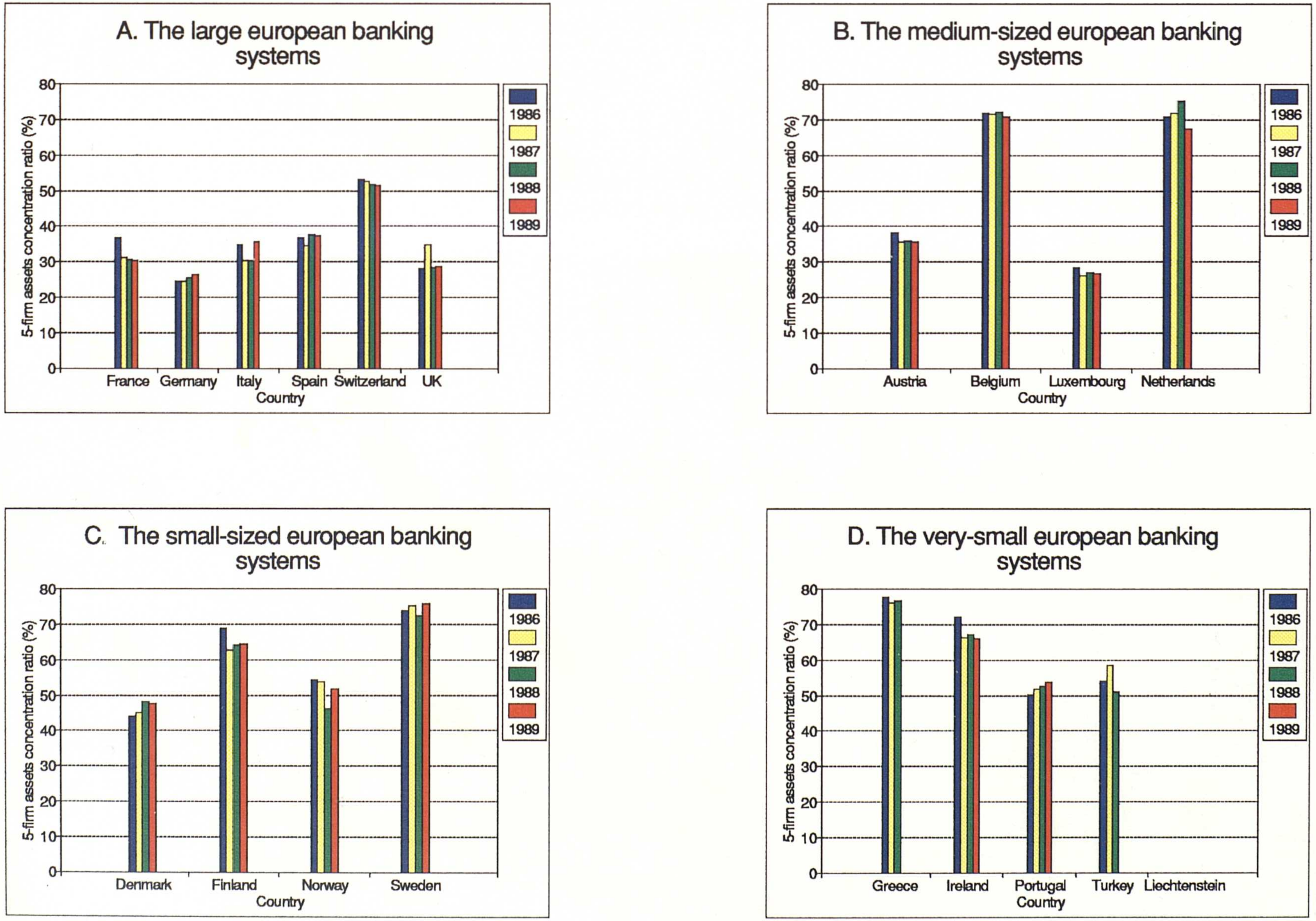
The lowest mean values for ROE, in general, appear to be for the Scandinavian banking markets, indicative of the poor performance as mentioned in the previous section. Variability of the ROE figures as measured by the dispersion statistic also suggest marked differences of banks' ROE in these particular countries. Overall, however, the level of dispersion of ROE for individual banks across European banking markets appears less marked than for the ROA variable. This may be a reflection of the more uniform international standards that regulators have demanded on equity requirements in the run-up to the acceptance of the Basle (1988) capital adequacy proposals.

7.4.2 Market structure variables

7.4.2.1 Concentration variables

In order to calculate concentration measures for individual European banking markets, we first obtained data on the size of individual banking sectors from the respective countries banking associations and official publications. This information was predominantly obtained by telefax and the sources are listed in Appendix 2. The market structure variables used in our analysis consist of five-and ten-firm assets and deposits concentration ratios as well as the respective Herfindahl indices. In Section 3.4, in Chapter 3 of this thesis, we have already examined the market size and concentration aspects of European banking markets for 1989: Table 3.6 illustrated that in 1989 in all but Germany, the United Kingdom and Luxembourg, the five-firm concentration ratios exceeded 30 per cent, and the deposits measure increased to over

Figure 7.2 Five-firm assets concentration ratio (%)



70 per cent in Belgium, Finland, Netherlands and Sweden. It was also noted that out of the four largest banking markets, concentration tended to be higher in France and Italy, markets which have traditionally been more restricted compared with Germany or the United Kingdom. Figure 7.2 compares the five-firm asset concentration ratios across European countries for the period 1986 to 1989.

From Figure 7.2 it can be seen that out of the largest European banking markets, the five-firm assets concentration has slightly risen over the period in Germany, Italy, Spain and the United Kingdom. The largest fall in concentration appears to have taken place in the French banking system where concentration fell from 36.7 per cent in 1986 to 30.4 per cent in 1989. Out of these banking sectors, the Swiss market stands out as the most concentrated mainly because the three largest banks (Union Bank of Switzerland, Swiss Banking Corporation and Credit Suisse) are noticeably larger than their near rivals. Credit Suisse, the country's third largest bank, is more than three times as big as the fourth-sized bank in the market - Swiss Volksbank: see Gardener and Molyneux (1990, p.279)[4]

Five-firm concentration ratios in the smaller banking systems commonly exceed 60 per cent with Belgium and Sweden being the most concentrated with 1989 ratios of 70.9 per cent and 76.0 per cent, respectively. The only smaller banking systems with concentration ratios under 40 per cent are Austria and Luxembourg. Both 5-firm and 10-firm asset and deposit concentration ratios, as well as market size figures, are provided for the years 1986 to 1989 in Appendix 1. The ten-firm concentration ratios (whether assets or deposits measures) confirm the same degree of concentration rankings across European countries as the five-firm ratios. It is noticeable that the combined market shares of the fifth to the tenth largest banks in the bigger European banking systems in most cases are greater than for the smaller markets. In France, for example, the concentration ratio increases from 30.4 per cent to 48.4 per cent in 1989 when we move from a five-firm assets to a ten-firm assets measure. The figures for Germany (26.3 per cent to 42.1 per cent), Italy (35.8 per cent to 58.4 per cent) and Spain (37.3 per cent to 60.3 per cent) also support the view that the 'second tier' banks are on average of significant size. This phenomenon, however, appears to be less marked in the United Kingdom where the ten-firm asset concentration ratio is only ten per cent greater than the five-firm measure. This feature also appears to be apparent in the Austrian, Danish, Irish and Portuguese banking systems.

If one compares the assets and deposits concentration measures across the years one can see that in all European banking systems, apart from (noticeably) in Germany and to a lesser extent in the United Kingdom, deposit concentration measures are greater than asset measures. This merely reflects the greater share of deposits for the largest banks than their assets size would suggest. Deposit concentration would also generally be expected to be higher than the assets measures because various banks rely less heavily on deposits as a source of funds.

The reason why the deposits concentration measures are relatively low in Germany and the United Kingdom can be explained by different factors. In Germany, deposit-taking is more evenly spread across the banking system, especially given the large number of savings and cooperative banks (see Gardener and Molyneux, 1990, p.285). This dilutes the level of concentration in the deposit market. For the United Kingdom, it is the presence of a large number of foreign banks who significantly engage in wholesale foreign currency deposits business which reduces the deposits concentration ratio. It should also be noted that in the estimates of market size for the United Kingdom we excluded the building society sector. As the IBCA Ltd. database provided information on a large number of foreign banks, yet only a handful of building societies, we deemed it best to focus entirely on banks and the official banking sector.

Finally, Appendix 7 provides estimates of the Herfindahl indices, using both assets and deposits measures, from our data sample provided by IBCA Ltd. The concentration rankings across countries closely conform with the five-firm and ten-firm concentration ratios. In fact the asset's Herfindahl measure suggests that concentration in the Italian and French banking systems is at least twice as large compared with the German and United Kingdom markets. The deposit's Herfindahl measure, however, suggest that the Italian system is markedly more concentrated than the other three largest European banking systems. Otherwise, concentration ranking appear in accordance with earlier findings.

7.4.2.2 Firm-specific market share

The firm-specific market share variable used in our analysis is simply the proportion of total banking sectors attributable to individual banks in the data sample. Table 7.5 provides an illustration of the asset's market shares of banks across European countries for 1986 and 1989 (descriptive statistics for 1987 and 1988 are included in Appendix 8). Firstly, it can be seen that for the largest European banking systems the mean market shares of banks in the respective samples are very similar, ranging between 0.4 per cent and 0.5 per cent. Viewing the asset's market shares of the largest banks in these countries for 1989 it can also be seen that they are also alike, the largest bank in Germany (Deutsche Bank) accounts for 7.9 per cent of total banking sector assets, compared with 8.1 per cent for the UK's largest bank (Barclays) 8.2 per cent for the largest bank in France (Credit Agricole) and 7.7 percent for the biggest bank in Italy (Istituto Bancario Sao Paolo). The only marked difference appears to be in Switzerland where the asset's markets share of the largest bank (Union Bank of Switzerland) accounts for nearly 17 per cent of total ban·ing sector assets. In Denmark, Greece, Ireland, Netherlands, Portugal, Sweden and Turkey the asset's market shares of the largest banks exceed 20 per cent.

Table 7.5 does not report the summary statistics describing the variability of these market shares because these are reported later in Table 7.7, which examines the asset's size of banks in the sample. The level of variability in our data samples for individual countries

TABLE 7.5 MARKET SHARE OF BANKS ASSETS MEASURE [%] 1986 and 1989

Country	Year	Number of Banks in Sample	N° Missing Observa-tions	Mean	Minimum	Maximum
1. Austria	1986 1989	27 48	0 0	2.581 1.554	0.015 0.083	12.416 11.064
2. Belgium	1986 1989	26 33	0 0	3.590 2.924	0.100 0.044	26.451 19.835
3. Denmark	1986 1989	22 26	0 0	2.763 2.546	0.078 0.060	23.308 27.850
4. Finland	1986 1989	9 12	0 0	8.010 6.310	0.220 0.070	22.640 18.980
5. France	1986 1989	96 138	0 0	0.628 0.435	0.002 0.001	7.242 8.247
6. Germany	1986 1989	115 149	0 0	0.619 0.527	0.011 0.003	7.078 7.869
7. Greece	1986 1989	9 3	0 0	8.578 15.580	0.470 0.800	35.140 40.211
8. Ireland	1986 1989	9 17	0 0	8.892 5.496	0.527 0.219	30.544 37.662
9. Italy	1986 1989	65 169	0 0	1.280 0.446	0.002 0.002	8.031 7.710
10. Luxembourg	1986 1989	61 74	0 0	1.416 1.189	0.015 0.039	8.822 7.418
11. Netherlands	1986 1989	23 29	0 0	3.780 3.002	0.110 0.090	22.570 20.250
13. Norway	1986 1989	26 27	0 0	2.704 2.561	0.020 0.009	19.103 18.563
14. Portugal	1986 1989	6 18	0 0	7.529 4.956	0.415 0.790	26.235 22.970
15. Spain	1986 1989	37 156	0 0	1.352 0.560	0.226 0.010	6.912 9.927
16. Sweden	1986 1989	19 23	0 0	3.830 3.399	0.050 0.080	20.901 27.870
17. Switzerland	1986 1989	88 160	0 0	0.909 0.539	0.006 0.003	17.860 16.868
18. United Kindgom	1986 1989	109 171	0 0	0.443 0.383	0.002 0.002	7.952 8.101
18. Liechtentein	1986 1989	3 3	0 0	n.a n.a	n.a n.a	n.a n.a
19. Turkey	1986 1989	9 12	0 0	6.540 5.223	0.990 0.523	23.750 27.117

Source: Authors own estimates

appears to be related positively to the number of banks in each country. Thus the dispersion statistic, in general, is larger for banking markets such as Germany, France, United Kingdom, Italy and Switzerland where we have a greater number of observations.

7.4.3 Other market structure variables

In Section 2.4.2 of this thesis we noted that in certain European banking markets state-controlled banks (whether central or local government owned) have a significant share of total banking sector assets. As such, our analysis aims to account for this by including a binary variable to distinguish between state-owned and other banks in our data sample. This could help us evaluate whether state-owned banks performed statistically significantly differently from their private sector counterparts.

Table 7.6 provides a breakdown of the number of publicly-owned banks in our sample. From the table it can be seen that the bulk of publicly owned banks in our sample occur in France, Germany, Italy and Switzerland. For France, the publicly-owned banks comprise Banque Nationale de Paris and Credit Lyonnais, the two largest commercial banks in the French system, a variety of smaller commercial banks, and several official banks like Credit National which provide medium and long-term finance to industry. In Germany we classified state banks according to the definition provided in Revell (1987, p.171) which includes the Landesbanks, Bausparkassen and the savings banks. For Italy the state owned banks comprise the country's largest commercial banks (public law

TABLE 7.6

NUMBER OF GOVERNMENT – OWNED BANKS
IN THE DATA SAMPLE

Country	1986	1987	1988	1989
Austria	10	15	17	17
Belgium	1	1	1	1
Denmark	0	0	0	0
Finland	1	1	1	1
France	30	52	62	53
Germany [1]	29	38	49	40
Greece	6	6	7	3
Ireland	0	0	0	0
Italy [2]	14	32	79	31
Liechtenstein	0	0	0	0
Luxembourg	0	0	0	0
Netherlands	1	1	1	1
Norway	1	1	1	2
Portugal	5	9	8	9
Spain	1	1	1	1
Sweden	1	1	1	1
Switzerland	10	17	19	19
Turkey	5	12	14	7
United Kingdom	0	0	0	0

NOTES:–

[1] For Germany the state owned banks comprise the Landesbanks, Bausparkassen and the savings banks

[2] For Italy the State owned banks comprise: public law banks, national interest banks and the savings banks. Classification according to Revell [1987 p.171]

Source: Authors own estimates

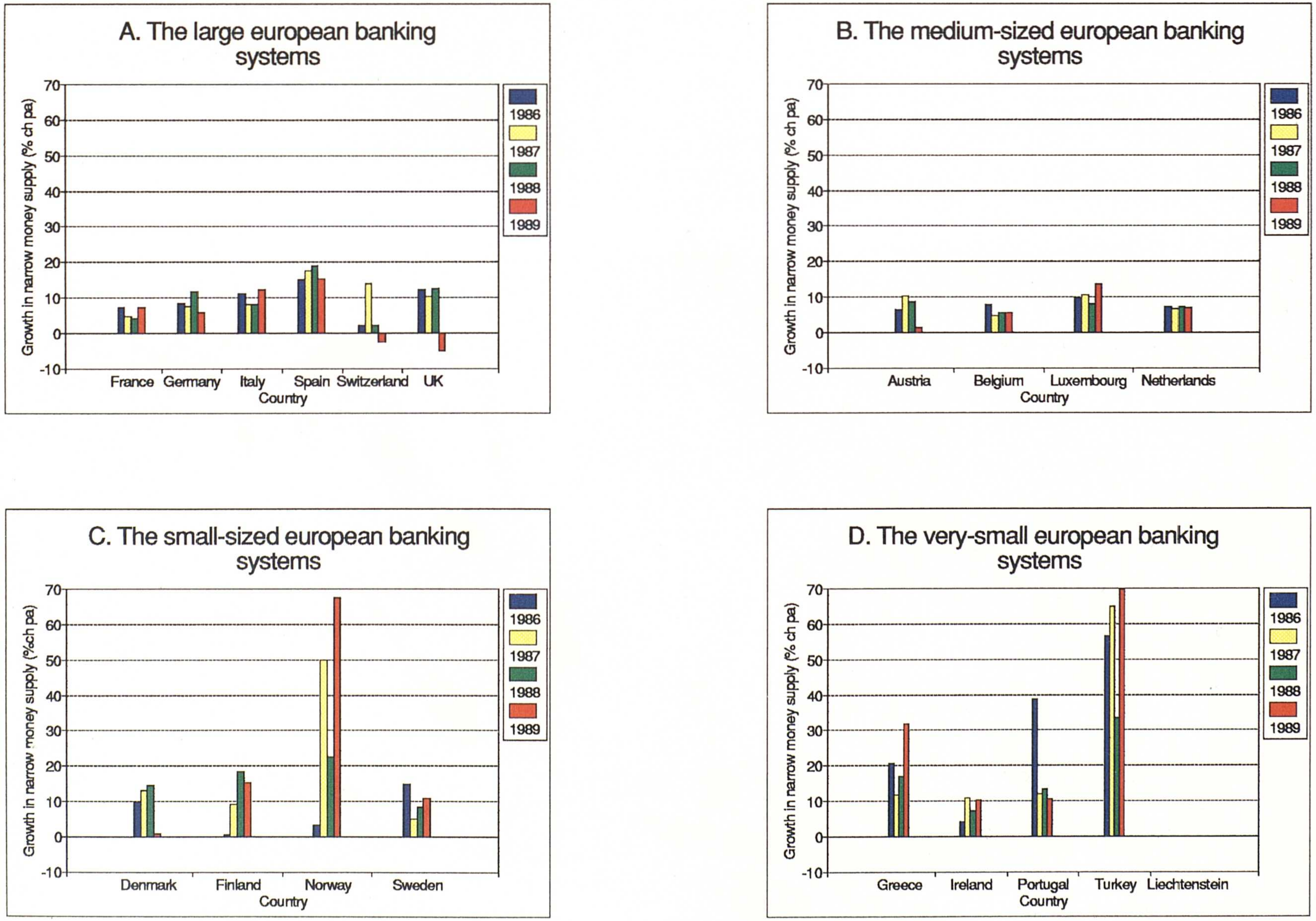
banks and national interest banks) as well as the savings banks sector. In Switzerland, the publicly-owned banks, are the cantonal banks which occupy a similar position to the savings banks in the German system. Finally, in the case of Austria, Greece, Portugal and Turkey our data sample is dominated by state-owned banks. In most of the other European banking systems, publicly-owned banks appear rarely in our data sample.

Where there is only one entry for a particularly country, the bank tends to be either the post-office bank or another specialist public credit institution, such as in Spain where the one bank identified is the foreign trade-financing bank, Banco Exterior. Other examples are: Belgium (Crédit Communal); Finland (Postipankki); Netherlands (Postbank) and Norway (Industri and Skipsbank). The entry for Sweden is for PK Banken. No publicly-owned banks were available in our data sample for Denmark, Ireland, Liechtenstein, Luxembourg and the United Kingdom.

7.4.4 Demand conditions variable

As a proxy for changing banking market demand conditions we use a growth in narrow money supply measure. This measure, as defined by the IMF's International Financial Statistics, is equal to the sum of currency outside banks and demand deposits other than those of the central government. Figure 7.3 illustrates the growth in narrow money for the European countries that are under study.

Figure 7.3 Growth in narrow money supply (annual % change)



The substantial variations in narrow money supply growth, as illustrated in Figure 7.3, make it difficult to suggest generalisations across countries. The high levels of growth of Turkey are indicative of the substantial level of inflation experienced in this country between 1986 and 1989. Large variations in the growth levels for Norway are 'possibly' indicators of extreme changes in monetary policy positions over the period. Switzerland, on average, seems to experience the lowest level of narrow money supply growth over the period. Overall, changes in demand conditions appear to be similar across other large banking systems for the period 1986 to 1988, and Spain seems to have experienced relatively higher levels of money supply growth over the period compared with the other larger European banking systems (see Appendix 9 for the data and source of information).

7.4.5 Cost variables

7.4.5.1 Asset size

The asset size of banks is included in the SCP analysis so as to take account of differences brought about by size, such as scale economies. Table 7.7 shows descriptive statistics for bank's assets size for our sample across European countries for 1986 and 1989 (see Appendix 10 for the figures for 1987 and 1988). It can be seen that in all countries (apart from Liechtenstein), the median bank size is substantially smaller than the mean values, which suggests that in virtually all European banking markets the presence of large banks substantially skews

TABLE 7.7 BANKS ASSETS SIZE [$ MILLION] 1986 AND 1989

Country	Year	Number of Banks in Sample	N° Missing Observa-tions	Mean	Median	Standard Deviation	Dispesion Standard Deviation / mean	Minimum	Maximum
1. Austria	1986	27	0	5793	1864	6980	1.20	34	27874
	1989	48	0	5039	1999	7638	1.52	269	35874
2. Belgium	1986	26	0	8023	1509	13011	1.62	220	58986
	1989	33	0	9338	1288	16516	1.77	142	63679
3. Denmark	1986	22	0	3161	1130	4288	1.36	90	26664
	1989	26	0	4288	1840	12475	2.91	108	47067
4. Finland	1986	9	0	6380	4064	7239	1.13	175	18043
	1989	12	0	10890	2137	12354	1.13	119	32649
5. France	1986	96	0	10395	4400	13130	1.26	30	119790
	1989	138	0	9582	2870	27322	2.85	22	181809
6. Germany	1986	115	0	11296	3229	20965	1.86	193	129508
	1989	149	0	7893	3108	28195	3.57	83	198254
7. Greece	1986	9	0	3811	2058	5576	1.46	209	15637
	1989	3	0	13333	1441	14400	1.08	680	34421
8. Ireland	1986	9	0	2533	834	4460	1.76	150	8700
	1989	17	0	2435	930	5854	2.40	97	16760
9. Italy	1986	65	0	9180	5021	14442	1.57	24	57598
	1989	169	0	4556	1375	15464	3.39	16	94810
10. Luxembourg	1986	61	0	2807	1753	3225	1.15	30	17480
	1989	74	0	3769	1803	4656	1.24	124	23519
11. Netherlands	1986	23	0	11209	4530	21701	1.94	314	66908
	1989	29	0	13990	2053	30600	2.19	421	93824
13. Norway	1986	26	0	2420	795	4221	1.74	18	1709
	1989	27	0	4160	1185	7094	1.71	138	30148
14. Portugal	1986	6	0	3750	1792	1119	0.30	207	13104
	1989	18	0	3506	3146	3674	1.05	559	16279
15. Spain	1986	37	0	3865	3359	6315	1.63	647	19749
	1989	156	0	2896	1259	7987	2.76	51	81609
16. Sweden	1986	19	0	4947	1920	8841	1.78	63	26355
	1989	23	0	7326	2828	18871	2.58	86	60061
17. Switzerland	1986	88	0	4748	740	14814	3.12	33	93273
	1989	160	0	5554	648	13685	2.46	23	163993
18. United Kindgom	1986	109	0	6804	1485	19211	2.82	43	122862
	1989	171	0	8724	1634	24991	2.86	35	184874
18. Liechtentein	1986	3	0	2134	2498	760	0.36	1261	2644
	1989	3	0	3466	3868	1061	0.31	2264	4268
19. Turkey	1986	9	0	1990	811	2494	1.25	119	7223
	1989	12	0	2217	940	986	0.44	221	1143

Source: Authors own estimates

the mean size distribution. Given the broad distribution of bank sizes in our data sample, however, this is hardly surprising.

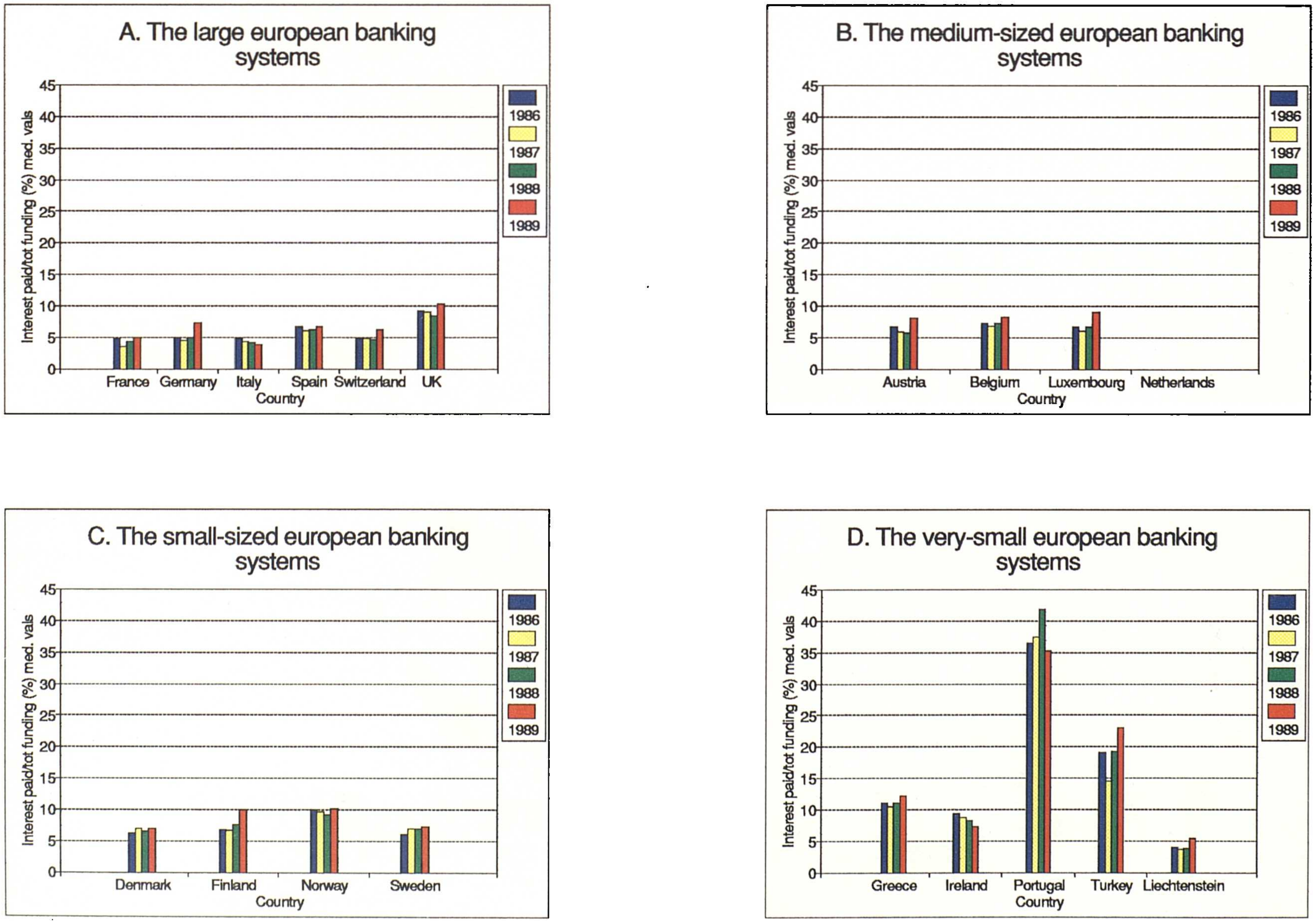
Considering the figures for 1986 and 1989, it can be seen that the largest banks in Germany, France and the United Kingdom are of a similar size, although it is noticeable how small the largest Italian bank is in comparison. Our data show that Istituto Bancario San Paolo had assets of \$94.8 billion in 1989 compared with \$198.3 billion for Deutsche Bank; \$184.9 billion for Barclays Bank and \$181.8 billion Credit Agricole. The data also suggests that the assets size of the largest banks in Belgium and the Netherlands are relatively high compared with the largest banks in other similar-sized banking system. This, of course, is reflected in the high levels of market concentration in these systems as reported earlier.

The variability of bank size in individual countries has already been discussed in Section 7.4.2.2 of this Chapter, where we considered the dispersion of the firm-specific market share variable.

7.4.5.2 Interest paid/total funds

The interest paid divided by total funds variable is a proxy for funding cost used in our SCP analysis. Figure 7.4 reports the median values of the funding cost ratios for our data sample of European banks. (Appendix 11 provides the descriptive statistics on this variable for 1986 to 1989.)

Figure 7.4 Interest paid/total funding (%) - median values



First, it should be noted that no data were available from the IBCA Ltd database for Dutch banks, and, secondly, a large number of observations were missing for UK banks (especially foreign subsidiaries). The funding cost figures for the UK banks primarily indicate the ratio for domestic institutions. Median values reported in Figure 7.4 give a clearer indication of average industry funding, because the mean values are exaggerated by some extreme values. In general, the median values are about 1 per cent lower than their mean counterparts.

Figure 7.4 illustrates that in most countries the median industry funding costs ranged between 5 and 10 per cent, with the noticeable exceptions of Portugal and Turkey. The median funding costs for Portuguese banks in our sample amounted to over 35 per cent in 1989, and for the Turkish banks over 25 per cent. In all countries, apart from Ireland and Italy, median funding costs increased between 1986 and 1989. This is probably indicative of higher domestic interest rate levels as well as the increasing cost of raising funds on capital markets for banks. Figure 7.4 also illustrates that median funding costs appeared to be the lowest in France, Germany, Italy and Switzerland over the period under study.

7.4.5.3 Staff expense ratio

Staff expense ratios calculated as staff expenses as a proportion of bank assets are described for our sample of banks for 1986 and 1989 in Table 7.8. (Appendix 12 contains the relevant data for 1987 and 1988.)

TABLE 7.8 STAFF EXPENSES TO TOTAL ASSETS RATIO 1986 AND 1989 [%]

Country	Year	Number of Banks in Sample	N° Missing Observations	Mean	Median	Standard Deviation	Dispesion Standard Deviation / mean	Minimum	Maximum
1. Austria	1986 1989	27 48	1 1	0.83 0.93	0.79 0.78	0.48 0.49	0.58 0.53	0.13 0.16	1.73 2.12
2. Belgium	1986 1989	26 33	4 4	0.59 0.44	0.31 0.35	0.59 0.43	1.00 0.98	0.01 0.01	1.59 1.40
3. Denmark	1986 1989	22 26	2 0	1.59 1.68	1.55 1.58	0.34 0.58	0.21 0.35	1.13 0.14	2.17 2.73
4. Finland	1986 1989	9 12	0 0	1.23 0.92	0.99 0.86	0.74 0.61	0.60 0.66	0.07 0.07	2.33 2.02
5. France	1986 1989	96 138	2 4	1.33 1.49	1.14 1.19	0.97 1.97	0.73 1.32	0.04 0.02	4.14 20.73
6. Germany	1986 1989	115 149	7 12	0.96 0.92	1.09 0.93	0.64 0.65	0.67 0.71	0.11 0.08	2.73 3.66
7. Greece	1986 1989	9 3	0 0	1.39 1.99	1.62 1.41	0.69 1.03	0.50 0.52	0.45 1.40	2.59 3.18
8. Ireland	1986 1989	9 17	9 14	n.a 1.57	n.a 1.88	n.a 0.77	n.a 0.49	n.a 0.69	n.a 2.14
9. Italy	1986 1989	55 169	1 2	1.41 1.85	1.27 1.39	0.46 1.08	0.33 0.58	0.07 0.01	3.04 7.21
10. Luxembourg	1986 1989	61 74	0 1	0.26 0.29	0.13 0.22	0.30 0.24	1.15 0.83	0.03 0.04	1.71 1.14
11. Netherlands	1986 1989	23 29	0 0	0.93 0.78	1.03 0.86	0.40 0.46	0.43 0.59	0.09 0.05	1.62 1.70
13. Norway	1986 1989	26 27	1 0	1.40 1.30	1.42 1.39	0.32 0.34	0.23 0.26	0.31 0.36	1.94 1.96
14. Portugal	1986 1989	6 18	0 0	3.47 2.87	2.55 2.57	2.72 1.47	0.78 0.51	1.84 1.45	8.95 6.97
15. Spain	1986 1989	37 156	0 3	1.83 1.76	1.87 1.81	0.62 0.66	0.34 0.38	0.27 0.10	3.09 4.62
16. Sweden	1986 1989	19 23	0 0	1.07 0.77	0.99 0.75	0.54 0.44	0.50 0.57	0.17 0.16	2.05 1.79
17. Switzerland	1986 1989	88 160	1 1	1.49 1.99	1.07 1.11	1.32 2.11	0.89 1.06	0.24 0.25	6.76 18.26
18. United Kindgom	1986 1989	109 171	81 124	0.98 1.03	0.56 0.62	0.73 0.90	0.74 0.87	0.27 0.30	2.76 5.02
18. Liechtentein	1986 1989	3 3	0 0	0.58 0.55	0.66 0.60	0.19 0.17	0.33 0.31	0.36 0.36	0.72 0.68
19. Turkey	1986 1989	9 12	9 12	n.a n.a	n.a n.a	n.a n.a	n.a n.a	n.a n.a	n.a n.a

Source: Authors own estimates

No data are available for this variable for Turkish banks, and a large number of observations are missing for Irish and UK banks. In the case of the United Kingdom, data on staff costs are unavailable for foreign bank subsidiaries, so the figures represent ratios for domestic banks only. Staff expense ratios are by far the lowest in Luxembourg, an indication of its status as an offshore banking centre and lack of many retail banks. One would also expect to find relatively low staff expense ratios for the sample of Liechtenstein and Swiss banks, but this is not borne out by the latter. In fact, the mean values are amongst the highest for any individual country in our sample. Further investigation of this surprising finding indicated that the cantonal banks had relatively high cost ratios. Some of the small private banks in the sample also illustrated very high ratios, possibly indicating the labour-intensive nature of private or/and investment management banking business in the country. As is the case of other variables that we have studied, the Greek and Portuguese banking systems exhibited extreme values: for example, in 1986 the mean value of staff expense ratios in our Portugal sample was nearly twice as large (3.47 per cent) as the country sample which had the second largest mean ratio, Spain (1.83 per cent).

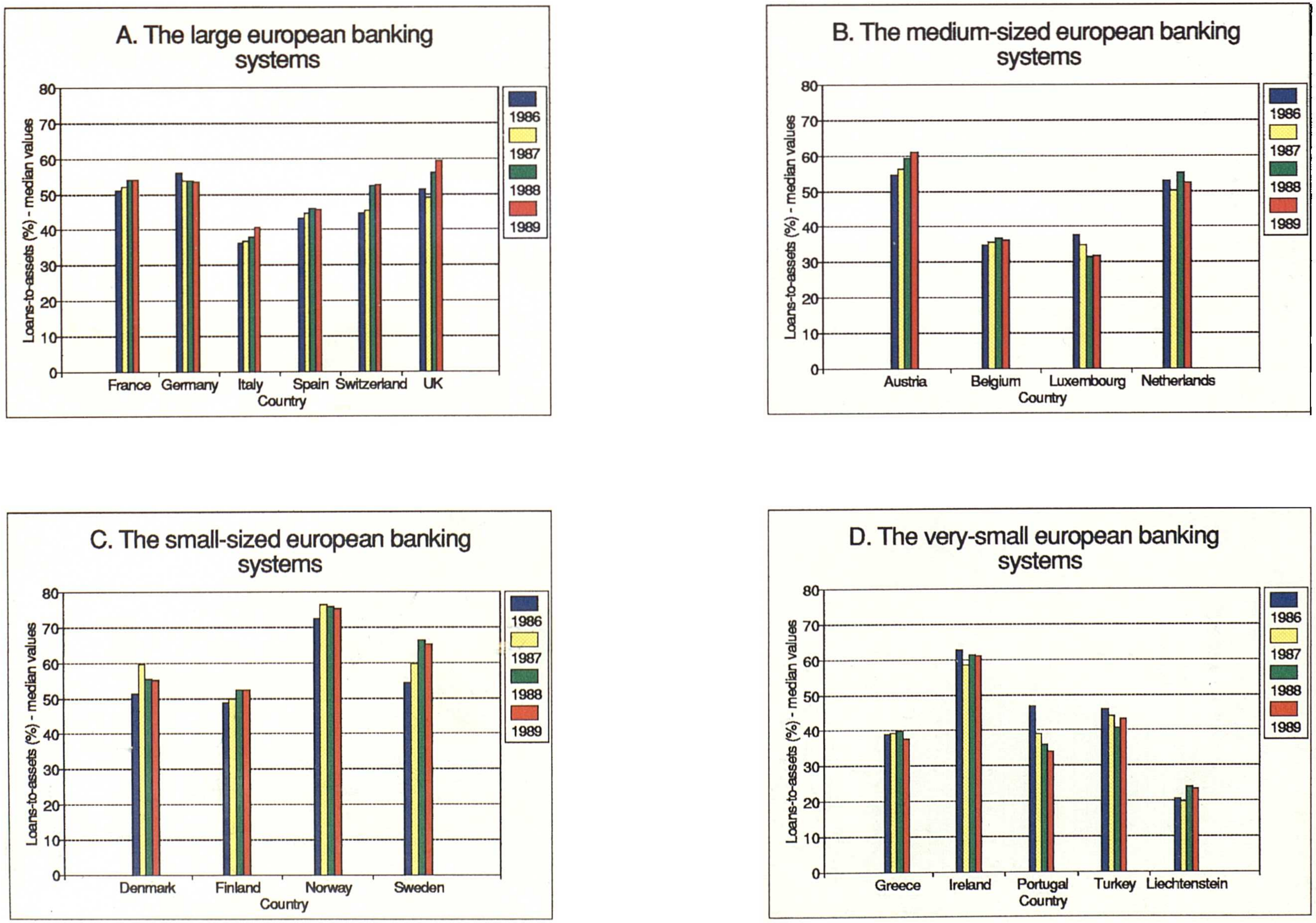
Out of the four largest European banking markets, the sample of banks for Germany and the United Kingdom exhibited lower cost ratios than for banks in France and Italy. Mean staff expense ratios also systematically increased in our sample of UK, French and Italian banks between 1986 and 1989. For the German banks, the ratio increased from 0.96 per cent in 1986 to 1.01 per cent in 1988, but fell to 0.92 per cent in 1989. In various other European countries, there appeared to be an unambiguous decrease in staff expense ratios between 1986 and 1989, both the mean and median values fell for our sample banks in Belgium, Finland, Netherlands, Norway, Spain and Sweden. The trend is more difficult to interpret for other countries where the sample mean ratio may have increased when the median value fell and vice versa. Finally, the dispersion of staff expense ratios across our sample of banks in individual countries appears to be the greatest in Belgium, France and Switzerland.

7.4.6 Other control variables

7.4.6.1 Loans-to-assets ratio

The loans-to-assets ratio is included in our SCP analysis as a proxy for balance sheet risk as described in Section 6.2.2.6 of this thesis. Figure 7.5 illustrates the median values of this ratio for our data sample across the European countries under study (see Appendix 13 for the descriptive statistics). In general, for most cases the ratio ranges between 50 and 60 per cent, and out of the four largest banking markets, only the Italian bank sample has noticeably lower median (and mean) values around 40 per cent. This implies that, on average, Italian banks have a greater proportion of their assets tied up in investments and liquid assets. What is also interesting to note is that in countries in which universal banking is undertaken (such as in Austria, Germany and Switzerland), the loans-to-assets ratios do not appear to be

Figure 7.5 Loans-to-assets ratio (%) - median values



markedly different from in other countries (although this cannot be said about our sample of Belgian banks where the ratios appear quite low).

Figure 7.5 also illustrates that in some countries where the public sector controls a large proportion of the banking system - such as in Italy, Greece and Portugal - the loans-to-assets ratios, on average, appear low. This may well be a reflection of the fact that in these countries, especially the less-developed systems, the State relies heavily on the banking system to provide its funding needs through purchase of its government debt. The greater level of portfolio restrictions in these countries (which in fact also existed in Spain up until 1991) also may be a factor in explaining why the mean loan-to-assets ratios in these countries appear relatively low on a European-wide basis. Finally, the loans-to-assets ratios for our sample of Luxembourg and Liechtenstein banks are noticeably lower than in other countries, reflecting the particular nature of investment off-shore banking business undertaken in these centres.

7.4.6.2 Equity-to-assets ratio

The equity-to-assets ratio is included in our SCP analysis to account for different risk levels between banks. Figure 7.6 shows the median values for our data sample across European countries (descriptive statistics are listed in Appendix 14).

Figure 7.6 Equity-to-assets ratio (%) - median values

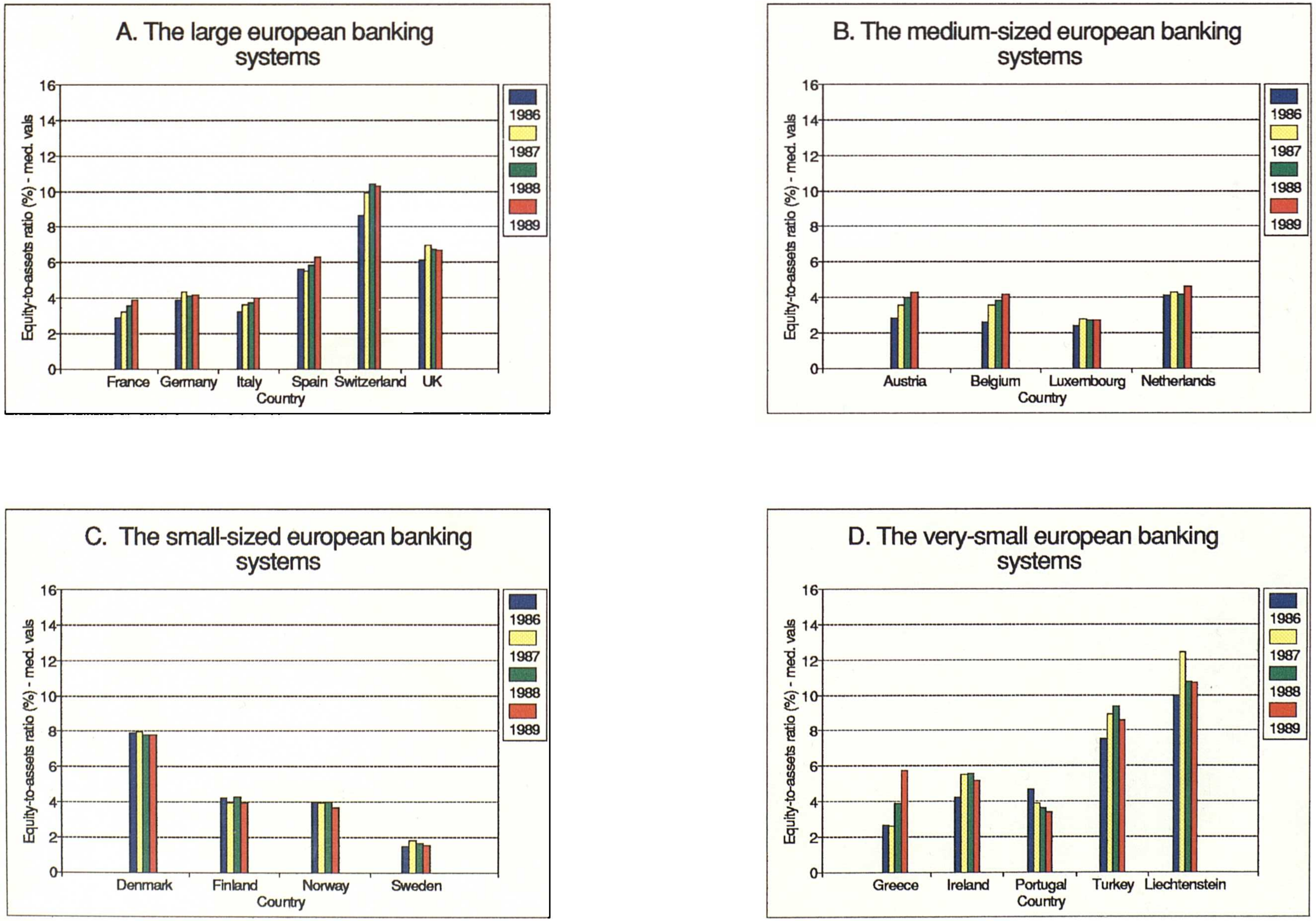


Figure 7.6 illustrates that in the majority of cases the median values for bank equity-to-assets ratios across countries range between 3 and 4 per cent. The ratios are noticeably higher for the sample of UK banks than for the German, French and Italian banks. Banks in the latter two countries also appear to have lower ratios than for the German banks. This is a widely accepted feature of the larger European banking systems which have a high proportion of publicly owned commercial banks. As IBCA (1991) notes, 'In France, ... profitability remains meagre but capital ratios, although stronger, are still well below those set by international competition' (p.3). Median equity-to-assets ratios also appear to be relatively low in Sweden and Luxembourg. The median values for Denmark, Spain, Switzerland and the United Kingdom overall appear to be high on a European wide comparison, as do the ratios for banks operating in the smallest banking markets. In the majority of countries the industry average equity-to-asset ratio increased between 1986 and 1989.

7.4.6.3 Loan-loss reserves to total loans ratio

The higher the loan-loss reserve ratio for an individual bank, the greater the apparent riskiness of the banks' loan book. Table 7.9 illustrates the descriptive statistics for this variable for our sample of European banks in 1986 and 1989 (Appendix 15 provides the descriptive statistics for 1987 and 1988). Firstly, it should be noted that there are a large number of missing values for this variable, no data are provided for banks in Austria, Belgium, Netherlands,

TABLE 7.9 LOAN-LOSS RESERVES / LOANS [%] 1986 AND 1989

Country	Year	Number of Banks in Sample	N* Missing Observa-tions	Mean	Median	Standard Deviation	Dispesion Standard Deviation / mean	Minimum	Maximum
1. Austria	1986 1989	27 48	27 48	n.a n.a	n.a n.a	n.a n.a	n.a n.a	n.a n.a	n.a n.a
2. Belgium	1986 1989	26 33	26 33	n.a n.a	n.a n.a	n.a n.a	n.a n.a	n.a n.a	n.a n.a
3. Denmark	1986 1989	22 26	22 23	n.a 2.814	n.a 3.112	n.a 2.173	n.a 0.77	n.a 0.510	n.a 4.820
4. Finland	1986 1989	9 12	0 1	2.712 2.562	2.880 2.380	1.622 1.303	0.60 0.51	0.400 0.150	5.680 5.160
5. France	1986 1989	96 138	67 101	3.912 5.087	3.700 3.820	2.270 4.665	0.58 0.92	0.270 0.150	8.030 22.370
6. Germany	1986 1989	115 149	64 147	0.723 0.558	0.464 0.558	0.636 0.424	0.88 0.76	0.039 0.258	3.322 0.858
7. Greece	1986 1989	9 3	0 0	2.357 2.660	2.050 2.120	0.902 0.940	0.38 0.35	1.370 1.040	3.910 4.810
8. Ireland	1986 1989	9 17	9 15	n.a 2.100	n.a 2.100	n.a 0.495	n.a 0.24	n.a 1.750	n.a 2.450
9. Italy	1986 1989	65 169	0 0	5.171 3.514	5.305 3.956	2.130 2.220	0.41 0.63	1.630 0.941	14.950 10.855
10. Luxembourg	1986 1989	61 74	3 4	9.180 9.370	6.000 4.860	8.260 10.010	0.90 1.07	1.080 0.790	39.860 44.520
11. Netherlands	1986 1989	23 29	23 29	n.a n.a	n.a n.a	n.a n.a	n.a n.a	n.a n.a	n.a n.a
13. Norway	1986 1989	26 27	1 1	3.001 2.062	2.902 1.905	0.862 0.981	0.29 0.48	0.645 0.346	4.917 4.501
14. Portugal	1986 1989	6 18	0 0	3.451 2.482	2.793 2.109	4.982 4.380	1.44 1.76	1.570 0.400	5.229 5.699
15. Spain	1986 1989	37 156	0 6	3.384 4.322	3.160 2.535	1.804 10.111	0.53 2.34	1.430 1.120	8.960 10.000
16. Sweden	1986 1989	19 23	0 0	0.895 0.624	0.909 0.620	0.534 0.522	0.59 0.84	0.009 0.011	1.593 1.640
17. Switzerland	1986 1989	88 160	88 160	n.a n.a	n.a n.a	n.a n.a	n.a n.a	n.a n.a	n.a n.a
18. United Kindgom	1986 1989	109 171	78 121	2.125 3.290	1.280 2.579	3.505 8.610	1.65 2.62	0.053 0.074	16.670 19.650
18. Liechtentein	1986 1989	3 3	3 3	n.a n.a	n.a n.a	n.a n.a	n.a n.a	n.a n.a	n.a n.a
19. Turkey	1986 1989	9 12	0 0	2.412 2.436	1.650 1.325	2.580 2.955	1.07 1.21	0.901 0.031	6.780 8.990

Source: Authors own estimates

Liechtenstein and Switzerland. Data are also unavailable for Ireland and Denmark in 1986. The number of observations for France, Germany and the United Kingdom is also limited.

For most countries the mean values for the loan-loss reserve ratios range between two and three per cent, although provisioning amongst French, Italian, Spanish and, most noticeably, Luxembourg banks appears to be higher. Conversely, loan-loss provisioning for German banks appears to be low if we consider the mean values for 1986 and 1987 where there is a reasonable number of observations. In these years the provisioning ratio was around 0.7 per cent. (The mean values for 1988 and 1989 are only based on six and two banks respectively).

The dispersion of loan-loss provisioning across banks in individual countries appears to be greater in the United Kingdom for 1986 and 1989 and also in Spain for 1987 through to 1989, which suggests larger differences in loan performance across banks in these countries, compared with banks operating in other systems. If one views the maximum figures for provisioning, the data in Table 7.9 and Appendix 17 illustrate that the largest provisions made by any banks in Germany in our sample over the four years amounted to 3.9 per cent, compared with 22.4 per cent in France, 26 per cent in Italy and 29 per cent in the United Kingdom. Swedish banks yielded the lowest maximum provisioning level at 1.6 per cent in 1989. Bearing in mind the number of missing observations. The variability in the data confirms the marked difference in loan-loss provisioning practice within countries and throughout European banking systems.

7.5 Conclusion

This chapter examined the variables outlined in the methodology to investigate the SCP relationship across European banking markets. The IBCA data represent a relatively small percentage of the number of banks operating in different European systems, yet for most countries the banks in each sample account for more than 70 per cent of total banking sector assets. Out of the four largest European banking markets concentration is higher in Italy and France, and in general it is also greater in the smaller European systems. The asset's market share of the largest bank in, Germany, France, Italy and the United Kingdom are all around 8 per cent, whereas in Denmark, Ireland, the Netherlands, Portugal, Sweden and Turkey the asset market share of the largest bank exceeds 20 per cent. In our data sample, the majority of publicly-owned banks appear in France, Germany, Italy and Switzerland.

Average funding cost ratios range between 5 and 10 per cent across European countries, and there appears to have been an increase in average industry funding costs across the majority of systems between 1986 and 1989. Staff expense ratios are by far the lowest for Luxembourg-based banks. The IBCA dataset also reveals that average loan-to-assets ratios typically range between 50 and 60 per cent, and there appears to be no major difference between universal banking and other types of systems apart from banks operating in Belgium where the average ratio across four years is below 40 per cent. The descriptive statistics also indicate that banks, operating in systems where there is a high level of government ownership, such as in Italy, Greece and

Portugal, hold a smaller proportion of their assets in loans. This may be indicative of the portfolio restrictions imposed on banks in these countries as a means of the banking system funding government deficits.

Equity-to-assets ratios appear to be around 3 to 4 per cent across European banking systems. The highest mean ratios in our data sample are for banks operating in Denmark, Spain, Switzerland and the United Kingdom. Average banking industry equity-to-asset ratios are higher for UK and German banks than for Italian and French banks. In the majority of countries, the industry average equity-to-assets ratios increased between 1986 and 1989. Finally, the data set revealed a very mixed range of loan-loss reserve ratios for banks across countries, although loan-loss reserve levels appear to be very low for German banks.

Overall, our analysis reveals the heterogenous nature of European banking markets and identifies some major differences across various systems between 1986 and 1989. Chapter 8 will utilise these data to further investigate the SCP relationship across these markets.

Notes

1. IBCA Ltd, Eldon House, Eldon Street, London EC2M 7LS
2. According to IBCA Ltd, the raw data for the European banks will be broadly comparable with their annual accounts, although spreadsheet data is standardised so more useful comparisons can be made. IBCA provide instruction manuals to illustrate how spreadsheet items are defined, but no documentation exists as to the rationale behind these definitions.
3. E.P. Davies, Adviser on Financial Structure and Regulation at the Bank of England, suggested in a personal conversation whilst on a seminar visit to UCNW, Bangor, on 25 November 1992, that it was probably the varied influence of foreign banks and an indication of the competitive environment that brought about this variability.
4. Swiss Banking Corporation agreed to merge with Swiss Volksbank in January 1993 to form Switzerland's largest banks.

Chapter 8

The Structure-Conduct-Performance Relationship in European Banking - The Results

8.1 Introduction

This chapter examines the empirical evidence of the SCP relationship in European banking between 1986 and 1989. It tests the models outlined in Chapter Six, using the data explored in Chapter Seven, of this thesis. The chapter is divided into two main sections. The first part of the chapter tests two competing hypotheses with regard to market structure and performance - the traditional SCP paradigm and the efficiency hypothesis. Cross-sectional results are reported for the years 1986 to 1989 as well as pooled-time series estimates, so as to confirm seasonal (yearly) effects, over the whole period. Tests for evidence of the two competing hypotheses in individual European banking markets are also conducted. The second part of this chapter investigates the performance - concentration relationship further by examining evidence of rivalrous and cooperative behaviour between leading banks across European banking markets.

8.2 The SCP Paradigm and Efficiency Hypothesis in European Banking

8.2.1 Cross-sectional estimates

8.2.1.1 Equation specification

The purpose of this section is to determine the precise specification of the model that is to be estimated. It addresses two main problems relating to variable selection which have already been mentioned in Section 6.3 of this thesis. It is important to note that reference will be made to results estimated for 1989 and other years but it is not the purpose of this section to analyse these in detail - this will be covered in the remainder of the Chapter. Rather, the estimates provided in this section will specifically address the variable selection problem and it will provide the model specification that is to be estimated.

In Section 6.3 of this thesis we stated that the model to be estimated would be as follows:

(1)

$$\begin{aligned} ROA_{ij} \text{ or } ROE_{ij} = \; & a_{90} + a_1\,(CR_j) + a_2\,(MS_{ij}) + a_3\,(NARMON_j) + a_4\,(ASSETS_{ij}) \\ & + a_5\,(IPAY/FUND_{ij}) + a_6\,(LOANS/ASSETS_{ij}) + a_7\,(EQUITY/ASSETS_{ij}) \\ & + a_8\,(STAFF/ASSETS_{ij}) + a_9\,(LLR/LOANS_{ij}) + a_{10}\,(GOVT_j) \end{aligned}$$

where: ROA_{ij} = bank i's profits measured as before tax return on assets in market j

ROE_{ij} = bank i's profits measured as before tax return on equity in market j

CRj = concentration ratio in market j (5 and 10

		firm assets and deposits concentration ratios and Herfindahl indexes)
MS_{ij}	-	individual bank i's asset market share in market j
NARMONj	-	narrow money supply growth in market j
$ASSETS_{ij}$	-	bank i's asset size in market j
$IPAY/FUND_{ij}$	-	interest paid divided by total bank funds for bank i's in market j
$LOANS/ASSETS_{ij}$	-	loans-to-assets ratios bank i's in market j
EQUITY/ASSETS	-	equity-to-assets ratios for bank i's in market j
$STAFF/ASSETS_{ij}$	-	staff expenses divided by total assets for bank i's in marketj
$LLR/LOANS_{ij}$	-	loan-loss reserves divided by total loans for bank i's in market j
GOVTj	-	binary variable equal to one if government owned, zero otherwise

We also noted that the above specification and data availability problems relating to the ($LLR/LOANS_{ij}$) variable created certain problems. First, as the test for market share (MS_{ij}) may be nullified by the inclusion of bank assets ($ASSETS_{ij}$), we estimated the equation (1) over the four years (using the ten-firm asset's concentration measure) and then replicated the exercise by omitting the ($ASSETS_{ij}$) variable. Both before tax return-on-assets (ROA_{ij}) and return-on-equity (ROE_{ij}) were used as the dependent variables. The ten-firm assets concentration measure was arbitrarily chosen for expository purposes.

Second, data on the loan-loss reserves variable ($LLR/LOANS_{ij}$) were unavailable for banks operating in Austria, Belgium, Netherlands, Switzerland and Liechtenstein across all the years under study. Only a handful of observations were available for Denmark and Ireland, and there were also substantial missing values for the other countries in the sample. As such, equations that include the ($LLR/LOANS_{ij}$) variable would only be estimating the SCP relationship over ten European countries (Finland, France, Germany, Greece, Italy, Norway, Portugal, Spain, Sweden and the United Kingdom). The theoretical justification for including this variable deterred us from rejecting it at the onset of the estimation. So as to evaluate the impact of the ($LLR/LOANS_{ij}$) variable, we estimated equation (1) over the four years (the same as in the $ASSETS_{ij}$ case above) and then dropped this variable.

Finally, our data sample provided no information on the interest paid to total funds ratio ($IPAY/FUND_{ij}$) for the Netherlands and similarly no staff expense ratios ($STAFF/ASSETS_{ij}$) for Turkish banks. In addition, we could not obtain information on the size of the Liechtenstein banking market so banks' market share (MS_{ij}) and the concentration ratios could not be estimated. As a result, the equations that exclude the ($LLR/LOAN_{ij}$) variables are estimated on a data sample across 16 countries.

The estimates for 1989 using both before tax return-on-assets (ROA_{ij}) and return-on-equity (ROE_{ij}) as the dependent variables are shown in Tables 8.1 and 8.2, respectively (estimates using the same equation specifications for 1986, 1987 and 1988 are reported in Appendix 16). Table 8.1 shows the results for estimating the ROA concentration relationship using the ten-firm asset's concentration ratio for 1989. Equation (1) in Table 8.1 is the model estimated with all the variables included, and equation (2) illustrates the impact of omitting the ($ASSETS_{ij}$) variable. It can be seen that the inclusion of the ($ASSETS_{ij}$) variable adds no explanatory power to the model with the adjusted coefficient of determination (R^2) actually increasing from 37.1

TABLE 8.1
Relationship between ROA and independent variables 1989

Independant Variables	[1] ROA	VIF	Dependant Variables [2] ROA	VIF	[3] ROA	VIF	[4] ROA	VIF
CONSTANT	0.0143[a] [2.69]		0.0131[a] [2.66]		0.0083[a] [2.95]		0.0085[a] [3.14]	
CRIO ASS	−0.0001 [−1.24]	1.2	−0.00009 [−1.10]	1.1	−0.000005 [−0.11]	1.3	−0.00008 [−0.18]	1.2
MSASS	0.0076 [0.37]	1.7	0.0001 [0.01]	1.1	0.0195 [−0.59]	1.6	−0.0086 [−0.54]	1.1
NARMON	0.00003 [0.84]	1.1	0000004 [0.89]	1.1	−0.00004 [−0.77]	1.1	−0.00003 [−0.79]	1.1
ASSETS	−0.00000 [−0.60]	1.7	–	–	−0.00000 [−0.26]	1.5	–	–
IPAY / FUND	0.0010[a] [2.43]	1.2	0.0010[a] [2.41]	1.2	0.0004 [0.98]	1.0	0.0004 [0.99]	1.0
LOANS / ASS	−0.0108[a] [−10.00]	1.6	−0.0108[a] [−10.06]	1.6	−0.0058[a] [−7.73]	1.7	−0.0058[a] [−7.73]	1.7
EQUITY / ASS	0.0884[a] [12.99]	1.4	0.08869[a] [13.06]	1.4	0.0051[a] [11.13]	1.4	0.0565[a] [11.15]	1.4
STAFF / ASS	0.1644[a] [4.62]	1.6	0.1639[a] [4.61]	1.6	0.0197[a] [3.69]	1.8	0.0727[a] [3.69]	1.8
LLR / LOAN	−0.0004[a] [−4.36]	1.3	−0.0004[a] [−4.36]	1.3	–	–	–	–
GOVT	0.0014 [0.67]	1.6	0.0021 [0.69]	1.6	0.0012[a] [−3.25]	1.4	−0.0039 [a] [−3.25]	1.4
Observations	1268		1268		1268		1268	
N*	716		716		229		229	
$\bar{R}^2$	37.1		37.2		18.1		18.2	
F	31.0		34.5		25.6		28.8	
LM	1.60		1.40		0.50		0.40	
SW	0.994		0.913		0.981		0.983	

t-ratio

Source: Authors own estimates

TABLE 8.2
Relationship between ROE and independent variables 1989

Independant Variables	Dependant Variables [1] ROE	VIF	[2] ROE	VIF	[3] ROE	VIF	[4] ROE	VIF
CONSTANT	0.8235[a] [2.09]		0.7401[a] [2.03]		0.3917[a] [1.98]		0.3806[a] [2.00]	
CRIO ASS	−0.0113 [−1.72]	1.2	−0.0100 [−1.63]	1.1	−0.0031 [−0.92]	1.3	−0.0029 [−0.90]	1.2
MSASS	0.0750 [0.70]	1.7	0.5550 [0.45]	1.1	0.0300 [0.02]	1.6	−0.1260 [−0.22]	1.1
NARMON	−0.0007 [−0.22]	1.1	−0.0005 [−0.17]	1.1	0.00003 [0.10]	1.1	0.0004 [0.12]	1.1
ASSETS	−0.000002 [−0.56]	1.7	–	–	−0.00000 [−0.20]	1.5	–	–
IPAY / FUND	0.0330 [1.03]	1.2	0.0322 [1.01]	1.2	0.0582[a] [2.10]	1.0	0.0580[a] [2.09]	1.0
LOANS / ASS	−0.1391 [−1.74]	1.6	−0.1416 [−1.77]	1.6	−0.0971 [−1.84]	1.7	−0.0974 [−1.85]	1.7
EQUITY / ASS	0.1702 [0.34]	1.4	0.1887 [0.37]	1.4	−0.1842 [−0.51]	1.4	−0.1788 [−0.50]	1.4
STAFF / ASS	1.8530 [0.70]	1.6	1.8150 [0.69]	1.6	2.2690 [1.64]	1.8	2.2680 [1.64]	1.8
LLR / LOAN	0.0169[a] [2.48]	1.3	0.0169[a] [2.48]	1.3	–	–	–	–
GOVT	−0.1805 [−1.16]	1.6	−0.1782 [−1.15]	1.6	−0.1075 [−1.27]	1.4	−0.1079 [−1.28]	1.4
Observations	1268		1268		1268		1268	
N*	716		716		229		229	
$\bar{R}^2$	1.9		2.0		0.2		0.3	
F	1.99		2.18		1.18		1.32	
LM	1.50		1.30		0.70		0.60	
SW	0.889		0.889		0.822		0.812	

Source: Authors own estimates

to 37.2 when it is omitted. In addition, the coefficients of the variables in equation (2) in Tables 8.1 are virtually the same as in equation (1), as are the t-statistics reported in parentheses.

If we compare equation (3) which includes all the variables as specified in our original model but omits ($LLR/LOAN_{ij}$) and equation (4) which omits ($LLR/LOAN_{ij}$) and ($ASSETS_{ij}$) we find again that the ($ASSETS_{ij}$) variable has virtually no impact on the estimated results. This finding is also confirmed if we examine the same equations in Table 8.2 and those reported in Appendix 16 for other years. Given these results we assume that the inclusion of the bank asset's size variable ($ASSETS_{ij}$) adds no explanatory value to our originally specified model, and therefore later estimates of the SCP relationship will exclude this variable.

The second difficulty to be addressed relates to the ($LLR/LOAN_{ij}$) variable. Equation (2) in Table 8.1 estimates the original model excluding the ($ASSETS_{ij}$) variable but including the ($LLR/LOAN_{ij}$) variable. Compare this with equation (4) which estimates the same equation with the ($LLR/LOAN_{ij}$) variable omitted. There are four major differences. Firstly, the equation that uses the ($LLR/LOAN_{ij}$) variable is estimated using only 552 banks (across ten countries), whereas equation (4) which excludes the ($LLR/LOAN_{ij}$) variable is estimated on a sample of 1039 banks (over 16 countries). Secondly, the explanatory power of the equation that includes the ($LLR/LOAN_{ij}$) variable is double that of the equation that excludes it, with adjusted R^2 being 37.2 and 18.2, respectively. Thirdly, loan-loss reserves do seem to have a significant impact on ROA as illustrated by the t-statistic of -4.36 on the ($LLR/LOAN_{ij}$) variable in equation (2). Fourthly, the significance and signs of various coefficients alter when the ($LLR/LOAN_{ij}$) variable is included: see for example ($MSASS_{ij}$), ($NARMON_j$), ($IPAY/FUND_{ij}$), and ($GOVT_j$). These differences are also confirmed if we examine the ROE estimates in Table 8.2 and those reported for other years in Appendix 16, although the difference in the coefficients of determination for 1986 and 1987 are not as great as in 1988 and 1989. From the above it is clear that the loan-loss reserves ratio improves the explanatory power of our equations, but due to the collapse in sample size brought about by its use we chose to estimate and report equations which excluded it as an explanatory variable.

In the following sections of this Chapter, tests of the SCP paradigm and the Efficiency Hypothesis will be undertaken on the following model:

$$\begin{aligned} ROA_{ij} \text{ or } ROE_{ij} = {} & a_0 + a_1 (CR_j) + a_2 (MS_{ij}) + a_3 (NARMON_j) + a_4(IPAY/FUND_{ij}) \quad (2) \\ & + a_5 (LOANS/ASSETS_{ij}) +_6 (EQUITY/ASSETS_{ij}) + a_7 (STAFF/ASSETS_{ij}) \\ & + a_8 (GOVT_j) \end{aligned}$$

We will, however, report analgous results of the two competing hypotheses for equations that include the loan-loss reserves variable in Appendix 17.

8.2.1.2 ROA and concentration

This section reports the estimated results for the before-tax ROA - concentration relationship for each year, 1986 through to 1989, using six different concentration measures. The six measures used -five-firm assets and deposits concentration ratios; ten-firm assets and deposits concentration ratios and the deposits and assets Herfindahl indices - are used to see if the nature of the relationship alters according to the concentration measure chosen. Estimated equations for each year are shown in Tables 8.3 to 8.6.

First, it can be seen that for all equations (apar from equation (1) in Table 8.4) the hypotheses of non-normality of residuals can be rejected by the derivative Shapiro-Wilk test (SW). Secoi, all values of the Lagrange Multiplier (LM) test fall below the critical 5 per cent level of the chi-square value of 3.84146, thus rejecting the assumption of heteroskedasticity in the residual variance. Finally, across all equations multicollinearity appears not to be evident as the variance inflationary factor (VIF) is well below the Marquardt (1980) critical value of 10. In fact, for virtually all the equations estimated in this section there appears to be little evidence of heteroskedasticity in residual variance or multicollinearity between independent variables.

The results for 1989 shows that the choice of concentration measure can alter the significance of this variable. In Table 8.3 the sign on all the concentration measures is negative, implying an inverse relationship between market concentration and banks' before-tax ROA.

Table 8.3
ROA and Concentration 1989

Dependent Variables / Independent Variables	[1]		[2]		[3]		[4]		[5]		[6]	
		VIF		VIF		VIF		VIF		VIF		VIF
CONSTANT	00136[a] [6.20]		0.0085[a] [3.14]		0.0099[a] [5.62]		0.0086[a] [4.10]		0.0096[a] [7.85]		0.0093[a] [9.00]	
CR5 ASS	−0.0001[a] [−2.82]	1.4										
CR10ASS			−0.000008 [−0.18]	1.2								
CR5DEP					−0.00004 [−1.28]	1.2						
CRIODEP							−0.00001 [−0.31]	1.3				
HERFASS									−0.0213[a] [−2.02]	1.5		
HERFDEP											−0.0129[a] [−2.80]	1.3
MSASS	0.0022 [0.14]	1.1	−0.0086 [−0.54]	1.1	−0.0069 [−0.44]	1.0	−0.0081 [−0.51]	1.1	0.0017 [0.11]	1.2	0.0055 [0.33]	1.1
NARMON	−0.00006 [−1.34]	1.1	−0.0003 [−0.79]	1.1	−0.00005 [−1.03]	1.1	−0.00004 [−0.81]	1.1	−0.00005 [−1.17]	1.1	−0.00006 [−1.27]	1.1
IPAY/FUND	0.0004 [1.06]	1.0	0.0004 [0.99]	1.0	0.0004 [1.02]	1.0	0.0004 [0.99]	1.0	0.0004 [0.99]	1.0	0.0004 [0.96]	1.0
LOAN/ASS	−0.0055[a] [−7.35]	1.7	−0.0058[a] [−7.73]	1.7	−0.0057[a] [−7.65]	1.7	−0.0058[a] [−7.72]	1.7	−0.0059[a] [−7.90]	1.7	−0.0058[a] [7.77]	1.7
EQUITY/ ASS	0.0574[a] [11.35]	1.4	0.0565[a] [11.15]	1.4	0.0565[a] [11.16]	1.4	0.0565[a] [11.15]	1.4	0.0564[a] [11.16]	1.4	0.0569[a] [11.27]	1.4
STAFF/ASS	0.0788[a] [4.04]	1.8	0.0727[a] [3.69]	1.8	0.0756[a] [3.86]	1.8	0.0730[a] [3.72]	1.8	0.0712[a] [3.67]	1.8	0.0699[a] [3.61]	1.8
GOVT	−0.0055[a] [−4.28]	1.7	−0.0039[a] [−3.25]	1.4	−0.0044[a] [−3.58]	1.5	−0.0039[a] [−3.20]	1.5	−0.0048[a] [−3.87]	1.5	−0.0049[a] [−4.06]	1.4
Observations	1268		1268		1268		1268		1268		1268	
N*	229		229		229		229		229		229	
$\bar{R}^2$	18.9		18.3		18.3		18.2		18.5		18.9	
F	30.02		28.81		29.05		28.82		29.43		30.01	
LM	0.42		0.40		0.46		0.39		0.41		0.41	
SW	0.992		0.993		0.989		0.990		0.986		0.985	

Source: Authors own estimates

TABLE 8.4

ROA and Concentration 1988

Dependent Variables / Independent Variables	[1]		[2]		[3]		[4]		[5]		[6]	
		VIF		VIF		VIF		VIF		VIF		VIF
CONSTANT	−0.0148[a] [−3.67]		−0.0197[a] [−4.87]		−0.0155[a] [−4.47]		−0.0188[a] [−5.76]		−0.0034[a] [−1.45]		−0.0004 [−0.20]	
CR5 ASS	0.0003[a] [4.21]	1.7										
CR10ASS			0.0003[a] [5.56]	1.3								
CR5DEP					0.0003a [5.39]	1.6						
CR10DEP							0.0003[a] [7.10]	1.2				
HERFASS									0.0381[a] [2.65]	1.5		
HERFDEP											0.0050 [0.74]	1.3
MSASS	0.0557[a] [2.42]	1.1	0.0502[a] [2.21]	1.1	0.0507[a] [2.22]	1.1	0.0462[a] [2.07]	1.1	0.0649[a] [2.77]	1.2	0.0805[a] [3.44]	1.1
NARMON	0.0007[a] [5.01]	1.5	0.0006[a] [4.40]	1.2	0.0007[a] [5.52]	1.5	0.0006[a] [4.95]	1.2	0.0005 [3.97]	1.2	0.0005[a] [3.54]	1.2
IPAY/FUND	−0.00001 [−0.09]	1.0	−0.000008 [−0.06]	1.0	−0.000004 [−0.03]	1.0	0.000005 [0.04]	1.0	−0.00001 [−0.11]	1.0	−0.00001 [−0.10]	1.0
LOAN/ASS	−0.0082[a] [−8.72]	1.6	−0.0079[a] [−8.53]	1.6	−0.0079[a] [−8.50]	1.6	−0.0078[a] [−8.43]	1.6	−0.0078[a] [−8.28]	1.6	−0.0082[a] [−8.65]	1.6
EQUITY/ ASS	0.851[a] [14.58]	1.3	0.0839[a] [14.44]	1.3	0.0849[a] [14.64]	1.3	0.826[a] [14.31]	1.3	0.0868[a] [14.82]	1.3	0.0863[a] [14.70]	1.3
STAFF/ASS	0.0131 [0.61]	1.7	0.0074 [0.35]	1.7	0.0108 [0.51]	1.7	0.0032 [0.15]	1.7	0.0218 [1.02]	1.7	0.0209 [0.97]	1.7
GOVT	0.0109[a] [6.17]	1.7	0.0100[a] [6.32]	1.4	0.0108[a] [6.56]	1.5	0.0103[a] [6.66]	1.3	0.0087[a] [5.29]	1.5	0.0073[a] [4.58]	1.4
Observations	1541		1541		1541		1541		1541		1541	
N*	272		272		272		272		272		272	
$\bar{R}^2$	22.1		23.0		22.8		24.2		21.4		20.9	
F	42.19		44.28		43.99		47.37		40.48		39.45	
LM	0.040		0.028		0.030		0.051		0.056		0.067	
SW	0.973		0.978		0.981		0.990		0.986		0.986	

Source: Authors own estimates

TABLE 8.5

ROA and Concentration 1987

Dependent Variables / Independent Variables	[1]	VIF	[2]	VIF	[3]	VIF	[4]	VIF	[5]	VIF	[6]	VIF
CONSTANT	−0.0047[a] [−1.10]		−0.0589[a] [−8.51]		−0.0163[a] [−3.87]		−0.0323[a] [−6.08]		0.0063[a] [3.26]		0.0071[a] [3.49]	
CR5 ASS	0.0003[a] [3.43]	1.6										
CR10ASS			0.0011[a] [10.08]	2.1								
CR5DEP					0.0005[a] [6.52]	1.9						
CR10DEP							0.0006[a] [8.16]	2.2				
HERFASS									0.0423[a] [2.89]	1.3		
HERFDEP											0.0229 [1.71]	1.3
MSASS	0.0041[a] [0.17]	1.2	−0.0288 [−1.25]	1.2	−0.0192 [−0.80]	1.2	−0.0345 [−1.44]	1.2	−0.0071 [−0.28]	1.3	0.0064 [0.26]	1.2
NARMON	0.000005[a] [8.53]	1.1	0.000004[a] [7.84]	1.2	0.000005[a] [8.67]	1.1	0.000005[a] [9.69]	1.1	0.000005[a] [8.56]	1.1	0.000005[a] [8,84]	1.1
IPAY/FUND	0.0005 [0.64]	1.0	0.0004 [0.59]	1.0	0.0003 [0.47]	1.0	0.0003 [0.38]	1.0	0.0005 [0.65]	1.0	0.0004 [0.57]	1.0
LOAN/ASS	−0.0120[a] [−7.07]	1.4	−0.0112[a] [−7.90]	1.2	−0.0097[a] [−6.63]	1.2	−0.0092[a] [−6.34]	1.2	−0.0109[a] [−7.28]	1.3	−0.0109[a] [−7.09]	1.3
EQUITY/ ASS	0.0907 [9.50]	1.2	0.0768[a] [8.52]	1.2	0.0888[a] [9.69]	1.2	0.0825[a] [9.02]	1.2	0.0975[a] [10.55]	1.1	0.0975[a] [10.45]	1.2
STAFF/ASS	0.0188[a] [15.09]	1.0	0.0168[a] [14.10]	1.1	0.0183[a] [15.03]	1.0	0.0191[a] [16.14]	1.0	0.0186[a] [14.65]	1.1	0.0193[a] [15.39]	1.0
GOVT	0.0077[a] [2.68]	1.8	0.0222[a] [7.37]	2.2	0.0144[a] [4.81]	2.0	0.0198[a] [6.27]	2.3	0.0028 [1.16]	1.3	0.0033 [1.35]	1.3
Observations	1201		1201		1201		1201		1201		1201	
N*	238		238		238		238		238		238	
$\bar{R}^2$	37.4		43.6		39.7		41.3		37.1		36.7	
F	61.15		78.98		67.25		72.03		60.47		59.39	
LM	1.192		1.187		1.197		1.186		1.171		1.174	
SW	0.986		0.987		0.987		0.985		0.976		0.978	

Source: Authors own estimates

TABLE 8.6

ROA and Concentration 1986

Dependent Variables / Independent Variables	[1]		[2]		[3]		[4]		[5]		[6]	
		VIF		VIF		VIF		VIF		VIF		VIF
CONSTANT	−0.0025 [−0.71]		0.0126[a] [5.29]		0.0031 [0.99]		−0.0126[a] [7.05]		0.0122[a] [7.09]		0.0111[a] [5.34]	
CR5 ASS	0.0002[a] [3.13]	1.8										
CR10ASS			−0.0005 [−1.62]	2.0								
CR5DEP					0.00007 [1.65]	1.9						
CR10DEP							0.00005[a] [−2.28]	1.8				
HERFASS									−0.0480[a] [−5.31]	1.5		
HERFDEP											−0.0274[a] [−2.45]	1.8
MSASS	−0.0259 [−1.90]	1.1	−0.0189[a] [−2.59]	1.1	−0.0237 [−1.69]	1.1	−0.0168[a] [−2.26]	1.1	0.0143[a] [0.99]	1.2	−3.958[a] [−3.80]	1.2
NARMON	0.0013[a] [13.22]	1.4	0.0002[a] [2.64]	1.8	0.0012[a] [12.77]	1.3	0.00002[a] [2.95]	1.5	0.0012[a] [13.49]	1.2	−0.0024[a] [−0.16]	1.2
IPAY/FUND	0.0009 [1.82]	1.1	−0.00006 [−0.23]	1.1	0.0008 [1.60]	1.1	−0.00009 [−0.33]	1.1	0.0006 [1.29]	1.0	0.0011[a] [12.40]	1.0
LOAN/ASS	−0.0035[a] [−3.40]	2.3	−0.0017[a] [−3.14]	2.3	−0.0035[a] [−3.40]	2.3	−0.0016 [−3.02]	2.4	−0.0031[a] [−3.09]	2.3	0.0006 [1.19]	2.4
EQUITY/ ASS	0.0257[a] [6.70]	1.2	0.0116[a] [5.54]	1.2	0.0257[a] [6.67]	1.2	0.0117[a] [5.61]	1.2	0.0255[a] [6.67]	1.2	−0.0037[a] [−3.58]	1.2
STAFF/ASS	0.1160[a] [5.12]	2.0	0.0434[a] [3.55]	2.1	0.1127[a] [4.95]	2.0	0.0445[a] [3.64]	2.1	0.1224[a] [5.47]	2.1	0.0251[a] [6.51]	2.0
GOVT	0.0134[a] [−7.36]	1.6	−0.0057[a] [6.09]	1.4	−0.0146[a] [−7.82]	1.6	−0.0062[a] [−6.31]	1.5	−0.0196[a] [−11.51]	1.4	0.1091[a] [4.79]	1.5
Observations	759		759		759		759		759		758	
N*	158		164		158		164		158		158	
$\bar{R}^2$	34.7		13.2		33.9		13.5		36.6		34.3	
F	40.90		12.28		39.5		12.65		44.41		40.17	
LM	1.692		1.612		1.618		1.632		1.727		1.734	
SW	0.930		0.921		0.923		0.924		0.954		0.960	

Source: Authors own estimates

The coefficients, however, are only significant at the 5 per cent level for equation (1), which uses the 5-firm assets concentration ratio, and equation (5) and (6) which use the Herfindahl assets and deposits measures respectively. The sign on the banks' market share variable (MSASS) varies, but is never significant. These results imply that for 1989 neither the traditional SCP paradigm nor the efficiency hypothesis holds.

The variable that proxies for changes in market demand conditions (NARMON) is negative and insignificant across all equations, thereby suggesting that changes in market demand has no effect on the return on assets. Similarly the variable that acts as a proxy for the cost of funds (IPAY/FUND) is positive yet insignificant across all equations, thereby also suggesting no impact on ROA. What is surprising is that we find a statistically significant inverse relationship between the loans-to-asset ratio and banking ROA. Thus, the smaller the proportion of loans to assets, the greater the ROA for banks. This can simply be explained by the case that earning assets, other than loans, performed much better than loans during 1989, or that banks that had relatively high loans-to-asset ratios also had higher funding costs, thereby reducing the impact on profitability. It may also be the case that banks with low loans-to-assets ratios have relatively more profitable off-balance sheet activities than those banks with larger loans-to-assets ratios.

The equity-to-assets ratio (EQUITY/ASSETS) shows a positive, statistically significant relationship across all the equations, implying that the greater the equity-to-assets ratio the higher the ROA. This is counter to the expected relationship where lower ratios suggest a relatively risky position, which one would expect be compensated for by higher returns. On the other hand, it may be the case that higher levels of equity suggest that the cost of capital is relatively cheap and therefore this variable would then be expected to have a positive impact on profitability. After all, recent evidence suggests (see IBCA (1991) for example) that higher capitalised banks are generally more profitable than those with lower capital bases.

The variable that proxies for the cost of labour (STAFF/ASS) is also positive and statistically significant across all equations. Thus, higher staff expenses-to-total assets ratios are positively related to banks' ROA. This counter-intuitive finding suggests that relatively more profitable banks direct a greater proportion of their expenses to staff costs than do less profitable banks. This may be interpreted as a reward to staff who have helped maintain certain banks high profitability. If this is the case for banks operating in the more concentrated markets it is evidence of expense-preference behaviour.

Finally, the sign on the binary variable that accounts for government ownership (GOVT) is negative and significant in all cases suggesting that for 1989 state-owned banks were relatively less profitable than their private sector counterparts. As in previous SCP studies of this nature, the explanatory power of all the equations listed in Table 8.3 is relatively low with adjusted coefficients of determination (R^2) ranging between 18.2 and 18.9. It should, however, be pointed out that for all the equations in Table 8.3 (and those in Tables 8.4, 8.5 and 8.6) there does not appear to be strong estimation bias caused by unidentified country-specific characteristics. We find that country-specific characteristics as well as firm-specific variables have statistically significant effects on bank performance (see section 6.5 of this thesis).

The results for 1988 shown in Table 8.4 illustrate how unstable the estimates are from year-to-year. We find, for example, that all but one of the equations shows a positive coefficient on the concentration measure, suggesting that the traditional SCP paradigm holds. In addition, the coefficients on the banks market share (MSASS) variable is always positive and significant indicating that the efficiency hypothesis also holds. The proxy for change in market demand conditions variable (NARMON) is positive and significant in all cases implying that changes in market demand has a positive impact on banks' ROA.

As in the case for 1989, the proxy for the cost of funds variable (IPAY/FUND) is always insignificant although the signs on the coefficients change. We do find, however, that the relationships between performance and both the loans-to-assets and equity-to-assets variables are the same in 1988 as in 1989. Conversely, the coefficients on the proxy for the cost of labour variable (STAFF/ASS) are positive but insignificant in all cases and the (GOVT) variable suggests that state-owned banks are relatively more profitable than their private sector counterparts. The explanatory power of the equations for 1988 is still relatively low with adjusted R^2 ranging between 20.9 and 24.2.

Instability across parameter estimates is further supported if we examine the equations estimated for 1987 and 1986 as shown in Tables 8.5 and 8.6 respectively. For brevity we will just discuss the main findings for these two years. The estimates for 1987 suggest that the traditional SCP paradigm holds with five of the equations reporting a positive and significant statistical relationship between the concentration measures and ROA. The efficiency hypothesis does not appear to be confirmed as the banks' market share variable is insignificant in every case. Change in market demand conditions, the equity-to-assets ratio, the staff costs ratio and government ownership all appear to exert a statistically significant positive effect on bank performance. As is the case for 1989 nd 1988, the loans-to-assets ratio has a negative statistically significant impact on banks' ROA.

Finally, the explanatory power of the equations estimated for 1987 is much better than for the other years with adjusted R^2 ranging between 36.7 and 43.6. The results for 1986 imply that neither the traditional SCP paradigm nor the efficiency hypothesis is evident in Luropean banking. Change in market demand conditions, the equity-to-assets ratio and the staff expenses ratio all '.ave a positive and significant impact on banks ROA. Bank performance appears to be inversely related to the loans-to-assets ratio and government ownership in 1986. The explanatory power of the equations estimated for 1986 is also mixed ranging between 13.2 and 36.6.

From the above it seems that the cross-sectional estimates of the ROA-concentration relationship are unstable - however, some of the variables do appear to have a similar impact over three or four years. Table 8.7 provides a summary of the cross-sectional results, listing the number and sign of significant variables across all equations. In the case of the concentration measures one can see that for 1987 five of the concentration measures had positive significant coefficients, whereas one was negative and significant. In contrast, the estimates for 1989 yielded (from six equations) three negatively significant coefficients on the concentration measures. Viewing the concentration measures as a whole it does appear that the positive relationship between ROA and concentration dominates for the 1987 and 1988 estimates although the relationship is less certain for 1986 and 1989. There is only evidence that the efficiency hypc hesis holds for 1988 (complementing the traditional SCP paradigm which also holds). No positive significant relationship between bank's market share and ROA is found for any other year. Change in market demand conditions as proxied by the (NARMON) variable is seen to have a strong positive impact on ROA for 1986, 1987 and 1988, whereas the cost of funds variable (IPAY/FUND) only has a significant impact in one equation for 1988. The loans-to-assets ratio has a significant negative impact on ROA for 1987, 1988 and 1989, and in 1986 the signs on the coefficients are also all negative yet insignificant.

Equity-to-assets ratios exert a positive statistically significant impact on bank performance across all years - the only variable in the model specification to have the same significant impact across every equation, a result confirmed also by the Bourke (1989) and Molyneux and Thornton (1992) studies. There also may be evidence of expense

Table 8.7 ROA and concentration: summary of cross-sectional results. Number of significant variables[a] 1986 to 1989

Variables	1986		1987		1988		1989	
	Positive	Negative	Positive	Negative	Positive	Negative	Positive	Negative
Concentration Measures	1	3	5	1	5	-	-	3
MSASS	-	2	-	-	6	-	-	-
Narmon	6	-	6	-	6	-	-	-[b]
IPAY/Fund	-	-	-	-	1	-	-	-
Loans/Assets	-	-[c]	-	6	-	6	-	6
Equity/Assets	6	-	6	-	6	-	6	-
Staff/Assets	6	-	6	-	-[d]	-	6	-
Govt.	-	6	4	-	6	-	-	6

Note: a t-statistics significant at the 5 per cent level
b all coefficients negative and insignificant
c all coefficients negative but insignificant
d all coefficients positive but insignificant

Analysis of results taken from the six equations estimated for each year.

preference behaviour in European banking with the (STAFF/ASSETS) variable being positive and statistically significant in three years. Finally, the relationship between government ownership and ROA is ambiguous with evidence of a strong positive relationship in 1987 and 1988 and the opposite in the other two years. The above general findings are also confirmed if we examine the results for the equations that are estimated including the Loan-loss Reserves ratio, as reported in Appendix 17.

8.2.1.3 ROE and concentration

This section replicates the estimation procedure outlined in Section 8.2.1.2, but uses instead before-tax ROE as the dependent variable. Results of the estimations are shown in Tables 8.8 to 8.11. For all the equations listed in the aforementioned tables, the hypotheses of non-normality of residuals cannot be rejected by the derivative Shapiro-Wilk (SW) test, so these results have to be treated with caution. The assumption of heteroskedasticity in the residual variance can be rejected because all the Lagrange Multiplier (LM) tests fall below the critical chi-squared value, and multicollinearity does not appear to be a problem as all the variance inflationary factor tests (VIF) are below the critical value of 10. / In addition, the explanatory power of the equations is much lower than in the ROA equations, apart from in 1987. Adjusted coefficients of determination (R^2) range between 0.2 and 0.3 for 1989; 7.2 and 7.4 for 1988; 49.1 and 49.7 for 1987; and 1.4 and 4.8 for 1986.

TABLE 8.8
ROE and Concentration 1989

Dependent Variables / Independent Variables	[1]	VIF	[2]	VIF	[3]	VIF	[4]	VIF	[5]	VIF	[6]	VIF
CONSTANT	0.1606 [1.03]		0.3806[a] [2.00]		0.1456[a] [1.17]		0.1659 [1.12]		0.2277[a] [2.62]		0.2286[a] [3.12]	
CR5ASS	−0.0014 [0.42]	1.4										
CR10ASS			−0.0029 [−0.90]	1.2								
CR5DEP					0.0016 [0.70]							
CR10DEP							0.0009 [0.41]	1.3				
HERFASS									−0.1051 [−0.14]	1.5		
HERFDEP											−0.0882 [−0.27]	1.3
MSASS	−0.4780 [−0.42]	1.1	−0.1260 [−0.11]	1.1	−0.4470 [−0.40]	1.1	−0.4620 [−0.41]	1.1	−0.3030 [−0.26]	1.2	−0.2570 [−0.22]	1.1
NARMON	0.0009 [0.31]	1.1	0.0004 [0.12]	1.1	0.0012 [0.37]	1.1	0.0009 [0.28]	1.1	0.0006 [0.19]	1.1	0.0005 [0.17]	1.1
IPAY/FUND	0.0569[a] [2 [illegible]5]	1.0	0.0580[a] [2.09]	1.0	0.0565[a] [2.04]	1.0	0.0568[a] [2.05]	1.0	0.0572[a] [2.06]	1.0	0.0571[a] [2.06]	1.0
LOAN/ASS	−0.1031 [−1.94]	1.7	−0.0974 [−1.85]	1.7	−0.1028 [−1.95]	1.7	−0.1016 [−1.93]	1.7	−0.1007 [−1.91]	1.7	−0.1[illegible]0 [−1.[illegible]]	1.7
EQUITY/ ASS	−0.2047 [−0.57]	1.4	−0.1788 [−0.60]	1.4	−0.1961 [−0.55]	1.4	−0.2028 [−0.57]	1.4	−0.1955 [−0.55]	1.4	−0.1922 [−0.54]	1.4
STAFF/ASS	1.9950 [1.45]	1.8	2.2680 [1.64]	1.8	1.9320 [1.40]	1.8	1.9810 [1.43]	1.8	2.0610 [1.51]	1.8	2.0500 [1.50]	1.8
GOVT	−0.0678 [−0.74]	1.7	−0.1080 [−1.28]	1.4	−0.0617 [−0.70]	1.7	−0.0718 [−0.82]	1.5	−0.0903 [−1.03]	1.5	−0.0928 [−1.09]	1.4
Observations	1268		1268		1268		1268		1268		1268	
N*	229		229		229		229		229		229	
$\bar{R}^2$	0.2		0.3		0.2		0.2		0.2		0.2	
F	1.24		1.32		1.28		1.24		1.22		1.22	
LM	0.62		0.60		0.71		0.80		0.73		0.75	
SW	0.810		0.812		0.824		0.817		0.803		0.800	

Source: Authors own estimates

TABLE 8.9

ROE and Concentration 1988

Dependent Variables / Independent Variables	[1]	VIF	[2]	VIF	[3]	VIF	[4]	VIF	[5]	VIF	[6]	VIF
CONSTANT	0.1266[a] [3.92]		0.0897[a] [2.75]		−0.0847[a] [3.03]		0.0526[a] [1.99]		0.1199[a] [6.44]		0.1175[a] [7.07]	
CR5 ASS	−0.0004[a] [−0.66]	1.7										
CR10ASS			0.0003 [0.63]	1.3								
CR5DEP					0.0004 [0.99]	1.6						
CR10DEP							0.0009[a] [2.54]	1.2				
HERFASS									−0.1288 [−1.12]	1.5		
HERFDEP											−0.0773 [−1.42]	1.3
MSASS	0.3551 [1.92]	1.1	0.2841 [1.55]	1.1	0.2644 [1.44]	1.1	0.2005 [1.11]	1.1	0.3890[a] [2.08]	1.2	0.4049[a] [2.17]	1.1
NARMON	0.0018 [1.53]	1.5	0.0022[a] [2.12]	1.2	0.0026[a] [2.27]	1.5	0.0027[a] [2.53]	1.2	0.0018 [1.75]	1.2	0.0018 [1.75]	1.2
IFAY/FUND	0.0013 [1.25]	1.0	0.0013 [1.26]	1.0	0.0013 [1.27]	1.0	0.0013 [1.31]	1.0	0.0013 [1.26]	1.0	0.0013 [1.25]	1.0
LOAN/ASS	−0.0531[a] [−7.07]	1.6	−0.0528[a] [−7.02]	1.6	−0.0527[a] [−7.00]	1.6	−0.0519[a] [−6.91]	1.6	−0.0542[a] [−7.15]	1.6	−0.0536[a] [−7.12]	1.6
EQUITY/ ASS	0.0235 [0.50]	1.3	0.0198 [0.42]	1.3	0.0199 [0.43]	1.3	0.0112 [0.24]	1.3	0.0204 [0.44]	1.3	0.0222 [0.47]	1.3
STAFF/ASS	1.0122[a] [5.88]	1.7	0.9914[a] [5.75]	1.7	0.9891[a] [5.75]	1.7	0.9534[a] [5.54]	1.7	0.9981[a] [5.82]	1.7	0.9949[a] [5.80]	1.7
GOVT	0.0641[a] [4.52]	1.7	0.0719[a] [5.64]	1.4	0.0749[a] [5.63]	1.5	0.0789[a] [6.31]	1.3	0.0631[a] [4.82]	1.5	0.0632[a] [4.99]	1.4
Observations	1541		1541		1541		1541		1541		1541	
N*	272		272		272		272		272		272	
$\bar{R}^2$	7.2		7.2		7.3		7.7		7.3		7.4	
F	12.35		12.34		12.42		13.16		12.46		12.56	
LM	0.090		0.094		0.089		0.094		0.092		0.095	
SW	0.823		0.829		0.827		0.830		0.825		0.824	

Source: Authors own estimates

TABLE 8.10

ROE and Concentration 1987

Dependent Variables / Independent Variables	[1]		[2]		[3]		[4]		[5]		[6]	
		VIF		VIF		VIF		VIF		VIF		VIF
CONSTANT	−0.2801 [−1.55]		−1.1476[a] [−3.77]		−0.2713 [−1.50]		−0.1202 [−0.52]		0.1308 [1.62]		0.1770[a] [2.09]	
CR5 ASS	0.0140[a] [3.74]	1.6										
CR10ASS			0.0246[a] [5.03]	2.1								
CR5DEP					0.0122[a] [3.70]	1.9						
CR10DEP							0.0071[a] [2.09]	2.2				
HERFASS									3.62[illegible][a] [3.97]	1.3		
HERFDEP											2.1752[a] [3.89]	1.3
MSASS	−3.504[a] [−3.44]	1.2	−3.8990[a] [−3.83]	1.2	−3.7760[a] [−3.65]	1.2	−3.4590[a] [−3.30]	1.2	−5.014[a] [−4.76]	1.3	−3.958[a] [−3.80]	1.2
NARMON	0.0005[a] [23.85]	1.1	0.0005[a] [23.62]	1.2	0.0005[a] [24.16]	1.1	0.0005[a] [24.46]	1.1	0.0005[a] [23.84]	1.1	0.0005[a] [24.18]	1.1
IPAY/FUND	0.0174 [0.58]	1.0	0.0139 [0.47]	1.0	0.0123 [0.41]	1.0	0.0120 [0.40]	1.0	0.0219 [0.74]	1.0	0.0175 [0.58]	1.0
LOAN/ASS	−0.1242 [−1.88]	1.4	−0.0638 [−1.02]	1.2	−0.0299 [−0.48]	1.2	−0.0319 [-0.50]	1.2	−0.1042 [−1.66]	1.3	−0.1044 [−1.62]	1.3
EQUITY/ ASS	−0.7478 [1.86]	1.2	−0.8441[a] [−2.13]	1.2	−0.6028 [−1.53]	1.2	-0.5354 [1.34]	1.2	−0.5128 [−1.34]	1.1	−0.5381 [1.38]	1.2
STAFF/ASS	0.5418 [10.33]	1.0	0.5182[a] [9.87]	1.1	0.5474[a] [10.49]	1.0	0.574[illegible] [11.09]	1.0	0.4942[a] [9.37]	1.1	0.5425[a] [10.37]	21.0
GOVT	0.1679 [1.40]	1.8	0.3627[a] [2.73]	2.2	0.2188 [1.70]	2.0	0.1213 [0.88]	2.3	−0.0366 [−0.37]	1.3	0.0178 [0.17]	1.3
Observations	1201		1201		1201		1201		1201		1201	
N*	238		238		238		238		238		238	
$\bar{R}^2$	49.7		50.4		49.7		49.1		51.0		49.7	
F	100.45		103.24		100.38		98.07		105.78		100.72	
LM	0.856		0.857		0.858		0.857		0.862		0.863	
SW	0.584		0.588		0.579		0.581		0.564		0.562	

Source: Authors own estimates

TABLE 8.11

ROE and Concentration 1986

Dependent Variables / Independent Variables	[1]		[2]		[3]		[4]		[5]		[6]	
		VIF		VIF		VIF		VIF		VIF		VIF
CONSTANT	0.1437[a] [4.81]		0.1369[a] [3.75]		0.1329[a] [5.12]		0.1192[a] [4.34]		0.1046[a] [7.21]		0.115[a] [6.45]	
CR5 ASS	−0.0004 [−0.78]	1.8										
CR10ASS			−0.00002 [−0.38]	2.0								
CR5DEP					0.0002 [−0.46]	1.9						
CR10DEP							0.00006 [0.19]	1.8				
HERFASS									0.1886[a] [2.48]	1.5		
HERFDEP											0.0874 [0.94]	1.8
MSASS	0.0368 [0.32]	1.1	0.0334 [0.30]	1.1	0.0337 [0.29]	1.1	0.0181 [0.16]	1.1	−0.1050 [−0.86]	1.2	−0.0285 [−0.23]	1.2
NARMON	0.0026[a] [3.27]	1.4	0.0013 [1.35]	1.8	0.0028[a] [3.54]	1.3	0.0016 [1.78]	1.5	0.0028[a] [3.87]	1.2	0.0030[a] [4.05]	1.2
IPAY/FUND	0.0103[a] [2.39]	1.1	0.0093[a] [2.21]	1.1	0.0105[a] [2.44]	1.1	0.0096[a] [2.27]	1.1	0.0109[a] [2.60]	1.0	0.0111[a] [[illegible].60]	1.0
LOAN/ASS	−0.0026 [−0.30]	2.3	0.0009 [0.11]	2.[illegible]	−0.0025 [−0.30]	2.3	0.0010 [0.12]	2.4	−0.0039 [−0.46]	2.3	- 0.0019 [−0.22]	2.4
EQUITY/ ASS	−0.0149 [−0.47]	1.2	−0.0289 [−0.89]	1.2	0.0151[a] [−0.[illegible]7]	1.2	−0.0284 [−0.88]	1.2	−0.00139 [−0.44]	1.2	−0.0129 [−0.40]	1.2
STAFF/ASS	0.5739[a] [3.04]	2.0	0.4300[a] [2.29]	2.1	0.[illegible]808[a] [[illegible].08]	2.0	0.4316[a] [2.30]	2.1	0.5422[a] [2.88]	2.1	0.5920[a] [3.13]	2.0
GOVT	−0.0329[a] [−2.17]	1.6	−0.0131 [−.90]	1.4	−0.0308[a] [−2.00]	1.6	−0.0103[a] [−0.68]	1.5	−0.0135 [−0.94]	1.4	−0.0211 [−1.43]	1.5
Observations	759		759		759		759		759		758	
N*	158		164		158		164		158		158	
$\bar{R}^2$	3.9		1.4		3.8		1.4		4.8		3.9	
F	4.02		2.09		3.97		2.08		4.75		4.06	
LM	0.031		0.023		0.026		0.024		0.037		0.039	
SW	0.959		0.958		0.955		0.958		0.968		0.965	

Source: Authors own estimates

If one considers the concentration-ROE relationship, it can be seen that only the results for 1987 strongly confirm evidence of the traditional SCP paradigm. The results for 1987 have the greatest explanatory power and all the coefficients on the concentration measures are positive and significant. Conversely, the results for 1987 reject evidence of the efficiency hypothesis as all the banks' asset size (MSASS) coefficients are negative and significant - suggesting an inverse relationship between ROE and bank size. Only in two other equations, (4) for 1988 and (5) 1986, is the traditional SCP hypothesis seen to hold. There is even less evidence that the efficiency hypothesis is valid - only two equations (in 1988) find a positive relationship between banks' market share and ROE.

Overall, the number of significant coefficients on the ROE estimates is lower than in the ROA case and the relative importance of some of the variables also differs markedly. For example, in the ROA estimates we found a significant positive relationship with the loans-to-assets variable in all equations from 1987, 1988 and 1989, yet the same relationship was only found to hold in one year, 1988, for the ROE estimates. Similarly, the strong positive relationship found between the equity-to-assets ratio and ROA disappeared when ROE was used as the dependent variable. The results for the ROE estimates, however, do seem to give further possible support to evidence of expense-preference behaviour in European banking as illustrated by the positive significant relationship between the staff expenses ratio and performance in 1986, 1987 and 1989. The relationship between government ownership of banks and ROE is ambiguous. Table 8.12 provides a summary of the cross-sectional results from the ROE equations and highlights the above

Table 8.12 ROE and concentration: summary of cross-sectional results. Number of significant variables[a] 1986 to 1989

Variables	1986		1987		1988		1989	
	Positive	Negative	Positive	Negative	Positive	Negative	Positive	Negative
Concentration Measures	1	-	6	-	1	-	-	-
MSASS	-	-	-	6	2	-	-	-
Narmon	4	-	6	-	3	-	-	-
IPAY/Fund	6	-	-	-	-	-	6	-
Loans/Assets	-	-	-	-	-	6	-	-[b]
Equity/Assets	-	-	-	1	-	-	-	-
Staff/Assets	6	-	6	-	6	-	-	-
Govt.	-	2	1	-	6	-	-	-

Notes: a t-statistics significant at the 5 per cent level
b Coefficients would all be significant at the 10 per cent level

Analysis of results taken from the six equations estimated for each year.

differences.

To conclude, it can be seen that the cross-sectional equations that estimate the relationship between before-tax ROE and concentration perform less well than the previous ROA estimates. This was a finding confirmed in an earlier study by Bourke (1989). Despite the fact that the equations do not fulfil the normality of residuals criterion (and therefore are biased estimations), it does appear that they at least provide some evidence that the traditional SCP hypothesis holds as opposed to the efficiency hypothesis. The positive impact of changes in market demand conditions (NARMON) and staff expense ratios (STAFF/ASSETS) on performance also supports the earlier findings. As with the previous ROA estimates, however, it should be noted that there appears to be strong seasonality in the results.

8.2.2 Pooled time-series estimates

The cross-sectional estimates of the SCP relationship described in the previous two sections suggest evidence that the traditional paradigm holds - that in markets with higher levels of concentration, the cost of collusion is lower, and this results in larger profits for all market participants. There seems to be less evidence of the competing efficiency hypothesis where firm's market share is seen as the dominant variable in explaining industry performance. So as to provide an overall view, we pool our data and estimate the ROA and ROE equations over the period 1986 to 1989; including four time dummy (binary) variables (YR86), (YR87), (YR88) and (YR89). We then use an F-test to test the null-hypothesis that there is no-seasonality in the data - that is the estimates over the four years are not statistically significantly different. The results of our pooled estimates for ROA are shown in Table 8.13 and for ROE in Table 8.14.

The pooled estimates reported in Table 8.13 appear to confirm the findings from our cross-sectional results. In five out of the six equations the concentration measure is seen to have a significant positive effect on banks' ROA, thus confirming the traditional SCP hypothesis. Only in equation (6), which uses the deposits Herfindahl measure of market structure, is the efficiency hypothesis seen to hold. Changes in market demand conditions, equity-to-assets ratios and staff expense ratios all appear to have a strong positive impact on banks' performance. In addition, the loans-to-assets ratio is significantly negatively related to performance, implying that the greater the proportion of non-loan earning assets on a bank's balance sheet the greater the ROA (or that relatively large loan books incur greater funding cost , thus depressing profitability). The sign on the coefficients for the cost of funds (IPAY/FUND) proxy variable is always positive yet insignificant as are the coefficients on the government ownership variable.

Overall, the explanatory power of the equations are quite good with adjusted R^2 ranging from 37.8 to 38.8, and the diagnostic tests reject the hypotheses of non-normality of residual variance, heteroskedasticity and multicollinearity. Finally, the t-statistics on the yearly dummy variables (YR86 to YR89) suggest evidence of seasonality in the data

TABLE 8.13
Pooled Estimates of the SCP relationship – ROA and Concentration

Dependent Variables / Independent Variables	[1] ROA	[2] ROA	[3] ROA	[4] ROA	[5] ROA	[6] ROA
CR5ASS	0.00006[a] [2.05]					
CR10ASS		0.0002[a] [7.06]				
CR5DEP			0.0001[a] [4.48]			
CR10DEP				0.0001[a] [6.99]		
HERFASS					0.0072[a] [1.98]	
HERFDEP						−0.0031 [−0.080]
MSASS	0.0179 [1.72]	0.0046 [0.46]	0.0127 [1.22]	0.0033 [0.33]	0.0181 [1.66]	0.0252[a] [illegible]
NARMON	0.000005[a] [12.08]	0.000004[a] [12.21]	0.000004[a] [12.03]	0.000005[a] [12.69]	0.000005[a] [12.08]	0.000005[a] [12.20]
IPAY/FUND	0.00006 [0.52]	0.00007 [0.65]	0.00007 [0.62]	0.00008 [0.70]	0.00005 [0.45]	0.00005 [0.40]
LOAN/ASS	−0.0069[a] [−14.87]	−0.0064[a] [−14.10]	−0.0068[a] [−14.47]	−0.0063[a] [−13.95]	−0.0069[a] [−14.72]	−0.0070[a] [−14.88]
EQUITY/ASS	0.0696[a] [22.86]	0.0636[a] [21.48]	0.0692[a] [22.81]	0.0633[a] [21.37]	0.0701[a] [23.09]	0.0702[a] [28.11]
STAFF/ASS	0.0194[a] [21.32]	0.01886[a] [21.48]	0.0192[a] [21.18]	0.0193[a] [22.14]	0.0194[a] [21.20]	0.0197[a] [21.64]
GOUV	0.0007 [0.96]	0.0005 [0.65]	0.0007 [0.95]	0.0005 [0.66]	0.0007 [0.98]	0.0007 [0.98]
YR86	0.0041[a] [2.71]	−0.0052[a] [−2.83]	0.0023 [1.60]	−0.0019 [−1.30]	0.0059[a] [5.19]	0.0065[a] [5.86]
YR87	0.0075[a] [4.80]	−0.0012 [−0.63]	0.0059[a] [4.40]	0.0026 [1.76]	0.0094[a] [8.68]	0.0102[a] [9.79]
YR88	0.0062[a] [4.45]	−0.0024 [−1.35]	0.0044[a] [3.46]	0.0010 [0.71]	0.0081[a] [8.73]	0.0086[a] [9.50]
YR89	0.0039[a] [2.76]	−0.0049[a] [−2.64]	0.0022 [1.73]	−0.0012 [−0.88]	0.0059[a] [6.12]	0.0064[a] [6.80]
Observations	4769	4769	4769	4769	4769	4769
N*	897	897	897	900	897	897
$\bar{R}^2$	37.8	38.8	38.1	38.7	37.8	37.8
F	180.53	187.67	182.66	187.53	180.15	180.05
LM	3.223	2.064	3.080	3.261	3.291	3.390
SW	0.980	0.983	0.981	0.979	0.997	0.995
VIF range	0.8–2.7	1.0–2.5	1.1–2.6	0.9–2.1	0.7–[illegible]	0.6–2.4

Source: Authors own estimates

(Table 8.13 continued)

NOTES:

t = statistics in paratheses
a = values significant at the 5% level
N* = missing values.

1. Equations were also estimated without the yearly binary variables and F–tests were undertaken to evaluate the evidence of seasonality in the results.

Equation 1	F - test 2.37	Equation 2	F - test 2.65
Equation 2	F - test 2.82	Equation 4	F - test 1.26
Equation 5	F - test 2.60	Equation 6	F - test 2.80

The 5% critical value for an F distribution with the relevant degrees of freedom is 2.37 so in all equations apart from equation (4) we reject the null hypothesis of no seasonal affects.

TABLE 8.14

Pooled Estimates of the SCP relationship – ROE and Concentration

Dependent Variables / Independent Variables	[1] ROE	[2] ROE	[3] ROE	[4] ROE	[5] ROE	[6] ROE
CR5ASS	0.0029[a] [2.72]					
CR10ASS		0.0031[a] [2.66]				
CR5DEP			0.0025[a] [3.06]			
CR10DEP				0.0019[a] [2.30]		
HERFASS					1.1226[a] [4.91]	
HERFDEP						0.2856[a] [1.99]
MSASS	−1.1476[a] [−2.94]	−1.1491[a] [−2.94]	−1.172[illegible][a] [−3.01]	−1.1356[a] [−2.89]	−1.6222[a] [−3.99]	−1.1557[a] [−2.89]
NARMON	0.0005[a] [37.54]	0.0005[a] [37.48]	0.00005[a] [37.78]	0.0005[a] [37.71]	0.0005[a] [37.38]	0.0005[a] [37.71]
IPAY/FUND	0.0049 [1.12]	0.0048 [1.09]	0.0049 [1.13]	0.0048 [1.09]	0.0049 [1.12]	0.0046 [1.05]
LOAN/ASS	−0.0474[a] [−2.71]	−0.0438[a] [−2.49]	−0.0429[a] [−2.45]	−0.0435[a] [−2.47]	−0.0401[a] [−2.28]	−0.0443[a] [−2.51]
EQUITY/ASS	−0.0937 [−0.82]	−0.0989 [−0.86]	−0.0907 [−0.80]	−0.0995 [−0.86]	−0.0744 [−0.66]	−0.0684 [−0.60]
STAFF/ASS	0.5814[a] [17.07]	0.5807[a] [17.02]	0.5814[a] [17.10]	0.5870[a] [17.29]	0.5651[a] [17.33]	0.5861[a] [17.25]
GOVT	−0.0238 [−0.84]	−0.0243 [−0.086]	−0.0237 [−0.84]	−0.0241 [−0.85]	−0.0235 [−0.84]	−0.0235 [−0.83]
YR86	0.0870 [1.52]	0.0386 [0.54]	0.0918 [1.73]	0.1001 [1.73]	0.1341[a] [3.52]	0.1823[a] [4.40]
YR87	0.1428[a] [2.45]	0.0969 [1.32]	0.1615[a] [3.22]	0.1669[a] [2.93]	0.1827[a] [4.51]	0.2400[a] [6.14]
YR88	0.0789 [1.51]	0.0247 [0.35]	0.0849 [1.80]	0.0899 [1.65]	0.1341[a] [3.88]	0.1716[a] [5.06]
YR89	0.0834 [1.56]	0.0289 [0.40]	0.0932[a] [1.96]	0.0964 [1.75]	0.1402[a] [3.93]	0.1769[a] [5.02]
Observations	4768	4769	4769	4769	4769	4769
N*	897	897	897	900	897	897
$\bar{R}^2$	36.4	36.4	36.4	36.3	36.7	36.3
F	169.64	169.28	169.90	169.04	171.82	169.19
LM	2.773	2.823	2.738	2.824	2.573	2.822
SW	0.463	0.456	0.46[illegible]	0.462	0.472	0.459
VIF range	0.9−1.1	1.0−1[illegible]	1[illegible].1	1.0−1.2	1.0−1.2	1.0−1.2

Source: Authors own estimates

(Table 8.14 continued)

NOTES:

t = statistics in paratheses
a = values significant at the 5% level
N* = missing values.

1. Equations were also estimated without the yearly binary variables and F-tests were undertaken to evaluate the evidence of seasonality in the results.

Equation 1 F – test 2.78	Equation 2 F – test 1.01
Equation 2 F – test 2.93	Equation 4 F – test 2.84
Equation 5 F – test 2.47	Equation 6 F – test 2.87

The 5% critical value for an F distribution with the relevant degrees of freedom is 2.37 so in all equations apart from equation (2) we reject the null hypothesis of no seasonal affects.

apart from in equation (4). F-tests, reported at the bottom of the table, were undertaken to confirm the evidence of seasonality in the results. In all equations (apart from equation 4) we cannot reject the null hypothesis of no seasonal effects. In other words, the parameter estimates are sensitive to the data period chosen and exhibit considerable instability.

Results shown in Table 8.14 give further support for the traditional SCP paradigm as all market concentration measures are positive and statistically significantly related to banks' ROE. The efficiency hypothesis is strongly rejected given that the coefficients on the (MSASS) variables are all negative and significant. The major difference between the ROA and ROE estimates is that the latter finds the equity-to-assets ratio to be negative <u>but</u> insignificantly related to banks performance as measured by ROE. As with the cross-sectional estimates, however, we cannot reject the assumption of non-normality of residual variance because the Shapiro-Wilk tests are well below their critical values. The F-tests again confirm evidence of strong seasonal effects on the parameter estimates.

8.2.5 Pooled country estimates

We have seen from the above that the traditional SCP paradigm appears to be the dominant hypothesis in explaining the market behaviour of European banks. This section goes further and investigates the SCP versus efficiency hypothesis for individual European countries. The equations that are estimated use the asset's Herfindahl measure of market structure. Given the poor explanatory power of the estimates that include ROE as the dependent variable, we chose to estimate only the ROA specification of the model. Data for individual countries are pooled across the four-year period. Estimates of the two competing hypotheses cannot be made for individual years because only one concentration measure is available for any one country in any one year. Pooling the data provides variability in the concentration measure (as it also does for the other country specific variable, NARMON). The results for individual countries are reported in Table 8.15. In the case of the Netherlands and Turkey, equations are estimated without the IPAY/FUND and STAFF/ASSETS variables, respectively. There are also insufficient observations available for estimating an equation for Irish banks.

Table 8.15 illustrates the marked instability in parameter estimates across countries and the substantial differences in the explanatory power of country equations. There is evidence that the SCP paradigm unambiguously seems to hold in the following countries' banking systems: Belgium, France, Italy, the Netherlands and Spain. This in fact, confirms the findings of the Price Waterhouse/Cecchini study which identified the same countries, apart from the Netherlands, as the systems which would experience the largest fall in financial service prices after 1992 integration. The efficiency hypothesis only appears to hold unambiguously in Norway. In the Danish banking system there is evidence that the two hypotheses complement one another. Out of the largest European banking markets, the only explanatory variable that has consistently the same sign and level of significance is the equity-to-

TABLE 8.15

Pooled Country Estimates of the SCP relationship, ROA as the dependant variable

Dependant Variables / Independant Variables	Austria	Belgium	Denmark	Finland	France	Germany
CONSTANT	0.0080 [1.13]	−0.0171 [−0.54]	−0.1460 [−1.29]	−0.0134 [−0.77]	0.0018 [1.07]	0.0039 [0.74]
HERFASS	−0.1507[a] [−2.89]	0.1636[a] [4.56]	0.0486[a] [3.73]	0.0723 [0.50]	0.0071[a] [2.31]	−0.3535[a] [−2.53]
MSASS	−0.0255 [−1.87]	0.0043 [0.26]	0.0629[a] [2.40]	−0.0002 [−0.02]	0.0192 [0.89]	0.0344 [1.18]
NARMON	0.0003[a] [3.35]	0.0004 [0.72]	0.0003 [1.40]	−0.00003 [−0.13]	0.000002 [0.01]	0.00009 [0.70]
IPAY/FUND	0.0021 [1.25]	−0.0567[a] [−3.06]	−0.1706 [−1.76]	−0.0290[a] [−3.41]	0.0019[a] [3.65]	0.00003 [0.68]
LOANS/ASS	−0.0022 [−1.31]	0.0004 [0.11]	0.0234 [1.89]	0.0194[a] [5.31]	−0.0017[a] [−5.45]	0.0027 [1.71]
EQUI/ASS	0.0272 [1.02]	0.1322[a] [5.00]	0.1307[a] [2.54]	0.1659[a] [2.90]	0.0154[a] [9.12]	0.1092[a] [6.95]
STAFF/ASS	0.1416[a] [2.07]	0.0228 [0.14]	−0.4107 [−1.76]	−0.3306[a] [−2.30]	0.0417[a] [6.50]	0.2587[a] [5.43]
GOVT	0.0001 [0.23]	0.0004 [−0.36]	n.a.	0.00005 [0.03]	0.0004[a] [2.48]	−0.0010 [−1.67]
Observations	163	134	100	43	555	57[illegible]
N*	9	17	5	1	22	57
$\bar{R}^2$	11.5	23.4	18.6	53.0	20.9	17.4
F	3.64	6.08	3.77	6.92	19.22	15.98
LM	2.431	3.467	1.119	1.879	5.623	1.046
SW	0.983	0.781	0.562	0.910	0.989	0.942
VIF range	1.0−8.2	2.1−4.7	1.3−3.6	1.1−2.1	1.7−6.3	1.2−2.4

Source: Authors own estimates

TABLE 8.15 [continued]
Pooled Country Estimates of the SCP relationship

Dependant Variables / Independant Variables	Greece	Italy	Netherlands	Norway	Luxembourg
CONSTANT	0.0706[a] [2.80]	−0.0213 [−0.29]	−0.0304 [−1.37]	−0.0167 [−1.42]	0.0164[a] [3.86]
HERFASS	−0.0604 [−1.82]	4.8490[a] [2.74]	0.1028[a] [2.14]	0.0533 [0.48]	0.1014 [1.62]
MSASS	−0.0267[a] [−3.40]	−0.6600 [−0.62]	−0.0080 [−0.90]	0.0663[a] [2.76]	0.0749 [1.01]
NARMON	removed high correlation	−0.0125 [−0.72]	0.0055 [1.38]	0.00007 [1.78]	0.0006 [1.14]
IPAY/FUND	−0.0407[a] [−2.13]	0.00002 [0.05]	n.a.	0.0009 [0.73]	0.00003 [0.60]
LOANS/ASS	−0.0191 [−0.72]	−0.0322[a] [−3.59]	0.0077[a] [2.37]	−0.0163 [−1.19]	−0.0142 [−1.78]
EQUI/ASS	0.0516 [1.04]	0.0912[a] [9.07]	0.2093[a] [8.35]	0.4384[a] [8.72]	0.3914[a] [3.56]
STAFF/ASS	−0.5655[a] [−2.34]	−0.5730[a] [−4.06]	0.2089 [1.55]	0.2737 [0.93]	0.4143[a] [2.14]
GOVT	−0.0021 [−0.80]	0.0019 [0.74]	−0.0009 [−0.86]	−0.0004 [−0.19]	n.a
Observations	31	722	118	110	306
N*	16	11	8	5	7
$\bar{R}^2$	40.7	47.5	46.3	46.1	38.2
F	3.94	20.37	15.41	12.44	11.11
LM	1.862	2.483	4.602	3.111	2.161
SW	0.876	0.982	0.917	0.934	0.917
VIF range	1.2−23.6	2.2−16.2.	1.3−43.2	2.3−[illegible]5	1.6−4.2

Source: Authors own cstimates

TABLE 8.15 [continued]
Pooled Country Estimates of the SCP relationship

	Portgual	Spain	Sweden	Switzerland	U.K.	Turkey
CONSTANT	0.4345[a] [2.42]	0.0163[a] [2.47]	0.5134[a] [5.97]	−0.0067 [−0.03]	0.0385 [1.68]	0.0042 [1.74]
HERFASS	0.0510 [0.03]	0.0708[a] [1.98]	removed virtually a constant	0.1430 [0.53]	−2.0463[a] [−2.37]	0.1320 [0.69]
MSASS	−0.4921[a] [−3.59]	−0.0293 [−0.93]	0.0924 [0.32]	−0.0104 [−0.53]	0.0309 [0.41]	0.0127 [0.63]
NARMON	−0.003 [−0.07]	−0.0006[a] [−1.99]	0.0000005 [0.17]	−0.0002 [−1.86]	−0.0005 [−1.67]	0.0009 [−1.59]
IPAY/FUND	−0.1039[a] [−6.54]	−0.0020[a] [−3.37]	−0.9385 [−1.86]	−0.0798[a] [−4.76]	0.0485[a] [2.05]	0.0621[a] [3.14]
LOANS/ASS	−0.3680 [−6.51]	−0.0082 [−1.95	−0.5625[a] [−5.18]	−0.0079[a] [−3.69]	0.0135[a] [4.19]	−0.0222[a] [−3.74]
EQUI/ASS	removed high correlation	0.1352[a] [14.01]	−1.1640 [−0.63]	0.0327[a] [5.13]	0.1524[a] [10.25]	0.6286[a] [3.01]
STAFF/ASS	−0.1985 [−0.64]	0.3187[a] [3.88]	0.0130[a] [1.99]	0.4209[a] [13.71]	0.0463 [0.28]	n.a.
GOVT	0.0123 [0.98]	removed virtually a constant	-0.0155 [−0.56]	0.0003 [0.35]	n.a.	−0.026 [−1.14]
Observations	59	463	88	556	615	60
N*	0	25	14	7	460	2
$\bar{R}^2$	64.0	33.5	56.5	54.4	20.3	33.7
F	11.4	30.15	4.89	83.78	15.59	32.61
LM	1.219	2.392	2.444	1.181	2.003	2.341
SW	0.431	0.997	0.920	0.781	0.996	0.784
VIF range	1.4−4.4	1.2−3.9	1.0−1.7	1.3−7.8	2.2−3.0	1.1−12.6

Source: Authors own estimates

assets ratio, suggesting, as in the previous findings, that banks with greater levels of equity are relatively more profitable. Differences between individual country estimates are too numerous to investigate, but it is clear that significant country variations exist when the model specification is estimated. This, however, is not surprising given the different regulatory regimes that exist in various countries. In the US SCP studies, researchers investigate the relationship across hundreds of markets (which have different branch banking and regulatory regimes) yet they only tend to report equations for the whole sample combined: estimates are rarely provided on individual markets. These US studies evaluate whether the SCP relationship holds across all markets, and therefore they do expect there to be variation of estimates for individual markets. While different regulatory regimes may lead to different relationships between structure and performance, it remains likely that market structure will impact on performance.

8.2.4 Conclusion on the SCP paradigm and efficiency hypothesis results

The first part of this chapter has investigated evidence of the traditional SCP paradigm and the efficiency hypothesis in European banking markets. There seems to be reasonable support for the former and little for the latter. The choice of before-tax ROA as a bank performance measure yields more robust estimates than the before-tax ROE measure. In general, the change in market demand conditions variable (NARMON), equity-to-assets ratio (EQUITY/ASSETS) and staff expenses ratio (STAFF/ASSETS) all appear to be related positively to banks' performance. In the majority of cases the loans-to-assets ratio

(LOANS/ASSET) exerts a negative influence on banks' performance. The positive relationship between the performance measures and the staff expenses ratio suggest that more profitable banks direct a larger proportion of their expenses towards staff costs. One can tentatively state, that given that we find the traditional SCP paradigm to hold, this may suggest evidence of expense-preference behaviour in European banking markets. The pooled country estimates also indicate that the traditional SCP paradigm unambiguously holds for the Belgium, French, Italian, Dutch and Spanish banking systems and all these countries, apart from the Dutch system, have been identified by the Price Waterhouse/Cecchini study as the systems which would experience the most significant financi l service price falls post 1992. The results also finds evidence of strong seasonal differences between parameter estimates across years and also instability of parameters across individual country estimates.

8.3 Cooperation and Rivalry in European Markets

The approach adopted in the first part of this chapter assumes that the higher the level of concentration in a market, the greater the degree of industry-wide cooperation. All firms in the industry benefit from higher prices that result from cooperation, therefore, profitability is assumed to be some positive function of industry-wide cooperation. Cooperation may, of course, be explicit or implicit. If the largest firms in the industry set the market price and all other firms are price-takers, then this is a form of implicit cooperation. The use of concentration ratios to analyse these relationships also assumes that there is a uniform level of industry-wide cooperation and this imposes a range of restrictions on the role of individual firm market shares and on inter-firm behaviour. In Section 6.4.2 of this thesis a model is developed from the Kwoka and Ravenscroft (1986) approach which enables us to test for inter-firm behaviour between leading banks across European banking markets. The evidence to be presented reveals a complex range of cooperative and rivalrous effects involving leading firms' markets shares in industry performance determination.

8.3.1 Cross-sectional estimates

Tables 8.16 to 8.19 reports estimates of equation (14) from Chapter 6 for each of the four years. These equations are similar to the ones estimated earlier in this chapter, the difference being that they include the interactive variables; $S1DMS_{ij}$, $S2DMS_{ij}$; $S3DMS_{ij}$; $S4DMS_{ij}$ and $S5DMS_{ij}$. $S1DMS_{ij}$ is a variable interacting the market share of the largest bank in the market ($S1_j$) with one minus the market share of all other firms ($1-MS_{ij}$), S2DMS is equal to $S2_j$ ($1-MS_{ij}$), and so on. Note that the estimation procedure involves first evaluating the effect of adding $S1DMS_{ij}$ to the equation. Then $S2DMS_{ij}$ is added to the equation with $S1DMS_{ij}$; then $S3DMS_{ij}$; is added, and so on. We test to see if these interactive terms have a significant impact on banking industry performance, as measured by the before tax return-on-assets (ROA), by undertaking sequential F-tests. These test to see if the equation which includes $S1DMS_{ij}$ is significantly different from the equation that has no interactive term; the equation that includes $S1DMS_{ij}$ and $S2DMS_{ij}$ is significantly different from the one that includes only $S1DMS_{ij}$; and so

Table 8.16
Cooperation and Rivarly, Individual Shares Components of Concentration Ratios, 1989

Dependant Variables / Independant Variables	[1] ROA	[2] ROA	[3] ROA	[4] ROA	[5] ROA	[6] ROA
CONSTANT	0.0103[a] [7.53]	0.0099[a] [7.03]	0.0102[a] [6.80]	0.0099[a] [6.61]	0.0097[a] [5.65]	0.0066[a] [6.57]
MSASS	0.0074 [0.47]	0.0079 [0.50]	0.0077 [0.49]	0.0117 [0.74]	0.0121 [0.76]	−0.0045 [−0.29]
NARMON	−0.00003 [−0.47]	0.00004 [0.08]	0.000006 [0.10]	0.00007 [1.35]	0.00007 [1.37]	−0.0000005 [−0.11]
IPAY/FUND	0.0001 [0.29]	0.0001 [0.32]	0.0001 [0.34]	0.0002 [0.46]	0.0002 [0.45]	0.00002 [0.48]
LOAN/ASS	−0.0060[a] [−8.27]	−0.0061[a] [−8.32]	−0.0061[a] [−8.30]	−0.0052[a] [−6.83]	−0.0053[a] [−6.70]	−0.0065[a] [−8.97]
EQUI/ASS	0.0604[a] [11.38]	0.0595[a] [11.45]	0.0594[a] [11.40]	0.0600[a] [11.60]	0.0598[a] [11.44]	0.0574[a] [11.28]
STAFF/ASS	0.0658[a] [3.42]	0.0642[a] [3.32]	0.0656[a] [3.36]	0.0699[a] [3.60]	0.0687[a] [3.44]	0.0635[a] [3.27]
GOVT	0.0006 [0.61]	0.0006 [0.60]	0.0006 [0.59]	0.0006 [0.64]	0.0006 [0.64]	0.0006 [0.62]
SIDMS	−0.0319[a] [−3.93]	−0.0624 [−1.91]	−0.0675[a] [−1.98]	−0.0518 [−1.52]	−0.0528 [−1.54]	
S2DMS		0.0383 [0.97]	0.0489 [1.10]	0.020.5 [−0.46]	0.0215 [0.48]	
S3DMS			−0.0100 [−0.52]	0.0615[a] [2.25]	0.0629[a] [2.25]	
S4DMS				−0.0885[a] [−3.67]	−0.0930[a] [−3.11]	
S5DMS					0.0078 [0.25]	
Observations	1268	1268	1268	1268	1268	1268
N*	229	229	229	229	229	229
$\bar{R}^2$	18.6	18.6	18.5	19.5	19.5	17.4
F	29.51	26.33	23.71	23.05	21.11	31.07
VIF range	1.0−1.8	1.0−20.6	1.0−26.0	1.0−26.8	1.0−27.0	1.0−1.8

Source: Authors own estimates

Table 8.16 [continued]

NOTES:

t = statistics in paratheses
a = values significant at the 5% level
N* = missing values.

1. Two-tail tests were performed on an ordered sequence of the Sn DMS coefficients. The F- statisitcs are as follows:-

Equation 1	F - test 4.60
Equation 2	F - test 1.1
Equation 3	F - test 2.14
Equation 4	F - test 3.10
Equation 5	F - test 2.90

The 5 % critical value for an F distribution with the relevant degrees of freedom are as follows:-

Equation 1,	=	3.84
Equation 2,	=	3.00
Equation 3,	=	2.67
Equation 4,	=	2.37
Equation 5,	=	2.10

Source: Authors own estimates

Table 8.17
Cooperation and Rivalry, Individual Share Components of Concentration Ratios, 1988

Dependant Variables / Independant Variables	[1] ROA	[2] ROA	[3] ROA	[4] ROA	[5] ROA	[6] ROA
CONSTANT	−0.0003 [−0.10]	0.00111[a] [4.63]	0.0138[a] [5.39]	0.2096[a] [8.57]	0.0199[a] [8.46]	0.0022 [1.11]
MSASS	0.0717[a] [3.14]	0.0364 [1.83]	0.0343 [1.70]	0.0087 [0.47]	0.00008 [0.00]	0.0788[a] [3.55]
NARMON	0.0004[a] [3.21]	−0.0003[a] [−2.29]	−0.0004[a] [−2.95]	−0.0001 [−1.19]	−0.0003[a] [−2.59]	0.0004[a] [2.95]
IPAY/FUND	0.00003 [0.22]	−0.00003 [−0.28]	−0.00003 [−0.31]	−0.00005 [−0.50]	−0.00002 [−0.17]	0.00002 [0.18]
LOAN/ASS	−0.0074[a] [−7.94]	−0.0069[a] [−8.53]	−0.0066[a] [−8.10]	−0.0015 [−1.81]	−0.0014[a] [−1.72]	−0.0074[a] [−7.93]
EQUI/ASS	0.0868[a] [14.60]	0.0663[a] [12.55]	0.0665[a] [12.63]	0.0743[a] [15.07]	0.0688[a] [14.36]	0.0877[a] [14.83]
STAFF/ASS	0.0342 [1.59]	0.0176 [0.94]	0.0255 [1.35]	0.0736[a] [4.11]	0.1010[a] [5.76]	0.0343 [1.59]
GOVT	0.0010 [0.74]	0.0010 [0.87]	0.0010 [0.90]	0.0011 [1.02]	0.0011 [1.05]	0.0010 [0.76]
SIDMS	0.0163[a] [11.35]	0.6357[a] [18.84]	0.6484[a] [19.12]	0.8632[a] [24.40]	0.8924[a] [26.06]	
S2DMS		−0.7483[a] [−19.31]	−0.7319[a] [−18.75]	−0.9956[a] [−24.12]	−1.0452[a] [−26.04]	
S3DMS			−0.0689 [−1.91]	0.0497 [[illegible].10]	0.0339 [1.48]	
S4DMS				−0.3899 [−1.43]	0.4641 [1.90]	
S5DMS					−0.8539 [−1.43]	
Observations	1541	1541	1541	1541	1541	1541
N*	272	272	272	272	274	272
$\bar{R}^2$	19.6	39.2	39.6	40.7	41.4	19.6
F	36.44	84.25	77.17	97.45	103.15	41.35
VIF range	1.0−1.7	1.0−6.9	1.0−6.9	1.0−10.6	1.0−30.0	1.0−1.7

Source: Authors own estimates

Table 8.17 [coninuted]

NOTES:

t = statistics in paratheses
a = values significant at the 5% level
N* = missing values.

1. Two–tail tests were performed on an ordered sequence of the Sn DMS coefficients.

The F–	statisitcs are as follows:–
Equation 1	F – test 9.33
Equation 2	F – test 107.46
Equation 3	F – test 2.08
Equation 4	F – test 1.26
Equation 5	F – test 0.99

The 5 % critical value for an F distribution with the relevant degrees of freedom are as follows:–

Equation 1,	=	3.84
Equation 2,	=	3.00
Equation 3,	=	2.67
Equation 4,	=	2.37
Equation 5,	=	2.10

Source: Authors own estimates

Table 8.18
Cooperation and Rivalry, Individual Share Components of Concentration Ratios, 1987

Dependant Variables / Independant Variables	[1] ROA	[2] ROA	[3] ROA	[4] ROA	[5] ROA	[6] ROA
CONSTANT	−0.0049 [−1.75]	−0.00006 [−0.03]	−0.0003 [0.12]	0.0006 [0.25]	0.0072[a] [2.47]	0.0099[a] [5.01]
MSASS	0.0119 [0.51]	0.0178 [0.94]	0.0171 [0.89]	0.0190 [0.99]	0.0138 [0.72]	0.0174 [0.72]
NARMON	0.000004[a] [6.87]	0.0000003 [0.67]	0.0000003 [0.70]	0.0000003 [0.67]	0.0000002 [0.34]	0.000005[a] [8.95]
IPAY/FUND	0.0009 [1.34]	0.0002 [0.41]	0.0002 [0.39]	0.0002 [0.40]	0.0002 [0.33]	0.0005 [0.68]
LOAN/ASS	−0.0103[a] [−7.46]	−0.0032[a] [−2.66]	−0.0029[a] [−2.43]	−0.0027[a] [−2.19]	−0.0001 [−0.09]	−0.0098[a] [−6.92]
EQUI/ASS	0.0939[a] [10.59]	0.0961[a] [13.23]	0.0966[a] [13.20]	0.0967[a] [13.22]	0.1042[a] [13.88]	0.1013[a] [11.13]
STAFF/ASS	0.0158[a] [12.19]	0.0059[a] [5.11]	0.0060[a] [5.12]	0.0060[a] [5.14]	0.0056[a] [4.85]	0.0196[a] [15.95]
GOVT	−0.0012 [−0.57]	−0.0011 [−0.65]	−0.0011 [−0.65]	−0.0011 [−0.66]	−0.0012 [−0.71]	−0.0013 [−0.62]
SIDMS	0.1156[a] [7.30]	0.6459[a] [21.78]	0.6467[a] [21.76]	0.6484[a] [21.79]	0.6433[a] [21.79]	
S2DMS		−0.7100[a] [−19.88]	−0.7019[a] [−18.13]	−0.7010[a] [−18.11]	−0.7260[a] [−18.66]	
S3DMS			−0.0168[a] [−0.54]	−0.0137[a] [−0.44]	0.0276 [0.85]	
S4DMS				−0.0155[a] [−1.22]	0.0047 [0.35]	
S5DMS					−0.1977[a] [−1.89]	
Observations	1201	1201	1201	1201	1201	1201
N*	238	238	238	238	238	238
$\bar{R}^2$	40.4	60.1	60.01	60.1	60.8	36.5
F	69.28	135.91	122.24	111.33	105.13	67.15
VIF range	1.0−1.3	1.0−6.9	1.0−6.9	1.0−6.9	1.0−7.0	1.0−1.1

Source: Authors own estimates

Table 8.18 [coninuted]

NOTES:

t = statistics in paratheses
a = values significant at the 5% level
N* = missing values.

1. Two−tail tests were performed on an ordered sequence of the Sn DMS coefficients.

The F−	statisitcs are as follows:−
Equation 1	F − test 14.62
Equation 2	F − test 38.96
Equation 3	F − test 1.94
Equation 4	F − test 1.98
Equation 5	F − test 2.01

The 5 % critical value for an F distribution with the relvant degrees of freedom are as follows:−

Equation 1,	=	3.84
Equation 2,	=	3.00
Equation 3,	=	2.67
Equation 4,	=	2.37
Equation 5,	=	2.10

Source: Authors own estimates

Table 8.19
Cooperation and Rivalry, Individual Share Componenets of Concentration Ratios, 1986

Dependant Variables / Independant Variables	[1] ROA	[2] ROA	[3] ROA	[4] ROA	[5] ROA	[6] ROA
CONSTANT	−0.0089[a] [−3.23]	−0.0095[a] [−3.40]	−0.0115[a] [−3.86]	−0.0072[a] [−2.53]	−0.0041[a] [−0.85]	−0.00021 [−1.39]
MSASS	−0.0056 [−0.39]	0.0068 [−0.47]	−0.0049 [−0.35]	−0.0063 [−0.46]	−0.0058 [−0.43]	−0.0022 [−0.15]
NARMON	0.0010[a] [9.59]	0.0010[a] [9.68]	0.0011[a] [9.87]	0.0014[a] [12.32]	0.0013[a] [6.56]	0.009[a] [9.54]
IPAY/FUND	0.0007 [1.31]	0.0007 [1.27]	0.0007 [1.37]	0.0009 [1.66]	0.0009 [1.68]	0.0005 [0.87]
LOAN/ASS	−0.0058[a] [−5.44]	−0.0057[a] [−5.36]	−0.0058[a] [−5.47]	−0.0031[a] [−2.88]	−0.00319[a] [−2.94]	−0.0059[a] [−5.46]
EQUI/ASS	0.0308[a] [7.49]	0.03109[a] [7.56]	0.0304[a] [7.37]	0.03374[a] [8.62]	0.0337[a] [8.60]	0.0315[a] [7.62]
STAFF/ASS	0.1214[a] [4.96]	0.1237[a] [5.05]	0.1174[a] [4.76]	0.1775[a] [7.28]	0.1786[a] [7.31]	0.1189[a] [4.83]
GOVT	0.0022 [1.67]	0.0022 [1.68]	0.0022 [1.69]	0.0023 [1.85]	0.0023 [1.85]	0.0024 [1.79]
SIDMS	0.0403[a] [2.94]	0.0936[a] [2.19]	0.0889[a] [2.08]	0.2968[a] [6.28]	0.2703[a] [4.61]	
S2DMS		−0.06055[a] [−2.32]	−0.0736[a] [−1.99]	−0.3079[a] [−5.94]	−0.2856[a] [−4.80]	
S3DMS			0.0421 [1.65]	0.0937 [1.40]	0.0864 [1.70]	
S4DMS				−0.2718 [−1.46]	−0.1601 [−1.07]	
S5DMS					−0.1437 [−0.77]	
Observations	759	759	759	759	759	759
N*	158	158	158	158	158	158
$\bar{R}^2$	23.9	34.0	34.4	34.6	34.7	22.9
F	24.60	22.08	20.35	27.21	24.97	26.53
VIF range	1.0−2.2	1.0−9.6	1.0−13.7	1.0−19.1	1.0−48.0	1.0−2.2

Source: Authors own estimates

TABLE 8.19 [continued]

NOTES:

t = statistics in paratheses
a = values significant at the 5% level
N* = missing values.

1. Two−tail tests were performed on an ordered sequence of the Sn DMS coefficients,

The F−statisitcs are as follows:−

Equation 1	F − test 8.06
Equation 2	F − test 10.34
Equation 3	F − test 1.46
Equation 4	F − test 1.53
Equation 5	F − test 1.62

The 5 % critical value for an F distribution with the relvant degrees of freedom are as follows:−

Equation 1,	=	3.84
Equation 2,	=	3.00
Equation 3,	=	2.67
Equation 4,	=	2.37
Equation 5,	=	2.10

Source: Authors own estimates

on. We use only five interactive terms so we can directly compare our findings with the results obtained earlier from the equations which use the five-firm assets concentration ratios (equation (1) in Tables 8.3 to 8.6). In particular, we are investigating the inter-firm behaviour of the top five firms so as to provide further insight into the concentration-performance relationship.

Table 8.16 reports the results for 1989. Note that a positive coefficient on the interactive term implies cooperation whereas a negative term implies rivalry. The coefficient on the S1DMS variable is negative and, in four of the five equations, insignificant. This confirms the proposition that leaders are lowering their own profitability through their rivalrous behaviour. The coefficients on S2DMS are positive but nowhere near normal levels of statistical significance. The coefficients on S3DMS, however, are positive (in two out of three cases) implying that a large third bank appears on average to induce cooperation with leaders rather than rivalry. On the other hand, the coefficients on the S4DMS variable has a large significantly negative impact, suggesting that a large fourth bank on average induces rivalry with leaders. The coefficient on the S5DMS is positive yet insignificant. The F-statistics on S2DMS and S3DMS taken together is 2.14, below the critical value of 2.67 thus suggesting that the market shares of the second and third largest banks do not, on average, affect banking industry profitability. On the other hand, the F-statistics do suggest that the largest bank as well as the fourth and fifth banks have a significant impact on industry profitability. So for 1989 it appears that complex cooperative and rivalrous behaviour is taking place between the largest banks in the industry. If we compare this with the result from equation (1) of Table 8.3, which finds a negative relationship between the five-firm assets concentration ratio and banking industry performance (ROA), it implies that rivalry is the dominant form of behaviour between the leading firms, thus driving down industry profitability. These findings for 1989, which are quite different compared with other years, could be the result of estimation bias brought about by multicollinearity in the explanatory variables as indicated by the size of the variance inflationary statistic in equations (2) to (5).

Tables 8.17 to 8.19 report the results for 1988, 1987 and 1986. Here the Kwoka and Ravenscroft (1986) methodology suggests that inter-firm behaviour is similar across the years and also easier to interpret. For each three years the coefficients on the S1DMS variable is positive and strongly significant implying a large leading bank, appears on average to encourage cooperation with leaders and increase banking industry profitability. The coefficient on the S2DMS variable, however, has a large significantly negative impact, so a large second bank seems to induce rivalry with leaders rather than cooperation. The F-statistic confirms that the addition of S2DMS to the equation does have a significant impact on industry profitability.

Estimated coefficients on the interactive terms for the more distant rivals (S3DMS, S4DMS and S5DMS) have different signs and are statistically insignificant. The F-statistics for the equations that include these variables suggest that they are not significantly different from the equations that include only S1DMS and S2DMS. This means that the market shares of the third, fourth and fifth largest banks do not affect banking industry profitability as measured by before-tax ROA. Despite the strong rivalry brought about by a large second bank, however, we do find for all three years that there is a positive relationship between the five-firm assets concentration ratio and ROA, as reported in equation (1) of Tables 8.4, 8.5 and 8.6. This suggests that although rivalry is evident, some form of cooperation between market leaders maintains banking industry profitability levels higher than would be the case if no cooperation took place. Or to put it another way, a large second bank acts as a strong rival to leaders, average banking industry profit levels are lower than would be the case if all banks cooperated fully ie. if all the signs on the interactive market share terms were positive. A further inspection of the results, for 1986 to 1988, however, leads us to be much more cautious with our final interpretation. In Tables 8.17 to 8.19 the coefficients on the two interactive variables that significantly affect banking industry profitability, S1DMS and S2DMS, are of a similar magnitude and sum to close to zero. The t-statistics on these coefficients also have similar magnitudes. Kwoka and Ravenscroft (1986) find no such relationships and whilst it is unclear why the coefficients should sum to zero, it draws attention to the nature of the SnDMS variables, and S1DMS and S2DMS in particular. Simple correlation coefficients calculated for the SnDMS variables show that the degree of correlation between S1DMS and S2DMS is high - 0.932 over the four years under study, and exceeding 0.91 in each individual year. Correlation coefficients between the other interactive market share terms are lower ranging between 0.252 and 0.75 as illustrated in Appendix 18. It appears that the partial correlation tests for multicollinearity in the regression equations, the VIF test, are misleading as they do not suggest evidence of a strong relationship between the S1DMS and S2DMS variables, yet simple correlation coefficients do.

In addition, we also find that the nature in which the interactive market share variables are constructed implies a collinearity bias when the market shares of the largest firms are of a similar size. For example, the S1DMS variable is calculated by, $S1_j$ $(1-MS_{ij})$ and the S2DMS by $S2_j$ $(1-MS_{ij})$. In industries where the market share of the two largest firms are identical, the S1DMS and S2DMS variables will be identical and hence, perfectly correlated. Presumably, as Kwoka and Ravenscroft (1986) examine 3186 lines of business they do not expect the market shares of the top, two, three or four firms in each line of business to be of similar size. If they are, then this could present serious collinearity problems, which indeed are not addressed in the Kwoka and Ravenscroft (1986) study. It is also the case that if the market share of firms (MS_{ij}) are in most cases very small, then the interactive term becomes virtually the same as the market share of the interacting leading firm. That is to say, for S1 $(1-MS_{ij})$, if MS_{ij} are small then the S1 $(1-MS_{ij})$ variable becomes approximately the same as S1 (the market share of the leading firm). (In fact we find this to be the case in our sample of European banks so that there is little difference between S1 and S1 $(1-MS_{ij})$, S2 and S2 $(1-MS_{ij})$ and so on).

Overall, the results presented above, therefore, suggest that because the market share of the two largest banks across European markets are similar in size, then this leads the S1DMS and S2DMS variables to be highly correlated which creates bias in our estimates (although, it does not appear to reduce the significance of the coefficient across equations as one would expect).

8.3.2 Pooled time-series estimates

The results for the pooled sample of European banks between 1986 and 1989 are reported in Table 8.20. These clearly confirm the relationships discussed in the previous section of the thesis. The coefficient on the S1DMS variable is positive and statistically significant across all equations, suggesting that larger leading firms generally increase, on average, banking industry profitability through cooperation. The introduction of a second large firm, however, appears to induce rivalry with leaders rather than cooperation. Our attention is again drawn to the coefficients on the S1DMS and S2DMS variables which have very similar magnitudes but different signs. The level of statistical significance on these terms is also remarkably alike. As discussed above, the explanation for this appears to relate to collinearity problems, between S1DMS and S2DMS. Bearing in mind the estimation bias caused by collinearity, an initial interpretation would suggest that from the F-statistics the addition of S2DMS to the equation has a statistically significant impact on industry ROA. The F-test on S1DMS and S2DMS taken together is 657.7, well above the critical value of 3.00. Larger second-ranked banks appear to lower significantly

TABLE 8.20

Cooperation and Rivalry, Individual Share Components of Concentration Ratios – Pooled estimates

Dependant Variables / Independant Variables	[1] ROA	[2] ROA	[3] ROA	[4] ROA	[5] ROA	[6] ROA
CONSTANT	0.0051[a] [5.08]	0.0063[a] [6.84]	0.0060[a] [6.24]	0.0071[a] [7.33]	0.0115[a] [10.98]	0.0078[a] [11.36]
MSASS	0.0186 [1.82]	0.0089 [0.95]	0.0095 [1.01]	0.0121 [1.29]	0.0051 [0.55]	0.0231[a] [2.27]
NARMON	0.000004[a] [11.84]	0.000002[a] [5.29]	0.000002[a] [5.23]	0.000002[a] [5.07]	0.000001[a] [3.85]	0.000005[a] [12.44]
IPAY/FUND	0.00007 [0.62]	−0.00007 [−0.06]	−0.000005 [−0.05]	−0.000005 [−0.04]	−0.000008 [−0.01]	0.00006 [0.47]
LOAN/ASS	−0.0071[a] [−15.20]	−0.0052[a] [−11.83]	−0.0053[a] [−11.81]	−0.0045[a] [−9.70]	−0.0022[a] [−4.42]	−0.0070 [−14.92]
EQUI/ASS	0.0690[a] [22.60]	0.0706[a] [25.14]	0.0703[a] [24.94]	0.0712[a] [25.35]	0.0763[a] [27.14]	0.0704 [23.15]
STAFF/ASS	0.0191[a] [20.59]	0.0111[a] [12.30]	0.0111[a] [12.20]	0.0110[a] [12.20]	0.0097[a] [10.84]	0.0198 [21.95]
GOVT	0.0007 [0.96]	0.0008 [1.18]	0.0008 [1.18]	0.0008 [1.18]	0.0008 [1.21]	0.0007 [0.98]
SIDMS	0.0229[a] [3.72]	0.4261[a] [25.50]	0.4261[a] [25.51]	0.4408[a] [26.23]	0.4699[a] [27.97]	
S2DMS		−0.4962[a] [−25.64]	−0.5034[a] [- 24.75]	−0.5223[a] [−25.49]	−0.5691[a] [−27.51]	
S3DMS			0.0142 [1.15]	0.0352 [1.76]	0.0613 [0.79]	
S.DMS				−0.0537 [−1.95]	−0.0007 [−0.07]	
S5DMS					−0.1989 [−0.39]	
Observations	4769	4769	476	4769	4769	4769
N*	897	897	897	897	897	897
$\bar{R}^2$	25.7	37.4	214.30	38.0	39.8	25.6
F	156.63	237.95	3.216	199.92	197.76	176.39
LM	2.291	2.394	0.990	2.961	2.893	1.921
SW	0.983	0.986	1.1−10.3	0.897	0.906	0.986
VIF range	1.0−1.2	1.0−9.8		1.0−10.6	1.0−11.1	1.0−1.1

Source: Authors own estimates

TABLE 8.20 [CONTINUED]

NOTES:

t = statistics in paratheses
a = values significant at the 5% level
N* = missing values.

Two-tail tests were performed on an ordered sequence of the Sn DMS coefficients, testing to see whether additional SnDMs variables contained additional explanatory power. The F-statistic is a test of linear restriction imposed in equation [1] to [5]. The F-tests are as follows:-

Equation 1	F - test 13.48	Equation 2F - test 657.70
Equation 3	F - test 1.33	Equation 4F - test 1.337
Equation 5	F - test 1.064	

The 5 % critical value for an F distribution with the relevant degrees of freedom are as follows:-

Equation 1,	=	3.84
Equation 2,	=	3.00
Equation 3,	=	2.60
Equation 4,	=	2.37
Equation 5,	=	2.21

Source: Authors own estimates

leaders' profit margins. More distant leading firms (S3DMS, S4DMS and S5DMS) seem to have, on average, no impact on banking industry profitability. These results yet again, have to be treated with caution given the collinearity problems and methodological biases identified in the previous section of this thesis.

One way of possibly dealing with this problem is by examining equations which do not include the S1DMS and S2DMS variables together as shown in Table 8.21 and 8.22. It can be seen that the variance inflationary factor (VIF) ranges are lower than in the previous estimates and that in table 8.21 the S1DMS variable exerts a strong positive influence on industry profitability, whereas in Table 8.22, the S2DMS variable is seen to exert a statistically significant negative influence on average industry profitability. The F-test statistics, yet again, confirm the significant influence of these two variables on industry profitability, whereas the relative size of the third, fourth and fifth banks have no impact on industry profitability. Further evidence of the rivalrous impact of the second largest bank can be found if we examine the relationship between the difference in size between the two largest banks across European banking markets as illustrated in Table 8.23. Here we include a variable $S1_j$-$S2_j$ (market share of the largest bank in $market_j$ minus the market share of the second largest bank in $market_j$) which gets rid of the correlation problem. It can be seen that there is a strong positive a statistically significant relationship between the difference in market share of the two top banks and average industry profitability. This implies that the larger is the difference in size between the two top banks the greater average

TABLE 8.21

Cooperation and Rivalry, Individual Share Components of Concentration Ratios – Pooled estimates. Excluding S1DMS variable

Dependent Variables / Independent Variables	[1] ROA	[2] ROA	[3] ROA	[4] ROA	[5] ROA
CONSTANT	0.0058[a] [5.08]	0.0069[a] [6.68]	0.0073[a] [6.92]	0.0092 [7.99]	0.00078[a] [11.36]
MSASS	0.0186 [1.82]	0.0146 [1.43]	0.0155 [1.52]	0.0126 [1.24]	0.0231[a] [2.27]
NARMON	0.00005[a] [11.84]	0.000004[a] [11.64]	0.000004[a] [11.67]	0.000004[a] [11.43]	0.000005[a] [2.44]
IPAY/FUND	0.00007 [0.62]	0.00006 [0.51]	−0.00006 [0.52]	−0.00006 [0.56]	0.00006 [0.47]
LOAN/ASS	−0.0071[a] [−15.20]	−0.0063[a] [−13.23]	−0.0061[a] [−12.25]	−0.0052[a] [−9.59]	−0.0070[a] [−14.92]
EQUI/ASS	0.0690[a] [22.60]	0.0708 [23.19]	0.0711[a] [23.27]	0.0732[a] [23.68]	0.0704[a] [23.15]
STAFF/ASS	0.0190[a] [20.59]	0.0188[a] [20.39]	0.01889[a] [20.46]	0.0186[a] [20.20]	0.0198[a] [21.95]
GOVT	0.0007 [0.96]	0.0007 [0.95]	0.0007 [0.95]	0.0007 [0.95]	0.0007 [0.98]
SIDMS	0.0229[a] [3.72]	0.0553[a] [6.91]	0.6556[a] [6.94]	0.0533[a] [6.66]	
S2DMS					
S3DMS		−0.0697 [−1.29]	−0.0734[a] [−1.66]	−0.0669 [−1.09]	
S4DMS			−0.0180 [−1.81]	0.00[illegible]8 [0.52]	
S5DMS				−0.0844 [−1.10]	
Observations	4769	4769	476	4769	4769
N*	897	897	897	897	897
$\bar{R}^2$	25.7	26.0	26.2	26.4	25.6
F	156.63	145.12	131.04	121.19	176.39
LM	2.489	2.794	2.719	2.[illegible]24	.921
SW	0.986	0.990	0.959	0.931	0.986
VIF range	1.0–1.1	1.0–2.0	1.0 – 2.1	1.0–2.3	1.0–1.1

Source: Authors own estimates

TABLE 8.2.1 [CONTINUED]

NOTES:

t = statistics in paratheses
a = values significant at the 5% level
N* = missing values.

Two-tail tests were performed on an ordered sequence of the Sn DMS coefficients, testing to see whether additional SnDMs variables contained additional explanatory power. The F-statistic is a test of linear restriction imposed in equation [1] to [5]. The F-tests are as follows:-

Equation 1	F - test 12.24	Equation 2F - test 1.77	
Equation 3	F - test 1.09	Equation 4F - test .0.964	

The 5 % critical value for an F distribution with the relevant degrees of freedom are as follows:-

Equation 1,	=	3.84
Equation 2,	=	3.00
Equation 3,	=	2.60
Equation 4,	=	2.37

Source: Authors own estimates

TABLE 8.22

Cooperation and Rivalry, Individual Share Components of Concentration Ratios – Pooled estimates. Excluding S1DMS variat

Dependent Variables / Independent Variables	[1] ROA	[2] ROA	[3] ROA	[4] ROA	[5] ROA
CONSTANT	0.0109[a] [11.15]	0.0106[a] [10.42]	0.01111[a] [10.59]	0.0137[a] [11.86]	0.00078[a] [11.36]
MSASS	0.0275[a] [2.70]	0.0280[a] [2.75]	0.0292[a] [2.85]	0.0259[a] [2.54]	0.0231[a] [2.27]
NARMON	0.00005[a] [12.60]	0.000005[a] [12.54]	0.000005[a] [12.58]	0.000005[a] [12.21]	0.000005[a] [2.44]
IPAY/FUND	0.00003 [0.25]	0.00003 [0.26]	−0.00003 [0.27]	0.00004 [0.30]	0.00006 [0.47]
LOAN/ASS	−0.0067[a] [−14.21]	−0.0068[a] [−14.10]	−0.0066[a] [−13.08]	−0.0054[a] [−9.83]	−0.0070[a] [−14.92]
EQUI/ASS	0.0719[a] [23.58]	0.0717[a] [23.40]	0.0721[a] [23.48]	0.0749[a] [24.13]	0.0704[a] [23.15]
STAFF/ASS	0.0202[a] [22.32]	0.0201[a] [22.20]	0.0202[a] [22.28]	0.0199[a] [21.88]	0.0198[a] [21.95]
GOVT	0.0008 [1.02]	0.0008 [1.02]	0.0008 [1.02]	0.0008 [1.03]	0.0007 [0.98]
SIDMS					
S2DMS	−0.0319[a] [−4.48]	−0.0382[a] [−3.90]	−0.0392[a] [−4.00]	−0.0475[a] [−4.80]	
S3DMS		0.0127 [0.95'	0.02004 [1.44]	0.0339 [1.44]	
S4DMS			−0.0189 [−1.04]	0.0115 [1.02]	
S5DMS				−0.1098 [−0.97]	
Observations	4769	4769	476	4769	4769
N*	897	897	897	897	897
$\bar{R}^2$	26.0	26.0	26.0	26.1	25.6
F	157.67	140.12	126.70	118.57	176.39
LM	2.041	2.311	2.778	2.819	1.921
SW	0.976	0.984	0.971	0.960	0.986
VIF range	1.0−1.2	1.0−2.2	1.0 − 2.3	1.0−2.4	1.0−1.1

Source: Authors own estimates

TABLE 8.22 [CONTINUED]

NOTES:

t = statistics in paratheses
a = values significant at the 5% level
N* = missing values.

Two-tail tests were performed on an ordered sequence of the Sn DMS coefficients, testing to see whether additional SnDMs variables contained additional explanatory power. The F-statistic is a test of linear restriction imposed in equation [1] to [5]. The F-tests are as follows:-

Equation 1	F - test 24.14	Equation 2F - test 1..61	
Equation 3	F - test 2.29	Equation 4F - test 0.93	

The 5 % critical value for an F distribution with the relevant degrees of freedom are as follows:-

Equation 1,	=	3.84
Equation 2,	=	3.00
Equation 3,	=	2.60
Equation 4,	=	2.37

Source: Authors owr :stimates

TABLE 8.23

Difference in the top Two Banks' Market Shares and Industry Profitability

Independent Variables	[1] ROA
CONSTANT	0.0003 [0.39]
MSASS	−0.0154 [−1.60]
NARMON	0.000002[a] [3.99]
IPAY/FUND	0.00005 [0.45]
LOAN/ASS	−0.00589[a] [−13.43]
EQUI/ASS	0.06691[a] [23.63]
STAFF/ASS	0.01130[a] [12. 4]
GOVT	0.0008 [1.0[illegible]
S1 j − S2 j	0.38411[a] [23.58]
Observations	4769
N*	1197
$\bar{R}^2$	35.6
F	247.86
LM	0.4419
SW	0.992
VIF	1.0 − 1.4

Notes: S1 j = Market share of largest bank in country j
S2 j = market share of second largest bank in country j
t = Statistic in paretheses
a = values significant at the 5% level
N* = missing values

Source: Authors own estimates

industry profitability and hence collusive (or monopoly) profits. The closer the market shares of the two top banks the lower average industry profitability, although the positive coefficient implies the rivalrous impact of a large second sized-bank will never compete away all the cooperative profit (hence the positive coefficients on the concentration ratio estimates found earlier).

Whilst the results indicate duopoly behaviour in European banking markets they also lead us to question the validity of using the market shares of the largest firms to identify cooperative and rivalrous behaviour within individual industries if the largest firms are of a similar size. It seems that differencing market shares of the top firms may be a partial solution to this problem. As the Kwoka and Ravenscroft (1986) approach, which is in the spirit of Demsetz (1973) and the Chicago School, suffers from deficiencies when the leading firms are of a similar size, one may have to turn to alternative methodologies to deal with this problem. It may, in fact, be more relevant to investigate simple one or two-firm concentration-profits relationships.

8.3.3 Pooled country-estimates - a note

In Section 8.2.3 we reported results which tested for evidence of the traditional SCP paradigm and efficiency hypothesis in individual European banking market. We attempted to estimate the cooperation versus rivalry form of equations for individual years, but the results were subject to severe multicollinearity problems. In particular, for every country estimate at least one of the interactive terms (S1DMS, S2DMS etc.) was rejected by the statistical package because they were too highly correlated. Even when these variables were dropped the variance inflationary factor (VIF) ranged across equations between 9.6 and 248.4 suggesting significant estimation bias. As a result, these equations are not reported in this thesis.

8.4 Conclusion

Two competing hypotheses with regard to market structure and performance are the traditional SCP paradigm and the efficiency hypothesis. In the first part of this Chapter, results are presented for tests of both hypotheses with respect to the European banking industry using poole and annual data for the period 1986 to 1989. The cross-sectional and pooled results generally support the traditional SCP paradigm as an explanation for the market behaviour of European banks, with little evidence to suggest that the efficiency hypothesis holds. We also find that changes in market demand conditions, the equity-to-assets ratio and the staff expenses ratio appear to be significant and positively related to banking industry performance (the latter possibly suggesting evidence of expense-preference behaviour in European banking). In the majority of cases, the loans-to-assets ratio exerts a negative influence on banks' profitability. The pooled country estimates indicate that the traditional SCP paradigm holds for the Belgium, French, Italian, Dutch and Spanish banking systems. It is in these countries, where the competitive effects of EC financial sector integration envisaged by the Price Waterhouse/Cecchini study, are likely to have the most noticeable effects on producer surplus losses following the completion of the EC internal market. Or to put another way - there will be a greater opportunity to compete away oligopoly banking industry profits in these particular EC countries. The results also find, however, strong differences between parameter estimates across years and also instability of parameters across individual country estimates.

The second part of this Chapter adopts a methodology which allows us to test for inter-firm behaviour between leading banks across European banking markets. From a first interpretation, the results indicate that a large leading bank appears on average to promote cooperation with other leaders and this, on average, increases banking industry profitability. A large second bank, however, seems on average, to induce rivalry with leaders rather than cooperation. The impact of more distant rivals does not seem to affect the profitability of banks in the industry. Larger second banks appear to induce rivalrous conjectures which reduce, on average, industry profitability, but this reduction is not large enough to bring about a negative relationship between industry profitability and the market concentration variable. Further analysis of our results, however, reveal that because the market shares of the two largest banks in individual European markets are similar in size, this leads the interactive market share variables, S1DMS and S2DMS, to be highly correlated causing estimation bias. Subsequently, this casts doubts on the methodology and interpretation of cooperative and rivalrous behaviour in European banking. We also find that the nature in which the interactive market share variables are constructed implies a collinearity bias when the market shares of the largest firms are of a similar size. This problem is not addressed in the Kwoka and Ravenscroft (1986) study. To counter the collinearity problem, we suggest dropping either the S1DMS or S2DMS variables from our models, so the two variables are not included in the same equation, and examine their influence on industry profitability. Alternatively, one can examine differences in market share between S1 and S2 and the relationship with industry profitability. By adopting these approaches, on our pooled cross-sectional data, we still observe evidence of duopoly behaviour, the second largest bank appears to act as a strong rival to the market leader.

Chapter 9

Conclusion and Limitations

9.1 Conclusion

SCP modelling forms a substantial part of industrial organisations literature and has been widely tested on the US banking system, although little empirical work to date has been undertaken on European banking markets. This thesis aims to rectify the imbalance in the literature by providing a detailed, in-depth and original analysis of structure-performance relationships in European banking markets.

The general findings of our research are as follows. Firstly, when we test for evidence of the two competing hypotheses - the traditional SCP paradigm and efficiency hypothesis - across European banking markets, we find strong evidence that the former holds. In other words, the degree of concentration in European banking markets lowers the cost of collusion between firms and increases average industry profitability. This confirms the earlier findings of Molyneux and Thornton (1992). Confronted with this evidence, regulators might feel compelled to prohibit large bank mergers so as to reduce, or at least restrict, the build-up of monopoly power across European banking systems. Our later empirical work aims to investigate this relationship further and an initial interpretation of these results suggests the following. A large leading bank does appear, on average, to promote cooperation with other market leaders and this seems to increase banking industry profitability. However, the appearance of a large second bank, seems, on average, to induce rivalry with leaders rather than cooperation. The impact of more distant rivals does not seem to affect the profitability of banks in the industry. As we mentioned in the last chapter, it appears that larger second banks induce rivalrous conjectures which reduce, on average, industry profitability, but this reduction is not large enough to bring about a negative relationship between industry profitability and the market concentration variable.

Further analysis of our results, however, reveal that because the market shares of the two largest banks in individual European markets are similar in size, this leads the interactive market share variables, S1DMS and S2DMS, to be highly correlated causing estimation bias. Subsequently, this casts doubts on the methodology and interpretation of cooperative and rivalrous behaviour in European banking. We also find that the nature in which the interactive market share variables are constructed implies a collinearity bias when the market shares of the largest firms are of a similar size. This problem is not addressed in the Kwoka and Ravenscroft (1986) study. To counter the collinearity problems we suggest dropping either the S1DMS or S2DMS variables from our models, so the two variables are not included in the same equation, and examine their influence on industry profitability. Alternatively, one can examine differences in market share between S1 and S2 and the relationship with industry profitability. By adopting these approaches, on our pooled cross-sectional data, we still observe evidence of duopoly behaviour, the second largest bank appears to act as a strong rival to the market leader.

In the interests of competition it may well be justified to encourage mergers between large banks so they can act as strong rivals to the leading institution. Our evidence also finds that the third, fourth and fifth sized banks do not seem to affect average industry profitability, suggesting that they neither cooperate nor compete with the largest bank, thus operating independently. From these results one may tentatively suggest that mergers between these banks may be justified on competitive grounds if the combined market shares of the merged bank is similar to the largest bank. If a merger creates an institution which is substantially larger than the present largest bank, then this may well result in explicit or implicit collusion. As national authorities generally use merger policies in the financial sector in a flexible manner so as to improve the efficiency of the banking system (see Section 3.2.3.3) it may well be in their interests to consider this policy prescription.

If we examine the individual country estimates, bearing in mind the problems associated with this analysis, we find evidence that the SCP paradigm unambiguously seems to hold in Belgium, France, Italy, the Netherlands and Spain. Our findings are in line with the Price Waterhouse/Cecchini study which identified the same countries, apart from the Netherlands, as the markets which would experience the largest financial service price falls post 1992. As such these banking markets appear to offer the greatest incentive for new entrants to benefit from (and compete away) high average industry margins. We noted earlier in this thesis that the gains from EC financial sector integration computed by Price Waterhouse/Cecchini may be overstated because the final estimates did not take into account producer surplus losses. Our individual country estimates suggest that oligopoly profits accrue in Belgium, France, Italy, the Netherlands and Spain. It is in these EC banking markets where the potential for producer surplus losses would be the greatest in the event of financial integration.

9.2 Limitations of the Study

Overall, the above analysis provides an informative and new insight, employing a hitherto infrequently used and substantial dataset to the SCP relationship across European banking markets, from which certain tentative policy prescriptions can be drawn. The analysis, however, is not without its limitations as identified in Sections 5.7, 6.5 and 8.3.1 of this thesis. In a study of this nature a major problem relates to accounting for country-specific differences and definition of the banking markets. The country-specific variables used in the analysis may not take account of all country-specific: characteristics thus, average industry profitability levels may vary from one country to another for reasons not accounted for in the model. One of the ways to avoid this problem is to examine the structure-performance relationship in a particular country, thereby avoiding cross-country differences. This, however, creates further difficulties because detailed regional data are not widely available (as far as we are aware) for many European banking markets. Data on specific products or services are also mainly unavailable. Given this data problem, it is very difficult to obtain anything but market structure variables on a national and yearly basis.

Our empirical analysis uses total banking sector assets (and total banking sector deposits) as the definition of the market. We recognise that this definition is adequate but not ideal. Further research should focus on defining regional or sub-market structural variables, within individual banking systems, so that more representative, cross-sectional estimates of the SCP relationship can be evaluated. Detailed regional and sub-market breakdowns for various products and services could also facilitate further research testing for cooperative and rivalrous behaviour in individual banking markets. This should be of particular interest to national authorities banking regulators and merger policymakers.

Problems relating to estimation bias brought about by the way in which the interactive market share variables are calculated have already been discussed in this Chapter. Other limitations relate to the nature of the data used in the empirical study. The various risk and cost of funds measures used in the analysis are very broad and only crudely proxy for the features they purport to measure. The SCP methodology also models the risk-return trade-offs in a linear multiple regression model, when there is no strong reason to believe why such a relationship is non-linear.

Finally, as the methodology relies heavily on the traditional SCP paradigm, advocates of the 'new' industrial economics would argue that it would be more appropriate to focus on game-theoretic oligopoly models to analyse the strategic behaviour of banks. This could well be a fruitful avenue for future research. However, no doctoral thesis can hope to cover all of the related ground on even a fairly specialised area of research. This thesis started with specific aims, which have been broadly achieved, but with an awareness of their inherent limitations and constraints.

APPENDIX 1

MARKET CONCENTRATION AND SIZE OF BANKING SECTORS IN EUROPE 1986

Number of Banks	Country	Size of Banking Sector [Assets $billion]	Concentration % of Total Market			
			Assets		Deposits	
			10–Firm	5–Firm	10–Firm	5–Firm
1247	Austria	224.5	60.1	38.3	68.9	45.7
120	Belgium	223.0	83.3	71.8	95.4	85.7
158	Denmark	114.4	55.2	43.9	57.5	53.2
621	Finland	79.7	72.1	68.9	85.3	80.4
2080	France	1654.1	49.2	36.7	53.8	32.9
4674	Germany	1829.7	38.9	24.6	27.7	19.2
39	Greece	44.5	73.6	77.7	81.4	76.3
54	Ireland	28.5	89.1	72.3	89.3	70.4
1108	Italy	717.2	57.7	34.7	55.2	35.5
120	Luxembourg	198.1	44.3	28.5	43.8	27.8
154	Netherlands	296.5	74.9	70.8	82.5	77.9
329	Norway	89.5	61.4	54.3	69.4	60.3
26	Portugal	49.8	n.a.	50.1	n.a.	37.4
441	Spain	285.7	54.9	36.9	46.9	25.6
745	Sweden	129.1	85.9	73.9	77.6	64.2
611	Switzerland	522.2	60.9	53.1	64.9	57.3
61	Turkey	30.4	58.9	54.1	71.1	65.0
778	United Kindgom	1545.0	34.1	28.2	31.5	25.9

Source: Authors own estimates

NOTES

Sources of information for banking sector size obtained from individual countries banking asocia-tions and central banks.

Concentration ratios calculated using data taken from the IBCA Credit Rating Agency [London] database.

APPENDIX 1

MARKET CONCENTRATION AND SIZE OF BANKING SECTORS IN EUROPE 1987

Number of Banks	Country	Size of Banking Sector [Assets $billion]	Concentration % of Total Market			
			Assets		Deposits	
			10–Firm	5–Firm	10–Firm	5–Firm
1242	Austria	303.9	55.9	35.8	67.2	44.8
127	Belgium	289.5	82.9	71.5	97.1	84.1
162	Denmark	145.9	60.7	45.2	61.6	47.6
607	Finland	124.3	65.9	62.8	84.8	81.6
2067	France	1816.3	50.4	31.2	49.6	29.0
4497	Germany	2370.4	39.2	24.6	27.1	19.2
40	Greece	50.7	82.6	76.2	76.9	71.9
53	Ireland	36.9	88.5	66.3	68.3	67.3
1116	Italy	1050.2	49.8	30.2	62.2	42..1
132	Luxembourg	262.0	42.6	26.1	42.4	25.7
157	Netherlands	377.2	77.0	72.1	80.6	77.5
294	Norway	124.6	61.3	53.8	70.5	60.9
26	Portugal	64.4	75.0	51.8	83.7	58.0
472	Spain	405.4	52.3	34.5	52.2	34.7
717	Sweden	152.6	86.4	75.3	73.2	77.2
614	Switzerland	706.0	60.8	52.8	64.8	56.8
62	Turkey	37.4	63.4	58,6	64.8	56.7
781	United Kindgom	2017.6	36.7	34.7	35.7	25.9

Source: Authors own estimates

NOTES

a] Includes 764 credit Cooperatives

b] Includes 1050 Special Finance Societies

c] Includes 3361 Credit Coooperatives

Sources of information for banking sector size obtained from individual countries banking asociations and central banks.

Concentration ratios calculated using data taken from the IBCA Credit Rating Agency [London] database.

APPENDIX 1

MARKET CONCENTRATION AND SIZE OF BANKING SECTORS IN EUROPE IN 1988

Number of Banks	Country	Size of Banking Sector [Assets $billion]	Concentration % of Total Market			
			Assets		Deposits	
			10–Firm	5–Firm	10–Firm	5–Firm
1231[a]	Austria	287.9	55.6	35.9	64.6	43.6
120	Belgium	285.2	82.9	72.2	96.3	88.6
165	Denmark	146.2	62.3	48.2	63.6	49.2
597	Finland	146.3	65.1	64.2	79.2	75.2
1999[b]	France	2119.3	49.8	30.6	50.7	31.4
4390[c]	Germany	2237.9	40.4	25.7	28.5	20.0
41	Greece	70.8	84.3	76.8	75.3	70.0
47	Ireland	37.0	89.3	67.2	87.4	68.3
1100	Italy	983.6	50.8	30.3	62.7	40.6
143	Luxembourg	266.1	43.2	27.0	43.6	27.1
169	Netherlands	373.4	81.2	75.3	86.6	80.4
286	Norway	125.7	54.6	46.2	53.3	43.8
27	Portugal	66.1	75.4	52.8	87.3	60.8
491	Spain	436.9	60.6	37.4	61.6	38.3
690	Sweden	180.4	85.8	72.5	76.0	75.1
630	Switzerland	643.3	59.8	51.6	61.3	53.6
64	Turkey	33.8	61.9	50.9	67.5	53.6
784	United Kindgom	2182.8	38.3	28.4	36.2	26.8

Source: Authors own estimates

NOTES

a] Includes 780 credit Cooperatives

b] Includes 1,009 Special Finance Societies

c] Includes 3225 Credit Coooperatives

The largest banks in Turkey had not reported in time for inclusion in the estimates.

Sources of information for banking sector size obtained from individual countries banking asociations and central banks.

Concentration ratios calculated using data taken from the IBCA Credit Rating Agency [London] database.

APPENDIX 1

MARKET CONCENTRATION AND SIZE OF BANKING SECTORS IN EUROPE 1989

Number of Banks	Country	Size of Banking Sector [Assets $billion]	Concentration % of Total Market			
			Assets		Deposits	
			10–Firm	5–Firm	10–Firm	5–Firm
1226[a]	Austria	324.2	55.3	35.8	61.9	42.0
117	Belgium	321.0	81.8	70.9	96.0	87.8
156	Denmark	169.0	64.2	47.6	65.6	50.1
502	Finland	172.0	68.7	64.5	77.8	73.8
1897	France	2204.3	48.4	30.4	50.7	33.1
4247	Germany	2519.4	42.1	26.3	30.2	21.8
42	Greece	85.6	n.a.	n.a.	71.2	68.9
49	Ireland	44.5	87.6	66.2	88.9	67.5
1059	Italy	1100.0	58.4	35.8	63.9	43.3
177	Luxembourg	317.8	43.2	26.7	43.0	26.5
180	Netherlands	463.3	72.9	67.5	83.0	77.3
267	Norway	162.4	61.1	51.8	62.2	51.1
33	Portugal	70,.9	77.5	53.7	83.9	59.4
482	Spain	519.3	60.3	37.3	60.9	37.9
655	Sweden	215.5	88.1	76.0	81.9	73.9
625	Switzerland	1031.5	59.5	51.5	62.5	54.9
66	Turkey	42.2	n.a.	n.a.	n.a.	n.a.
774	United Kindgom	2280.2	38.6	28.7	36.9	27.5

Source: Authors own estimates

Appendix 2

Source of Banking Sector and Market Size Information

1. Austria

a) Verband Österreichischer Banken und Bankiers, A1013 Wien, Börsegasse 11, Postfach 132, Fax 535 17 71

b) Austrian Nationalbank, Annual Reports 1986-1990, Table Monatsausureise der Osterreichen Banken pp.18-29

2. Belgium

a) Association Belge des Banques, Rue Ravenstein 36-Bte 5 1000 Bruxelles, Fax 507 69 29

b) Les Banques am Seim du Sectur Financier en 1988. Aspects et Documents 93

3. Denmark

a) Denmark Nationalbank, Report and Accounts, 1989 and 1988. Tables 24, 25 and 27

b) Den Danske Bankforening, Bankfernes Hus, Amaliegade 7, 1256 Copenhagen K, Fax 33 93 0260

4. Finland

a) Finnish Bankers Association, PO Box 1009, Kansakoulukatu 1A, 00101 Helsinki, Fax 0094 7844

5. France

a) Association Francaise des Banques, 18 rue la Fayette, 75009 Paris, Fax 4246 7640

b) Banque de France; Statistiques Monétaires et Financieres Annuelles, 1986 to 1989, Section 2.4, Les Banques

6. <u>Germany</u>

a) Monthly Report of the Deutsche Bundesbank (1990) Vol 42, No. 11, Table 13.111; Vol. 41, No. 11, Table 13.111; Vol. 40, No. 11, Table 13.111, Vol. 39, No. 11, Table 13.111

7. <u>Greece</u>

a) Hellenic Bankers Association, 1 Massalias Street, 10680 Athens, Fax: 364 6124

b) Bank of Greece, Monthly Statistical Bulletin, June 1989, Table 19 , p.37

8. <u>Ireland</u>

a) The Irish Bankers Federation, Nassau House, Nassau Street, Dublin 2, Fax 6796680

b) Central Bank of Ireland, Annual Reports 1988, Statistical Appendix, Tables c9-c15, c20, c21, p.42-68

9. <u>Italy</u>

a) Associazone Bancaria Italiana, Piazza del Gesu 49, 1-00186 Roma. Fax 6767457

10. <u>Luxembourg</u>

a) Institut Monetaire Luxembourgeois, Siege 83, avenue de la Liberté, L-2983 Luxembourg, Fax 492180

b) Institut Monetaire Luxembourgeis, Quarterly Bulletin, 1989 and 1988. No. 1s

11. Liechtenstein a) Unable to obtain data on market structure for this country.

12. Netherlands a) Netherlands Bankers' Association, Keizersgracht 706 PO Box 19870; 1017 BW Amsterdam, Fax 239748

b) De Nederlandsche Bank Quarterly Bulletin, 1988, no. 4 Table 1.2. pp.4-7

13. Norway a) Den Norske Bankforening, PO Box 489, Vika, 0116 Oslo Fax 83 07 51

b) Norges Bank Economic Bulletin (1989) Vol. 1 Tables 5 to 9, 12 and 13, pp.62-66

14. Portugal a) Associacao Portuguesa de Bancos, Avenida La Republica, no. 35-50; 1000 Lisboa, Fax 579533

15. Spain a) Banco de España, Boletin Estadistico, February, 1990 to 1987, Tables II; III and IV

b) Associación Espanola de Banca Privada; Velázquez, 64-66. 28001 Madrid. Fax 448 2885

16. Sweden a) Svenska Bankföreningen, Box 7603, S-103 94 Stockholm, Fax 87969395

b) Sveriges Riksbank Quarterly Reviw vol. 1 (1989), p.54

c) Bankerna (1988) Tables 1.3, 2.4, 3.4 pp.18, 46-47, 72-73

17. Switzerland a) Swiss Bankers Association, Aeschenplatz 7, 4052 Basle, Fax 061 235382

b) Banque National Suisse, Les banques Suisses (1988) no. 75, Tables 1.0, 2.0, 2.1, pp.52-57

18. Turkey a) Central Bank of the Republic of Turkey, Quarterly Bulletin, 1990, no. 1, January-March, Table 3a/1, p.198-99

b) Bankers Association of Turkey, Mithatpara Cadderi 12, Yenisehir, Ankara, Fax 131 6679

19. United Kingdom a) Bank of England Quarterly Bulletin, May 1990, Tables 3.2, 3.4-3.8 (some tables for May 1989, May 1988 and May 1987)

b) Committee of London and Scottish Clearing Bankers, Abstract of Banking Statistics, May 1990 through to May 1988, vol. 7 to vol. 4. Table 5.61.

APPENDIX 3 Review of the US SCP literature

Authors	Sample	Measure of Bank Performance	R^2 or $\bar{R}^2$	Measure of Market Structure	Coefficient on the Measure of Market Structure are Significant[a]
Schweiger and McGee [1961]	11 large cities for 1960	Automobile loan rates; installment loan rates	No econometric tests	N	Not available
Edwards [1964]	Data from 1955 and 1957 business loan surveys, 49 SMSAs	Interest rate on business loan	0.36 to 0.64	CR 3	Yes for 1955 data No for 1957 data
Flechsig [1965]	64 banks in 19 cities, 1960 data	Interest rate on business loans	0.16 to 0.48	CR 3	No
	Data from 1955 business loan survey, 49 SMSAs	Interest rate on business loans	0.37 to 0.51	CR 3	No

Comments: Influence of market concentration on interest rates charged on business loans is insignificant when regional variables are included.

Authors	Sample	Measure of Bank Performance	R^2 or $\bar{R}^2$	Measure of Market Structure	Coefficient on the Measure of Market Structure are Significant[a]
Edwards [1965]	36 SMSAs, 1962 data	IT - TS IL - TL NI - TA	0.20 to 0.48 0.42 to 0.70 0.07 to 0.25	CR 2	Yes Yes Yes
Kaufman [1966]	99 countries in Iowa, 1959 and 1960 data	IL - TL IT - TS NT - TA	0.200 to 0.268 0.323 to 0.409 0.066 to 0.090	CR 1 N	Yes Yes Yes, with CR1 as market structure measure

Authors	Sample	Measure of Bank Performance	R^2 or $\bar{R}^2$	Measure of Market Structure	Coefficient on the Measure of Market Structure are Significant[a]
Meyer [1967]	Data from 1955 and 1957 business loan survey, SMSAs in unit and limited branch banking states	Interest rates on business loans	0.69 to 0.73	CR 3	Yes for 1955 data No for 1957 data
Philips [1967]	Survey of bank rates on short-term business loans in 19 SMSAs	Interest rates or business loans	0.51 to 0.64	CR3	Yes
Taylor [1968]	1315 banks for 1962	IL - TL Portfolio Selection	-	N	No
Weiss [1969]	25 SMSAs for 1968	Offering of no service charge on checking accounts	-	N CR3 H	Higher concentration related to the absence of free chequing
Bell and Murphy [1969]	14 market areas in the First Federal reserve District	Estimated service charge on demand deposits	0.22 to 0.29	CR3	Yes

Comments: This paper does not present a valid test of the structure-performance hypothesis. Service charge rates for each market do not reflect rates charged in the market, but estimated service charges based on an equation estimated for a sample of banks and economic variables for each market areas, which are inserted in to the equation for estimating bank service charges.

Authors	Sample	Measure of Bank Performance	R^2 or $\bar{R}^2$	Measure of Market Structure	Coefficient on the Measure of Market Structure are Significant[a]
Aspinwall [1969]	31 SMSAs, 1965 data	Interest rate on residential mortgages	0.562 0.647	CR 3 N	Yes
Brucker [1970]	175 State Economic Areas, 1967 data for insured banks	Elasticity of loan demand	0.57	CR 3	Yes
Emery [1971]	980 banks 1967 to 1968	Profitability as measured by deviations from the capital market line	-	N CR1	No effect apart from on deposit mix
Fraser and Rose [1971]	78 Texas cities, 1966 and 1967 data	IL - TL IT - TS SC - DD NI - C	0.41 to 0.54 0.03 to 0.14 0.21 to 0.30 0.07 to 0.15	CR1	No for 1966 Yes for 1967 No No No
Vernon [1971]	85 large member banks, data for 1961-1966	NI - C	0.21	CR3	Yes

Comments:- Significant coefficients on CR3 are negative, the opposite of the sign indicated by the structure-performance hypothesis. The article presents only t-statistics, no regression coefficients.

Klein and Murphy [1971]	1968 FCA data for banks in 164 SMSAs	Interest rate on time deposits. Service charge revenue divided by: 1. No of DD accounts 2. No of debits to DD accounts	0.24 0.24 0.33	Concentration of time deposits or DD at the largest. 2nd largest and 3rd largest banks\ in each SMSA	No for all concentration measures

Comments:- Average of return on assets is included as an independent variable. Coefficients on concentrations may be insignificant because this performance measure is included as an independent variable.

Authors	Sample	Measure of Bank Performance	R^2 or $\bar{R}^2$	Measure of Market Structure	Coefficient on the Measure of Market Structure are Significant[a]
Jacobs [1971]	National survey of interest rates on business loans of 8,500 customers at 160 banks in 107 SMSAs	Interest rate on business loans	0.18 to 0.25	CR3	Yes
Fraser and Rose [1972]	71 one-bank towns, 67 two-bank towns, and 16 three-bank towns not in SMSAs, data for 1965 and 1966	IL - TL ITD - TD SC - DD NI - TA NI - C	0.060 to 0.112 0.023 to 0.082 0.299 to 0.320 0.044 to 0.070 0.074 to 0.444	N	No No No No No
Ware [1972]	Data for 1969 and 1970 for 57 counties in Ohio outside SMSAs	SC - DD NI - C IL - TL IT - TS	0.49 to 0.51 0.26 to 0.45 0.42 to 0.43 0.49 to 0.61	CR2	No No No No
Edwards & Heggestad [1973]	66 of 100 largest banks, 1954 to 1966	Uncertainty avoidance [variance of profits divided by average profits]	-	CR3	Increased uncertainty avoidance with concentration.
Edwards [1973]	36 large banks in 23 SMSAs, 1965 data	NI- C	0.05	CR3	No

Authors	Sample	Measure of Bank Performance	R^2 or $\bar{R}^2$	Measure of Market Structure	Coefficient on the Measure of Market Structure are Significant[a]
Fraser, Phillips and Rose [1974]	1206 Texas banks	Index of performance including many balance sheet items	-	CR1 N	No No
Yeats [1974]	Tennessee and Lousiana counties for 1970	IL - TL IT - TD NI - TA Portfolio Selection	0.14 to 0.35	H Change in H Market Share Stability	Small effects of concentration but important effect for changes in concentration
Alhadeff and Alhadeff [1975]	Sample of counties 1948 to 1966	Various concentration measures	-	-	New entry significantly reduces national and local concentration
Beighley and McCall [1975]	1968 data for 184 banks in 7 SMSAs	Lerner index Elasticity of loan demand	0.42 to 0.43 0.25	Gini coefficient CR3 N	Lerner index / Elasticity of loan Demand: No / No Yes No / No
	Comments: Observations from only seven market areas				
Fraser and Alvis [1975]	74 unit banks in 74 market areas in several unit banking states	NI - TA NI - C IL - TL SC - DD IT - TS	NA NA NA NA NA	Dummy variable for markets with relatively high CR1	No for all performance variables
Heggestad and Mingo [1976]	332 banks in 69 SMSAs, survey data for 1973	The following measures are based on a survey: [1] Interest rate on passbook savings [2] Interest rate on one-year $1,000 CD	0.04 0.09	H and 1/H	No No

Authors	Sample	Measure of Bank Performance	R^2 or $\bar{R}^2$	Measure of Market Structure	Coefficient on the Measure of Market Structure are Significant[a]	
Heggestad and Mingo [1976] {continued}		*Continued* [3] Service charge on standardised accounts.	0.11		No	
		[4] Charge for returned check.	0.13		No	
		[5] Interest rate on new car loans	0.13		Yes	
Comments:- For many banks, interest rates on passbook saving accounts and $1,000 DC's were at Regulation Q ceiling rates. For these dependent variables, they should have used Tobit analysis [see Hannan 1979b].						
Fraser and Rose [1976]	90 Texas countries 1973 data	IL - TL IT - TS SC - DD NI - TA	0.21 to 0.24 0.26 to 0.28 0.40 to 0.42 0.42	H	No No No Yes	
Mingo [1976]	384 banks in 9 unit banking states	NI - TA	0.006	H	No	
					IL - H	SC - DD
Rose and Fraser [1976]	704 unit banks in 90 county market areas in Texas, 1970 data	IL - TL SC - DD IT - TS	0.39 0.42 0.35 to 0.37	N CR1 CR2 CR3 Entropy H Hall-Tideman index Relative entropy Gini coefficient	No No No No No Yes Yes No No	No Yes No No Yes Yes Yes No No

Authors	Sample	Measure of Bank Performance	R^2 or $\bar{R}^2$	Measure of Market Structure	Coefficient on the Measure of Market Structure are Significant[a]
Heggertad and Rhoades [1976]	228 SMSAs for 1966 to 1972	Market Share Stability	-	CR3	No
Stolz [1976]	333 banking offices in 75 rural countries for 1975	Interest rate on household and farm loans SC - DD Non price competition variables	-	H	Concentration affects most non price variables
Rose [1976]	90 Senational votes	United States Senators vote on the Helm's Amendment to the Financial Institutions Act of 1975	-	CR3	No
White [1974]	40 SMSAs in statewide branching states	Service quality measured by the number of branch offices	-	H	A decrease of 0.1 percent in H is associated with a 14.4 percent rise in the number of bank branches in each SMSA.
Edwards [1977]	44 SMSAs in 1962, 1964 and 1966	Labour expenses	-	Separation of monopoly and competitive markets	YES Evidence of expense preference behaviour and a critical level of concentration.

Authors	Sample	Measure of Bank Performance	R^2 or $\bar{R}^2$	Measure of Market Structure	Coefficient on the Measure of Market Structure are Significant[a]
Heggestad and Mingo [1977]	236 banks in 52 SMSAs survey data for 1973	Interest rate on new car loan Monthly service charge on demand deposits [based on a survey of banks]	0.170 0.194	H times a dummy variable for areas with low H	Yes Yes
Heggstad [1977]	218 banks in 60 SMSAs, data for 1960 - 70	NI - TA	0.08	CR3	Yes
Whitehead [1977]	130 banking markets in the Sixth District, 1974 data	IL - TL IT - TS NI - C	0.39 to 0.45 0.37 to 0.45 0.39 to 0.43	N CR3 H	IL - TS: No IT - TS: Yes NI - C: No
Whitehead [1978]	47 banking markets in Florida, 1974 data	IL - TL IT - TS NI - C	0.160 to 0.262 0.095 to 0.129 -0.025 to 0.066	CR3	Yes No No

Comments: Coefficients on CR3 are negative and significant with IL - TL as the dependent variable, contradicting the structure performance hypotheses.

Heggetad and Rhoades [1978]	187 SMSAs, 1960 to 1972	Market share stability	-	CR3	YES Higher concentration leads to a significant reduction in rivaly

Authors	Sample	Measure of Bank Performance	R^2 or $\bar{R}^2$	Measure of Market Structure	Coefficient on the Measure of Market Structure are Significant[a]
Hannan and Mavinga [1980]	366 Pennsylvanian banks for 1970	Bank wage and salary expenses Bank furniture and equipment expenses Bank net occupancy expenses	0.76 to 0.92	Binary variable, one if CR3 exceedsd 63 percent, zero otherwise	YES in all cases
Graddy and Kyle [1979]	463 banks in unit and limited branch banking states, 1974 data	SC - DD IT - TS IL - TL	0.34 0.25 0.37	H	No No No
Harvey [1979]	426 banks in 120 rural countries in 7 states, 1976 and 1977 data	IL - TL Interest payments on TD - TD NI - C	0.26 to 0.49 0.24 to 0.27 0.29 to 0.42	Performance Measure: IL - TL Interest on TD - TD NI - C	Market Strucutre Measure: CR1: No; N: Yes CR1: Yes; N: Yes CR1: Yes; N: Yes
Savage and Rhoades [1979]	6,619 unit banks, 1977 data	NI - TA IL - TL SC - DD IT - TS	0.160 0.131 0.096 0.210	CR3	Yes Yes Yes

Comments: SC - DD are lower in areas with higher CR3 the opposite sign from the structure performance hypothesis

Authors	Sample	Measure of Bank Performance	R^2 or $\bar{R}^2$	Measure of Market Structure	Coefficient on the Measure of Market Structure are Significant[a]
Rhoades [1979]	184 SMSAs, data for 1970 and 1972	NI - TA IL - TL SC - DD IT - TS	0.05 to 0.06 0.21 to 0.25 0.19 to 0.22 0.08 to 0.50	CR3	No Yes Yes No
Rhoades and Rutz [1979]	184 SMSAs, 1970 and 1972 data	IL - TL SC - DD NI - TA	0.22 0.19 0.05	CR3	Yes Yes No
Rose and Scott [1979]	600 banks, 1972 data	IL - TL IT - TS	0.087 0.034	N CR1	IL - TL: Yes IT - TS: No
Hannan [1979a]	367 banks in 49 local banking markets in Pensylvania	Wage and salary expenditure. Number of bank employees	0.91 to 0.93	Dummy variable when CR3 is greater than 63 percet	YES for both peformances measures
	Comments: This study finds evidence of expense-pre-ference behaviour in local banking markets				
Hannan [1979b]	About 400 banks in Pennsylvania market areas, 1970 data	Interest rate paid on passbook savings accounts	Used Tobit maximum likelihood analysis	CR3 H N	Yes No Yes

Authors	Sample	Measure of Bank Performance	R^2 or $\bar{R}^2$	Measure of Market Structure	Coefficient on the Measure of Market Structure are Significant[a]
McCall and Peterson [1980]	155 banking markets in 14 unit or county wide branching states. 98 of the 155 markets are country markets 270 banks in total for 1968	Lerner index	All markets 0.25 to 0.80 SMSA markets 0.82 to 0.85 County markets 0.13 to 0.92	$^{1}/_{H}$ Number equivalent	YES in 12 equations
Comments: This study tests for a critical level of concentration. The impact of changes in concentration is greater in concentrated than in unconcentrated markets.					
Glassman and Rhoades [1980]	Largest bank in 1406 BHCs, 1975 and 1976 data	NI - TA	0.12 to 0.13	CR3	Yes
Rhoades [1980a]	524 commercial banks for 1976 participating in the Federal Reserves Functional Cost Analysis programme	Expenses / Total assets for various expense items Total assets / various groups of employees [25 measures in all]	0.00 to 0.15 [for 25 equations]	CR3	YES in only 5 equations
Comments: Expenses are found to be lower in high concentration markets than in low concentration markets, thus rejecting expense preference behaviour theory.					

Authors	Sample	Measure of Bank Performance	R^2 or $\bar{R}^2$	Measure of Market Structure	Coefficient on the Measure of Market Structure are Significant[a]
Rhoades [1980b]	3120 banks in 336 market areas	NI - TA	0.02	CR3	Yes
Osborne and Wendel [1981]	154 Texas banks in 23 towns	SC - DD Service charge rates on DD based on a survey	0.30 0.12	H	No
Rhoades [1981]	3,534 banks in 167 SMSAs; data for 1966 1968, 1979, 1972 1973, 1974, 1975	IL - TL SC - DD IT - TS NI - TA NI - C	0.14 to 0.32 0.08 to 0.23 0.12 to 0.24 0.05 to 0.18 0.10 to 0.29	CR3	Yes in 4 years Yes in 3 years Yes in 4 years No in all years Yes in 2 years

Comments: IT – TS is higher in areas with higher CR3 [when significant], the opposite sign from the structure-performance hypothesis.

Authors	Sample	Measure of Bank Performance	R^2 or $\bar{R}^2$	Measure of Market Structure	Coefficient on the Measure of Market Structure are Significant[a]
Rhoades and Savage [1981]	120 branch banks, 40 BHCs with no branches, and 109 BHCs with branches. 1975 data	NI - TA	0.05	CR3 of deposits in the state in which a bank is located	No
Spellman [1981]	106 SMSAs, 1972 data	Profits of S&Ls	0.83 to 0.90	No of banks in SMSA No of S&Ls in SMSAs	Yes Yes

Authors	Sample	Measure of Bank Performance	R^2 or $\bar{R}^2$	Measure of Market Structure	Coefficient on the Measure of Market Structure are Significant[a]
Rhoades and Rutz [1982]	6,500 unit banks between 1969 and 1978	[1] NI - TA [2] Coefficent of Variation of NI - TA [Overall risk measure] [3] Equity / Assets ratio [balance sheet risk measure] [4] Loan / Asset ratio [5] Net loan asset / Total loans	0.003 to 0.06	CR3	[1] NI - TA Yes [2] Coeff of Variation NI - TA Yes [3] Equity / Asset Yes [4] Loan / Asset Yes [5] Net loan Losses/ Total loans No
Comments: This paper tests for evidence of the so-called 'Quiet life' Hypothesis. The results generally indicate that banks with significant market power tend to lower their level of risk					
Rhoades [1982a]	6,500 unit banks, data for 1969 - 78	NI - TA	0.0034	CR3	Yes
Marlow [1982]	62,409 mortgage loans in 111 SMSAs, 1975 data	Interest rate on residential mortgage loans	0.25 to 0.31	N CR3 CR5	Yes Yes Yes

Authors	Sample	Measure of Bank Performance	R^2 or $\bar{R}^2$	Measure of Market Structure	Coefficient on the Measure of Market Structure are Significant[a]
Kwast and Rose [1982]	Sample of 80 member banks in SMSAs with total deposits over $500 million, data for 1970 - 77	NI - TA	0.42 to 0.580	H	Yes
Smirlock and Marshal [1983]	38 SMSAs for 1978 and 1979. 190 banks in 1979 and 138 banks for 1978	Number of bank employees	0.18 to 0.86	CR3 Market share of banks [MS]	CR3 - YES in 1 out of 24 equations MS - YES in 1 out of 14 equations
Comments: This study finds no strong evidence of expense preference behaviour of banks					
Hannan [1974]	412 banks operating in the state of Pennsylvania in 1971	Passbook Savings rate Total weekly banking hours	0.04 to 0.05	H	Passbook Saving rate YES Weekly banking hours NO
Comments: [The equations using passbook savings rate as a performance measure are estimated using Tobit Maimum Likelihood Log likelihoods range between 402.6 and 410.4]					
Curry and Rose [1984]	34 SMSAs in 1972 52 SMSAs in 1978	[1] Portfolio composition [7 measures] [2] Bank capital [3 measures] [3] Operating efficiency [4 mesures] [4] Prices of Bank Services [3 measures] [5] Bank Profitability [3 measures]	Not reported	H	Not given

Comments: This paper tests for the relationship between bank holding company presence and banking market performance, the results suggest that outside bank holding company presence leads to increased bank lending, particularly in the real estate and consumer loan aareas.

Authors	Sample	Measure of Bank Performance	R^2 or $\bar{R}^2$	Measure of Market Structure	Coefficient on the Measure of Market Structure are Significant[a]
Wall [1985]	Homogenous sample of independent SMSA banks	NI - TA NI - C	-	CR3 H	No No
Smirlock [1985]	2,700 unit state banks operating in the 7 state area under the jurisdiction of the Federal Reserve Bank of Kansas City	NI - Equity NI - C NI - TA	0.05 to 0.06	CR3 Market share of banks [MS]	CR3 YES when MS not included as an explantory variable CR3 NO when MS included as an explantory varialbe [or significant and opposite] MS YES

Comments: This study finds support for the Effiency Hypothesis in Banking Markets

Authors	Sample	Measure of Bank Performance	R^2 or $\bar{R}^2$	Measure of Market Structure	Coefficient on the Measure of Market Structure are Significant[a]
Clark [1986a]	1857 banks located in 152 SMSAs in unit or limited branching states. 1973 to 1982	NI - Equity Standard deviation of NI - Equity	0.02 to 0.05	H Market share of banks {MS]	No No
Clark 1986b]	1857 banks located in 152 SMSAs in unit or limited branching states. 1973 to 1982	NI - Equity Standard deviation of NI - Equity	Uses 2 stage least squares procedure. [F-test bewteen 1.8 and 65.1]	H Market share of banks [MS]	H YES MS NO

Comments: In these 2 studies Clark uses the same data to estimate the SCP relationship. Clark [1986b] is an extension of [1986a] where it is shown how a 2 stage least squares estimation procedure generates different results to OLS. Using 2SLS Clark [1986b] finds evidence supporting the traditional SCP hypothesis on profitability and risk aversion, and also rejects the Efficiency Hypothesis.

Authors	Sample	Measure of Bank Performance	R^2 or $\bar{R}^2$	Measure of Market Structure	Coefficient on the Measure of Market Structure are Significant[a]
Evanoff and Fortier [1988]	6,300 unit banks located in the 30 states of the US which permit either unit banking only or statewide branching, for 1984	NI - TA	0.03 to 0.08	CR3 Market share of largest firm [MS1] Market share of second largest firm [MS2] Market share of third largest firm [MS3]	YES but only in two equations when MS is not included NO or wrong sign when MS variable is included YES for the MS of the largest firm when sequential MS of 3 largest firms included.
	Comments: This study finds support for the Efficiency Hypothesis				
Berger and Hannan [1988]	470 banks in 195 local banking markets observed quarterly over a two and a half year period, Sept 1983 to Dec 1985.	Money Market Deposit Account [MMDA] rate. Super Now Rate 3, 6, 12 + 30 month CD Rate	0.33 to 0.88	CR3 H	YES in 8 out of 10 equations
	Comments: In this study the authors state that, "an alternative form of the efficient structure hypothesis that is consistent with the price concentration results is ruled out as a dominant explanation of the results'				
Daskin and Wolken [1989]	441 banking markets, of which 63 are SMSAs	Lerner index	Maximum likelihood Estimation Log likelihood 1034 to 1049	H Loan H Deposit	YES when H loan and H deposits below critical levels. NO when above critical levels
	Comments: This paper tests for a critical level of concentration in banking markets. The estimated range of ciritical levels are H loan 0.36 to 0.38 and H deposits 0.306 to 0.308				

Authors	Sample	Measure of Bank Performance	R^2 or $\bar{R}^2$	Measure of Market Structure	Coefficient on the Measure of Market Structure are Significant[a]
Calem and Carlino [1989]	466 commercial banks and federal savings banks insured by the FDIC in 1985. Sample covers 145 SMSAs	Money market deposit accounts [MMDA's] rate 3 and 6 month CD rates	0.10 to 0.26	CR3	MMDAs YES 6 month CD YES 3 month CD YES
Comments: A ten percent increase in concentration creates a fall in MMDA rate by 5.0 basis points the figure for 6 month CD rate is a fall by 5.4 basis points.					
Hannan [1991]	Loan survey data from the Federal Reserves Study of the Terms of Bank Lending to Business. Data on 8,250 loans originated by 260 banks in August 1984, November 1985 and November 1986	Commercial loan rates for:- 1] Floating rate unsecured loans 2] Floating rate secured loans 3] Fixed rate unsecured loans 4] Fixed rate secured loans. For loans greater and less than $100,000.	August 1984 0.05 to 0.21 November 1985 0.07 to 0.38 November 1986 0.06 to 0.39	H	August 1984 YES for 1 out of 8 equations November 1985 YES for 5 out of 8 equations [1 finding a negative relationship] November 1986 YES for 5 out of 8 equations
Comments: This study, the author notes, finds strong support for the traditinoal SCP paradigm					

Source: Gilbert [1984 pp 619 – 625] nd authors own updates.

Notes:

a: Regression coefficients on measures of market structure are listed as statistically significant if their their t–statistics [in absolute value] are at least as large as 1.95

–	=	Division sign
NI	=	Net Income
TA	=	Initial asset
C	=	Capital
IL	=	Interest and fees on loans
TL	=	Total loans
IT	=	Interest payment on time and savings deposits
IID	=	Interest payments on tmie deposits
TS	=	Time and savings deposits
ID	=	Time deposits
SC	=	Revenue from service charges on demand deposits
DD	=	Demand deposits
CR1	=	One firm concentration ratio
CR2	=	Two firm concentration ratio
CR3	=	Three firm concentration ratio
H	=	Herfindahl index
N	=	Number of loans in the market

Appendix 4 IBCA Ltd database format types

RAW DATA PAGE 1

RAW DATA Nick:BARBNK BARCLAYS (C.)		31/12/90 GBP mln	31/12/89 GBP mln	31/12/88 GBP mln	31/12/87 GBP mln
Own banknotes in circ (may also incl prec metals held for customers)	5	n.a.	n.a.	n.a.	n .
Cash, bullion and balances with Bank of England	10	1,858.0	1,802.0	1,564.0	1,382,0
Due from banks/in course of collection from other banks	15	1,351.0	708.0	761.0	1,099.0
Money at call and short notice	20	10,554.0	10,986.0	8,635.0	9,899.0
Treasury bills	25	3,552.0	2,963.0	2,343.0	885.0
Banks' CDs	30	4,012.0	2,488.0	2,782.0	1,711.0
Special deposits with Bank of England	35	n.a.	n.a.	n.a.	n.a.
Government listed securities	40	799.0	573.0	786.0	1,104.0
Deposits with banks, discount houses and local authorities	45	n.a.	n.a.	n.a.	n.a.
Placings with banks (more than one month)	50	10,883.0	12,120.0	9,290.0	9,778.0
Local authorities' listed securities	55	n.a.	n.a.	n.a.	n.a.
Dealing assets	60	n.a.	n.a.	n.a.	n.a.
Trade and other bills discounted	65	2,393.0	1,953.0	1,826.0	1,213.0
Customer loans/advances - domestic	67	58,731.0	55,172.0	48,278.0	36,377.0
Customer loans/advances - international	68	19,915.0	19,513.0	14,950.0	13,482.0
Cust loans/advances if no breakdown (gross of LLR)	70	n.a.	n.a.	n.a.	n.a.
Loan loss reserve (specific)/ accumulated specific provision	72	1,942.0	2,281.0	1,480.0	1,523.0
Loan loss reserve (general)/ accumulated general provision	73	393.0	218.0	175.0	262.0
Unearned income	74	n.a.	n.a.	n.a.	n.a.
Accrued interest and other (customer) accounts	75	2,720.0	2,538.0	1,215.0	1,316.0
Hire purchase loans/instalment loans	80	n.a.	n.a.	n.a.	n.a.
Leased assets/lease amounts receivable	85	4,956.0	4,383.0	4,012.0	3,236.0
Investments: quoted (listed) in United Kingdom	90	105.0	34.0	16.0	9.0
Investments: quoted (listed) elsewhere	95	1,000.0	999.0	686.0	890.0
Investments: unquoted/investment properties	100	494.0	332.0	282.0	353.0
Long term life insurance business	102	192.0	147.0	102.0	n.a.
Investments in associates	105	257.0	386.0	319.0	280.0
Trade investments	110	34.0	49.0	29.0	28.0
Other equity investments	115	n.a.	n.a.	n.a.	n.a.
A/cs receivable/def tax receivable/ debtors/prepayments	120	2,687.0	2,870.0	1,987.0	1,750.0
Acceptances shown on-balance sheet	122	n.a.	n.a.	n.a.	n.a.
Fixed assets/premises	125	2,507.0	2,262.0	1,793.0	1,731.0
Goodwill	130	n.a.	n.a.	n.a.	n.a.
Marketable securities (long positions)	135	2,637.0	2,418.0	1,337.0	883.0
Amounts due from brokers	140	n.a.	n.a.	n.a.	757.0

RAW DATA PAGE 2

RAW DATA Nick:BARBNK BARCLAYS (C.)		31/12/90 GBP mln	31/12/89 GBP mln	31/12/88 GBP mln	31/12/ GBP m
Other debtors (securities business)	145	1,953.0	2,237.0	1,656.0	855
Securities purchased under agreements to resell	150	2,441.0	2,168.0	1,018.0	n.
Cash deposited against stock loans	155	1,191.0	1,014.0	633.0	622
Other securities balances	160	n.a.	n.a.	n.a.	n.
Other assets (securities business)	165	n.a.	n.a.	n.a.	n.
Total securities dealing assets (if no breakdown)	170	n.a.	n.a.	n.a.	n.
TOTAL ASSETS	175	134,887.0	127,616.0	104,645.0	87,855

RAW DATA PAGE 3

RAW DATA Nick:BARBNK BARCLAYS (C.)		31/12/90 GBP mln	31/12/89 GBP mln	31/12/88 GBP mln	31/12/87 GBP mln
Own banknotes in circ (may also incl prec metals held for customers)	180	n.a.	n.a.	n.a.	n.a.
Demand deposits/current accounts	185	14,604.0	14,127.0	11,697.0	10,944.0
Savings deposits/savings accounts/ retail deposits	190	20,832.0	18,090.0	14,694.0	11,209.0
Time deps or current & dep a/cs with no split	195	40,090.0	37,786.0	27,808.0	25,083.0
Wholesale deposits	200	34,638.0	32,956.0	31,937.0	25,855.0
Accrued interest on deposit accounts	205	1,998.0	1,742.0	1,009.0	799.0
Items in transit & other customer accounts/other accounts	210	387.0	504.0	19.0	305.0
CDs issued	215	n.a.	n.a.	n.a.	n.a.
Other short-term borrowing	220	n.a.	n.a.	n.a.	n.a.
Taxation payable/current	225	581.0	697.0	495.0	283.0
Accounts payable/sundry creditors	230	3,847.0	3,426.0	2,747.0	2,192.0
Dividend(s) payable	245	190.0	180.0	145.0	94.0
Deferred taxation	250	469.0	452.0	658.0	572.0
Loan capital	255	624.0	847.0	898.0	770.0
Minority interests	260	475.0	448.0	116.0	111.0
Non-banking minority interests	262	n.a.	n.a.	n.a.	n.a.
Subordinated loans/subordinated debt	265	1,652.0	1,801.0	1,756.0	1,859.0
Reserves	270	4,518.0	5,101.0	4,597.0	3,451.0
Share capital - ordinary	275	1,587.0	1,124.0	1,114.0	736.0
Share capital - preference	280	n.a.	n.a.	n.a.	n.a.
Primary perpetual subordinated debt	285	948.0	1,066.0	747.0	715.0
Other hybrid capital	287	n.a.	n.a.	n.a.	n.a.
Marketable securities (short positions)	290	2,638.0	1,553.0	656.0	434.0
Amounts due to brokers, dealers and customers	295	1,880.0	1,914.0	1,763.0	932.0
Other creditors/payables (securities business)	300	n.a.	n.a.	n.a.	741.0
Securities sold under agreements to repurchase	305	2,120.0	2,774.0	1,208.0	n.a.
Loans secured against stock deposited	310	809.0	1,028.0	581.0	770.0
Other securities balances	315	n.a.	n.a.	n.a.	n.a.
Other liabilities (securities business)	320	n.a.	n.a.	n.a.	n.a.
Total securities dealing liabilities (if no breakdown)	325	n.a.	n.a.	n.a.	n.a.

RAW DATA PAGE 4

RAW DATA Nick:BARBNK BARCLAYS (C.)		31/12/90 GBP mln	31/12/89 GBP mln	31/12/88 GBP mln	31/12/87 GBP mln
Interest on loans to customers	330	11,123.0	9,673.0	6,611.0	5,412.0
Interest on market placings and money at call and short notice	335	3,267.0	3,008.0	1,878.0	1,591.0
Interest and dividends on investment securities	340	199.0	171.0	217.0	231.0
Other interest income	345	676.0	616.0	441.0	399.0
Interest received (if no breakdown)	350	n.a.	n.a.	n.a.	n.a.
Interest on deposits	355	11,445.0	9,678.0	5,861.0	4,689.0
Interest on short-term borrowings	360	n.a.	n.a.	n.a.	n.a.
Interest on long-term debt	365	331.0	370.0	320.0	273.0
Interest paid (if no breakdown)	370	n.a.	n.a.	n.a.	n.a.
Commissions	375	1,561.0	1,435.0	1,283.0	1,155.0
Foreign exchange income	380	159.0	172.0	112.0	113.0
Sundry operating income	385	404.0	[illegible]	[illegible]	233.0
Increase in value of long-term assurance policies	387	70.0	69.0	[illegible]	30.0
Other operating income (if no breakdown)	390	n.a.	n.a.	n.a.	n.a.
Share of earnings of associated companies	395	29.0	92.0	98.0	70.0
Investment securities gains	400	-1.0	-3.0	16.0	[illegible]
Other non-banking income	405	43.0	28.0	[illegible]	n.a.
Other income (if no breakdown)	410	n.a.	n.a.	n.a.	0.0
Specific loan loss provision	415	1,053.0	384.0	287.0	329.0
General loan loss provision	420	180.0	30.0	14.0	30.0
Exceptional loan loss provision - sovereign risk	425	0.0	983.0	0.0	713.0
Personnel expenses	430	2,132.0	2,064.0	1,882.0	1,676.0
Non-interest expenses	435	1,629.0	1,486.0	1,273.0	1,172.0
Exceptional Income	436	0.0	0.0	0.0	0.0
Exceptional Expenses	437	0.0	0.0	0.0	0.0
Pre-tax profit	440	760.0	692.0	1,391.0	369.0
Taxes	445	332.0	215.0	498.0	159.0
PROFIT AFTER TAX	450	428.0	477.0	893.0	210.0
Ordinary dividend(s)	455	335.0	308.0	256.0	171.0
Preference dividend(s)	457	n.a.	n.a.	n.a.	n.a.
Charge-offs	460	664.0	370.0	385.0	406.0
Profit attributable to minorities	465	37.0	25.0	6.0	6.0
Extraordinary income	470	198.0	0.0	0.0	0.0
Extraordinary losses	475	n.a.	n.a.	n.a.	n.a.
Contingent liabilities	480	14,528.0	11,405.0	9,393.0	8,303.0
Confirmed credits	485	n.a.	298.0	157.0	n.a.
Recoveries of advances previously written off	490	42.0	53.0	27.0	34.0
Acceptances	495	3,523.0	2,664.0	2,869.0	2,254.0
Average assets (true average)	500	129,729.0	118,486.0	94,362.0	78,772.0
Average equity (true average)	505	6,867.0	6,399.0	5,043.0	3,983.0
Average loans (true average), net of LLR	510	81,208.0	74,140.0	59,776.0	49,685.0
Tier 1 capital	515	6,185.0	5,731.0	n.a.	n.a.
Total capital	520	8,916.0	9,092.0	n.a.	n.a.
Weighted risks - on-balance sheet	525	88,372.0	83,455.0	n.a.	n.a.
Weighted risks - total	530	107,270.0	101,174.0	n.a.	n.a.

RAW DATA PAGE 5

RAW DATA Nick:BARBNK BARCLAYS (C.)		31/12/90 GBP mln	31/12/89 GBP mln	31/12/88 GBP mln	31/12/87 GBP mln
Tier 1 capital ratio	535	5.80	5.70	6.00	n.a.
Total capital ratio	540	8.30	9.00	9.30	n.a.
Unconsolidated equity	545	n.a.	n.a.	n.a.	n.a.
Unconsolidated total assets	550	n.a.	n.a.	n.a.	n.a.
Unconsolidated net income	555	n.a.	n.a.	n.a.	n.a.

SUMMARY DATA Nick:BARBNK BARCLAYS (C.)	31/12/90 One Year of Data GBP mln	Average of Two Years GBP mln	Net Diff of 2 Years GBP mln	% Change Between Two Years	Year 2 as % of Total Assets	31/12/88 Year 3 in Sterling GBP mln	31/12/88 Year 3 in US Dollars USD mln	Sum Of 3 Years GBP mln	Year 2 as % of Average Net Income
Total Assets	134,887.0	131,251.5	7,271.0	5.70	100.00	104,645.0	189,334.2	367,148.0	18,630.07
Equity	6,580.0	6,626.5	-93.0	-1.39	5.23	5,827.0	10,542.8	19,080.0	974.16
Tier 1 Capital	6,185.0	5,958.0	454.0	7.92	4.49	n.a.	n.a.	11,916.0	836.64
Total Earning Assets	120,620.0	117,402.5	6,435.0	5.64	89.48	95,036.0	171,948.6	329,841.0	16,669.34
Loans	81,267.0	78,918.0	4,698.0	6.14	60.00	65,585.0	118,662.9	223,421.0	11,177.96
Deposits	110,164.0	106,561.5	7,205.0	7.00	80.68	86,136.0	155,845.8	299,259.0	15,030.51
Net Interest Revenue	3,489.0	3,454.5	69.0	2.02	2.68	2,966.0	5,366.4	9,875.0	499.27
Pre-tax Profit	760.0	726.0	68.0	9.83	0.54	1,391.0	2,516.7	2,843.0	101.02
Net Income	428.0	452.5	-49.0	-10.27	0.37	893.0	1,615.7	1,798.0	69.64
Net Income/Assets (av.)	0.33	0.37	-0.07	-17.50	0.00	0.95	0.95	1.68	0.06
Pre-tax Profit/Assets (av.)	0.59	0.59	0.01	1.72	0.00	1.47	1.47	2.64	0.08
Net Income/Equity (av.)	6.23	6.84	-1.22	-16.38	0.01	17.71	17.71	31.39	1.09
Net Interest Rev./Assets (av.)	2.69	2.79	-0.20	-6.92	0.00	3.14	3.14	8.72	0.42
Equity/Assets	4.88	5.06	-0.35	-6.69	0.00	5.57	5.57	15.68	0.76
Tier 1 Capital Ratio	5.80	5.75	0.10	1.75	0.00	6.00	6.00	17.50	0.83
Liquid Assets/Total Deposits	32.14	32.39	-0.49	-1.50	0.03	32.49	32.49	97.26	4.76
Loans/Total Deposits	73.77	74.07	-0.60	-0.81	0.06	76.14	76.14	224.28	10.86

Templating Example using Summary Data.

Appendix 4

IBCA SPREADSHEET PAGE 1

IBCA SPREAD SHEET Nick:BARBNK BARCLAYS (C.)	31/12/90 YEAR END USD mln	31/12/90 YEAR END GBP mln	AS % OF ASSETS	AVERAGE GBP mln	31/12/89 YEAR END GBP mln	AS % OF ASSETS	31/12/88 YEAR END GBP mln	AS % OF ASSETS	31/12/87 YEAR END GBP mln	AS % OF ASSETS
A. LOANS										
1. Domestic Customer	113,233.4	58,731.0	43.54	56,951.5	55,172.0	43.23	48,278.0	46.14	36,377.0	41.41
2. International Customer	38,396.1	19,915.0	14.76	19,714.0	19,513.0	15.29	14,950.0	14.29	13,482.0	15.35
3. Customer Loans (1 + 2)	151,629.5	78,646.0	58.31	76,665.5	74,685.0	58.52	63,228.0	60.42	49,859.0	56.75
4. Consumer Loans	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
5. Lease Receivables	9,555.2	4,956.0	3.67	4,669.5	4,383.0	3.43	4,012.0	3.83	3,236.0	3.68
6. (Unearned Income)	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
7. (Loan Loss Reserves)	4,501.9	2,335.0	1.73	2,417.0	2,499.0	1.96	1,655.0	1.58	1,785.0	2.03
TOTAL A	156,682.8	81,267.0	60.25	81,208.0	76,569.0	60.00	65,585.0	62.67	51,310.0	58.40
B. OTHER EARNING ASSETS										
1. Bank Deposits and Placings	49,065.7	25,449.0	18.87	25,521.5	25,594.0	20.06	20,707.0	19.79	21,388.0	24.34
2. Short-term Investments	11,462.0	5,945.0	4.41	5,430.5	4,916.0	3.85	4,169.0	3.98	2,098.0	2.39
3. U.K. Listed Gov. Securities	1,540.5	799.0	0.59	686.0	573.0	0.45	786.0	0.75	1,104.0	1.26
4. Other Investments	7,789.1	4,040.0	3.00	3,786.5	3,533.0	2.77	2,002.0	1.91	1,252.0	1.43
5. Securities - Long Positions	5,084.1	2,637.0	1.95	2,527.5	2,418.0	1.89	1,337.0	1.28	883.0	1.01
6. Equity Investments	931.2	483.0	0.36	532.5	582.0	0.46	450.0	0.43	308.0	0.35
TOTAL B	75,872.6	39,353.0	29.17	38,484.5	37,616.0	29.48	29,451.0	28.14	27,033.0	30.77
C. TOTAL EARNING ASSETS (A + B)	232,555.4	120,620.0	89.42	117,402.5	114,185.0	89.48	95,036.0	90.82	78,343.0	89.17
D. FIXED ASSETS	4,833.5	2,507.0	1.86	2,384.5	2,262.0	1.77	1,793.0	1.71	1,731.0	1.97
E. NON-EARNING ASSETS										
1. Cash and Due from Banks	8,483.2	4,400.0	3.26	3,962.0	3,524.0	2.76	2,958.0	2.83	3,103.0	3.53
2. Other	14,190.1	7,360.0	5.46	7,502.5	7,645.0	5.99	4,858.0	4.64	4,678.0	5.32
F. TOTAL ASSETS	260,062.2	134,887.0	100.00	129,729.0	127,616.0	100.00	104,645.0	100.00	87,855.0	100.00
G. CUSTOMER AND SHORT-TERM FUNDING										
1. Demand Deposits	28,156.5	14,604.0	10.83	14,365.5	14,127.0	11.07	11,697.0	11.18	10,944.0	12.46
2. Savings Deposits	40,164.1	20,832.0	15.44	19,461.0	18,090.0	14.18	14,694.0	14.04	11,209.0	12.76
3. Time Deposits	144,075.6	74,728.0	55.40	72,735.0	70,742.0	55.43	59,745.0	57.09	50,938.0	57.98
4. Other	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
TOTAL G	212,396.3	110,164.0	81.67	106,561.5	102,959.0	80.68	86,136.0	82.31	73,091.0	83.20
H. OTHER FUNDING										
1. Securities business	5,647.1	2,929.0	2.17	3,365.5	3,802.0	2.98	1,789.0	1.71	770.0	0.88
2. Long Term Debt	1,203.1	624.0	0.46	735.5	847.0	0.66	898.0	0.86	770.0	0.88
3. Subordinated Debt	3,185.1	1,652.0	1.22	1,726.5	1,801.0	1.41	1,756.0	1.68	1,859.0	2.12
4. Hybrid Capital	1,827.7	948.0	0.70	1,007.0	1,066.0	0.84	747.0	0.71	715.0	0.81
I. OTHER (Non-int. bearing)										
1. Securities - Short Positions	5,086.1	2,638.0	1.96	2,095.5	1,553.0	1.22	656.0	0.63	434.0	0.49
2. Other	18,030.7	9,352.0	6.93	9,133.5	8,915.0	6.99	6,836.0	6.53	5,918.0	6.74
J. LOAN LOSS RESERVES (See A above)										
K. OTHER RESERVES	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
L. EQUITY	12,686.2	6,580.0	4.88	6,867.0	6,673.0	5.23	5,827.0	5.57	4,298.0	4.89
M. TOTAL LIABILITIES & EQUITY	260,062.2	134,887.0	100.00	129,729.0	127,616.0	100.00	104,645.0	100.00	87,855.0	100.00
Exchange Rate (USD1 = GBP)		0.51867			0.62286		0.55270		0.53430	

IBCA SPREADSHEET PAGE 2

IBCA SPREAD SHEET Nick:BARBNK BARCLAYS (C.)	31/12/90 INCOME, EXPENSES GBP mln	AS % OF TOTAL AV EARN'G ASSTS	31/12/89 INCOME, EXPENSES GBP mln	AS % OF TOTAL AV EARN'G ASSTS	31/12/88 INCOME, EXPENSES GBP mln	AS % OF TOTAL AV EARN'G ASSTS	31/12/87 INCOME, EXPENSES GBP mln	AS % OF TOTAL AV EARN'G ASSTS
1. Interest Received	15,265.0	13.00	13,468.0	12.87	9,147.0	10.55	7,633.0	10.29
2. Interest Paid	11,776.0	10.03	10,048.0	9.61	6,181.0	7.13	4,962.0	6.69
3. NET INTEREST REVENUE	3,489.0	2.97	3,420.0	3.27	2,966.0	3.42	2,671.0	3.60
4. Other Operating Income	2,194.0	1.87	2,102.0	2.01	1,747.0	2.02	1,531.0	2.06
5. Other Income	71.0	0.06	117.0	0.11	134.0	0.15	87.0	0.12
6. Provisions for Loan Lo ses								
(a) Exceptional for Sov. Risks	0.0	0.00	983.0	0.94	0.0	0.00	713.0	0.96
(b) Other Loan Losses	1,233.0	1.05	414.0	0.40	301.0	0.35	359.0	0.48
7. Personnel Expenses	2,132.0	1.82	2,064.0	1.97	1,882.0	2.17	1,676.0	2.26
8. Other Non-interest Expenses	1,629.0	1.39	1,486.0	1.42	1,273.0	1.47	1,172.0	1.58
9. Exceptional Income	0.0	0.00	0.0	0.00	0.0	0.00	0.0	0.00
10. Exceptional Expenses	0.0	0.00	0.0	0.00	0.0	0.00	0.0	0.00
11. PRE-TAX PROFIT	760.0	0.65	692.0	0.66	1,391.0	1.60	369.0	0.50
12. Taxes	332.0	0.28	215.0	0.21	498.0	0.57	159.0	0.21
13. NET INCOME	428.0	0.36	477.0	0.46	893.0	1.03	210.0	0.28
Memo: Extraordinary Items (net)	198.0	0.17	0.0	0.00	0.0	0.00	0.0	0.00
INTERNAL CAPITAL GENERATION	4.24		2.64		12.63		0.98	
I. PROFITABILITY LEVEL								
1. Pre-tax Profit/Assets (av.)	0.59		0.58		1.47		0.47	
2. Net Income/Equity (av.)	6.23		7.45		17.71		5.27	
3. Net Income/Assets (av.)	0.33		0.40		0.95		0.27	
4. Total Non-int. Exp./Net Int. Rev. + Other Operating Income	66.18		64.29		66.94		67.78	
5. Net Interest Rev./Assets (av.)	2.69		2.89		3.14		3.39	
III. CAPITAL ADEQUACY (year end)								
1. Equity/Total Assets	4.88		5.23		5.57		4.89	
2. Free Capital/Banking Assets	5.80		6.57		7.62		7.48	
3. Equity/Loans	8.10		8.72		8.88		8.38	
IV. LIQUIDITY (year end)								
1. Liquid Assets/Customer & Short-term Funding	32.14		32.63		32.49		37.04	
2. Loans/Customer & Short-term Funding	73.77		74.37		76.14		70.20	
V. LOAN LOSS COVERAGE								
1. Net Charge-offs/' . ns (av.)	0.74		0.42		0.58		0.73	
2. Equity (av.)/Net ' .arge-offs	11.04		20.19		14.09		10.71	
3. Net Income before Loan Loss Provs & Taxes/Net Charge-offs	3.20		6.59		4.73		3.87	
4. Loan Loss Reserves/Loans	2.79		3.16		2.46		3.36	

APPENDIX 5 BEFORE TAX RETURN ON ASSETS 1986 AND 1989 [%]

Country	Year	Number of Banks in Sample	N° Missing Observa-tions	Mean	Median	Standard Deviation	Dispesion Standard Deviation / mean	Minimum	Maximum
1. Austria	1986 1989	27 48	0 1	0.42 0.38	0.40 0.35	0.26 0.44	0.62 1.16	0.11 -1.77	1.15 1.73
2. Belgium	1986 1989	26 33	0 0	0.61 0.50	0.35 0.49	0.66 0.66	1.08 1.32	0.01 -1.85	2.91 1.99
3. Denmark	1986 1989	22 26	0 0	-0.41 0.26	-0.04 0.35	1.10 0.73	-2.68 2.81	-3.14 -2.28	0.91 1.65
4. Finland	1986 1989	9 12	0 0	0.33 0.01	0.42 0.26	0.18 1.31	0.55 131.00	0.06 -3.99	0.57 1.41
5. France	1986 1989	96 138	2 6	0.72 0.73	0.53 0.54	0.69 1.42	0.96 1.95	-0.41 -3.85	3.32 11.67
6. Germany	1986 1989	115 149	7 14	0.65 0.52	0.58 0.34	0.44 0.53	0.68 1.02	0.03 -0.32	2.28 9.33
7. Greece	1986 1989	9 3	0 0	0.69 1.64	0.63 1.36	0.18 1.80	0.26 1.10	0.03 0.04	1.73 3.56
8. Ireland	1986 1989	9 17	7 9	0.70 1.18	0.70 1.10	0.05 0.57	0.07 0.48	0.67 0.42	0.73 2.32
9. Italy	1986 1989	55 169	0 0	1.65 1.95	1.68 1.73	0.71 2.46	0.43 1.26	0.14 0.12	3.05 30.00
10. Luxembourg	1986 1989	61 74	1 0	0.32 0.36	0.24 0.27	0.35 0.63	1.09 1.75	-1.01 -1.73	1.88 4.89
11. Netherlands	1986 1989	23 29	0 0	0.93 0.53	0.54 0.54	1.19 0.36	1.28 0.68	0.02 0.02	5.61 1.41
13. Norway	1986 1989	26 27	2 1	0.35 0.09	0.33 0.29	0.20 0.94	0.57 10.44	0.02 -2.83	0.77 1.55
14. Portugal	1986 1989	6 18	0 0	1.64 1.93	1.81 2.02	0.54 0.77	0.33 0.40	0.72 0.40	2.21 3.35
15. Spain	1986 1989	37 156	3 8	0.98 1.67	0.90 1.37	0.75 1.66	0.77 0.99	-0.70 -2.94	2.87 11.42
16. Sweden	1986 1989	19 23	0 2	0.35 0.16	0.59 0.18	0.82 0.79	2.34 4.94	-2.05 -2.74	1.50 2.04
17. Switzerland	1986 1989	88 160	1 1	1.20 1.41	0.77 0.68	1.18 1.85	0.98 1.31	0.08 -0.89	6.94 13.33
18. United Kindgom	1986 1989	109 171	13 19	1.07 0.84	1.01 1.14	0.81 2.70	0.76 3.21	-0.94 -17.76	4.69 7.00
18. Liechtentein	1986 1989	3 3	0 0	0.70 0.59	0.83 0.69	0.36 0.22	0.51 0.37	0.28 0.35	0.97 0.75
19. Turkey	1986 1989	9 12	0 0	2.72 2.39	3.24 1.94	1.67 2.07	0.61 0.87	0.29 -0.09	5.14 7.03

Source: Authors own estimates

APPENDIX 5 BEFORE TAX RETURN - ON - ASSETS 1987 AND 1988 [%]

Country	Year	Number of Banks in Sample	N° Missing Observa-tions	Mean	Median	Standard Deviation	Dispesion Standard Deviation / mean	Minimum	Maximum
1. Austria	1987	41	1	0.60	0.45	0.44	0.73	0.14	2.00
	1988	47	1	0.63	0.55	0.40	0.63	0.07	2.18
2. Belgium	1987	37	1	0.62	0.42	0.82	1.32	-1.13	4.56
	1988	38	1	0.50	0.46	0.95	1.90	-3.10	2.94
3. Denmark	1987	25	0	0.28	0.54	0.81	2.89	-1.88	1.40
	1988	27	0	0.74	0.93	1.13	1.53	-3.19	2.34
4. Finland	1987	10	1	0.18	0.27	0.41	2.28	-0.87	0.45
	1988	12	0	0.38	0.35	0.35	0.92	-0.17	1.18
5. France	1987	142	8	0.56	0.43	0.73	1.30	-2.22	3.89
	1988	179	3	0.71	0.47	1.25	1.76	-4.08	12.31
6. Germany	1987	149	14	0.65	0.51	0.60	0.92	-0.10	5.48
	1988	162	15	0.65	0.53	0.94	1.45	-0.09	9.96
7. Greece	1987	9	1	0.90	0.74	0.71	0.79	0.14	2.13
	1988	10	1	1.09	0.95	1.04	0.95	0.10	3.22
8. Ireland	1987	16	10	0.79	0.83	0.36	0.46	0.19	1.19
	1988	17	9	1.04	1.12	0.64	0.62	0.24	2.00
9. Italy	1987	170	0	1.83	1.79	3.42	1.87	-3.29	19.13
	1988	318	0	2.05	1.87	3.61	1.76	0.15	16.3
10. Luxembourg	1987	84	3	0.46	0.29	0.86	1.87	0.03	7.18
	1988	87	2	0.55	0.32	0.90	1.64	0.03	6.65
11. Netherlands	1987	30	1	0.75	0.55	0.95	1.27	0.008	5.04
	1988	36	0	0.59	0.54	0.63	1.07	-0.59	3.37
13. Norway	1987	28	0	0.17	0.28	0.38	1.36	-0.76	0.64
	1988	29	0	-0.54	0.04	2.22	-4.11	-11.01	0.70
14. Portugal	1987	17	0	1.68	1.75	0.62	0.37	0.47	2.75
	1988	18	0	1.72	1.59	0.71	0.41	0.35	2.82
15. Spain	1987	105	1	[illegible]	1.38	0.46	0.46	0.01	2.86
	1988	165	13	[illegible] 19	1.00	1.14	1.14	-5.18	8.81
16. Sweden	1987	22	0	1.50	1.14	0.95	0.63	0.39	4.27
	1988	24	1	0.32	0.33	0.25	0.78	-0.14	0.68
17. Switzerland	1987	138	1	1.23	0.78	1.41	1.15	-5.35	8.00
	1988	170	1	1.25	0.69	1.37	1.10	-0.83	7.97
18. United Kindgom	1987	157	25	0.77	1.08	2.17	2.82	-11.07	8.60
	1988	178	18	1.20	1.13	1.08	0.90	-2.05	7.49
18. Liechtentein	1987	3	0	0.68	0.77	0.33	0.49	0.31	0.95
	1988	3	0	0.65	0.76	0.26	0.40	0 35	0.83
19. Turkey	1987	18	0	2.88	2.22	2.51	0.87	0.09	10.12
	1988	21	0	2.54	2.[illegible]	2.86	1.13	-4.72	6.88

Source: Authors own estimates

APPENDIX 6 BEFORE TAX RETURN - ON - EQUITY 1987 AND 1988 [%]

Country	Year	Number of Banks in Sample	N° Missing Observa-tions	Mean	Median	Standard Deviation	Dispesion Standard Deviation / mean	Minimum	Maximum
1. Austria	1987 1988	41 47	1 1	15.88 15.77	12.10 14.38	9.80 8.94	0.62 0.57	5.54 1.03	48.12 45.17
2. Belgium	1987 1988	37 38	1 1	14.97 10.66	15.52 13.33	8.59 16.50	0.57 1.55	-12.44 -48.87	36.07 37.34
3. Denmark	1987 1988	25 27	0 0	2.71 8.88	5.72 12.58	11.54 11.92	4.26 1.34	-33.11 -27.24	16.20 25.35
4. Finland	1987 1988	10 12	1 0	7.44 9.29	9.49 7.99	12.67 8.76	1.70 0.94	-22.50 -2.48	25.87 30.64
5. France	1987 1988	142 179	8 3	12.49 14.80	13.88 12.98	15.10 32.49	1.21 2.20	-67.15 -21.04	51.14 30.74
6. Germany	1987 1988	149 162	14 15	15.28 14.38	14.68 14.43	11.81 9.44	0.77 0.66	-1.43 -2.13	116.89 66.75
7. Greece	1987 1988	9 10	1 1	32.69 21.60	19.24 17.99	27.41 17.95	0.84 0.83	9.78 4.48	79.26 61.88
8. Ireland	1987 1988	16 17	10 9	12.68 18.07	10.97 18.81	4.40 10.21	0.35 0.57	8.66 4.75	19.05 36.97
9. Italy	1987 1988	170 318	0 0	33.10 30.91	23.53 25.68	29.44 26.07	0.89 0.84	-5.26 4.65	131.25 171.43
10. Luxembourg	1987 1988	84 87	3 2	12.46 14.70	9.66 11.46	10.78 12.16	0.87 0.83	1.10 1.00	53.81 51.55
11. Netherlands	1987 1988	30 36	1 0	13.62 10.79	13.06 12.80	9.22 9.93	0.68 0.92	0.33 -23.63	40.67 35.96
13. Norway	1987 1988	28 29	0 0	2.46 9.04	6.47 2.39	12.38 40.07	5.03 4.43	-30.94 -33.87	20.70 15.83
14. Portugal	1987 1988	17 18	0 0	21.88 27.54	15.44 15.45	11.26 16.40	0.51 0.60	1.02 5.88	71.88 101.18
15. Spain	1987 1988	105 165	1 13	23.66 16.59	23.99 16.98	11.26 12.55	0.48 0.76	0.23 -55.93	91.09 62.26
16. Sweden	1987 1988	22 24	0 1	8.38 21.64	5.50 16.48	7.39 18.55	0.88 0.86	1.90 -3.74	28.66 60.97
17. Switzerland	1987 1988	138 170	1 1	10.32 9.69	9.01 8.51	7.65 6.55	0.74 0.68	-27.70 -5.02	50.59 38.67
18. United Kindgom	1987 1988	157 178	25 18	14.80 15.26	14.00 16.25	9.14 11.84	0.62 0.78	-46.50 -36.92	43.30 44.69
18. Liechtentein	1987 1988	3 3	0 0	6.47 7.04	6.35 7.62	1.11 1.10	0.17 0.16	5.42 5.76	7.64 7.74
19. Turkey	1987 1988	18 21	0 0	31.69 25.94	25.82 29.47	20.14 29.31	0.64 1.13	1.18 -81.56	77.95 61.97

Source: Authors own estimates

APPENDIX 7

HERFINDAHL INDICES FOR EUROPEAN BANKING MARKETS
ASSETS MEASURE

Country	1986	1987	1988	1989
Austria	0.043	0.038	0.039	0.038
Belgium	0.116	0.114	0.112	0.109
Denmark	0.046	0.053	0.049	0.054
Finland	0.124	0.100	0.100	0.096
France	0.078	0.043	0.049	0.038
Germany	0.019	0.020	0.021	0.022
Greece	0.637	0.654	0.673	0.527
Ireland	0.095	0.122	0.133	0.135
Italy	0.041	0.032	0.029	0.043
Luxembourg	0.027	0.026	0.027	0.026
Netherlands	0.145	0.147	0.191	0.153
Norway	0.075	0.070	0.052	0.067
Portugal	0.081	0.082	0.088	0.091
Spain	0.035	0.033	0.046	0.045
Sweden	0.129	0.299	0.238	0.243
Switzerland	0.078	0.076	0.073	0.072
Turkey	0.092	0.094	0.098	n.a.
United Kingdom	0.019	0.020	0.022	0.023

Source: Authors own estimates

APPENDIX 7

HERFINDAHL INDICES FOR EUROPEAN BANKING MARKETS
DEPOSITS MEASURE

Country	1986	1987	1988	1989
Austria	0.058	0.056	0.053	0.049
Belgium	0.166	0.158	0.169	0.168
Denmark	0.051	0.054	0.059	0.051
Finland	0.130	0.168	0.137	0.124
France	0.009	0.011	0.013	0.038
Germany	0.010	0.010	0.011	0.013
Greece	0.394	0.342	0.321	0.256
Ireland	0.110	0.154	0.183	0.182
Italy	0.036	0.056	0.034	0.037
Luxembourg	0.028	0.026	0.027	0.026
Netherlands	0.176	0.160	0.216	0.198
Norway	0.091	0.089	0.046	0.067
Portugal	0.090	0.102	0.111	0.105
Spain	0.032	0.033	0.048	0.047
Sweden	0.105	0.263	0.157	0.162
Switzerland	0.093	0.090	0.080	0.083
Turkey	0.132	0.164	0.147	n.a.
United Kingdom	0.016	0.018	0.019	0.020

Source. Authors c..n estimates

APPENDIX 8 MARKET SHARE OF BANKS ASSETS MEASURE [%] 1987 and 1988

Country	Year	Number of Banks in Sample	N* Missing Observa-tions	Mean	Minimum	Maximum
1. Austria	1987 1988	41 47	0 0	1.751 1.578	0.017 0.037	11.206 11.027
2. Belgium	1987 1988	37 38	0 0	2.538 2.541	0.046 0.041	21.005 19.893
3. Denmark	1987 1988	25 27	0 0	2.713 2.660	0.071 0.070	24.319 32.480
4. Finland	1987 1988	10 12	0 0	6.990 5.690	0.170 0.100	20.250 20.810
5. France	1987 1988	142 179	0 0	0.472 0.395	0.005 0.001	7.389 7.202
6. Germany	1987 1988	149 162	0 0	0.502 0.486	0.005 0.003	6.998 7.468
7. Greece	1987 1988	9 10	0 0	8.614 7.623	0.510 0.750	27.970 29.711
8. Ireland	1987 1988	16 17	0 0	5.625 5.385	0.440 0.300	34.33 41.86
9. Italy	1987 1988	170 378	0 0	0.443 0.264	0.001 0.001	7.561 7.020
10. Luxembourg	1987 1988	84 87	0 0	1.108 1.072	0.055 0.038	7.497 7.755
11. Netherlands	1987 1988	30 36	0 0	2.800 2.313	0.070 0.070	22.500 22.810
13. Norway	1987 1988	28 29	0 0	2.544 2.265	0.079 0.120	16.430 12.525
14. Portugal	1987 1988	17 18	0 0	5.060 4.950	0.360 0.650	20.911 22.211
15. Spain	1987 1988	105 165	0 0	0.852 0..559	0.010 0.006	7.333 10.429
16. Sweden	1987 1988	22 24	0 0	3.448 3.269	0.097 0.080	23.210 27.660
17. Switzerland	1987 1988	138 170	0 0	0.615 0.513	0.006 0.003	17.646 17.005
18. United Kindgom	1987 1988	157 178	0 0	0.376 0.363	0.002 0.001	8.150 8.660
18. Liechtentein	1987 1988	3 3	0 0	n.a n.a	n.a n.a	n.a n.a
19. Turkey	1987 1988	18 21	0 0	4.480 4.326	0.470 0.350	22.21 21.31

Source: Authors own estimates

APPENDIX 8 MARKET SHARE OF BANKS DEPOSIT MEASURE [%] 1986 AND 1989

Country	Year	Number of Banks in Sample	N* Missing Observa-tions	Mean	Median	Standard Deviation	Dispesion Standard Deviation / mean	Minimum	Maximum
1. Austria	1986	27	0	2.825	0.910	13.731	1.32	0.010	12.416
	1989	48	0	1.723	0.665	2.706	1.57	0.024	11.495
2. Belgium	1986	26	0	3.330	0.790	6.980	2.10	0.100	26.450
	1989	33	0	2.951	0.510	6.410	2.17	0.006	25.270
3. Denmark	1986	22	0	2.871	1.014	3.953	1.38	0.078	13.308
	1989	26	1	2.546	1.990	10.090	3.96	0.101	22.931
4. Finland	1986	9	0	7.243	1.775	14.380	1.99	0.280	25.960
	1989	12	0	6.510	1.470	8.150	1.25	0.080	21.510
5. France	1986	96	0	0.615	0.098	0.589	0.96	0.014	8.960
	1989	138	1	0.466	0.022	0.502	1.08	0.009	7.863
6. Germany	1986	115	2	0.419	0.152	0.873	2.08	0.002	5.880
	1989	149	1	0.352	0.091	0.860	2.44	0.002	6.6677
7. Greece	1986	9	0	9.760	6.450	18.380	1.88	0.330	58.950
	1989	3	0	17.90	2.600	28.300	1.58	0.500	50.600
8. Ireland	1986	9	0	8.778	1.760	2.057	0.23	0.881	37.541
	1989	17	0	4.967	1.011	2.542	0.41	0.798	37.123
9. Italy	1986	55	0	1.238	0.395	2.244	1.81	0.002	8.031
	1989	169	0	0.396	0.096	1.176	2.97	0.001	14.026
10. Luxembourg	1986	61	0	1.418	0.857	1.593	1.12	0.009	8.641
	1989	74	0	1.164	0.567	1.465	1.26	0.040	7.58
11. Netherlands	1986	23	0	3.780	0.620	8.050	2.13	0.080	24.82
	1989	29	0	3.006	0.480	7.530	2.50	0.120	23.74
13. Norway	1986	26	1	3.160	1.120	5.240	1.66	0.020	20.84
	1989	27	0	2.623	0.846	4.275	1.63	0.012	18.169
14. Portugal	1986	6	0	7.410	3.520	2.600	0.35	0.330	27.150
	1989	18	0	5.350	4.590	5.600	1.05	0.780	24.310
15. Spain	1986	37	0	1.246	1.087	2.131	1.71	0.203	6.884
	1989	156	0	0.554	0.252	1.561	2.82	0.091	10.154
16. Sweden	1986	19	0	3.420	1.650	6.120	1.79	0.050	21.52
	1989	23	0	3.106	1.401	7.110	2.29	0.040	24.4
17. Switzerland	1986	88	0	0.947	0.140	3.124	3.30	0.006	19.816
	1989	160	0	0.553	0.097	2.219	4.01	0.003	18.430
18. United Kindgom	1986	109	0	0.404	0.089	1.146	2.84	0.002	7.566
	1989	171	0	0.354	0.063	1.036	2.93	0.002	8.052
18. Liechtenstein	1986	3	3	n.a	n.a	n.a	n.a	n.a	n.a
	1989	3	3	n.a	n.a	n.a	n.a	n.a	n.a
19. Turkey	1986	9	0	7.900	3.180	9.730	1.23	0.450	27.290
	1989	12	0	6.410	2.424	9.900	1.54	0.410	28.731

Source: Authors own estimates

APPENDIX 8 MARKET SHARE OF BANKS DEPOSIT MEASURE [%] 1987 AND 1988

Country	Year	Number of Banks in Sample	N° Missing Observa-tions	Mean	Median	Standard Deviation	Dispesion Standard Deviation / mean	Minimum	Maximum
1. Austria	1987	41	0	1.646	0.730	3.129	1.90	0.022	12.659
	1988	47	0	1.584	0.665	2.849	1.80	0.043	11.784
2. Belgium	1987	37	0	2.433	0.532	5.914	2.43	0.055	25.144
	1988	38	0	2.481	0.567	6.059	2.44	0.051	24.951
3. Denmark	1987	25	0	2.754	0.774	3.814	1.38	0.069	14.279
	1988	27	1	2.201	0.611	9.480	4.69	0.01-0	15.086
4. Finland	1987	10	0	6.480	2.140	10.320	1.59	0.230	26.170
	1988	12	0	6.620	1.153	8.760	1.32	0.110	24.110
5. France	1987	142	0	0.382	0.118	0.297	0.78	0.005	7.321
	1988	179	0	0.219	0.091	0.386	1.21	0.006	7.641
6. Germany	1987	149	0	0.331	0.098	0.770	2.33	0.001	5.645
	1988	162	2	0.323	0.086	0.779	2.41	0.001	6.100
7. Greece	1987	9	0	9.110	6.610	17.010	1.87	0.340	54.760
	1988	10	0	8.724	4.650	15.830	1.81	0.490	53.080
8. Ireland	1987	16	0	4.930	2.980	16.560	3.36	0.680	32.10
	1988	17	0	4.102	3.350	20.120	4.90	0.542	29.60
9. Italy	1987	170	0	0.432	0.095	2.046	4.74	0.003	14.254
	1988	318	0	0.240	0.072	1.178	4.91	0.011	15.075
10. Luxembourg	1987	84	0	1.009	0.654	1.361	1.35	0.054	7.435
	1988	87	0	0.971	0.535	1.403	1.44	0.033	7.851
11. Netherlands	1987	30	0	2.630	0.510	6.810	2.59	0.040	23.75
	1988	36	0	2.142	0.510	7.170	3.60	0.041	24.51
13. Norway	1987	28	1	2.305	1.072	4.952	2.15	0.009	17.966
	1988	29	0	2.210	0.975	3.371	1.53	0.037	11.590
14. Portugal	1987	17	0	5.550	4.910	5.559	1.00	0.250	23.40
	1988	18	0	5.560	4.720	5.740	1.03	0.350	24.51
15. Spain	1987	105	0	0.808	0.328	1.153	1.43	0.010	6.973
	1988	165	0	0.547	0.237	1.538	2.81	0.009	10.720
16. Sweden	1987	22	0	3.190	1.194	10.25	3.21	0.103	32.50
	1988	24	0	3.006	1.320	6.88	2.29	0.080	33.35
17. Switzerland	1987	138	0	0.636	0.105	2.483	3.90	0.005	19.299
	1988	170	0	0.514	0.089	2.118	4.12	0.003	17.866
18. United Kindgom	1987	157	1	0.344	0.078	1.018	2.96	0.002	7.804
	1988	178	0	0.344	0.067	0.994	2.98	0.001	7.900
18. Leichtentein	1987	3	3	n.a	n.a	n.a	n.a	n.a	n.a
	1988	3	3	n.a	n.a	n.a	n.a	n.a	n.a
19. Turkey	1987	18	0	4.670	2.700	7.990	1.69	0.420	29.25
	1988	21	0	4.401	3.060	5.190	1.18	0.450	27.27

Source: Authors own estimates

APPENDIX 9

GROWTH IN NARROW MONEY SUPPLY [ANNUAL % CHANGE]

Country	1986	1987	1988	1989
Austria	6.38	10.34	8.76	1.21
Belgium	7.78	4.69	5.52	5.39
Denmark	9.80	13.18	14.33	0.58
Finland	0.52	8.99	18.39	15.38
France	7.24	4.55	4.15	7.99
Germany	8.17	7.49	11.65	5.71
Greece	20.54	11.61	16.91 [1]	31.87 [1]
Ireland	4.11	10.83	7.05	10.12
Italy	11.10	7.89	8.09	12.11
Luxembourg	9.58 [2]	10.37 [2]	7.92 [2]	13.65 [2]
Netherlands	7.09	6.69	7.33	6.93
Norway	3.15	49.99	22.59	67.52
Portugal	38.90	11.92	13.23	10.46 [3]
Spain	15.04	17.40	18.81	15.17
Sweden	14.85 [4]	4.98 [4]	8.37 [4]	10.89 [4]
Switzerland	2.09	13.75	2.26	−2.56
Turkey	56.63	64.95	33.44	69.81
United Kingdom	12.29 [5]	10.31 [5]	12.49 [5]	−5.18 [5]

SOURCE:– International Financial Statistics [ITS] Vol EXLIU, No5, May 1991.

NOTES:– Narrow money measure is equal to the sum of currency outside banks and demand deposits other than those of the central government [Data calculated from line 34 of the table]

1. IFS provide no data for these years. Updates obtained from the Central Bank of Greece Bulletin. 1990.

2. IFS provided no data for three years. Narrow money supply measures obtained from Institute Moneytime Luxembourg, Bulletin Times, September 1992.

3. IFS provided no data for this year. Narrow money supply mean obtained from Central Bank of Portugal, Quotes Bulletin, 1991.

4. IFS did not provide data on narrow money supply for Sweden. Change in broad money [M2] is used instead. The Swedish Riksbonte only publishes data on its broad money aggregate.

5. There was a change in the IFS series at the end of 1986 so we used the change in non–interest being M1 over the years as reported in the Bank of England Quarterly Bulletin, Table 11.1, February 1990.

APPENDIX 10 BANKS ASSETS SIZE [$ MILLION] 1987 AND 1988

Country	Year	Number of Banks in Sample	N* Missing Observa-tions	Mean	Median	Standard Deviation	Dispesion Standard Deviation / mean	Minimum	Maximum
1. Austria	1987	41	0	5264	1973	7666	1.46	51	34058
	1988	47	0	4532	1722	6869	1.52	107	31748
2. Belgium	1987	37	0	7354	1243	14523	1.97	133	60802
	1988	38	0	7205	1309	14026	1.95	118	56730
3. Denmark	1987	25	0	3968	1177	5521	1.39	104	35481
	1988	27	0	3885	1364	11443	2.95	97	47497
4. Finland	1987	10	0	8200	3922	9846	1.20	207	25176
	1988	12	0	8292	1852	10913	1.32	150	30419
5. France	1987	142	0	8564	3840	15940	1..86	110	134209
	1988	179	0	8291	2350	14807	1.79	61	152631
6. Germany	1987	149	0	11889	2976	24569	2.07	126	165887
	1988	162	0	10874	2513	23323	2.14	71	167133
7. Greece	1987	9	0	4334	2820	7025	1.62	156	15080
	1988	10	0	5380	2922	849	1.27	230	23317
8. Ireland	1987	16	0	2106	741	3975	1.89	162	12656
	1988	17	0	2024	794	4729	2.34	10	15501
9. Italy	1987	170	0	4629	1301	12351	2.67	5	75565
	1988	318	0	2597	661	9353	3.60	10	69141
10. Luxembourg	1987	84	0	2903	1660	3597	1.24	145	19643
	1988	87	0	2853	1455	3709	1.30	101	20638
11. Netherlands	1987	30	0	10554	1676	24587	2.33	264	84870
	1988	36	0	8608	1845	25167	2.92	261	85176
13. Norway	1987	28	0	3168	1088	5462	1.72	98	20464
	1988	29	0	2846	1131	4557	1.60	151	15739
14. Portugal	1987	17	0	3256	2852	3171	0.97	229	13463
	1988	18	0	3269	2640	3338	1.02	430	14671
15. Spain	1987	105	0	3436	1361	6216	1.81	40	29729
	1988	165	0	2445	1055	6593	2.70	26	45564
16. Sweden	1987	22	0	5268	2214	11132	2.11	104	35172
	1988	24	0	5863	2352	15328	2.61	143	49901
17. Switzerland	1987	138	0	3913	766	16055	4.10	42	124575
	1988	170	0	3301	591	12927	3.92	21	109397
18. United Kindgom	1987	157	0	7632	1743	21794	2.86	42	164430
	1988	178	0	7972	1625	23132	2.90	25	189026
18. Liechtentein	1987	3	0	3085	3622	970	0.31	1966	3668
	1988	3	0	2974	3420	982	0.33	1848	3654
19. Turkey	1987	18	0	1226	864	2181	1.78	176	8309
	1988	[illegible]	0	1480	1034	1753	1.18	120	7191

Source: Authors own estimates

APPENDIX 11 INTEREST PAID / TOTAL FUNDING 1986 AND 1989

Country	Year	Number of Banks in Sample	N° Missing Observa-tions	Mean	Median	Standard Deviation	Dispesion Standard Deviation / mean	Minimum	Maximum
1. Austria	1986	27	0	7.06	6.65	8.08	0.87	4.93	13.35
	1989	48	3	8.73	8.02	13.70	0.64	4.59	9.52
2. Belgium	1986	26	0	7.39	7.23	1.66	0.22	4.04	10.70
	1989	33	0	9.40	8.18	4.79	0.51	5.52	12.10
3. Denmark	1986	22	0	6.33	6.17	1.06	0.17	4.84	9.66
	1989	26	1	7.27	6.99	1.33	0.18	5.37	10.57
4. Finland	1986	9	0	7.36	6.77	14.61	0.50	5.22	12.79
	1989	12	0	10.72	10.02	12.10	0.77	7.16	13.06
5. France	1986	96	2	6.06	4.73	5.09	0.84	0.70	8.88
	1989	138	2	7.82	4.98	10.84	0.72	0.24	9.01
6. Germany	1986	115	9	9.00	5.00	8.56	0.95	1.60	11.91
	1989	149	14	9.62	7.20	6.43	0.67	0.90	12.18
7. Greece	1986	9	5	15.44	11.13	11.53	0.75	7.00	32.48
	1989	3	2	12.15	12.15	n.a	n.a	12.15	12.15
8. Ireland	1986	9	8	9.40	9.40	n.a	n.a	9.40	9.40
	1989	17	13	8.14	7.22	3.70	0.45	5.00	13.13
9. Italy	1986	55	0	10.05	4.84	14.78	1.47	2.56	13.90
	1989	169	0	6.27	3.88	8.88	1.42	0.40	15.39
10. Luxembourg	1986	61	1	7.70	6.56	3.82	0.50	4.74	13.85
	1989	74	0	10.03	9.09	4.83	0.48	4.65	12.43
11. Netherlands	1986	23	23	n.a	n.a	n.a	n.a	n.a	n.a
	1989	29	29	n.a	n.a	n.a	n.a	n.a	n.a
13. Norway	1986	26	1	9.76	9.91	2.26	0.23	0.67	13.07
	1989	27	0	11.00	10.20	153.4	3.74	0.90	14.86
14. Portugal	1986	6	0	33.33	36.55	16.53	0.50	11.72	52.68
	1989	18	0	37.48	35.25	16.81	0.45	16.60	68.57
15. Spain	1986	37	0	7.12	6.61	1.95	0.27	4.96	12.45
	1989	156	0	10.91	6 73	24.74	2.27	4.23	16.00
16. Sweden	1986	19	3	6.26	6.08	2.91	0.46	1.61	9.00
	1989	23	4	8.44	7.32	2.43	0.29	5.84	13.13
17. Switzerland	1986	88	1	4.87	4.85	1.73	0.36	0.40	9.04
	1989	160	1	6.68	6.17	3.78	0.57	0.54	11.99
18. United Kindgom	1986	109	80	8.45	9.19	1.47	0.17	5.46	10.04
	1989	171	121	10.22	10.31	1.75	0.17	4.99	15.18
18. Liechtentein	1986	3	0	4.07	3.99	0.31	0.08	3.81	4.42
	1989	3	0	5.55	5.48	0.36	0.06	5.22	5.94
19. Turkey	1986	9	0	17.66	19.01	4.23	0.24	9.31	22.44
	1989	12	0	25.04	23.05	10.46	0.42	13.85	55.63

Source: Authors own estimates

APPENDIX 11 INTEREST PAID / TOTAL FUNDING 1987 AND 1988 [%]

Country	Year	Number of Banks in Sample	N° Missing Observa-tions	Mean	Median	Standard Deviation	Dispesion Standard Deviation / mean	Minimum	Maximum
1. Austria	1987 1988	41 47	2 3	11.80 9.13	5.78 5.70	4.92 4.67	0.41 0.51	2.95 3.78	14.75 13.04
2. Belgium	1987 1988	37 38	0 0	7.49 7.85	6.92 7.33	2.97 3.11	0.40 0.40	3.76 3.91	13.30 13.55
3. Denmark	1987 1988	25 27	0 1	7.08 6.50	7.01 6.53	0.84 0.49	0.12 0.08	5.36 5.61	9.62 7.41
4. Finland	1987 1988	10 12	0 0	9.95 10.55	6.62 7.58	13.85 11.27	0.72 0.94	4.43 5.17	12.64 12.46
5. France	1987 1988	142 179	2 2	5.64 6.16	3.63 4.27	9.57 8.21	1.70 1.33	0.77 0.25	10.59 9.34
6. Germany	1987 1988	149 162	17 17	6.94 7.65	4.46 5.00	9.29 14.50	1.34 1.90	0.80 0.30	10.07 11.45
7. Greece	1987 1988	9 10	5 5	17.73 16.88	10.55 11.13	17.01 15.20	0.96 0.90	6.76 7.46	23.09 23.93
8. Ireland	1987 1988	16 17	12 12	9.11 8.13	8.66 8.18	1.31 1.95	0.14 0.24	8.09 5.69	11.04 10.21
9. Italy	1987 1988	170 318	0 0	7.18 5.76	4.34 4.12	9.54 6.68	1.33 1.16	0.45 0.16	10.47 12.93
10. Luxembourg	1987 1988	84 87	0 0	7.28 7.64	6.05 6.58	4.40 3.85	0.60 0.50	3.17 3.79	12.17 10.63
11. Netherlands	1987 1988	30 36	30 36	n.a n.a	n.a n.a	n.a n.a	n.a n.a	n.a n.a	n.a n.a
13. Norway	1987 1988	28 29	1 1	9.30 9.41	9.66 9.20	6.66 5.80	0.72 0.62	8.33 9.01	11.85 12.28
14. Portugal	1987 1988	17 18	0 0	42.89 45.18	37.45 41.89	26.83 19.96	0.63 0.44	16.24 19.56	56.50 78.47
15. Spain	1987 1988	105 165	0 0	6.24 8.96	6.02 6.20	1.27 1.49	0.20 0.17	4.53 1.50	11.96 12.67
16. Sweden	1987 1988	22 24	3 4	7.43 6.94	7.03 7.01	3.27 1.39	0.44 0.20	3.75 3.50	10.78 8.99
17. Switzerland	1987 1988	138 170	1 1	4.62 4.63	4.71 4.57	1.75 2.19	0.38 0.47	0.25 0.41	10.92 10.40
18. United Kindgom	1987 1988	157 178	120 127	10.78 8.35	9.08 8.42	16.40 13.08	1.52 1.57	2.83 2.27	13.73 14.57
18. Liechtentein	1987 1988	3 3	0 0	3.79 3.88	3.72 3.84	0.38 0.09	0.10 0.02	3.45 3.83	4.19 3.98
19. Turkey	1987 1988	18 21	0 1	16.46 21 '0	14.52 19.22	9.52 9.73	0.58 0.46	6.32 7.19	24.88 27.75

Source: Authors own estimates

APPENDIX 12 STAFF EXPENSES TO TOTAL ASSETS RATIO 1987 AND 1988

Country	Year	Number of Banks in Sample	N° Missing Observa-tions	Mean	Median	Standard Deviation	Dispesion Standard Deviation / mean	Minimum	Maximum
1. Austria	1987	41	1	0.90	0.74	0.49	0.54	0.15	1.78
	1988	47	1	0.88	0.78	0.46	0.52	0.15	1.87
2. Belgium	1987	37	4	0.53	0.41	0.47	0.89	0.01	1.53
	1988	38	4	0.55	0.44	0.45	0.82	0.01	1.48
3. Denmark	1987	25	1	1.86	1.83	0.46	0.25	1.10	2.74
	1988	27	0	1.78	1.71	0.57	0.32	0.13	2.71
4. Finland	1987	10	0	1.12	0.97	0.71	0.63	0.07	2.41
	1988	12	0	0.94	0.88	0.60	0.64	0.06	2.07
5. France	1987	142	2	1.37	1.13	0.96	0.70	0.04	3.84
	1988	179	5	1.45	1.15	1.19	0.82	0.05	8.54
6. Germany	1987	149	14	1.00	1.10	0.65	0.65	0.09	3.09
	1988	162	14	1.01	1.08	0.68	0.67	0.08	3.46
7. Greece	1987	9	0	1.38	1.50	0.62	0.45	0.43	2.52
	1988	10	0	1.53	1.57	0.76	0.50	0.51	2.78
8. Ireland	1987	16	14	2.36	2.36	0.07	0.03	2.31	2.41
	1988	17	14	1.77	2.38	1.11	0.63	0.48	2.44
9. Italy	1987	170	5	1.77	1.23	1.29	0.95	0.03	10.00
	1988	318	3	1.77	1.22	1.04	0.59	0.01	8.18
10. Luxembourg	1987	84	2	0.28	0.17	0.27	0.96	0.04	1.17
	1988	87	1	0.30	0.19	0.28	0.93	0.04	1.26
11. Netherlands	1987	30	1	0.85	0.82	0.50	0.59	0.07	1.89
	1988	36	0	0.80	0.79	0.51	0.64	0.05	1.91
13. Norway	1987	28	0	1.24	1.33	0.38	0.31	0.17	1.72
	1988	29	1	1.34	1.37	0.45	0.34	0.20	1.89
14. Portugal	1987	17	0	2.83	2.47	1.16	0.41	1.47	5.15
	1988	18	0	3.39	2.80	2.61	0.77	1.67	13.22
15. Spain	1987	105	0	1.89	1.90	0.49	0.26	0.30	2.81
	1988	165	1	1.78	1.78	0.69	0.39	0.09	4.74
16. Sweden	1987	22	0	1.21	1.04	0.62	0.51	0.62	1.92
	1988	24	0	0.81	0.71	0.48	0.59	0.16	2.02
17. Switzerland	1987	138	1	1.78	1.23	1.46	0.82	0.25	6.35
	1988	170	1	1.96	1.19	1.87	0.95	0.28	12.86
18. United Kindgom	1987	157	122	1.07	0.57	0.87	0.81	0.26	4.18
	1988	178	131	1.06	0.60	0.92	0.87	0.22	4.10
18. Liechtenstein	1987	3	0	0.58	0.68	0.19	0.33	0.36	0.69
	1988	3	0	0.57	0.64	0.18	0.32	0.37	0.71
19. Turkey	1987	18	18	n.a	n.a	n.a	n.a	n.a	n.a
	1988	21	21	n.a	n.a	n.a	n.a	n.a	n.a

Source: Authors own estimates

APPENDIX 13 LOANS - TO - ASSETS RATIOS [%] 1986 AND 1989

Country	Year	Number of Banks in Sample	N° Missing Observations	Mean	Median	Standard Deviation	Dispesion Standard Deviation / mean	Minimum	Maximum
1. Austria	1986	27	0	54.61	54.51	17.49	0.32	24.75	84.84
	1989	48	3	59.39	60.93	18.58	0.31	12.05	96.16
2. Belgium	1986	26	0	34.84	34.62	15.22	0.44	9.27	68.75
	1989	33	0	39.40	35.99	17.38	0.44	14.48	81.77
3. Denmark	1986	22	0	52.10	51.40	9.18	0.18	38.48	77.55
	1989	26	3	56.62	55.36	11.06	0.20	37.15	92.18
4. Finland	1986	9	0	50.40	48.68	17.17	0.34	26.50	79.33
	1989	12	0	47.81	52.31	24.97	0.52	14.34	88.76
5. France	1986	96	0	48.36	50.81	13.41	0.28	1.91	85.11
	1989	138	0	54.43	54.11	13.03	0.24	2.02	87.26
6. Germany	1986	115	0	54.63	55.90	21.50	0.39	2.33	96.34
	1989	149	0	51.48	53.56	22.39	0.43	2.41	95.90
7. Greece	1986	9	0	41.30	38.94	7.51	0.18	32.32	53.17
	1989	3	0	35.44	37.70	7.87	0.22	26.69	41.93
8. Ireland	1986	9	0	64.68	62.72	10.71	0.17	53.82	82.60
	1989	17	0	57.40	60.93	20.47	0.36	2.04	79.73
9. Italy	1986	65	0	39.01	36.15	16.17	0.41	0.02	90.60
	1989	169	0	43.37	40.63	16.22	0.37	0.81	95.59
10. Luxembourg	1986	61	0	36.76	37.41	14.87	0.40	6.71	65.50
	1989	74	0	34.26	31.77	18.05	0.53	1.74	72.61
11. Netherlands	1986	23	0	51.51	52.93	17.01	0.33	8.95	79.63
	1989	29	0	47.23	52.43	19.13	0.41	14.25	75.73
13. Norway	1986	26	0	73.59	72.43	7.02	0.10	56.18	88.67
	1989	27	0	74.78	75.11	8.52	0.11	48.17	89.60
14. Portugal	1986	6	0	49.20	46.73	16.25	0.33	29.46	70.98
	1989	18	0	36.86	33.95	11.44	0.31	24.94	61.87
15. Spain	1986	37	0	44.23	43.13	10.66	0.25	21.34	87.44
	1989	155	0	43.17	45.61	14.67	0.34	0.52	96.05
16. Sweden	1986	19	0	54.16	54.40	12.20	0.23	28.43	78.51
	1989	23	0	60.06	65.02	14.48	0.24	31.10	77.79
17. Switzerland	1986	88	0	48.10	44.38	23.15	0.48	7.88	91.47
	1989	160	0	53.14	52.84	23.53	0.44	0.57	91.33
18. United Kindgom	1986	109	0	52.40	51.40	23.43	0.45	4.92	98.17
	1989	171	0	57.80	59.23	24.83	0.43	0.73	98.37
18. Liechtentein	1986	3	0	23.50	20.64	7.71	0.33	17.63	32.23
	1989	3	0	27.13	23.65	10.56	0.39	18.75	38.98
19. Turkey	1986	9	0	46.31	45.94	5.61	0.12	39.05	54.83
	1989	12	0	43.96	43.12	12.65	0.29	24.71	64.15

Source: Authors own estimates

APPENDIX 13 LOANS -TO - ASSETS RATIOS [%] 1987 AND 1988

Country	Year	Number of Banks in Sample	N° Missing Observa-tions	Mean	Median	Standard Deviation	Dispesion Standard Deviation / mean	Minimum	Maximum
1. Austria	1987	41	0	53.23	56.21	20.50	0.38	9.92	90.25
	1988	47	0	56.98	59.38	19.66	0.35	11.88	91.06
2. Belgium	1987	37	0	37.22	35.57	17.46	0.47	8.78	88.92
	1988	38	0	38.92	36.61	17.90	0.46	11.94	79.22
3. Denmark	1987	25	0	60.36	59.65	8.62	0.14	41.18	76.10
	1988	27	0	57.21	55.50	11.14	0.19	41.05	91.38
4. Finland	1987	10	0	44.18	49.90	22.30	0.50	4.97	83.24
	1988	12	0	46.98	52.28	25.91	0.55	12.89	87.20
5. France	1987	142	0	52.17	50.63	17.18	0.33	2.19	85.19
	1988	179	0	53.98	54.47	14.24	0.26	1.50	83.27
6. Germany	1987	149	0	52.64	53.66	21.79	0.41	1.56	97.28
	1988	162	0	52.51	53.68	21.73	0.41	1.65	96.85
7. Greece	1987	9	0	42.00	39.23	8.98	0.21	29.55	57.04
	1988	10	0	42.58	39.62	9.54	0.22	28.05	58.71
8. Ireland	1987	16	0	57.86	58.46	14.96	0.26	15.03	80.92
	1988	17	0	55.87	61.38	19.89	0.36	3.16	78.77
9. Italy	1987	170	0	40.07	36.77	17.59	0.44	0.40	96.26
	1988	318	0	39.66	37.95	13.84	0.35	0.80	95.76
10. Luxembourg	1987	84	0	34.78	34.69	16.60	0.48	2.21	21.69
	1988	87	0	33.61	31.28	16.84	0.50	1.90	67.87
11. Netherlands	1987	30	0	49.80	50.07	19.21	0.39	9.12	83.81
	1988	36	0	50.46	55.31	20.74	0.41	7.96	94.48
13. Norway	1987	28	0	73.20	76.25	9.41	0.13	47.48	89.78
	1988	29	0	74.62	75.84	8.42	0.11	54.21	89.22
14. Portugal	1987	17	0	43.39	39.03	11.22	0.26	28.53	70.41
	1988	18	0	40.93	35.91	12.27	0.30	23.58	70.48
15. Spain	1987	105	0	43.83	44.38	8.69	0.20	21.69	90.02
	1988	165	0	45.10	45.95	13.82	0.31	1.34	97.24
16. Sweden	1987	22	0	55.94	59.68	14.20	0.25	25.89	78.22
	1988	24	0	61.93	66.30	15.60	0.25	27.16	80.89
17. Switzerland	1987	138	0	47.45	45.30	21.92	0.46	3.87	90.05
	1988	170	0	52.64	52.24	22.51	0.43	0.91	90.94
18. United Kindgom	1987	157	0	52.21	49.01	24.86	0.48	1.64	98.47
	1988	178	0	56.07	56.15	24.89	0.44	2.45	98.36
18. Liechtenstein	1987	3	0	23.73	19.87	6.72	0.28	19.82	31.49
	1988	3	0	25.63	23.74	7.76	0.30	18.99	34.16
19. Turkey	1987	18	0	43.41	44.18	10.36	0.24	26.95	71.54
	1988	21	0	41.70	40.56	13.19	0.32	14.49	68.14

Source: Author's own estimates

APPENDIX 14 EQUITY - TO - ASSETS RATIO 1986 AND 1989 [%]

Country	Year	Number of Banks in Sample	N° Missing Observations	Mean	Median	Standard Deviation	Dispesion Standard Deviation / mean	Minimum	Maximum
1. Austria	1986 1989	27 48	0 0	3.09 4.53	2.80 4.27	1.29 1.60	0.42 0.35	0.14 0.35	6.43 9.67
2. Belgium	1986 1989	26 33	0 0	3.19 4.77	2.60 4.19	1.96 2.62	0.61 0.55	0.94 2.11	9.66 13.08
3. Denmark	1986 1989	22 26	0 0	8.64 8.21	7.92 7.77	2.39 2.23	0.28 0.27	5.32 4.67	12.95 13.15
4. Finland	1986 1989	9 12	0 0	3.66 4.17	4.22 3.92	1.47 2.14	0.40 0.51	0.85 0.91	5.42 8.56
5. France	1986 1989	96 138	0 0	4.21 5.14	2.90 3.86	5.64 7.85	1.34 1.53	0.79 0.64	52.67 89.84
6. Germany	1986 1989	115 149	0 0	4.12 4.49	3.91 4.17	1.91 2.60	0.46 0.58	1.59 1.48	12.22 20.90
7. Greece	1986 1989	9 3	0 0	4.82 4.88	2.63 5.72	5.26 2.44	1.09 0.50	1.61 2.13	15.00 6.80
8. Ireland	1986 1989	9 17	0 0	4.44 10.80	4.20 5.19	1.21 22.26	0.27 2.06	3.11 2.57	6.63 96.94
9. Italy	1986 1989	55 169	0 0	5.81 11.38	3.22 3.98	3.54 17.14	0.61 1.51	1.38 0.80	9.42 81.20
10. Luxembourg	1986 1989	61 74	0 0	3.66 3.60	2.39 2.71	5.73 3.92	1.57 1.09	1.65 1.27	45.95 30.51
11. Netherlands	1986 1989	23 29	0 0	4.51 5.30	4.11 4.63	1.94 2.30	0.43 0.43	1.99 2.47	10.58 10.92
13. Norway	1986 1989	26 27	0 0	5.02 3.66	3.99 3.63	2.78 1.02	0.55 0.28	2.16 2.11	15.17 5.84
14. Portugal	1986 1989	6 18	0 0	4.92 2.69	4.67 3.39	1.63 1.14	0.33 0.31	2.95 2.49	7.10 6.18
15. Spain	1986 1989	37 156	0 0	5.75 7.96	5.63 6.27	2.14 8.47	0.42 1.06	0.94 1.67	16.47 94.71
16. Sweden	1986 1989	19 23	0 0	2.45 2.24	1.49 1.54	3.39 1.94	1.38 0.87	0.38 0.94	16.09 9.54
17. Switzerland	1986 1989	88 160	0 0	10.28 12.06	8.64 10.30	6.97 8.34	0.68 0.69	2.66 2.50	39.23 40.55
18. United Kindgom	1986 1989	109 171	0 0	7.56 8.32	6.14 6.69	4.16 5.72	0.55 0.69	2.74 2.39	26.42 43.57
18. Liechtentein	1986 1989	3 3	0 0	8.39 8.98	9.98 10.69	4.26 3.87	0.51 0.43	3.56 4.55	11.62 11.69
19. Turkey	1986 1989	9 12	0 0	6.92 9.93	7.54 8.57	2.63 4.01	0.38 0.40	2.78 6.07	10.30 18.56

Source: Authors own estimates

APPENDIX 14 EQUITY – TO – ASSETS RATIO 1987 AND 1988

Country	Year	Number of Banks in Sample	N° Missing Observations	Mean	Median	Standard Deviation	Dispesion Standard Deviation / mean	Minimum	Maximum
1. Austria	1987	41	0	3.94	3.53	1.42	0.36	0.35	7.70
	1988	47	0	4.24	3.99	1.43	0.34	0.38	7.33
2. Belgium	1987	37	0	4.51	3.54	3.15	0.70	1.59	13.02
	1988	38	0	4.86	3.85	3.08	0.63	1.77	15.00
3. Denmark	1987	25	0	8.63	7.96	2.64	0.31	5.01	14.07
	1988	27	0	8.63	7.78	2.41	0.28	4.92	13.56
4. Finland	1987	10	0	3.45	3.95	1.19	0.34	0.82	4.50
	1988	12	0	4.52	4.27	1.27	0.28	2.85	6.85
5. France	1987	142	0	4.13	3.19	3.39	0.82	0.62	31.39
	1988	179	0	4.29	3.55	3.22	0.75	0.10	26.82
6. Germany	1987	149	0	4.54	4.30	2.20	0.48	1.54	14.45
	1988	162	0	4.53	4.12	2.33	0.51	1.54	16.80
7. Greece	1987	9	0	4.51	2.57	4.65	1.03	1.45	12.79
	1988	10	0	5.26	3.86	3.08	0.59	2.33	11.42
8. Ireland	1987	16	0	5.72	5.49	2.34	0.41	2.17	11.32
	1988	17	0	10.31	5.57	20.21	1.96	2.28	88.42
9. Italy	1987	170	0	11.35	3.59	18.40	1.62	1.57	86.00
	1988	318	0	9.29	3.71	14.96	1.61	1.58	81.49
10. Luxembourg	1987	84	0	3.71	2.76	4.48	1.21	1.66	40.57
	1988	87	0	3.93	2.72	4.58	1.71	1.64	37.93
11. Netherlands	1987	30	0	4.75	4.23	2.24	0.47	1.51	12.39
	1988	36	0	5.10	4.16	2.55	0.50	1.30	12.51
13. Norway	1987	28	0	4.14	3.95	1.39	0.34	1.72	7.02
	1988	29	0	3.22	4.00	2.68	0.83	1.17	6.19
14. Portugal	1987	17	0	4.34	3.90	1.12	0.26	2.85	7.04
	1988	18	0	4.09	3.59	1.23	0.30	2.36	7.08
15. Spain	1987	105	0	5.88	5.48	2.08	0.35	0.85	14.67
	1988	165	0	7.10	5.82	4.37	0.62	0.13	32.66
16. Sweden	1987	22	0	2.33	1.83	1.59	0.68	0.36	7.92
	1988	24	0	2.06	1.65	1.32	0.64	0.56	5.72
17. Switzerland	1987	138	0	11.92	9.89	9.10	0.76	2.41	69.13
	1988	170	0	12.72	10.39	9.52	0.75	2.44	63.83
18. United Kindgom	1987	157	1	8.54	6.92	5.17	0.61	0.20	30.58
	1988	178	0	8.66	6.74	5.23	0.60	1.90	33.64
18. Liechtentein	1987	3	0	10.54	12.43	4.96	0.47	4.91	14.27
	1988	3	0	9.48	10.75	4.45	0.47	4.53	13.15
19. Turkey	1987	18	0	8.20	8.93	2.65	0.32	2.79	12.98
	1988	21	0	10.44	9.35	7.02	0.67	4.47	37.49

Source: Authors own estimates

APPENDIX 15 LOAN-LOSS RESERVES / LOANS [%] 1987 AND 1988

Country	Year	Number of Banks in Sample	N° Missing Observa-tions	Mean	Median	Standard Deviation	Dispesion Standard Deviation / mean	Minimum	Maximum
1. Austria	1987	41	41	n.a	n.a	n.a	n.a	n.a	n.a
	1988	47	47	n.a	n.a	n.a	n.a	n.a	n.a
2. Belgium	1987	37	37	n.a	n.a	n.a	n.a	n.a	n.a
	1988	38	38	n.a	n.a	n.a	n.a	n.a	n.a
3. Denmark	1987	25	24	2.150	2.150	*	*	2.150	2.150
	1988	27	25	1.235	1.235	1.365	1.11	0.270	2.200
4. Finland	1987	10	1	2.722	2.780	1.564	0.57	0.360	5.710
	1988	12	0	2.457	2.255	1.536	0.63	0.140	5.570
5. France	1987	142	99	2.840	2.441	1.151	0.41	0.100	7.000
	1988	179	129	2.421	2.237	2.181	0.90	0.050	7.383
6. Germany	1987	149	80	0.728	0.518	0.615	0.84	0.040	3.571
	1988	162	156	1.461	1.116	1.449	0.99	0.062	3.894
7. Greece	1987	9	0	2.244	1.630	1.077	0.48	1.310	4.320
	1988	10	0	1.952	1.760	1.144	0.59	0.340	4.480
8. Ireland	1987	16	14	3.065	3.065	0.219	0.07	2.910	3.220
	1988	17	15	2.870	2.870	0.297	0.10	2.660	3.080
9. Italy	1987	170	0	4.073	4.549	2.943	0.72	0.010	25.953
	1988	318	0	3.380	3.548	2.157	0.64	0.090	12.36
10. Luxembourg	1987	84	4	9.500	5.753	8.773	0.92	0.260	41.010
	1988	87	4	10.410	5.170	11.550	1.11	0.680	56.670
11. Netherlands	1987	30	30	n.a	n.a	n.a	n.a	n.a	n.a
	1988	36	36	n.a	n.a	n.a	n.a	n.a	n.a
13. Norway	1987	28	0	2.336	2.558	1.047	0.45	0.184	3.863
	1988	29	0	2.261	2.217	1.136	0.50	0.316	5.352
14. Portugal	1987	17	0	2.649	2.951	2.711	1.02	0.362	6.784
	1988	18	0	1.828	1.343	1.516	0.83	0.342	5.725
15. Spain	1987	105	1	3.414	2.935	1.826	0.53	1.020	10.160
	1988	165	4	3.844	2.770	6.037	1.57	0.070	55.600
16. Sweden	1987	22	0	0.571	0.555	0.387	0.68	0.100	1.421
	1988	24	0	0.656	0.660	0.550	0.84	0.009	1.602
17. Switzerland	1987	138	138	n.a	n.a	n.a	n.a	n.a	n.a
	1988	170	170	n.a	n.a	n.a	n.a	n.a	n.a
18. United Kindgom	1987	157	117	3.230	1.480	5.518	1.71	0.068	25.540
	1988	178	125	2.590	1.190	5.661	2.19	0.009	29.350
18. Liechtentein	1987	3	3	n.a	n.a	n.a	n.a	n.a	n.a
	1988	23	3	n.a	n.a	n.a	n.a	n.a	n.a
19. Turkey	1987	18	0	2.264	1.630	2.618	1.16	0.097	8.350
	1988	21	0	3.061	2.140	3.369	1.10	0.001	12.650

Source: Authors own estimates

APPENDIX 16

Relationship between ROA and independent variables 1986 [including LLR/LOAN variable]

Independant Variables	Dependant Variables [1] ROA	VIF	[2] ROA	VIF	[3] ROA	VIF	[4] ROA	VIF
CONSTANT	0.0041a [1.27]		0.0042 [1.29]		0.0124a [5.08]		0.0126a [5.29]	
CR10 ASS	0.0005a [1.06]	1.8	0.0005 [1.05]	1.8	−0.0005 [−1.50]	2.0	0.0005 [−1.62]	2.0
MSASS	−0.0170a [−1.99]	1.4	−0.0166a [−2.61]	1.1	−0.0209a [−2.53]	1.4	−0.0189a [−2.59]	1.1
NARMON	0.0003a [3.69]	2.0	0.0003a [3.71]	2.0	0.0002a [2.68]	1.8	0.0002a [2.64]	1.8
ASSETS	0.00000 [0.13]	1.3			0.00000 [0.51]	1.3		
IPAY / FUND	0.00008 [0.14]	1.1	0.00008 [0.14]	1.1	−0.00006 [−0.23]	1.1	−0.00006 [−0.23]	1.1
LOANS / ASS	−0.0038a [−5.57]	2.1	−0.0038a [−5.59]	2.1	−0.0017a [−3.13]	2.4	−0.0017a [−3.14]	2.3
EQUITY / ASS	0.0415a [6.97]	1.5	0.0415a [6.98]	1.5	0.0117a [5.55]	1.2	0.0116a [5.54]	1.2
STAFF / ASS	0.0919a [4.21]	1.9	0.0919a [4.22]	1.9	0.0438a [3.56]	1.4	0.0434a [3.55]	2.1
LLR / LOAN	−0.0007a [−3.28]	1.4	−0.0007a [−3.31]	1.4				
GOVT	0.0022a [−1.95]	1.5	−0.0022 [−1.95]	1.5	−0.0058a [−6.09]	1.4	−0.0057a [−6.09]	1.4
Observations	759		759		759		759	
N*	435		435		164		164	
$\bar{R}^2$	29.3		29.5		13.1		13.2	
F	13.51		15.06		10.93		12.28	
LM	0.088		0.082		1.703		1.612	
SW	0.994		0.984		0.920		0.921	

Source: Authors own estimates

APPENDIX 16

Relationship between ROA and independent variables 1987 [including LLR/LOAN variable]

Independant Variables	Dependant Variables [1] ROA		[2] ROA		[3] ROA		[4] ROA	
		VIF		VIF		VIF		VIF
CONSTANT	−0.1083[a] [−10.46]		−0.1082[a] [−10.51]		−0.0589[a] [−8.40]		−0.0589[a] [−8.51]	
CR10 ASS	0.0020[a] [11.59]	2.2	0.0020[a] [11.62]	2.1	0.0011[a] [10.00]	2.1	0.0011[a] [10.08]	2.1
MSASS	−0.0723[a] [2.27]	1.7	−0.0706[a] [−2.61]	1.2	−0.0293 [−1.12]	1.5	−0.0288 [−1.25]	1.2
NARMON	0.0003[a] [5.46]	1.3	0.000004[a] [5.46]	1.3	0.000004[a] [7.84]	1.2	0.000004[a] [7.84]	1.2
ASSETS	0.00000 [0.10]	1.5	–	–	0.00000 [0.04]	1.3	–	–
IPAY / FUND	0.00004 [0.05]	1.0	0.00005 [0.05]	1.0	0.0004 [0.59]	1.0	0.0004 [0.59]	1.0
LOANS / ASS	−0.0153[a] [−6.19]	1.2	−0.0152[a] [−6.20]	1.2	−0.0111[a] [−7.89]	1.2	−0.0112[a] [−7.90]	1.2
EQUITY / ASS	0.1032[a] [6.82]	1.4	0.1031[a] [6.84]	1.4	0.0768[a] [8.46]	1.2	0.0768[a] [8.52]	1.2
STAFF / ASS	0.0141[a] [10.39]	1.2	0.0141[a] [10.40]	1.2	0.01683[a] [14.09]	1.1	0.0169[a] [14.10]	1.1
LLR / LOAN	0.00003 [0.90]	1.4	0.0003 [0.90]	1.4	–	–	–	–
GOVT	0.0347[a] [8.45]	2.0	0.0347[a] [8.48]	2.0	0.0222[a] [7.37]	2.2	0.0222[a] [7.37]	2.2
Observations	1201		1201		1201		1201	
N*	627		627		238		238	
$\bar{R}^2$	55.4		55.5		43.6		43.6	
F	64.4		71.7		70.12		78.98	
LM	0.4504		0.438		1.196		1.187	
SW	0.985		0.990		0.989		0.987	

Source: Authors own estimates

APPENDIX 16

Relationship between ROA and independent variables 1988 [including LLR/LOAN variable]

Independant Variables	[1] ROA	VIF	[2] ROA (Dependant Variables)	VIF	[3] ROA	VIF	[4] ROA	VIF
CONSTANT	-0.232^{a} [−3.12]		-0.0199^{a} [−2.84]		-0.0188^{a} [−4.48]		-0.0197^{a} [−4.87]	
CR10 ASS	0.0004^{a} [3.70]	1.4	0.0004^{a} [3.46]	1.3	0.0003^{a} [5.18]	1.4	0.0003^{a} [5.56]	1.3
MSASS	−0.0179 [−0.52]	1.7	0.0092 [0.33]	1.1	0.0624^{a} [2.27]	1.6	0.0502^{a} [2.21]	1.1
NARMON	0.0004^{a} [2.45]	1.2	0.0003^{a} [2.36]	1.2	0.0006^{a} [4.34]	1.2	0.0006^{a} [4.40]	1.2
ASSETS	0.00000 [1.33]	1.6	–	–	−0.0000 [−0.79]	1.5	–	–
IPAY / FUND	−0.0005 [−0.74]	1.0	−0.0005 [−0.73]	1.0	−0.0000 [−0.06]	1.0	−0.0000 [−0.06]	1.0
LOANS / ASS	-0.0133^{a} [−8.11]	1.5	-0.0132^{a} [−8.05]	1.5	-0.0079^{a} [−8.51]	1.6	-0.0079^{a} [−8.53]	1.6
EQUITY / ASS	0.1032^{a} [10.38]	1.5	0.1031^{a} [10.37]	1.5	0.0836^{a} [14.32]	1.3	0.0839^{a} [14.44]	1.3
STAFF / ASS	0.0561 [1.04]	1.6	0.0554 [1.03]	1.6	0.0070 [0.33]	1.7	0.0074 [0.35]	1.7
LLR / LOAN	0.0003^{a} [9.14]	1.4	00003^{a} [9.11]	1.4	–	–	–	–
GOVT	0.0167^{a} [6.05]	1.6	0.0162^{a} [5.91]	1.6	0.0099^{a} [6.30]	1.4	0.0099^{a} [6.32]	1.4
Observations	1541		1541		1541		1541	
N*	807		807		272		272	
$\bar{R}^2$	47.6		47.6		22.9		23.0	
F	57.8		64.0		39.4		44.3	
LM	0.141		0.138		0.025		0.028	
SW	0.992		0.981		0.971		0.970	

Source: Authors own estimates

APPENDIX 16

Relationship between ROE and independent variables 1986 [including LLR/LOAN variable]

Independant Variables	[1] ROE		Dependant Variables [2] ROE		[3] ROE		[4] ROE	
		VIF		VIF		VIF		VIF
CONSTANT	0.0958[a] [2.32]		0.0939[a] [2.30]		0.01273[a] [3.42]		0.1369[a] [3.75]	
CR10 ASS	−0.00002 [−0.03]	1.4	0.0000 [0.01]	1.8	−0.00007 [−0.13]	2.0	−0.0002 [−0.38]	2.0
MSASS	−0.0057 [−0.05]	2.0	−0.0244 [−0.25]	1.1	−0.0454 [−0.36]	1.4	0.0334 [0.30]	1.1
NARMON	0.0064[a] [5.57]	1.3	0.0063[a] [5.56]	2.0	0.0015 [1.47]	1.8	0.0013 [1.35]	1.8
ASSETS	0.0000 [−0.39]	1.1			0.00000 [1.32]	1.3		
IPAY / FUND	0.0085 [1.14]	2.1	0.0085 [1.14]	1.1	0.0093[a] [2.21]	1.1	0.0093[a] [2.21]	1.1
LOANS / ASS	−0.0024 [−0.28]	1.5	−0.0024 [−0.27]	2.1	0.0011 [0.13]	2.4	0.0009 [0.11]	2.3
EQUITY / ASS	−0.0942 [−1.25]	1.9	−0.0932 [−1.24]	1.5	−0.0261 [−0.81]	1.2	−0.0289 [−0.89]	1.2
STAFF / ASS	1.3240[a] [4.78]	1.4	1.3230[a] [4.78]	1.9	0.4426[a] [2.35]	2.1	0.4300[a] [2.29]	2.1
LLR / LOAN	−0.0114[a] [−3.99]	1.5	−0.0113[a] [−3.98]	1.4				
GOVT	0.0057 [0.40]	1.4	−0.0055 [0.39]	1.5	−0.0134 [−0.92]	1.4	−0.0131 [−0.90]	1.4
Observations	759		759		759		759	
N*	435		435		164		164	
$\bar{R}^2$	19.1		19.3		1.6		1.4	
F	8.11		9.02		2.06		2.09	
LM	0.025		0.019		0.0119		0.023	
SW	0.969		0.968		0.957		0.958	

Source: Authors own estimates

APPENDIX 16

Relationship between ROE and independent variables 1987 [including LLR/LOAN variable]

Independant Variables	Dependant Variables [1] ROE		[2] ROE		[3] ROE		[4] ROE	
		VIF		VIF		VIF		VIF
CONSTANT	−2.7972[a] [−5.44]		−2.7461[a] [−5.37]		−1.2106[a] [−3.92]		−1.1476[a] [−3.77]	
CR10 ASS	0.0557[a] [6.44]	2.2	0.0552[a] [6.40]	2.1	0.0254[a] [5.15]	2.1	0.0246[a] [5.03]	2.1
MSASS	−6.0630[a] [−3.83]	1.7	−5.2400[a] [−3.90]	1.2	−4.5740[a] [−3.98]	1.5	−3.8990[a] [−3.83]	1.2
NARMON	0.0005[a] [17.47]	1.3	0.0005[a] [17.46]	1.3	0.0005[a] [23.65]	1.2	0.0005[a] [23.62]	1.2
ASSETS	0.00000 [0.99]	1.5	–	–	0.00000 [1.26]	1.3	–	–
IPAY / FUND	0.0097 [0.21]	1.0	0.0106 [0.23]	1.0	0.0133 [0.45]	1.0	0.0139 [0.47]	1.0
LOANS / ASS	−0.0937 [−0.77]	1.2	−0.0862 [−0.71]	1.2	−0.0619 [−0.99]	1.2	−0.638 [−1.02]	1.2
EQUITY / ASS	−2.1274[a] [−2.83]	1.4	−2.1805[a] [−2.91]	1.4	−0.7855 [−1.90]	1.2	−0.8441[a] [−2.13]	1.2
STAFF / ASS	0.4199[a] [6.24]	1.2	0.4192[a] [6.23]	1.2	0.5175[a] [9.86]	1.1	0.5182[a] [9.87]	1.1
LLR / LOAN	−0.0009 [−0.61]	1.4	0.0009 [−0.61]	1.4	–	–	–	–
GOVT	0.7585[a] [3.72]	2.0	0.7420[a] [3.65]	2.0	0.3621[a] [2.72]	2.2	0.3627[a] [2.73]	2.2
Observations	1201		1201		1201		1201	
N*	627		627		238		238	
$\bar{R}^2$	52.1		52.1		50.4		50.4	
F	56.6		62.7		92.0		103.2	
LM	0.399		0.354		0.893		0.857	
SW	0.772		0.751		0.650		0.588	

Source: Authors own estimates

APPENDIX 16

Relationship between ROE and independent variables 1988 [including LLR/LOAN variable]

Independant Variables	Dependant Variables [1] ROE		[2] ROE		[3] ROE		[4] ROE	
		VIF		VIF		VIF		VIF
CONSTANT	0.2079[a] [4.25]		0.2325[a] [5.02]		0.0799[a] [2.36]		0.0897[a] [2.75]	
CR10 ASS	−0.0013 [−1.63]	1.4	−0.0016[a] [−2.21]	1.3	0.0004 [0.88]	1.4	0.0003 [0.63]	1.3
MSASS	−0.0105 [−0.05]	1.7	0.1950 [1.05]	1.1	0.1510 [0.68]	1.6	0.2841 [1.55]	1.1
NARMON	0.0023[a] [2.34]	1.2	0.0022[a] [2.22]	1.2	0.0023[a] [2.18]	1.2	0.00226[a] [2.12]	1.2
ASSETS	0.0000 [1.52]	1.6	–	–	0.0000 [1.07]	1.5	–	–
IPAY / FUND	0.0158[a] [3.75]	1.0	0.0158[a] [3.76]	1.0	0.0012 [1.26]	1.0	0.0013 [1.26]	1.0
LOANS / ASS	−0.0603[a] [−5.58]	1.5	−0.0594[a] [−5.50]	1.5	−0.0529[a] [−7.04]	1.6	−0.0528[a] [−7.02]	1.6
EQUITY / ASS	−0.1305[a] [−1.99]	1.5	−0.1314[a] [−2.00]	1.5	0.0239 [0.51]	1.3	0.0198 [0.42]	1.3
STAFF / ASS	0.6656 [1.87]	1.6	0.6597 [1.86]	1.6	0.9957[a] [5.77]	1[illegible]	0.9914[a] [5.75]	1.7
LLR / LOAN	0.0007[a] [3.77]	1.4	0.0007[a] [3.74]	1.4	–	–	–	–
GOVT	0.1249[a] [6.85]	1.6	0.1206[a] [6.69]	1.6	0.0723[a] [5.67]	1.4	0.0720[a] [5.64]	1.4
Observations	1541		1541		1541		1541	
N*	807		807		272		272	
$\bar{R}^2$	18.6		18.4		7.3		7.2	
F	15.29		16.69		11.10		12.34	
LM	0.007		0.004		0.092		0.094	
SW	0.890		0.891		0.828		0.829	

Source: Authors own estimates

APPENDIX 17
ROA and Concentration 1986 [including LLR/LOAN variable]

Dependent Variables / Independent Variables	[1] ROA		[2] ROA		[3] ROA		[4] ROA		[5] ROA		[6] ROA	
		VIF		VIF		VIF		VIF		VIF		VIF
CONSTANT	−0.0229ª [−5.01]		0.0042 [1.29]		−0.0130ª [−3.27]		0.0066ª [2.95]		0.0061ª [2.70]		0.0025 [0.92]	
CR5 ASS	0.0004ª [5.82]	1.7										
CR10ASS			0.00005 [1.05]	1.8								
CR5DEP					0.0002ª [4.14]	1.6						
CR10DEP							0.00001 [0.37]	1.7				
HERFASS									−0.0468ª [−4.50]	1.5		
HERFDEP											−0.0094 [−0.71]	1.5
MSASS	−0.0449ª [−2.85]	1.1	−0.0166ª [−2.17]	1.1	−0.0451ª [−2.72]	1.2	−0.0157ª [−2.00]	1.3	0.0102 [0.59]	1.3	−0.0176 [−0.99]	1.3
NARMON	0.0018ª [12.58]	1.8	0.0003ª [3.71]	2.0	0.0017ª [11.63]	1.6	0.0003ª [3.58]	1.2	0.0016ª [11.56]	1.4	0.0014ª [10.35]	1.4
IPAY/FUND	0.0014 [1.17]	1.1	0.00008 [0.14]	1.1	0.0012 [1.00]	1.1	0.0006 [0.11]	1.0	0.0005 [0.38]	1.1	0.0007 [0.55]	1.1
LOAN/ASS	−0.0064ª [−4.61]	2.0	−0.0038ª [−5.59]	2.1	−0.0069ª [−4.81]	2.0	−0.0039ª [−5.75]	1.2	−0.0065ª [−4.34]	2.0	−0.0070ª [−4.72]	2.0
EQUITY/ASS	0.0948ª [8.30]	1.9	0.0415ª [6.98]	1.5	0.0979ª [8.38]	1.9	0.0414a [6.95]	1.4	0.0941ª [8.04]	1.9	0.1004ª [8.33]	1.9
STAFF/ASS	0.1435ª [3.27]	1.8	0.0919ª [4.22]	1.9	0.1334ª [2.97]	1.8	0.0921ª [4.21]	1.0	0.1342ª [3.00]	1.8	0.1264ª [2.74]	1.8
LLR/LOAN	−0.0006 [−1.81]	1.5	−0.0007ª [−3.31]	1.4	−0.00005 [−1.42]	1.5	−0.0007 [−3.23]	1.4	−0.00005 [−1.49]	1.5	−0.0003 [−0.97]	1.5
GOVT	−0.0089ª [−3.97]	1.5	−0.0022 [−1.95]	1.5	−0.0090ª [−3.82]	1.6	−0.0022 [−1.91]	1.8	−0.0165ª [−6.88]	1.6	−0.0128ª [−5.39]	1.5
Observations	759		759		759		759		759		759	
N*	435		441		435		441		435		435	
$\bar{R}^2$	59.2		29.5		57.1		29.3		57.5		54.7	
F	50.76		15.06		46.52		14.90		47.31		42.33	
LM	0.089		0.082		0.309		0.081		0.351		0.201	
SW	0.987		0.984		0.980		0.992		0.985		0.981	

Source: Authors own estimates

APPENDIX 17
ROA and Concentration 1987 [including LLR/LOAN variable]

Dependent Variables / Independent Variables	[1] ROA		[2] ROA		[3] ROA		[4] ROA		[5] ROA		[6] ROA	
		VIF		VIF		VIF		VIF		VIF		VIF
CONSTANT	−0.0184[a] [−2.93]		−0.1082[a] [−10.51]		−0.0217[a] [−3.60]		−0.0425[a] [−5.43]		−0.0042 [1.46]		0.0009 [0.29]	
CR5 ASS	0.0006[a] [4.66]	1.7										
CR10ASS			0.0020[a] [11.62]	2.1								
CR5DEP					0.0006[a] [5.48]	1.7						
CR10DEP							0.0008[a] [6.85]	1.7				
HERFASS									0.0657[a] [3.55]	1.4		
HERFDEP											0.1173[a] [4.49]	1.6
MSASS	−0.0272 [−0.92]	1.2	−0.0706[a] [−2.61]	1.2	−0.0428 [−1.43]	1.2	−0.0598[a] [−2.01]	1.3	−0.0421[a] [−1.33]	1.3	−0.0623 [−1.93]	1.4
NARMON	0.000004[a] [6.76]	1.2	0.000003[a] [5.46]	1.3	0.000004[a] [6.90]	1.2	0.00005[a] [7.92]	1.2	0.000004[a] [6.99]	1.2	0.00004[a] [6.91]	1.2
IPAY/FUND	0.0003 [0.24]	1.0	0.000005 [0.05]	1.0	0.00001 [0.01]	1.0	−0.0002 [−0.18]	1.0	0.0003 [0.30]	1.0	0.0003 [0.25]	1.0
LOAN/ASS	−0.0180[a] [−6.27]	1.3	−0.0152[a] [−6.20]	1.2	−0.0123[a] [−4.56]	1.2	−0.0107[a] [−4.01]	1.2	−0.0144[a] [−5.26]	1.2	−0.0168[a] [−5.98]	1.2
EQUITY/ ASS	0.1342[a] [8.19]	1.4	0.1031[a] [6.84]	1.4	0.1308[a] [8.03]	1.4	0.1204[a] [7.41]	1.4	0.1511[a] [9.35]	1.3	0.1447[a] [8.98]	1.3
STAFF/ASS	0.0179[a] [12.38]	1.1	0.0141[a] [10.40]	1.2	0.0178[a] [12.49]	1.1	0.0186[a] [13.58]	1.0	0.0181[a] [12.28]	1.1	0.0175[a] [11.78]	1.1
LLR/LOAN	0.0008[a] [2.35]	1.4	0.0003 [0.90]	1.4	0.0008[a] [2.64]	1.3	0.0007[a] [2.08]	1.3	0.0009[a] [2.82]	1.3	0.0008[a] [2.65]	1.3
GOVT	0.0159[a] [3.77]	1.7	0.0347[a] [8.84]	2.0	0.0167[a] [4.08]	1.7	0.0208[a] [5.03]	1.8	0.0049 [1.38]	1.2	0.0081[a] [2.24]	1.3
Observations	1201		1201		1201		1201		1201		1201	
N*	627		627		627		627		627		627	
$\bar{R}^2$	45.9		55.5		46.7		48.4		44.9		45.7	
F	49.01		71.70		50.69		54.06		47.19		48.71	
LM	1.257		0.438		1.196		1.239		1.454		1.274	
[illegible]	0.996		0.974		0.998		0.899		0.862		0.881	

Source: Authors own estimates

APPENDIX 17
ROA and Concentration 1988 [including LLR/LOAN variable]

Dependent Variables / Independent Variables	[1] ROA	VIF	[2] ROA	VIF	[3] ROA	VIF	[4] ROA	VIF	[5] ROA	VIF	[6] ROA	VIF
CONSTANT	−0.0113 [−1.90]		−0.0197^{a} [−4.87]		−0.0095 [−1.70]		−0.0165^{a} [−2.68]		−0.0056 [−1.56]		−0.0038 [−1.26]	
CR5 ASS	−0.0003^{a} [2.61]	1.7	–	–	–	–	–	–	–	–	–	–
CR10ASS	–	–	0.0003^{a} [5.56]	1.3	–	–	–	–	–	–	–	–
CR5DEP	–	–	–	–	0.0002^{a} [2.46]	1.4	–	–	–	–	–	–
CR10DEP	–	–	–	–	–	–	0.0003^{a} [3.42]	12	–	–	–	–
HERFASS	–	–	–	–	–	–	–	–	0.0912^{a} [3.17]	1.7	–	–
HERFDEP	–	–	–	–	–	–	–	–	–	–	0.0709^{a} [3.52]	2.1
MSASS	0.0139 [0.49]	1.1	0.0502 [0.42]	1.1	0.0158 [0.56]	1.1	0.0118 [0.42]	1.1	−0.0074 [−0.25]	1.3	−0.0372 [−1.10]	1.7
NARMON	0.0005^{a} [3.13]	1.5	0.0006^{a} [4.46]	1.2	0.0005^{a} [3.05]	1.5	0.0004^{a} [2.45]	1.2	0.0005^{a} [3.18]	1.3	0.0005^{a} [3.23]	1.3
IPAY/FUND	−0.0004 [−0.72]	1.0	−0.0000 [−0.06]	1.0	−0.0005 [−0.74]	1.0	−0.0005 [−0.75]	1.0	−0.0005 [−0.73]	1.0	−0.0005 [−0.73]	1.0
LOAN/ASS	−0.0139^{a} [−8.52]	1.5	−0.0079^{a} [−8.53]	1.6	−0.0134^{a} [−8.16]	1.5	−0.0125^{a} [−7.52]	1.6	−0.0128^{a} [−7.67]	1.6	−0.13[illegible]^{a} [−8.1[illegible]]	1.5
EQUITY/ ASS	0.1046^{a} [10.49]	1.5	0.0839^{a} [14.44]	1.3	0.1054^{a} [10.58]	1.5	0.1043^{a} [10.51]	1.5	0.1069^{a} [10.77]	1.5	0.1053^{a} [10.63]	1.5
STAFF/ASS	0.0693 [1.29]	1.6	0.0074 [0.35]	1.7	0.0713 [1.32]	1.6	0.0606 [1.13]	1.6	0.0806 [1.50]	1.6	0.0713 [1.33]	1.6
LLR/LOAN	0.0003^{a} [9.28]	1.4	0.0003^{a} [9.11]	1.4	0.0003^{a} [9.41]	1.4	0.0003^{a} [9.19]	1.4	0.0003^{a} [9.58]	1.4	0.0003^{a} [9.60]	1.4
GOVT	0.0174^{a} [5.71]	1.9	0.0099^{a} [6.32]	1.4	0.0152^{a} [5.57]	1.5	0.0131^{a} [5.02]	1.4	0.0167^{a} [5.92]	1.6	0.0179^{a} [6.15]	1.8
Observations	1541		1541		1541		1541		1541		1541	
N*	807		807		807		807		807		807	
$\bar{R}^2$	47.1		46.6		47.1		47.5		47.4		47.6	
F	62.9		64.00		62.8		63.9		63.6		64.1	
LM	0.145		0.138		0.152		0.142		0.155		0.165	
SW	0.993		0.991		0.989		0.989		0.979		0.978	

Source: Authors own estimates

APPENDIX 17
ROA and Concentration 1989 [including LLR/LOAN variable]

Dependent Variables / Independent Variables	[1] ROA		[2] ROA		[3] ROA		[4] ROA		[5] ROA		[6] ROA	
		VIF		VIF		VIF		VIF		VIF		VIF
CONSTANT	0.0206^a [6.73]		0.0131^a [2.66]		0.0170^a [6.29]		0.0131^a [3.21]		0.0103^a [5.42]		0.0095^a [6.52]	
CR5ASS	−0.0003^a [−4.49]	1.2	–	–	–	–	–	–	–	–	–	–
CR10ASS	–	–	−0.00009 [−1.10]	1.1	–	–	–	–	–	–	–	–
CR5DEP	–	–	–	–	−0.0002^a [−3.74]	1.1	–	–	–	–	–	–
CR10DEP	–	–	–	–	–	–	−0.00009 [−1.35]	1.1	–	–	–	–
HERFASS	–	–	–	–	–	–	–	–	−0.0340 [−1.62]	1.7	–	–
HERFDEP	–	–	–	–	–	–	–	–	–	–	−0.0235 [−1.88]	2.1
MSASS	0.0147 [0.91]	1.1	0.0001 [0.01]	1.1	−0.0015 [−0.09]	1.0	−0.0019 [0.11]	1.1	0.0116 [0.62]	1.4	0.0208 [1.00]	1.7
NARMON	0.00007 [0.18]	1.1	0.00004 [0.89]	1.1	0.000008 [0.18]	1.1	0.00003 [0.81]	1.1	0.00002 [0.57]	1.1	0.00002 [0.42]	1.2
IPAY/FUND	0.0011^a [2.71]	1.2	0.0010^a [2.41]	1.2	0.0011^a [2.64]	1.2	0.00101^a [2.42]	1.2	0.0011^a [2.44]	1.2	0.00103^a [2.41]	1.2
LOAN/ASS	−0.0105^a [−10.05]	1.6	−0.0108 [−10.06]	1.6	−0.01018^a [−10.33]	1.6	−0.0109^a [−10.08	1.7	−0.0110^a [−10.12]	1.7	−0.0107^a [−10.10]	1.1
EQUITY/ ASS	0.0912^a [12.64]	1.4	0.0887^a [13.06]	1.4	0.0897^a [13.38]	1.4	0.0886^a [13.07]	1.4	0.0884^a [13.06]	1.4	0.0888^a [13.12]	1.4
STAFF/ASS	0.1607^a [4.64]	1.5	0.1639^a [4.61]	1.6	0.1561^a [4.48]	1.4	0.1622^a [4.59]	1.6	0.1556^a [4.59]	1.6	0.1581^a [4.49]	1.5
LLR/LOAN	−0.0005^a [−5.14]	1.3	−0.004^a [−4.36]	1.3	−0.0005^a [−4.95]	1.3	−0.004^a [−4.40]	1.3	−0.0004^a [−4.49]	1.3	−0.0004^a [−4.45]	1.3
GOVT	0.0006 [−0.26]	1.7	0.0021 [0.69]	1.6	0.0008 [0.40]	1.6	0.00160 [0.77]	1.6	0.0007 [0.33]	1.6	0.0003 [0.02]	1.8
Observations	1268		1268		1268		1268		1268		1268	
N*	716		716		716		716		716		716	
$\bar{R}^2$	39.5		37.2		38.8		37.3		37.4		37.5	
F	37.86		34.5		36.75		34.57		34.71		34.88	
LM	0.30		1.40		0.50		1.20		0.80		0.60	
SW	0.970		0.882		0.974		0.870		0.884		0.885	

Source: Authors own estimates

APPENDIX 17
ROE and Concentration 1986 [including LLR/LOAN variable]

Dependent Variables / Independent Variables	[1] ROE		[2] ROE		[3] ROE		[4] ROE		[5] ROE		[6] ROE	
		VIF		VIF		VIF		VIF		VIF		VIF
CONSTANT	0.0475 [1.63]		0.0939^{a} [2.30]		0.0588^{a} [2.39]		0.0869^{a} [3.02]		0.0845^{a} [6.05]		0.0769^{a} [4.80]	
CR5ASS	0.0008 [1.70]	1.7										
CR10ASS			0.0000 [0.01]	1.5								
CR5DEP					0.0006 [1.56]	1.6						
CR10DEP							0.0001 [0.29]	1.6				
HERFASS									0.0735 [1.14]	1.5		
HERFDEP											0.1178 [1.47]	1.5
MSASS	−0.1350 [−1.35]	1.1	−0.0245 [−0.25]	1.3	−0.1462 [−1.43]	1.2	−0.0334 [−0.34]	1.2	−0.1468 [−1.37]	1.3	−0.1615 [−1.51]	1.3
NARMON	0.0079^{a} [8.43]	1.8	0.0063^{a} [5.56]	1.4	0.0077^{a} [8.64]	1.6	0.0065^{a} [6.27]	1.7	0.0069^{a} [8.34]	1.4	0.0074^{a} [8.83]	1.4
IPAY/FUND	0.0079 [1.03]	1.1	0.0085 [1.14]	1.1	0.0078 [1.02]	1.1	0.0087 [1.17]	1.1	0.0072 [0.93]	1.1	0.0075 [0.97]	1.1
LOAN/ASS	−0.0068 [−0.76]	2.0	−0.0024 [−0.27]	2.0	−0.0076 [−0.86]	2.0	−0.0024 [−0.27]	2.0	−0.0086 [−0.96]	2.0	−0.0061 [−0.68]	2.0
EQUITY/ ASS	0.0691 [−0.96]	1.9	−0.0932 [−1.24]	1.9	−0.0648 [−0.90]	1.9	−0.0931 [−1.23]	1.5	0.0460 [−0.63]	1.9	−0.0465 [−0.64]	1.9
STAFF/ASS	1.3432^{a} [4.85]	1.8	1.3230^{a} [4.78]	1.8	1.3276^{a} [4.79]	1.8	1.3223^{a} [4.78]	1.9	1.3043^{a} [4.70]	1.8	1.3314^{a} [4.80]	1.8
LLR/LOAN	−0.0005^{a} [−2.50]	1.5	−0.0113^{a} [−3.98]	1.4	−0.0005^{a} [−2.44]	1.5	−0.0114^{a} [−4.00]	1.4	−0.0004^{a} [−2.14]	1.5	−0.0004^{a} [−2.26]	1.5
GOVT	−0.0134 [−0.98]	1.5	0.0055 [0.39]	1.6	−0.0125 [−0.85]	1.6	0.0066 [0.45]	1.6	−0.0136 [−0.91]	1.6	−0.0147 [−1.03]	1.5
Observations	759		759		759		759		759		759	
N*	435		441		435		441		435		435	
$\bar{R}^2$	25.1		19.3		25.0		19.3		24.7		24.9	
F	12.46		9.02		12.4		9.04		12.23		12.36	
LM	0.000		0.019		0.000		0.0[illegible]8		0.000		0.000	
SW	0.975		0.968		0.976		[illegible]85		[illegible]975		0.976	

Source: Authors own estimates

APPENDIX 17
ROE and Concentration 1987 [including LLR/LOAN variable]

Dependent Variables / Independent Variables	[1] ROE	VIF	[2] ROE	VIF	[3] ROE	VIF	[4] ROE	VIF	[5] ROE	VIF	[6] ROE	VIF
CONSTANT	0.6835[a] [−2.37]		−2.7461[a] [−5.37]		−0.5857[a] [−2.09]		−0.4843[a] [−1.30]		0.1630 [1.26]		−0.0153 [−0.11]	
CR5 ASS	0.0264[a] [4.27]	1.7										
CR10ASS			0.0552[a] [6.40]	2.1								
CR5DEP					0.0215[a] [4.04]	1.7						
CR10DEP							0.0151[a] [2.62]	1.7				
HERFASS									4.5094[a] [5.39]	1.4		
HERFDEP											7.2920[a] [6.19]	1.6
MSASS	−4.4640[a] [−3.27]	1.2	−5.2400[a] [−3.90]	1.2	−4.7780[a] [−3.44]	1.2	−4.3900[a] [−3.10]	1.3	−6.2280[a] [−4.36]	1.3	−7.2090[a] [−4.95]	1.4
NARMON	0.0005[a] [18.14]	1.2	0.0005[a] [17.46]	1.3	0.0005[a] [18.37]	1.2	0.0005[a] [18.89]	1.2	0.0005[a] [18.39]	1.2	0.0005[a] [18.42]	1.2
IPAY/FUND	0.0172 [0.36]	1.0	0.0106 [0.23]	1.0	0.0085 [0.18]	1.0	0.0079 [0.16]	1.0	0.0230 [0.49]	1.0	0.0186 [0.40]	1.0
LOAN/ASS	−0.2259 [−1.71]	1.3	−0.0862 [−0.71]	1.2	0.0038 [0.03]	1.2	0.0111 [0.09]	1.2	−0.0961 [−0.78]	1.2	−0.2370 [−1.87]	1.2
EQUITY/ ASS	−1.5669[a] [−2.08]	1.4	−2.1805[a] [−2.91]	1.4	−1.5592[a] [−2.06]	1.4	−1.4350 [−1.86]	1.4	−0.8315 [−1.14]	1.3	−1.2509 [−1.72]	1.3
STAFF/ASS	0.4976[a] [7.48]	1.1	0.4192[a] [6.23]	1.2	0.5084[a] [7.67]	1.1	0.5533[a] [8.47]	1.0	0.4648[a] [6.98]	1.1	0.4343[a] [6.50]	1.1
LLR/LOAN	0.002 [0.15]	1.4	−0.009 [−0.61]	1.4	0.006 [0.42]	1.3	0.004 [0.27]	1.4	0.009 0.0745	1.3	0.005 [0.36]	1.3
GOVT	0.3931[a] [2.02]	1.7	0.7420[a] [3.65]	2.0	0.3322 [1.75]	1.7	0.2189 [1.11]	1.8	[−0.46] [0.61]	1.2	0.1209[a] [0.75]	1.3
Observations	1201		1201		1201		1201		1201		1201	
N*	627		627		627		627		394		627	
$\bar{R}^2$	50.0		52.1		49.9		48.9		51.1		51.9	
F	57.78		62.74		57.37		55.29		60.15		62.17	
LM	0.499		0.353		0.5159		0.632		0.432		0.374	
SW	0.654		0.672		0.645		0.608		0.649		0.676	

Source: Authors own estimates

APPENDIX 17
ROE and Concentration 1988 [including LLR/LOAN variable]

Dependent Variables / Independent Variables	[1] ROE		[2] ROE		[3] ROE		[4] ROE		[5] ROE		[6] ROE	
		VIF		VIF		VIF		VIF		VIF		VIF
CONSTANT	0.2308[a] [5.93]		0.2325[a] [5.02]		0.2176[a] [5.95]		0.2063[a] [5.09]		0.1532[a] [6.46]		0.1422[a] [6.98]	
CR5 ASS	−0.0018[a] [−2.65]	1.7	–	–	–	–	–	–	–	–	–	–
CR10ASS	–	–	−0.0016[a] [−2.21]	1.3	–	–	–	–	–	–	–	–
CR5DEP	–	–	–	–	−0.0014[a] [−2.46]	1.4	–	–	–	–	–	–
CR10DEP	–	–	–	–	–	–	−0.0011 [−1.87]	12	–	–	–	–
HERFASS	–	–	–	–	–	–	–	–	−0.1794 [−0.94]	1.7	–	–
HERFDEP	–	–	–	–	–	–	–	–	–	–	−0.0586[a] [−0.44]	2.1
MSASS	0.2256 [1.21]	1.1	0.1950 [1.05]	1.1	0.2111 [1.14]	1.1	0.1704 [0.92]	1.1	0.1710 [0.86]	1.3	0.1477 [0.66]	1.7
NARMON	0.0009 [0.84]	1.5	0.0022[a] [2.22]	1.2	0.0011 [0.97]	1.5	0.0021[a] [2.18]	1.2	0.0019 [1.83]	1.3	0.0021[a] [2.05]	1.3
IPAY/FUND	0.0157[a] [3.75]	1.0	0.0158[a] [3.76]	1.0	0.0158[a] [3.76]	1.0	0.0159[a] [3/.7]	1.0	0.0159[a] [3.77]	1.0	0.0159[a] [3.77]	1.0
LOAN/ASS	−0.562[a] [−5.25]	1.5	−0.0594[a] [−5.50]	1.5	−0.0594[a] [−5.52]	1.5	−0.0613[a] [−5.56]	1.6	−0.0588[a] [−5.35]	1.6	−0.0571[a] [−5.28]	1.5
EQUITY/ ASS	−0.1330[a] [−2.04]	1.5	−0.1314[a] [−2.00]	1.5	−0.1391[a] [−2.13]	1.5	−0.1375[a] [−2.10]	1.5	−0.1457[a] [−2.22]	1.5	−0.1437[a] [−2.19]	1.5
STAFF/ASS	0.6082 [1.72]	1.6	0.6597 [1.86]	1.6	0.5949 [1.68]	1.6	0.6305 [1.78]	1.6	0.5722 [1.61]	1.6	0.5893 [1.66]	1.6
GOVT	0.0007[a] [3.82]	1.4	0.0007[a] [3.74]	1.4	0.0007[a] [3.73]	1.4	0.0007[a] [3.66]	1.4	0.0006 [3.45]	1.4	0.0006[a] [3.39]	1.4
LLR/LOAN	0.1053[a] [5.27]	1.9	0.1206[a] [6.69]	1.6	0.1204[a] [6.73]	1.5	0.1332[a] [7.73]	1.4	0.1258[a] [6.76]	1.6	0.1286[a] [6.66]	1.8
Observations	1541		1541		1541		1541		1541		1541	
N*	807		807		807		807		807		807	
$\bar{R}^2$	18.7		18.4		18.6		18.2		17.9		17.8	
F	16.99		16.69		16.85		16.50		16.15		16.05	
LM	0.005		0.004		0.003		0.003		0.002		0.006	
SW	[illegible].886		[illegible].891		0.888		0.892		0.893		0.896	

Source: Authors own estimates

APPENDIX 17
ROE and Concentration 1989 [including LLR/LOAN variable]

Dependent Variables / Independent Variables	[1] ROE		[2] ROE		[3] ROE		[4] ROE		[5] ROE		[6] ROE	
		VIF		VIF		VIF		VIF		VIF		VIF
CONSTANT	0.479[a] [2.07]		0.07401[a] [2.00]		0.3751 [1.84]		0.5670 [1.86]		0.2122 [1.50]		0.2058 [1.88]	
CR5 ASS	−0.0071 [−1.48]	1.2	–	–	–	–	–	–	–	–	–	–
CR10ASS	–	–	−0.0100 [−1.63]	1.1	–	–	–	–	–	–	–	–
CR5DEP	–	–	–	–	−0.0043 [−1.16]	1.1	–	–	–	–	–	–
CR10DEP	–	–	–	–	–	–	−0.0066 [−1.39]	1.1	–	–	–	–
HERFASS	–	–	–	–	–	–	–	–	−0.7120 [−0.45]	1.7	–	–
HERFDEP	–	–	–	–	–	–	–	–	–	–	−0.6078 [−0.65]	2.1
MSASS	0.5650 [0.46]	1.1	0.5550 [0.45]	1.1	0.1570 [0.13]	1.0	0.5500 [0.45]	1.1	0.4240 [0.30]	1.4	0.7410 [0.48]	1.7
NARMON	−0.0011 [−0.36]	1.1	0.0005 [−0.17]	1.1	−0.0011 [−0.34]	1.1	−0.0007 [−0.24]	1.1	−0.0006 [−0.21]	1.1	−0.0009 [−0.28]	1.2
IPAY/FUND	0.0337 [1.05]	1.2	0.0322 [0.01]	1.2	0.0330 [1.03]	1.2	0.0321 [1.00]	1.2	0.0312 [0.97]	1.2	0.0309 [0.96]	1.2
LOAN/ASS	−0.1199 [−1.51]	1.6	−0.1416 [−1.77]	1.6	−0.1288 [−1.62]	1.6	−0.1455 [−1.80]	1.7	−0.1316 [−1.62]	1.7	−0.1258 [−1.58]	1.6
EQUITY/ ASS	0.2177 [0.43]	1.4	0.1887 [0.37]	1.4	0.1786 [0.35]	1.4	0.1665 [0.33]	1.4	0.1473 [0.29]	1.4	0.1574 [0.31]	1.4
STAFF/ASS	1.2510 [0.51]	1.5	1.8150 [0.69]	1.6	1.2420 [0.47]	1.5	1.533 [0.58]	1.6	1.2380 [0.47]	1.6	1.2850 [0.49]	1.5
LLR/LOAN	0.0158[a] [2.28]	1.3	0.0169[a] [2.48]	1.3	0.0163[a] [2.35]	1.3	0.0169[a] [2.47]	1.3	0.0173[a] [2.50]	1.3	0.0173[a] [2.53]	1.3
GOVT	−0.2321 [−1.47]	1.7	−0.1782 [−1.15]	1.6	−0.1973 [−1.27]	1.6	−0.1669 [−1.07]	1.6	−0.1984 [−1.25]	1.6	−0.2191 [−1.33]	1.8
Observations	1268		1268		1268		1268		1268		1268	
N*	716		716		716		716		716		2716	
$\bar{R}^2$	2.0		2.0		1.8		0.9		1.6		1.6	
F	2.12		2.18		2.03		1.38		1.90		1.92	
LM	0.70		1.30		0.70		0.90		0.40		0.40	
SV	0.880		0.889		0.880		0.884		0.882		0.883	

Source: Authors own estimates

APPENDIX 17

Pooled Estimates of the SCP relationship, ROA [LLR/LOAN included]

Dependent Variables / Independent Variables	[1] ROA	[2] ROA	[3] ROA	[4] ROA	[5] ROA	[6] ROA
CR5ASS	0.00006 [2.27]					
CR10ASS		0.0004[a] [7.03]				
CR5DEP			0.0001[a] [2.80]			
CR10DEP				0.0003[a] [6.01]		
HERFASS					0.0234[a] [2.58]	
HERFDEP						0.0190[a] [2.04]
MSASS	0.0042 [0.32]	−0.0118 [−0.95]	0.0003 [0.02]	−0.1028 [−1.02]	−0.0072 [−0.51]	−0.0069 [−0.48]
NARMON	0.000004[a] [9.57]	0.000004[a] [9.01]	0.000004[a] [9.48]	0.000004[a] [9.90]	0.000004[a] [9.45]	0.000004[a] [9.65]
IPAY/FUND	0.00009 [0.22]	0.00008 [0.21]	0.0001 [0.24]	0.00001 [0.03]	0.00009 [0.22]	0.00009 [0.24]
LOAN/ASS	−0.0101[a] [−11.96]	−0.0087[a] [−10.67]	−0.0098[a] [−11.52]	−0.0086[a] [−10.49]	−0.0099[a] [−11.75]	−0.0099[a] [−11.64]
EQUITY/ASS	0.1202[a] [20.43]	0.1084[a] [19.00]	0.1190[a] [20.22]	0.1084[a] [18.89]	0.1210[a] [20.69]	0.1208[a] [20.64]
STAFF/ASS	0.0194[a] [18.77]	0.0182[a] [18.34]	0.0192[a] [18.65]	0.0190[a] [19.42]	0.0190[a] [18.25]	0.0192[a] [18.53]
LLR/LOAN	0.0002[a] [11.29]	0.0002[a] [12.06	0.0002[a] [11.34]	0.0002[a] [12.11]	0.0002[a] [11.37]	0.0002[a] [11.34]
GOVT	0.0011 [0.95]	0.0006 [0.54]	0.0011 [0.93]	−0.0006 [0.56]	0.0011 [0.96]	0.0011 [0.97]
YR86	0.0044 [1.71]	−0.0161[a] [−4.58]	0.0019 [0.76]	−0.0083[a] [−2.89]	0.0051[a] [2.77]	0.0055[a] [2.99]
YR87	0.0067[a] [2.74]	−0.0131[a] [−3.72]	0.0044[a] [1.99]	−0.0047 [−1.72]	0.0074[a] [4.65]	0.0076[a] [4.71]
YR88	0.0045 [1.93]	−0.0159[a] [−4.45]	0.0020 [0.89]	−0.0079[a] [−2.74]	0.0056[a] [3.86]	0.0058[a] [3.97]
YR89	0.0029 [1.21]	−0.0176[a] (−4.85)	0.0004 [0.19]	−0.0094[a] [−3.22]	0.0041[a] [2.71]	0.0043[a] [2.74]
Observations	4769	4769	4769	4769	4769	4769
N*	2585	2591	2585	2591	2585	2585
$\bar{R}^2$	52.7	54.0	52.8	53.7	52.8	52.8
F	166.45	174.72	167.47	172.56	167.27	166.87
LM	1.908	1.813	1.834	2.057	1.833	1.871
SW	0.980	0.989	0.984	0.986	0.971	0.979
VIF range	1.0−2.9	1.1−3.2	0.8−2.3	0.8−2.9	0.9−2.8	1.2−3.1

Source: Authors own estimates

NOTES:

t = statistics in paratheses
a = values significant at the 5% level
N* = missing values.

1. Equations were also estimated without the yearly binary variables and F−tests were undertaken to evaluate the evidence of seasonality in the results.

Equation 1	F − test 1.34	Equation 2	F − test 2.29
Equation 3	F − test 1.57	Equation 4	F − test 2.33
Equation 5	F − test 1.06	Equation 6	F − test 1.19

The 5 % critical value for an F distribution with the relevant degrees of freedom is 2.37 so in all equations we reject the null hypothesis of no seasonal affects.

Source: Authors own estimates

APPENDIX 17

Pooled Estimates of the SCP relationship, ROE [LLR/LOAN included]

Dependant Variables / Independant Variables	[1] ROE	[2] ROE	[3] ROE	[4] ROE	[5] ROE	[6] ROE
CR5ASS	0.0037[a] [2.07]					
CR10ASS		0.0079[a] [3.36]				
CR5DEP			0.0032[a] [2.12]			
CR10DEP				0.0025 [1.44]		
HERFASS					1.9450[a] [5.59]	
HERFDEP						1.5873[a] [4.44]
MSASS	−1.3811[a] [−2.76]	−1.5087[a] [−3.02]	−1.3827[a] [−2.76]	−1.3535[a] [−2.67]	−2.3851[a] [−4.47]	−2.3753[a] [−4.25]
NARMON	0.0005[a] [31.69]	0.0005[a] [31.34]	0.0005[a] [31.75]	0.0005[a] [31.94]	0.0005[a] [31.55]	0.0005[a] [31.95]
IPAY/FUND	0.0307 [1.96]	0.0306 [1.95]	0.0299 [1.91]	0.0289 [1.84]	0.00313[a] [2.01]	0.0322[a] [2.06]
LOAN/ASS	−0.0626 [−1.92]	−0.0475 [−1.44]	−0.0554 [−1.69]	−0.0551 [−1.66]	−0.0486 [−1.50]	−0.0454 [−1.39]
EQUITY/ASS	−0.2578 [−1.14]	−0.3161 [−1.37]	−0.2684 [−1.18]	−0.2759 [−1.19]	−0.2012 [−0.90]	−0.2201 [−0.98]
STAFF/ASS	0.5715[a] [14.37]	0.5581[a] [13.94]	0.5724[a] [14.42]	0.5789[a] [14.64]	0.5378[a] [13.47]	0.5527[a] [13.89]
LLR/LOAN	0.0007 [1.04]	0.0005 [0.79]	0.0007 [1.04]	0.0006 [0.93]	0.0007 [1.21]	0.0007 [1.15]
GOVT	−0.0093 [−0.21]	−0.0118 [−0.27]	−0.0093 [−0.21]	−0.0099 [−0.22]	−0.0092 [−0.21]	−0.0086 [−0.19]
YR86	0.0787 [0.80]	−0.1949 [−1.37]	0.0859 [0.91]	0.0912 [0.79]	0.0914 [1.30]	0.1226 [1.74]
YR87	0.1741 [1.86]	−0.1053 [−0.74]	0.1918 [2.24]	0.1933 [1.74]	0.1854[a] [3.05]	0.2040[a] [3.28]
YR88	0.0639 [0.71]	−0.2326 [−1.61]	0.0717 [0.83]	0.0704 [0.61]	0.1058 [1.90]	0.1226[a] [2.18]
YR89	0.0433 [0.46]	−0.2541 (−1.73)	0.0536 [0.60]	0.0538 [0.46]	0.0903 [1.54]	0.1005 [1.68]
Observations	4769	4769	4769	4769	4769	4769
N*	2585	2591	2585	2591	2585	2585
$\bar{R}^2$	43.5	543.7	43.5	43.5	44.3	44.0
F	115.21	115.79	115.23	114.54	118.86	117.30
LM	1.903	1.793	1.904	1.943	1.629	1.742
SW	0.612	0.605	0.597	0.589	0.518	0.565
VIF range	1.0−1.3	1.0−1.3	1.0−1.4	1.0−1.4	1.0−1.4	1.0−1.3

Source: Authors own estimates

NOTES:

t = statistics in paratheses
a = values significant at the 5% level
N* = missing values.

1. Equations were also estimated without the yearly binary variables and F–texts were undertaken to evaluate the evidence of seasonality in the results.

Equation 1	F – test 1.32	Equation 2	F – test 1.70
Equation 3	F – test 1.51	Equation 4	F – test 1.52
Equation 5	F – test 2.71	Equation 6	F – test 2.80

The 5 % critical value for an F distribution with the relvant degrees of freedom is 2.37 so in all equations we reject the null hypothesis of no seasonal affects.

Source: Authors own estimates

APPENDIX 17

Pooled Country Estimates of the SCP relationship, ROA as dependent variable, [LLR/LOAN variable included]

	Finland	France	Germany	Greece	Italy
CONSTANT	−0.0009 [−0.13]	−0.0044 [−1.81]	−0.0582 [−2.25]	0.0733 [3.08]	−0.0209 [−0.28]
HERFASS	0.03191 [0.57]	0.0096 [2.83]	1.5090 [1.38]	−0.0624 [−2.00]	4.8250 [1.93]
MSASS	0.0033 [0.73]	0.0242 [1.34]	0.2978 [1.65]	−0.0055 [−0.43]	−0.6560 [−0.61]
NARMON	0.00004 [0.47]	0.0002 [0.69]	0.0024 [2.87]	removed high correlation	−0.0124 [−0.72]
IPAY/FUND	−0.0141[a] [−4.07]	0.0019 [1.77]	0.0001 [0.23]	−0.0629[a] [−2.98]	0.00003 [0.06]
LOANS/ASS	0.0066[a] [2.86]	−0.0009 [−1.87]	0.0083 [1.80]	−0.0144 [−0.55]	−0.0322[a] [−3.51]
EQUI/ASS	0.0152 [0.58]	0.0303[a] [9.13]	0.1936[a] [4.82]	0.1293[a] [2.12]	0.0910[a] [8.40]
STAFF/ASS	−0.2607[a] [−4.70]	0.0254[a] [2.07]	0.2662[a] [2.12]	−0.4966[a] [−2.16]	−0.5733[a] [−4.04]
LLR/LOAN	0.0003 [0.77]	0.00001 [1.37]	−0.0011 [−0.98]	−0.0047[a] [−1.99]	−0.000009 [−0.05]
GOVT	0.0005 [0.73]	−0.0001 [−0.11]	0.0021 [1.45]	−0.0019 [−0.74]	0.0019 [0.74]
Observations	43	555	675	31	722
N*	1	398	547	16	11
$\bar{R}^2$	55.1	37.8	34.2	47.5	47.2
F	6.46	11.65	8.20	14.39	18.00
LM	2.342	4.115	1.009	1.766	2.477
SW	0.978	0.981	0.954	0.994	0.983
VIF range	1.2−3.3	1.4−6[illegible]	1.0−2.4	1.3−24.1	2.1−1154.1

Source: Authors own estimates

APPENDIX 17

Pooled Country Estimates of the SCP relationship, ROA as Dependent variable, [LLR/LOAN variable included]

	Norway	Portugal	Spain	Sweden	UK
CONSTANT	−0.0169 [−1.46]	0.4138[a] [2.27]	0.0113 [1.85]	0.5132[a] [5.73]	0.0386 [1.35]
HERFASS	0.0428 [0.37]	0.2100 [0.14]	0.0841 [2.02]	removed virt−ually a constant	−1.5800 [−1.46]
MSASS	0.0625[a] [2.67]	−0.4596[a] [−3.18]	−0.0233 [−0.81]	0.0798 [0.15]	0.0117 [0.22]
NARMON	0.00008[a] [2.13]	0.0001 [0.03]	−0.0005 [−1.69]	0.0000 [0.09]	−0.0006 [−1.55]
IPAY/FUND	10.0005 [0.40]	−0.1951[a] [−6.[illegible]]	0.0020 [1.21]	−0.9360 [−1.76]	0.0233 [0.62]
LOANS/ASS	−0.0176 [−1.30]	−0.3483[a] [−5.57]	−0.0012 [−0.29]	−0.5631[a] [−4.91]	0.0030 [0.44]
EQUI/ASS	0.4515[a] [8.77]	removed high correlation	0.1385[a] [14.28]	−1.1710 [0.60]	0.2359[a] [4.54]
STAFF/ASS	0.2234 [0.77]	−0.2320 [−0.73]	0.3275[a] [4.18]	0.0132 [1.84]	0.0291 [0.22]
LLR/LOAN	0.0[illegible]09 [0.[illegible]8]	−0.00003 [−0.76]	−0.0003[a] [−2.72]	0.00006 [0.03]	−0.0014[a] [−7.81]
GOVT	−0.0014 [−0.7[illegible]]	0.0117 [0.93]	removed virtually a constant	−0.0155 [−0.54]	n.a
Observations	110	59	463	88	615
N*	5	0	28	16	460
$\bar{R}^2$	48.1	63.5	35.7	53.1	56.9
F	11.79	9.69	28.80	3.98	20.53
LM	3.268	1.222	2.281	1.965	2.141
SW	0.914	0.367	0.990	0.974	0.948
VIF range	2.[illegible]-3.5	1.4−64.4	1.1−3.9	1.1−1.9	2.0−3.2

Source: Authors own estimates

Appendix 18

Correlation Coefficients - Pooled Data 1986 to 1989

	ROA	MSASS	NARMON	IPAY/ FUND	LOAN/ASS	EQUI/ASS	STAF/ASS
MSASS	0.039						
NARMON	0.180	0.190					
IPAY/FUND	-0.007	-0.007	-0.002				
LOAN/ASS	-0.096	-0.035	-0.008	0.000			
EQUI/ASS	0.294	-0.071	-0.026	0.018	0.336		
STAF/ASS	0.270	-0.015	0.024	-0.004	0.049	0.041	
GOVT	0.012	0.007	0.011	0.032	0.002	-0.002	0.001

	S1DMS	S2DMS	S3DMS	S4DMS
S2DMS	0.932			
S3DMS	0.708	0.753		
S4DMS	0.352	0.337	0.494	
S5DMS	0.265	0.252	0.474	0.673

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