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MARKET VALUE, BOOK VALUE AND GOODWILL

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By

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Catatan:
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ABSTRACT

This thesis examines the value relevance of goodwill that has been eliminated through reserves in the year of acquisition. Specifically, it investigates the association between goodwill reserve write-off and the value placed on the firm by the stock market. In so doing, the thesis describes the relationship between the implied value of purchased goodwill and that of other assets, and we seek to explain the underlying pattern of the amortisation of goodwill over time.

The empirical method uses cross-sectional equity valuation models for the period 1994-6. Based on the modified balance sheet identity, the equity valuation model parameterises purchased goodwill and other assets separately, and a more meaningful interpretation is given of the intercept term than in previous studies relating to purchased goodwill.

The results confirm that the market incorporates information on the goodwill reserve write-off in the valuation of a firm, and the results also show that the market: book ratio is similar to tangible assets but its behaviour suggests a relatively higher amortisation rate. Although the present study provides evidence supporting the requirement in FRS 10 (*Goodwill and Intangible Assets*) to capitalise purchased goodwill, the findings also show that the incremental value of capitalised goodwill declines far more quickly than FRS10 suggests, thus placing particular importance on the impairment test required by FRS 10.

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CHAPTER 1

INTRODUCTION

1.1 Background and Objectives of the Thesis

This study examines accounting for purchased goodwill in a policy environment where the choice of writing off in the year of acquisition has been the prevalent accounting policy. In a paper for the UK Accounting Standards Board (ASB), Arnold *et al.* (1992) conclude that "much has been written on the problem of accounting for goodwill during the past century" but that "the solutions remain elusive", a point that is echoed in a historical review by Bryer (1995). Indeed, Canning (1929) remarked on the breadth of the debate some 70 years ago:

> "Accountants, writers on accounting, economists, engineers, and the courts, have all tried their hands at defining goodwill, at discussing its nature, and at proposing means of valuing it. The most striking characteristic of this immense amount of writing is the number and variety of disagreements reached"

In more recent times, this issue has remained firmly on the standard-setting agenda. In the UK, work started on this subject in 1974, which led to the publication of the first accounting standard related to goodwill in 1985 (SSAP22 *Accounting for Goodwill*). This created the situation underlying the analysis in this thesis, namely the requirement that purchased goodwill (if positive) be eliminated through reserves in the period in which it is acquired. SSAP 22 also allowed capitalisation followed by amortisation through the profit and loss account, although this became very much the minority practice amongst financial statement preparers. The recommended treatment of negative goodwill was to credit it to reserves at the time of acquisition. Evidence that most UK companies have chosen the immediate write-off treatment is given by a number of studies, including Russell *et al.* (1989), Higson (1990), Nobes (1992), Bryer (1995) and Gore *et al.* (1996). However, as noted by Russell *et al.* (1989), this policy was not prevalent elsewhere in the world:-

> "Accounting for goodwill varies widely in different countries and it is certainly possible to argue that the dominant British practice of writing off goodwill directly to reserves in the year it was acquired is both inconsistent with the practices prevalent elsewhere and theoretically unacceptable"

On the other hand, during the 1980's acquisition was increasingly used as a means for companies to grow. As the relative size of acquisition increased, the amount and the

proportion of the purchase price assigned to goodwill also increased. This had a significant effect on reported income, as mentioned by Bryer (1990 and 1995):

> "From 1977 a high level of merger activity continued virtually unabated, and from 1984 it grew to unprecedented heights. From a high of over £20 billion in 1972 prices, sales of independent companies and subsidiaries have seldom fallen below £2 billion, and since 1984 have grown from over £6 billion to an estimated £23 billion in 1988. In 1988 prices, in total over this period companies and subsidiaries costing £108 billion have been paid for, £69 billion being paid between 1984 and 1988. As on average goodwill was rarely less than 25% of the target's value, and rose from 51.2% in 1984 to 70.2% in 1988, it could clearly have an important impact on the reported profits and pay out ratio of many UK companies. On average over this period some 40% of the target's value was goodwill. Therefore, crudely, if instead of writing off goodwill against reserves, if it had been written off (say) 20 years, by 1988 the reported profits of UK companies would have been some £2 billion a year lower"

The policy of immediate write-off, *i.e.* elimination against reserves, soon created a further problem. As acquisitions by companies increased in size, along with the amount and the proportion of the purchase price assigned to goodwill, some consolidated balance sheets started to show negative net worth, with elimination of goodwill against reserves finally eliminating reserves altogether (Rutteman, 1990). In some companies, the policy on goodwill made accounts look unacceptably weak, as gearing ratios became high enough to breach covenants or to cause embarrassment when raising finance (Nobes, 1992). Certain companies reacted to the "goodwill problem" by choosing to separate other intangibles such as brand names from purchased goodwill. In 1988, when Rank Hovis McDougall PLC capitalised brands, this contributed to a rethinking of the regulatory strategy with respect to goodwill (In Appendix 1, we report a simple analysis of the effects on EPS, gearing and reserves of a company by changing its goodwill accounting policy).

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Soon afterwards, a report published by Woodhead-Faulkner (*Brands and Goodwill Accounting Strategies: 1990*) mentioned at least 15 companies that had placed intangible assets of this sort on the face of their balance sheet. After a sequence of exposure drafts and discussion papers, the ASB has now published FRS 10 with the stated objectives of changing the behaviour of UK firms with regard to the treatment of purchased goodwill and intangible assets. The aims of the new financial reporting standard are to ensure that: (i) capitalised goodwill and intangible assets are charged in the profit and loss account in the periods in which they are depleted; and (ii) sufficient information is disclosed in the financial statements to enable users to determine the impact of goodwill and intangible assets on the financial position and performance of the reporting entity. In order to achieve its objectives, FRS 10 requires purchased goodwill and other intangibles to be capitalised and amortised as indicated, with impairment reviews if the carrying value is suspected to have fallen below

the book value (FRS 11). Indeed, it could be argued that the success of FRS 10 would mainly be based on the effectiveness of the impairment review.

One could, however, pose the question as to whether the controversy surrounding goodwill is really important or whether the choices of accounting method just create 'noise' in the security market. This situation merits further investigation in order to clarify this question. One possibility is to examine whether the UK market perceives purchased goodwill as an important variable in determining the value of a UK company. Therefore, against the backdrop of the contemporary debate surrounding accounting for goodwill, the empirical aims of this study are to investigate (a) the association between goodwill disclosures in accounts and market values; (b) the relationship between purchased goodwill and other assets; and (c) the implications of (a) and (b) for impairment reviews.

1.2 Research Implementation

As discussed above, this study is concerned with accounting for goodwill in the UK. To address the research question mentioned in Section 1.1, the approach followed is that developed by Landsman (1986) who studied the relationship between market value and the pension fund assets and liabilities of a firm. This model was developed further by McCarthy and Schneider (1995) and by Jennings *et al.* (1996) when they investigated accounting for goodwill using data reported by US companies regarding the capitalisation and subsequent amortisation of goodwill. The present study, however, is based on UK companies. Until the implementation of the new Financial Reporting Standard for goodwill and intangible assets in the UK (FRS 10), these firms have generally chosen to write off purchased goodwill in the year of acquisition, as mentioned above. Therefore, a modelling framework is developed to reflect the availability of data on goodwill elimination rather than on goodwill capitalisation. Given the regulatory changes now under way in the UK, the findings of this study should be important for those involved in the setting and monitoring of standards involving goodwill.

The research study was divided into four stages: -

Stage 1 - All the available articles on goodwill in the mainstream accounting research literature were listed using the database search program *FIRSTSEARCH*. The main purpose of this stage was to review the previous work done and to analyse the nature of controversy surrounding accounting for goodwill in the literature, as well as the regulatory history in the UK.

Stage 2 - The main objectives of this study (as mentioned in Section 1.2) are to examine whether the market perceives purchased goodwill as an important variable in determining the value of a company. The model for this study is based on the balance sheet identity, as specified by Landsman (1986). Once again, other research using this model was identified using the database search program *FIRSTSEARCH*. Our main interest was to review the various applications of this model employing different variables in the balance sheet. In this respect, it is shown that the model has been tested with regard to disclosures in corporate reports concerning pensions, research and development, mortgages and purchased goodwill, as well as to value net assets in the banking sector, all in the US.

Stage 3 - The data for this study were obtained from DATASTREAM for all company listings under the total market segment (mnemonic - LTOTMKUK) as at 31 December 1996. All relevant information needed for the model was recorded in MICROSOFT EXCELL 97 spreadsheets as a database. The final selection of companies included those which reported purchased goodwill as an elimination for any year from 1994 to 1996 and which had not recorded any other intangible assets during that period, and a control sample of other firms not eliminating goodwill was also constructed. The size of the principal sample of firms eliminating goodwill is 137 firms, providing between 275 and 404 firm-years for analysis in the 1994 to 1996 period.

Stage 4 - The database was used to obtain the empirical results reported in this thesis. Multiple regression analysis was used to test the theoretical model using a Market Value Test Methodology. Data analysis and all the estimations in the model were carried out using *MINITAB*, *MICROSOFT EXCELL 97* and *MICROFIT*.

1.3 Main Empirical Results

The major goal of this thesis is to examine the empirical evidence concerning the relationship between purchased goodwill and the market value of shareholders' equity. The overall results of this study find that the market does incorporate information about goodwill in the valuation of a firm. The empirical results also show that the market appears to perceive purchased goodwill as an asset with a value at least equal to other assets. These results are consistent with previous studies by McCarthy and Schneider (1995) and Jennings *et al.* (1996) in the US.

However, because the present study is based on UK companies which write-off purchased goodwill in the year of acquisition, the analysis and interpretation is based on the assumption that, by immediately writing off goodwill, a secret reserve would be created. This secret reserve (if it exists) can be captured by the intercept term in the valuation model. Results from various regression analyses show that the intercept term is significantly non-zero for the first two years of cumulative goodwill. The findings also show that the intercept decreases in absolute value and becomes zero as the purchased goodwill estimate is increased by accumulating prior eliminations. Further analysis suggests that, although purchased goodwill is recognised by the market, its value is reduced fairly quickly.

Given these findings, it is reasonable to claim that the implementation of FRS 10 is justifiable for the following reasons: (a) Purchased goodwill is an important variable incorporating information on the valuation of a firm; (b) The market appears to perceive purchased goodwill with a value at least equal to other assets; and (c) Purchased goodwill shows a decline in value which is relevant to the impairment test required by FRS 10.

1.4 Summary Outline of the Thesis

At the outset, it is necessary to review the conceptual and theoretical underpinnings of accounting for goodwill in an attempt to clarify the issues that make goodwill a controversial topic. Against this backdrop, it is also worth considering the history and regulation of accounting for goodwill in the UK. Chapter 2 presents this review. The evidence presented makes it clear that there is lack of agreement as to the definition of goodwill itself. Consequently, it is not surprising that there are competing claims for the "preferred method". Basically, opinion is divided as to whether goodwill should be "capitalised and amortised" or "written off on acquisition", and both policies have their supporters. As a result, the history and regulation of accounting for goodwill in the UK has followed the same pattern of controversy and unresolved agendas.

Chapter 3 reviews the relevant literature on accounting for goodwill. Most of the earlier papers that discuss goodwill issues are analytical and descriptive in nature. The main objective of this thesis, however, is to provide empirical evidence on whether the market takes into consideration the amount of goodwill write-off in the determination of the company's valuation. In this context, we propose to apply a cross-sectional market value regression model that is based on the modified balance sheet identity. Chapter 4 will review some of the previous empirical work in accounting that employs market value and book value relationships. Some of the methodological issues arising from this research,

especially econometric problems associated with estimation of the model, will be highlighted and discussed.

Chapter 5 begins with a discussion on the rationale of the proposed research followed by the research design. The model for this study is based on the simple balance sheet identity mentioned by Landsman in 1986. However, following Ohlson (1993), we have included a variable from the income statement (earnings) to improve the model further. Given this model, the chapter also reconsiders some of the methodological issues first discussed in Chapter 4.

Chapter 6 is concerned with data collection and sample selection and discusses the sources of data and criteria for selecting the sample. The chapter ends with an exploratory data analysis.

The empirical work reported in this study is based on multiple regression analysis for the model that was developed in Chapter 5. In order to assess the impact of goodwill write-off on equity values, we regress the market value of the firms under consideration against the book value of assets, liabilities, year to year cumulative goodwill and earnings of the company. To make our analysis more robust, we rerun the regression model based on a net asset model and reduced sample size. We also rerun the model taking into account year and industry effects that might influence the overall results. Results from these are presented in Chapter 7.

Our empirical work finds evidence that the market perceives goodwill as assets and incorporates the information in the valuation of a firm. At the same time, it is obvious that the market perceives purchased goodwill to decline in value a few years after acquisition. Goodwill also appears to be perceived by the market with a value equal to other assets. The interpretation and analysis of the results are presented in Chapter 7 and are summarised in Chapter 8. Chapter 8 also presents a general comparison with previous research relevant to this thesis. Finally, Chapter 8 suggests avenues for future research on the topic of accounting for goodwill.

CHAPTER 2

THEORETICAL, HISTORY AND REGULATION ISSUES

2.1 Introduction

Goodwill has been referred to as "the most intangible of the intangibles" (Davis, 1992). Despite having been the subject of a long debate held in the academic and financial communities, accounting for goodwill remains a contentious and controversial problem[1]. Arguably, the main problem of accounting concerning goodwill stems from the lack of agreement in defining the real nature of goodwill. What is goodwill? And how should this item be treated? Analysis shows that the arguments are split between two main schools of thought. One school considers that goodwill poses difficulties and, unlike other assets, in most cases cannot be separately sold. In these circumstances, to carry the asset in the balance sheet is of little value to the users of accounts.

Consequently, this school maintains that purchased goodwill should be written off directly against reserves on acquisition. The second main school of thought believes that goodwill is an on-going asset that in principle is no different from any other asset. Thus, since goodwill eventually has a finite useful life, it follows that purchased goodwill should be capitalised and amortised through the profit and loss account over its useful life. In an ideal world, a rational analysis of the conceptual issues might lead to a clearly preferred accounting method that could be seen in the history and regulation of accounting for goodwill in the UK.

However, accounting for goodwill is one of the longest running and controversial accounting issues in the UK. Although UK standard-setters started their work on this subject in 1974, accounting for goodwill is still an issue in the 1990s. In June 1980, the Accounting Standards Committee (ASC) issued their first Discussion Paper relating to goodwill. Subsequently they published: (a) the Exposure Draft No. 30 (ED 30) in October 1982; (b) the somewhat contentious SSAP 22 (*Accounting for Goodwill*) in December 1984; and (c) yet another exposure draft (ED 47) in 1990. In July 1990, the ASC ceased to operate but was able to pass on ED 47 and the responses to it to the Accounting Standards Board

[1] Brunovs and Kirsch (1991) mention that commercial and legal references to goodwill can be found as early as 1417. In the accounting literature, goodwill has been discussed for more than 100 years. Lee (1971) said that in 1891, Francis More started the debate and those eminent accountants and academicians have continued it over the years.

(ASB). In 1993, the ASB issued a discussion paper entitled *Goodwill and Intangible Assets* that a prompted mixed response, followed in 1995 by a new version of the discussion paper with the same title. The ASB then published a Financial Reporting Exposure Draft (FRED 12) in June 1996 which was followed by Financial Reporting Standard 10 (*Goodwill and Intangible Assets*) issued in December, 1997 which was to be applied to financial statements relating to accounting periods which ended on or after 23 December 1998.

The "controversial" status of accounting for goodwill might be due to many factors. One of the most important which has been suggested is the behavioural aspects of managers who have personal interests[2] at stake and who consequently engage in lobbying to help determine the standard practice of accounting in the UK (Grinyer *et al.*, 1992). Also, it was reported (during the ASC era), that most of the members of the ASC were in a poor position to resist lobbying because they were generally full-time employees of, or colleagues of, or providers of services to interested parties (Nobes, 1992). This chapter will discuss the above issues.

The first part will present the conceptual and theoretical issues, which make it clear that there are competing claims for the "preferred method". Then, the historical and regulative perspective will be presented in order to provide the backdrop to the conceptual issues of accounting for goodwill in the UK.

The discussion is organised as follows. Section 2.2 provides the basic background of goodwill that includes the concepts and definition of goodwill. Section 2.3 presents factors that create goodwill as found in the literature. These factors are based on views that have been proposed from various studies which have employed either survey or deductive methodologies, with or without empirical analysis. Section 2.4 discusses alternative accounting treatments for purchased goodwill that can be divided into three categories: namely, capitalised without amortisation, capitalised and amortised and write-off against reserves, while Section 2.5 considers the arguments related to the question of why there are such different treatments in the types of accounting for purchased goodwill which were discussed in Section 2.4. Section 2.6, summarises the history and regulation of accounting for goodwill in the UK by looking at the backdrop of conceptual and theoretical issues. Finally, Section 2.7 briefly reviews the overall conclusions of this chapter.

[2] They (managers who are most likely a policy-makers) wish to maximise both reported earnings and reported assets because of the favourable effects on their company's share prices and on their personal compensation and reputation (Watts and Zimmerman, 1978).

2.2 Concepts of Goodwill

As mentioned earlier, the issue of goodwill has been seriously debated by both academic and practising accóuntants who have tried to define and evaluate goodwill over a number of decades. However, the subject of goodwill remains a problem. In Australia, a statement by Lord Macnaghten of the High Court, in *Inland Revenue Commissioners v Muller & Co.'s Margarine,* summarised the difficulty in defining goodwill (Walpole, 1999):

> "What is goodwill? It is a thing very easy to describe, very difficult to define. It is the benefit and advantage of the good name, reputation, and connection of a business. It is the attractive force, which brings in custom. It is the one thing, which distinguishes an old established business from a new business as its first start. The goodwill of business must emanate from a particular centre or source. However widely extended or diffused its influence may be, goodwill is worth nothing unless it has power of attraction sufficient to bring customers home to the source which it emanates. Goodwill is composed of a variety of elements. It differs in its composition in different trades and in different businesses in the same trade"

In earlier historical periods, before the proliferation of business entities, goodwill was regarded as being of a personal nature; its existence in a particular business was due to the personality, fairness and skill of the proprietors or partners. Goodwill would become a commercial interest when a business was sold upon the death of a partner. Generally, goodwill may exist in any business and how much there is varies as the business develops and also in response to changes in the value of the business as a whole. Changes in the value of a business may occur for many reasons; for example, changes in economic expectations, in forecasts for that sector or in perceived value.

The value of goodwill may be constantly changing and is often highly volatile (Walker, 1953). It is therefore difficult to reach a valuation of goodwill at any point, particularly as goodwill is by definition (refers to SSAP 22) not capable of being valued independently of the business as a whole. The only time at which the value of goodwill may be known with reasonable certainty is at the point where a cost is established in a transaction. This will happen when the business and the goodwill inherent in it are sold. Basically there are two types of goodwill: first, internally generated goodwill that results from a favourable attitude or a good perception on the part of the customer toward the business, due to the business person's reputation for honesty, fair dealing and etc.

Second, the value of goodwill exists with respect to a business, whether or not that business is being sold or absorbed in a business combination. Moreover, when goodwill is purchased, as the result of amalgamations, the cost of the goodwill acquired must be

determined before deciding on the proper accounting treatment. The amount allocated to goodwill is said to be the difference between the purchase consideration for the business as a whole and the total fair value of its net resources that are identifiable and separable. The *Oxford Dictionary* describes goodwill as follows:

> "the privilege, granted by the seller of a business to the purchaser, of trading as his recognised successor; the possession of a ready formed "connexion" of customers, considered as an element in the saleable value of a business, additional to the value of the plant, stock in trade, book debts, etc.".

From the legal perspective, the court's reference to the definition of goodwill can be found in the United States case of *Haberle Crystal Springs Brewing Co. v Clarke* (Walpole, 1999). Judge Swan said that:

> "A going business has a value over and above the aggregate value of the tangible property employed in it. Such excess of value is nothing more than recognition that, used in an established business that has won the favour of its customers, the tangibles may be expected to earn in the future as they have in the past. The Owner's privilege of so using them and his privilege of continuing to deal with customers attracted by the established business are property of value. This latter privilege is known as goodwill".

In an accounting context, goodwill can arise from a number of causes. However, it is usually recognised in the accounts only when it is acquired through specific purchases/events. Such events are as follows; the sale includes the conversion and amalgamation of a business from one to another, and/or the change in the constitution of a partnership of a firm as a result of admission, death, retirement, etc., of a partner; the amalgamation of two or more companies, the acquisition of a majority holding in a company and the consolidation of the assets and liabilities of a holding company and its subsidiary and the valuation of unquoted shares.

In these situations, goodwill is calculated as the excess of cost of the acquired entity over the current fair market value of the separable net assets acquired. According to Walker (1953), goodwill must be more or less persistent and of definite duration to be of any value and it must exist as a result of a business acquisition and must be measurable in monetary terms. Internally generated goodwill is not usually recognised in the accounts. According to the literature, goodwill may be defined or viewed in two different ways: first, the excess profit approach or excess earnings view and, second, the residuum approach or hidden assets view (Johnson and Tearny, 1993).

In the excess profit approach, goodwill is "simply conceptualised as the present value of a number of years of abnormal expected returns for the type of business concerned. Thus, in

this view the total value of a business is the sum of the present values of the normal returns from the identifiable net assets, and the present value of the super-normal returns" (Bryer, 1990).

According to Colley and Volkan (1988), a price is paid in excess of the market value of net assets acquired because profits in excess of a normal return on these net assets are anticipated. Thus, goodwill can be viewed as the present value of the anticipated excess earnings discounted over a certain number of years. The discount period will reflect the estimated life or duration of the reasons underlying the excess returns.

Spacek (1964) defined goodwill as the present value placed on anticipated future earnings in excess of a reasonable return on producing assets. Thus, it is the cost to the buyer of earnings over and above the cost of the assets required to produce these earnings. Ma and Hopkins (1988) defined goodwill as the capitalised value (*i.e.*, the present value) of the future stream of superior earnings of the business to be acquired. Thus over payment giving rise to goodwill is due to the expectation of future earnings generated by the acquired business concerned. Under this approach, the present value of the projected future excess earnings is determined and recorded as goodwill.

Therefore, the determination of goodwill will depend on the estimates of future earnings or cash flows, the normal rate of return, the value of identifiable net assets and the discount period. However goodwill, as conceptualised by this definition, is very difficult to measure since future earnings cannot be predicted with certainty. Thus, it is not surprising to find that this approach has been criticised. For example, Gynter (1969) states that,

> "This is not what goodwill is. This is merely a rationalisation of the method commonly used to calculate the value of goodwill, and it is this rationalisation that has come to be accepted by many as being the nature of goodwill. If we are to get to the nature of goodwill, we must ask the question, `Why does excess earning power on tangible assets exist?'..."

In the residuum approach[3], goodwill is defined as the difference between the purchase price and the fair market value of an acquired company's assets. Goodwill is a leftover amount that, after a thorough investigation, cannot be identified, as any other tangible or intangible asset (Johnson and Tearny, 1993). Goodwill also can be defined as "the difference between the cost of the investment to the parent and the value of the subsidiary's net assets at the

[3] The intangibles are the residuum, the balance of the legitimate values attaching to an enterprises totality over the sum of the legitimate values of the various tangible properties taken individually...The amount by which the total of the value of the various physical properties within the enterprise, inventoried unit by unit, fall short of the legitimate asset total for the entire business, express the intangible value (Paton (1922) quoted by Gynter (1969)).

time the investment was purchased" (McKinnon, 1983). Both definitions imply that goodwill is the "left-over amount". As goodwill is measured by calculating the difference between the value of the identifiable assets and liabilities and the value of the business as a whole, the concept of identifiability is the key to measuring the value of goodwill. Any asset or liability that is identifiable can be valued separately from the business and is not part of the goodwill. Conversely it follows that any asset or liability which cannot be separately identified, cannot have a value ascribed to it and thus forms part of the goodwill. According to Lee (1971), it is very important to note that the lack of agreement in the definition of goodwill has been followed by a corresponding lack of agreement as to how to determine its treatment in the financial accounts once it has been recorded as a purchase cost.

2.3 Factors Creating Goodwill

There are numerous advantageous factors and conditions that might contribute to the value of an enterprise. Factors in the aggregate such as business reputation, location, monopolistic situation, managerial ability, know-how and experience and future potential will all constitute goodwill. It is interesting to note the views taken by various authors regarding the factors which constitute goodwill. Various views have been proposed in different studies that employ either the survey or deductive methodologies, with or without empirical analysis. For an easily accessible reference we summarise these factors in Table 2.1.

Nelson (1953) stated that goodwill comprises customer lists, organisation costs, development costs, trademarks, trade names and brands, secret processes and formulas, patents, copyrights, licences, franchises and superior earning power. On the other hand, Catlett and Olsen (1968) listed these factors: a superior management team; an outstanding sales manager or organisation; weakness in a competitor's management; effective advertising; a secret manufacturing process; good labour relations; an outstanding credit rating because of an established reputation for integrity resulting in increased leverage at favourable interest rates; top-flight training program for employees; high standing in a community through contribution to charitable activities and participation in civic activities by a company's officer; unfavourable developments in a competitor's operations; favourable association with another company; strategic location; discovery of talents or resources; favourable tax conditions and favourable government regulation.

Table 2.1: Suggested Factors Constituting Goodwill

Author	Factor
R.H. Nelson (1953)	Customer list, Organisation costs, Development costs, Trademarks, trade names, brands, Secret processes, formulas, Patents, Copyrights, Licenses, Franchises and Superior earning power.
Catlett and Olsen (1968)	Superior management team, outstanding sales manager or organisation, weakness in a competitor's management, effective advertising, secret manufacturing process, good labour relations, outstanding credit rating, top-flight training program for employees, high standing in a community through contribution to charitable activities and participation in civic activities by a company's officer, unfavourable developments in a competitor's operations, favourable association with another company, strategy location, discovery of talents or resources, favourable tax conditions and favourable government regulation.
Tearny (1973) Percentages refer to a sample of 209 NYSE listing applications for 1969 that indicated the specific reasons for the acquisitions	9.8% wanted to accomplish a particular market objective, 4.3% wanted to save time in expanding into a new area, 5.6% wanted to acquired management and technical skills, 40.1% wanted to achieve product diversification and 33.2% to achieve integration.
Falk and Gordon (1977)	increasing short-run cash flows, stability, human factor and exclusiveness
Coopers and Lybrand (1993)	Expanding a market share, protecting an existing market position, geographical expansion, acquiring a related business or product, diversification into a new business, stabilisation, acquiring market skills or distribution facilities, acquiring expertise, know-how or technology rights, securing the supply of a key component, material or service, acquiring production facilities, rationalising of production facilities and securing other economies of scale, increasing financial leverage by acquiring a company with cash or low borrowings, acquiring a place of business in a country in order to gain access to protected markets and acquiring assets at a discount with a view to piecemeal disposal after acquisition.
Henning (1994)	Superior management, effective advertising, good labour relations, exclusive patents, or strategic location, reduction in agency costs in post-take-over periods, the potential for synergy in the post-merger firm, acquisition method and the number of competing bids.

Tearny (1973) investigated a sample of 209 companies listed on the New York Stock in 1969 to discover the specific reasons why companies made acquisitions. According to him, 9.8% wanted to accomplish a particular market objective, 4.3% wanted to save time in expanding into a new area, 5.6% wanted to acquire management and technical skills, 40.1% wanted to achieve product diversification and 33.2% wanted to achieve integration. Tearny argued that a detailed examination of such motives is necessary before the specific sources of purchased goodwill can be understood. These hidden assets might include intangible factors such as distribution channels, good customer relations, personnel skills, product diversification and so on.

Falk and Gordon (1977) separated out four main factors which constitute goodwill. These factors are as follows:

1. Increasing short-run cash flow - under this factor the authors include production economies, raising more funds, cash reserves, low cost of funds, reducing inventory holding costs, avoiding transaction costs, and tax benefits.
2. Stability - including assured supply, reduced fluctuations and good investment relations.
3. Human Factor - including managerial talent, good labour relations, good training programs, organisational structure and good public relations.
4. Exclusiveness - including accesses to technology, and brand names.

Among the factors discussed by Falk and Gordon, managerial talent appears to be a prime contributor to goodwill. Also ranked as highly important were good labour relations, brand name recognition, production economies and access to technology.

A report by Coopers and Lybrand (1993) listed the reasons why companies seek to expand by acquisition. These are: to expand their market share or to protect an existing market position; to promote geographical expansion in a core business to acquire a related business or product; to diversify into a new business or different product line; to stabilise a seasonal or cyclical business, to acquire market skills or distribution facilities; to acquire expertise, know-how or technology rights; and to secure the supply of a key component: material or service; to acquire production facilities; to rationalise production facilities and to secure other economies of scale; to increase financial leverage by acquiring a company with cash or low borrowings; to acquire a place of business in a country in order to gain access to protected markets and to acquire assets at a discount with a view to piecemeal disposal after acquisition.

Henning (1994) mentioned two potential sources of goodwill in his study. The first is the pre-bid which he defines as the difference between the pre-take-over-bid market price and the fair value of the firm's identifiable net assets. The pre take-over-bid market price provides a fair appraisal of a firm's value as an independent entity. It excludes the components that reflect the benefits for which a specific acquiring company is willing to pay above the market price. Sources of pre-bid goodwill may include superior management, effective advertising, good labour relations, or strategic location. Premium goodwill is the excess that acquiring firms pay over the pre-take-over-bid share price. Components of premium goodwill include the reduction in agency costs in post-take-over periods, the potential for synergy in the post-merger firm, the method of acquisition and the number of competing bids.

2.4 Accounting Treatment of Goodwill

Goodwill is acknowledged for accounting purposes only when it is purchased as part of a take-over. In practice all businesses develop internally generated goodwill as they expand and develop relations with suppliers, customers and the work force all of which take time and money to put in place (Cooke, 1985). The worth of all of such valuable intangible assets that are not separately identified on the balance sheet could collectively be termed "goodwill". In 1988 Rank Hovis McDougall (RHM) announced that it had included a value on its balance sheet for all of its brands, both acquired and internally generated (Moorhouse, 1990). Until then, no attempt had been made to account for anything other than purchased goodwill. Lee (1971) suggested possible reason for this:

1. The acquired conservatism of accountants, combined with a fear that created goodwill might well be a fictitious asset introduced to improve the financial position of the business described in its balance sheet
2. Certain generally accepted concepts of accounting which are extremely difficult to apply in practice to goodwill - that is, historic cost, objectivity and verifiability.
3. The difficulty of annually revaluing goodwill. Such an exercise has to be based on several assumptions, including the estimation of future profits and of what is a reasonable rate of return for the particular business.
4. The difficulty of capitalising the business costs which contribute to the value of goodwill - for example, the cost of research or advertising expenditure. Which part of the total advertising expenditure of the business contributed to the sales which generated the profits related to goodwill? Such an allocation exercise would be, at best, artificial.

Grinyer *et al.* (1990) summarises two characteristics of self-generated goodwill, which need to be identified:

1. Goodwill is not included in the matching-based balance sheet presumably because the benefit expected to result from it is considered too uncertain to allow it to be recognised under the prudence concept or because it is not feasible to disentangle the costs of establishing such goodwill from operating costs; and

2. The costs of establishing goodwill are included as debits in a profit and loss account at some time (identified as costs of advertising, staff costs, training, personnel costs, etc.).

Thus the costs incurred by management to generate goodwill within the existing business have been charged at some time to a profit and loss account. Although the lag between

recognising the cost and recognising the resulting cash inflows obviously prevents an accurate matching, it may be considered that the orientation towards recognising realised achievements for the purpose of control justifies such a departure from strict matching. In the literature, the accounting treatment for purchased goodwill can be grouped into three different viewpoints: immediate write-off, capitalised and capitalised and amortised.

However, McLeay *et al.* (1999) in their study relating to international standardisation and harmonisation analysed in detail the goodwill accounting method that was used by the companies in their data sample which was made up of inter-listed companies on all the stock exchanges in Western Europe. The description of policy, accounting treatment and the effect on financial statements is given in Table 2.2. As mentioned earlier, the accounting treatment of purchased goodwill can generally be divided into three categories. In the first approach, as soon as it is purchased, goodwill is immediately written off against an account in the shareholder's equity section, generally retained earnings.

Some advocates of the immediate write-off of goodwill reason that this treatment is consistent with non-purchased goodwill, for example Taylor (1987), and Arnold (1992). Taylor (1987) suggests that the removal of purchased goodwill by immediate write-off treats purchased and non-purchased goodwill similarly by removing them both, and that this may be helpful when comparing two similar firms, one of which has grown by acquisition and another by internal growth. Gray (1988) favours immediate write-off because the balance sheet is misleading if it includes only purchased goodwill, which is likely to understate the total goodwill where also includes self-constructed goodwill.

Ma and Hopkins (1988) argue that where internally generated and purchased goodwill represent benefits with similar risk characteristics they should be accounted for in the same way and since it is often difficult to define precisely the economic benefits gained by goodwill payments; *i.e.,* they cannot be identified with the present value of a defined stream of benefits, the systematic amortisation of goodwill is difficult to justify.

Table 2.2: A Summary of Goodwill Accounting Methods

Description of Policy	Accounting Treatment	Effect on Financial Statements
Goodwill - Asset	The difference between the consideration and the fair value of the asset acquired is included amongst assets in the balance sheet The asset is either left at its original historic cost or revalued.	The book value of the firm reflects the view that the value of the asset is not likely to be impaired for the foreseeable future (e.g. brands)
Goodwill - Negative Reserve	The goodwill (arrived at as above) is disclosed in reserves as a 'dangling debit' instead of as an asset	The effect is to reduce total assets and distributable reserves by the amount of the goodwill, reflecting current uncertainty as to whether the asset is realisable
Goodwill - Reserve Write Off	The goodwill (arrived at as above) is written off immediately against reserves.	A reduction in distributable reserves would occur as if a terminal dividend equivalent to the goodwill is paid to the shareholders in the acquired company.
Goodwill - Income Write Off	The goodwill (arrived at as above) is written off entirely against income in the year of acquisition.	A charge in the income statement in the year of acquisition reflects the immediate loss of any value in excess of the carrying amount.
Goodwill - Reserve Amortisation	The goodwill is amortised over fixed or variable period, the reserves being reduced accordingly in each period.	Goodwill amortisation is not included in the income statement as if a distribution on acquisition were made conditional upon later realisation of the asset
Goodwill - Income Amortisation	The goodwill is amortised over a fixed or variable period, a charge being made each year against the current income.	Goodwill amortisation is included in the income statement. The treatment is the same as any other fixed asset and reflects the use of the wasting asset over its economic life.
Negative Goodwill - Reserve	Where the consideration is less then the fair value of the asset acquired, negative goodwill arises. This reflects a bargain purchase, or some particular feature of the assets concerned. The negative goodwill is shown as a reserve.	The effect is similar to a revaluation reserve. The surplus can either be left at cost until the asset to which it relates is disposed of, or it can be transferred to distributable reserves as the asset depreciates.
Negative Goodwill - Provision	As above but the provision is shown as a reduction of net assets	The provision is taken to income if the gain is realised and as the related asset is depreciated.
Negative Goodwill - Deferred Income	As above but the negative goodwill is shown as a separate asset	The amount deferred is taken to income when the gain is realised.

Source: McLeay *et al.* (1999)

Other authors argue that capitalisation and amortisation are arbitrary and understate net income; for example, Spacek (1964). Therefore, a better treatment is to write goodwill off immediately against retained earnings. Another rationale which is very conservative argument for the immediate write-off approach is that it is reasonable to expect that goodwill relating to a business at the time of purchase will eventually disappear over time. This argument is based on the fact that the products of the business purchased will decline in importance. Therefore, the particular goodwill purchased might well be written off.

The second approach to accounting for purchased goodwill states that goodwill should not be written off at all, unless there is strong evidence to support this procedure. According to Zeff and Thomas (1973), this school of thought bases their argument on the major points stated below:

1. It is over-conservative to write goodwill off the books when it has not depreciated in value below the purchase price. To write off goodwill in such a case creates a secret reserve while to recognise this reserve is thought to be unorthodox accounting. Goodwill suffers no actual decline in value so long as the earning capacity of the enterprise is maintained.
2. When goodwill has actually depreciated, it is not necessary to record that depreciation in the operating account. The profit and loss record best shows the degree to which goodwill exists. Its value fluctuates according to the expected future earning possibilities of the enterprise. It is permissible to write goodwill off the books when it is declining in value or when it has lost its value but amortisation is not required.
3. It is impossible to determine accurately the extent to which the goodwill has depreciated. Some accountants have accepted this fact as one of the major reasons why it should not be brought into published accounts, unless purchased. The owner of a business cannot make an impartial estimate of the extent to which goodwill has depreciated. Consequently, since appreciation of goodwill is not recognised in the accounts, neither should depreciation be charged.

The third approach to accounting for purchased goodwill states that goodwill should be amortised systematically over a reasonable period of time. In accordance with a primary function of accounting which is to match costs and income, the cost of purchased goodwill should be amortised as a means of matching the cost of securing the income actually received. All expenditure whether on advertising, stationery, buildings, machinery, employee services, goodwill, or the use of money or machinery, is made for the purpose of generating an income return which is greater than the output, or as an aid to that goal. The cost of these purchases is matched with that part of the income stream for which it is applicable.

The matching does not take place in terms of the changed value of each of the assets (Walker, 1953).

Under stewardship accounting, management should be required to justify its acquisition of other companies by demonstrating that cash inflows from the acquisition exceed the cash outflows incurred when making the investment. It seems reasonable to claim that appropriate reporting for monitoring and control of the management can only be achieved if the cash outlay committed to achieve the future net profit inflows are charged as costs in a profit and loss at some time. To do otherwise is analogous to treating gross profit as the net gain from trading during a period by charging all overhead costs to reserves. It follows that payments for goodwill should be debited at some time to the profit and loss account (Russell *et al.* 1989).

According to the momentum theory of goodwill, the buyer of a company normally pays a large sum of money for the goodwill because he wants a starting push in his new company rather than to start fresh in a similar business and devote so much effort and money over a long period of time to developing goodwill. This push is not a continual, everlasting one, but rather it is like momentum or a running start. The money that is spent on goodwill is just as beneficial as the money spent on plant and equipment. Thus, the investment ought to be charged against income over the estimated life of the momentum (Nelson, 1953).

If acquisition is based on momentum theory, Grinyer (1995) argues that the most significant element of the benefit from acquiring an existing company is the avoidance of the start up costs of establishing the infrastructure of an alternative business, its production and service capacity and skills and the market for its product. Those costs are likely to fall particularly heavily on the early years of a new business.

One could anticipate wide variations between industries. Nevertheless, it is likely that, because of the heavy commitments of time and resources required to establish and develop a fledging organisation, the pattern of the start-costs will show a decline over time and those costs will not be incurred over a very lengthy period. As a result, Grinyer argues this cost should be amortised but in the shorter period, but not in accordance with the current practise[4].

[4] The maximum period for amortisation is differs from one country to another. For example the United States and Canada allow 40 years, Australia and Sweden allow 20 years, the Netherlands allows 10 years and Japan allows 5 years. In UK, under the current FRS 10, maximums of 20 years of amortisation period are allowed.

As mentioned before, in an ideal world a rational analysis of the conceptual issues might lead to a clearly preferred accounting method but as the above analysis makes clear, there are competing claims for that preferred method. Basically, opinion is divided on whether goodwill should be "capitalised and amortised" or "written off on acquisition", and both policies have their supporters. One could ask the question - why does this happen? The next section will briefly discuss one possible answer to this question.

2.5 Goodwill - Matching or Valuation?

According to Grinyer *et al.* (1990),

> "...a root cause of apparent confusion concerning the treatment of goodwill, as in many other accounting matters, arises because of a failure to identify what the accounts are trying to measure and the purposes that they serve."

Grinyer *et al.* advance their argument by listing two distinct conceptual models (the matching and the valuation approaches) which are essentially mutually exclusive within a single profit and loss account. However, in practice, many theorists failed to differentiate between the two models and as result they believe their model should be superior to the others. Since the above issue seems to be very important in the discussion of accounting for goodwill in the UK, both of the conceptual models in financial reporting will be briefly discussed below.

The valuation concept in accounting can be defined as the difference between values at two different dates. Hendriksen (1977) defines valuation in accounting as a process of assigning meaningful quantitative monetary amounts to assets; since the business enterprise is not a consuming unit, economic values based on subjective utility are not relevant in accounting. Therefore, the relevant valuation concepts should be based on exchange or conversion values. There are two types of exchange values: firstly, the output values that reflect the expected funds to be received by the firm in the future based particularly on the exchange price for the firm's product or output and, secondly, input values which reflect some measure of the consideration given up in obtaining the assets used by the firm in its operations (Hendriksen, 1977). An example of a valuation model that utilises Hendriksen's definition can be found in Bodenhorn (1961) who describes depreciation. According to him, the depreciation of any asset during a year is the difference between the present value of the future earnings of the asset at the beginning and the end of the year.

One important characteristic of valuation-based approaches is that because they consider that the gains recognised as attributable to a trading period should include all gains (realised and unrealised) which occurred in the period and only the gains that occurred in the period, wealth is therefore considered to be the total worth of business at a point in time. Profit is then the increment in wealth during the accounting period after adjusting for transfers of wealth to or from the owners.

In 1964, The AAA (*American Accounting Association*) committee defined the matching concept as the process of reporting expenses on the basis of a cause-and-effect relationship with reported revenues. The committee advocated that costs (defined as the products and services factor given up) should be related to revenue realised within a specific period on the basis of some discernible positive correlation of such costs with the recognised revenues (Hendriksen, 1977). This approach is the one that is conventionally practised under accruals-based historical cost accounting.

Thomas (1969) regards matching as an attempt to relate costs directly to revenue. He argues that most of the matching approaches are arbitrary, incorrigible and indefensible because they fail to apportion costs by referring to a clearly defined economic model. However this argument can be challenged because in practice, direct costs are matched, as far as possible, with revenue whilst period costs are matched with accounting periods (Skinner, 1979). Such costs may then be perceived as being necessary to establish and maintain the capacity to operate during the period, and therefore as overheads to be recovered before identifying any surplus wealth arising from the activities of the period.

Compared to valuation approaches, matching-based approaches are all realised profit systems. They recognise inflows, and hence gains, only when the outcome of the series of transactions leading up to the inflow is virtually assured. Thus matching recognises gross income from completed activities and then deducts the direct expenses that were incurred to generate that gross income. Period costs are then typically charged as overheads of the period.

The valuation and matching concepts illustrate two completely different approaches in financial reporting. The concepts are totally different in the sense of the purpose of financial reporting. Although both concepts identify the purpose of business as the creation of wealth, the valuation approach differs from the matching approach because it recognises both realised and unrealised gains in one trading period, as previously explained. However, it has been argued that matching concepts are more useful for controlling and motivating

managers and valuation concepts are more useful for decision making purposes (Grinyer, 1990). It is also important to note that the matching concept occurs more often[5] then the valuation concepts in UK GAAP. SSAP 2 states that the fundamental concepts of accounting are going concern, accruals, consistency and prudence. The standard defines accruals as follows:

> "Revenue and costs are accrued (that is, recognised as they are earned or incurred, not as money is received or paid), matched with one another so far as their relationship can be established or justifiably assumed, and dealt with in the profit and loss account of the period to which they relate"

With respect to accounting for goodwill, it is arguable that decisions by managers to acquire other companies should have to be justified to the shareholders by showing that cash outflows from acquisition are less than the corresponding cash inflows. It seems that the only way the above objective can be achieved is by debiting the cost of the acquisition at some time to the profit and loss account.

The main aim of the first part of this chapter has been to review the theoretical issues of accounting for goodwill in the UK. We will now consider the history of accounting for goodwill and its regulation against the backdrop of the theoretical issues.

2.6 History and Regulation

In the United Kingdom, the statutory requirements relating to accounting for goodwill are set out in the Companies Act of 1985. As explained in Paragraph 9(4) and (5) of Schedule 4A, the interest of the parent company and its subsidiaries in the adjusted capital and reserves of an acquired subsidiary undertaking must be offset against the acquisition cost. The resulting amount, if positive, must be treated as goodwill, and, if negative, as a negative consolidation difference. The positive goodwill, if it not has been written off, should be included under the heading of intangible fixed assets and shown separately from other assets. If the goodwill is treated as an asset, it must be depreciated systematically over a period chosen by the directors. The period chosen must not exceed the useful economic life of the goodwill and must be disclosed in a note. Internally generated goodwill may not be capitalised and the act also prohibits the revaluation of goodwill.

[5] In practice, some of the accounting standards is based on the valuation concepts or combination of the two models.

However, the history of accounting for goodwill history and its regulation in the UK goes beyond the basic statutory requirements. Lee (1973) carried out an empirical study of the accounting treatment of goodwill by companies in the UK from 1962 to 1971. His survey was based on the top 100 companies listed in the industrial section of The Times 1000 and was concerned essentially with goodwill arising from acquisitions. According to Lee, there were five main ways in which UK companies accounted for goodwill at that time (Table 2.3).

Table 2.3: Goodwill Practices of UK Companies (1962 - 1971)

Year/Accounting Treatment	1962 (%)	1965 (%)	1971 (%)
Disclosing as a fixed asset	31	24	14
Neither fixed or current asset	24	28	32
Separate deduction from reserve	18	22	9
As a reserve	13	9	8
Immediate write-off	49	50	58
Two accounting treatments	-35	-29	-21
Three accounting treatments	0	-2	0
Total	100	100	100

Source adapted from Lee (1973).

Goodwill was treated as a fixed asset; or as an asset classified as neither fixed nor current; as a separate deduction from reserves; as a non-distributable reserve (negative reserve); or as a write off or write back either to profit retained for the year or to reserves. The varied practices in that period might have been due to the fact that managers faced different circumstances which might dictate their choice of accounting treatment, including differences in the size of available "accounting" reserves, the amounts of goodwill, the level of earnings and the extent to which companies were vulnerable to take-over (Nobes, 1992).

However, one could conclude that of the five accounting treatments the most popular during this period was immediate write-off which was used in 49% (1962) and 58% (1971) of all cases. Of the companies that disclosed a separate asset value for goodwill, only between 10 percent and 17 percent amortised that amount.

In 1974, the Accounting Standard Steering Committee (ASSC) set up two working sub-committees on accounting for goodwill. These sub-committees proposed two different accounting treatments for goodwill on acquisition. The first was to amortise goodwill over a period of 40 years and the second was to write it off immediately against reserves. However the topic was dropped in the mid-1970s when the ASC began their work on inflation accounting (Nobes, 1992). On the other hand, there were developments regarding accounting for goodwill in the European Community. The EC Fourth Directive on company published account was issued in 1978. This deals only with the accounts of individual

companies not with group accounts - thus only with goodwill which arises in the accounts of a particular company and not with goodwill arising from consolidation. Article 37 of the Directive requires that where goodwill is treated as an asset, it should be written off over a period of not more than five years. The words "where goodwill is treated as an asset" are important in the United Kingdom. They allow, by implication, that goodwill need not be treated as an asset but can be written off directly to reserves, which is exactly what the UK officials who negotiated the Directive had sought (Holgate, 1990).

In June 1980, the ASC published a discussion paper on goodwill. The principle recommendations for the accounting treatment of goodwill were as follows:

1. Goodwill should not be carried as a permanent item in consolidated balance sheets
2. Goodwill should be amortised over its useful economic life
3. The useful economic life should not be larger than the number of years for which the value of the stream of distributable earnings arising from the acquisition is material in relation to the price paid. A mathematical formula was presented which gave a figure of 2 1/2 times the Price/Earnings ratio applicable to the acquired company as being approximate to the amortisation period, up to a limit of forty years.

At that time, the goodwill practices of UK companies could be grouped into three approaches: (a) to show goodwill at cost, (b) to capitalise goodwill in the balance sheets and amortise it against profit and (c) to immediately write off acquisition goodwill against reserves (Tables 2.4 and 2.5).

Table 2.4: Goodwill Practices of UK Companies (1973 - 1974)

Year/Accounting Treatment	1973 - 4 (%)
Shown at cost	24
Amortised	2
Written off immediately	24
Written down but not amortisation	19
No reference to goodwill	30
Total	100

Source: deduced from ICAEW Survey of Published Accounts 1973 - 1974.

Table 2.5: Goodwill Practices of UK Companies (1979 - 1980)

Year/Accounting Treatment	1979 (%)	1980 (%)
Shown at cost	17	11
Amortised	19	12
Written off immediately	64	77
Total	100	100

Source: deduced from ICAEW: Survey of Published Accounts 1980 - 1981.

The above mentioned discussion paper attracted different opinions from commentators. One school of thought believed that goodwill should be amortised while a second school believed that goodwill should be written off immediately on acquisition. The ASC were clearly influenced by the divergence of opinion because it did not proceed with the recommendation in the main body of the 1980 discussion paper that acquired goodwill should be amortised.

This led to a change of direction which can be seen clearly from the Exposure Draft 30 (ED 30) which the ASC published in October 1982. The main proposals in ED 30 were:

1. Non-purchased goodwill should not be recognised in the financial statements.
2. Goodwill should be the difference between the fair value of the consideration given and the fair value of the separable net assets acquired.
3. Purchased goodwill should not be carried in the balance sheet by either amortisation through the profit and loss account on a systematic basis over its estimated useful economic life or by writing it off immediately against reserves representing realised profits.
4. The estimated useful economic life should not exceed 20 years.
5. Negative goodwill should be directly credited to reserves.

Comments on ED 30 were received from ninety-seven organisations and individuals with a majority of them favouring "immediate write-off" rather than "amortisation". Following these comments, the working party recommended to the ASC that the accounting standard should now adopt a flexible approach and allow an option of capitalisation and amortisation but that it should express a preference for "immediate write-off". However, this change did not include a twenty-year maximum amortisation period, as proposed (Holgate, 1990). In December 1984, almost two years from the publication of ED 30, the ASC published Statement of Standard Accounting Practice 22 "*Accounting for Goodwill*". The standard's principal recommendations may be summarised as follows:

1. Internally generated goodwill is not allowed to be shown on a company's balance sheet.
2. Positive goodwill should be written off to reserves in the period in which it is acquired or by amortisation through the profit and loss account.
3. Negative goodwill should be credited to reserves at the time of acquisition.
4. It also allows acquiring companies to account for some acquisitions using immediate write off and for others using capitalisation and amortisation.

This standard received much criticism soon after it was published. According to Holgate (1990), the major criticisms levelled at SSAP 22 were:

1. A document that allows widely differing approaches to an issue cannot be called a standard. This criticism relates principally to the alternative accounting policies allowed by the standard whereby companies can immediately write-off acquired goodwill to reserves, which has no impact on reported earning per share, or they can capitalise and amortise it, which does have an impact.
2. Even if the choices in 1 above were deemed to be generally acceptable, it is not acceptable for the standard to allow a company to use both policies at the same time because this conflicts with the fundamental accounting concept of consistency.
3. Immediate write-off was attacked because it was said that goodwill often increased in value and that amortisation was contrary to that fact. Moreover, it was argued that expenses such as advertising and staff training have the effect of sustaining the value of goodwill and amortisation has the effect of duplicating that charge.

A study by Russell *et al.* (1989) showed that, in 1986, almost all UK companies chose the "immediate write-off" accounting treatment for goodwill (Table 2.6). Arguably, the method chosen by the companies can be justified if it is assumed that managers will act to achieve their personal interest. By choosing immediate write-off against reserve, part of the cost of the acquisition which, logically, should be charged to the profit and loss account will not impact on profits.

Table 2.6: Goodwill Practices of UK Companies (1982 - 1986)

Year/Accounting Treatment	1982	1983	1984	1985	1986
c/f as Intangible asset	10	8	7	3	0
c/f as negative reserve	4	3	1	1	0
Written off immediately	78	80	87	94	98
Amortised	4	6	2	1	1
Other	4	3	3	2	1
Total	100	100	100	100	100

Source: Adapted from Russell *et al.* (1989).

The effect of the choice between immediate write-off and a five year amortisation (as recommended by IASC E32) was so material (Grinyer *et al.*, 1992) that the decision by managers to choose immediate write-off can be understood in terms of the positive effect on reported earnings. In practical terms, SSAP 22 "encouraged" companies to select the treatment that gave the most favourable results. Consequently this led to abuse by managers. Such abuse has been well documented and, according to Woolf (1990), included the following:

1. Allocating low value to acquired assets and a correspondingly high value to goodwill; writing off goodwill against reserves and enjoying low future depreciation charges on acquired assets, inflating goodwill still further with a provision for future rationalisation costs (e.g. British Airways acquired British Caledonian in 1990)[6];
2. writing off future revenue costs against the provision (rather than profit); and writing back to the profit and loss account any part of the original provision now regarded as excessive;
3. obtaining the court's permission to write off goodwill against share premiums[7]; writing off goodwill against nothing at all;
4. creating a negative "goodwill write-off reserve" which could linger indefinitely as a dangling debit leaving other reserves and earnings intact[8];
5. writing off goodwill against revaluation reserve (which is now prohibited under the Companies Act of 1989) and finding an alternative treatment to different acquired intangible assets such as brands, titles, concessions and patents.

Because the ASC received a great deal of criticism for allowing the above-mentioned "abuses", it is not surprising that the ASC revised SSAP 22. The revised standard was published in September 1989 and required companies to disclose more information about the treatment of goodwill. The extra disclosure requirements obliged companies to publish:

1. The fair value of the purchase consideration, the amount of purchased goodwill arising on each acquisition and the method of dealing with goodwill;
2. A table of the previous book values of the acquired assets, the adjustments made and the fair values ascribed;
3. Movements in the provision relating to acquisitions;
4. Certain details when fair values can be ascribed only on a provisional basis; and
5. Certain details regarding the treatment of goodwill on the disposal of a previously acquired subsidiary.

[6] The calculation of goodwill of £353m given by the sum of Net Liabilities acquired £10m, purchase price £246m, acquisition expenses £7m, and estimated reorganisation expenses £90m.
[7] Saatchi & Saatchi sought court approval for the cancellation of their share premium account in order to write off goodwill in 1985.
[8] Erskine House Group accounts for the year ended 31 March 1986 shows a goodwill reserve.

In August 1989 the ASC issued a report (*ASC Report No. 7*) which indicated that

> "acquired goodwill should be recognised as an asset in the balance sheet, it should be amortised through the profit and loss account on a systematic basis and amortisation should be over the useful economic life subject to a maximum of forty years, but if the directors consider that the life exceeds twenty years they must give sufficient information to explain why the believe the life to be of such length, giving details of the main factors that give rise to goodwill".

On the other hand, in January 1989, the IASC issued Exposure Draft 32 (*The Comparability of Financial Statements*), which proposed amendments to numerous International Accounting Standards, including IAS 22, which also governs the accounting for goodwill. The IASC sees the purpose of the proposed amendments as the first step in the process of improving IASs through the removal of the free choice of accounting treatments presently permitted. For the treatment of goodwill; that is, the difference between the cost of acquisition and fair values of net identifiable assets acquired, the IASC proposes:

1. that for positive goodwill any excess of cost over the fair value of net assets acquired be given asset recognition as goodwill on the consolidation balance sheet;
2. that goodwill be amortised to income on a systematic basis over its useful life; the amortisation period should not exceed five years unless the company justifies and explains in the financial statements a longer useful life. The maximum useful life should not exceed twenty years.

In February 1990 the ASC issued ED 47 (*Accounting for Goodwill*) that contained the same proposals as the 1989 report. In this exposure draft, it was argued that the disclosure of goodwill as an asset would lead to improved accountability and this would bring the UK into line with most of the world (For example, goodwill must be amortised in the United States and Canada. The amortisation period is not more than 40 years. By comparison, Japan allows an option between capitalisation and immediate write-off of goodwill against income. In Australia, capitalisation and amortisation over the goodwill's determinable life is recommended. However in practice, most companies immediately write-off goodwill to stockholders' equity).

Leading practitioners and businessman attacked this proposal even before it was officially published (Grinyer *et al.*, 1992). A study by Grinyer *et al.* shows that most of the companies and auditors that responded to ED 47 rejected the proposal to capitalise goodwill and to systematically amortise it against profits (Table 2.7).

opposition to systematic amortisation (Nobes, 1992). The ASB started their work on this issue with a new version of the discussion paper "*Goodwill and Intangible Assets*". In this discussion paper the ASB outlined six possible alternative treatments. These alternatives were as follows:

1. Capitalisation and predetermined gradual amortisation.
2. Capitalisation and annual impairment.
3. Combination of two capitalisation approaches with method 2 being used only in the special circumstances where goodwill had an indefinite life believed to exceed 20 years.
4. Immediate write-off to reserves.
5. Immediate write-off to separate reserves.
6. Immediate write-off to separate reserve with impairment tests.

According to the ASB, no overall consensus emerged from the responses to the Discussion Paper. The method that individually achieved greatest support was method 5. However, more respondents favoured the capitalisation method than favoured the elimination methods. The board decided to develop proposals based on method 3 after taking into account both the arguments made by respondents and the direction being taken internationally as well as the previous opposition to ED 47's proposals for compulsory amortisation. As mentioned in the FRS 10, the board favoured capitalisation rather than elimination against reserves and was influenced by the arguments below:

1. A method requiring elimination against reserves would treat goodwill very differently from brands and similar intangible assets. Given that such assets are very similar in nature to goodwill and that the allocation of a purchase cost between the two can be subjective, it would be possible for a reporting entity's results to be shown in a more favourable light merely by classifying expenditure as an intangible asset rather than goodwill, or vice versa.
2. The immediate elimination of goodwill against reserves fails to demonstrate management's accountability for goodwill as part of the investment in an acquired business. The goodwill is not included in the assets on which a return must be earned, and under methods 4 and 5 no charge would be made in the profit and loss account if the value of the goodwill were not maintained.

In January 1995, Gore *et al.* (1996) conducted a survey that was based on the Finance Directors and senior management of The Times 1,000 companies. According to Gore *et al.*, 92% of UK companies preferred to use immediate write-off and 6% used capitalisation and gradual amortisation, consistent with other UK surveys. The ASB then published the

Financial Reporting Exposure Draft (FRED 12) in June 1996, which is based on method 3 set out above. In these proposals, the ASB proposes that goodwill should be written off over a maximum of 20 years except where it can be demonstrated that the goodwill might have an indefinitely long life and, for time being, require no depreciation at all. Where goodwill is depreciated over more than 20 years or not at all, its value would be subject to an `impairment test'.

Basically the proposals can be summarised briefly as:

1. purchased goodwill to be capitalised;
2. purchased intangible assets to be recognised separately from goodwill when their value can be measured reliably;
3. goodwill and intangible assets generally to be amortised over not more than 20 years, but, exceptionally, amortisation to be avoided altogether and impairment review applied instead.

There are two aspects which should be considered when discussing impairment tests. According to Brown (1996), impairment reviews would involve a comparison of the carrying value of the purchased goodwill with the value of goodwill in the acquired business at the review date. If the carrying value were higher, it would be written down. The value of goodwill in the acquired business would be determined by calculating the present value of the forecast future cash flows. However, goodwill that was being amortised over 20 years or less would not totally escape the requirements for impairment reviews. An impairment review would be required one year after acquisition. If the business was not performing in line with pre-acquisition expectations, any resulting over- valuation of the goodwill would be written off. Thereafter, only if a change in circumstances, such as the emergence of a major competitor, indicated that the goodwill had become impaired, would any further impairment reviews be required.

One could argue that FRED 12 has a diplomatic ambivalence. Those who are opposed to write off goodwill through Profit and Loss Account will seize on the opportunity offered to avoid doing so. Those who support a Profit and Loss write-off will be pleased that there is a rebuttable presumption that the life of goodwill does not exceed 20 years.

As mentioned by the ASB, the majority of respondents to FRED 12 were broadly supportive of its overall approach. The minority who were opposed to the approach divided into those who would prefer immediate elimination of goodwill against reserves and those who would prefer compulsory amortisation. In December 1997, ASB issued Financial Reporting

Standard (FRS) 10 (*Goodwill and Intangible Assets*) which is based on FRED 12 with some minor modification.

The most significant changes that have been made by FRS 10 are as follows:

1. The removal of the procedures to be used in performing impairment reviews which has been published as a separate FRS encompassing the impairment of all fixed assets and goodwill[9].
2. Simplification of the procedures for performing 'first year' impairment reviews. According to the ASB, they accept the argument that a requirement to perform a full first year impairment review for every acquisition would be unduly onerous, particularly for smaller companies. The FRS permits the first year impairment review to be performed on a simpler review with full review being required only if the simpler review indicates a potential impairment.

Nine out of ten members of the ASB approved the adoption of FRS 10. One member who dissented is Mr Hinton and his dissenting view was set out in Appendix IV of FRS 10. The statement published by the ASB is as follows:

> "Mr Hinton dissents from the FRS because he does not agree that goodwill should be capitalised as an asset and amortised, or that revaluation of identifiable intangible assets should be prohibited. He advocates an alternative approach, which, he believes, places greater emphasis on the needs of users and the nature of goodwill, recognising that it is neither an asset nor an immediate loss in value. He concludes that goodwill should not be presented as an asset or in any way amortised but should be deducted from shareholders' equity. He notes that over 95 per cent of UK companies with goodwill at present deduct such goodwill from shareholders equity by write-off to reserves or to goodwill reserves"

Basically, FRS 10 restricts accounting for goodwill to one method; that is, to capitalise purchased goodwill and to amortise it in the profit and loss account with a few exceptions (As required by FRS 10, goodwill and intangible assets generally to be amortised over not more than 20 years, but, exceptionally, amortisation to be avoided altogether and impairment review applied instead). Companies no longer have a choice as there is no longer an option to write off goodwill to reserves. However, a number of factors will influence FRS 10's success. One will be the effectiveness of the impairment review procedures that have been field tested but not yet applied more widely. Logically, if managers follow their personal interests, instead of amortisation, it is reasonable to believe that there will be a large amount of goodwill in the balance sheet. At least that amount will

[9] This Financial Reporting Standard, FRS 11 (*Impairment of Fixed Assets and Goodwill*) was issued by Accounting Standard Board in July 1998.

not disappear immediately through a hole in reserves and, thus, it will would bring the UK closer to international practice.

2.7 Conclusion and Discussion

This chapter has discussed two issues: first, the theoretical issues and then the history and regulation of accounting for goodwill in the UK. Most of the arguments in the literature relating to accounting for goodwill are based on one or other of the valuation and matching concepts. Authors who define goodwill under the excess profit approach are advocates of the valuation concepts which often leads to them supporting the immediate write-off against reserve alternative.

On the other hand, authors who define goodwill under the residuum approach favour the matching concept that leads to capitalisation and amortisation of goodwill. As stated before, these two concepts are essentially mutually exclusive within a single profit and loss account. Therefore, it can be understood why advocates of the different approaches reach different conclusions as to the appropriate treatment of goodwill. From the second part of discussion, it is obvious that accounting for goodwill is a controversial subject in the UK, at least in terms of history and regulatory perspectives. This might be related to the controversy surrounding the theoretical aspect of accounting for goodwill.

However, many researchers in this area believe that the behavioural aspects of managers play a very important role in contributing to the accounting for goodwill saga in the UK. Most of the "managers factors" analysis is based on the perception that financial statements are supposed to be one of the basic elements in accounting system. Therefore, any different treatments of accounting for goodwill will affect the final result of the financial statement, which then will affect managers.

Most of these arguments are based on Agency Theory that was developed by Jensen and Meckling in 1976. Agency Theory as defined by Jensen and Meckling is:

> "a contract, under which one or more persons [the principal(s)] engage another person (the agent) to perform some service on their behalf which involves delegating some decision making authority to the agent"

This theory can be applied in financial reporting, because a manager who is supposed to perform his service on behalf of a principal will always be obliged to give some information about the results of his efforts in order to allow for the principal to monitor his performance

(Ballwieser, 1987). It is reasonable to acknowledge that the large public companies are complex organisations far different from the traditional economic notion of a single entrepreneur running his own small firm. Thus, the owners of a firm (shareholders) generally have little interest in and even less direct knowledge of the day to day operations of their firms. This phenomenon can be attributed to the separation of the ownership and the management functions that have become increasingly prevalent (Cohen and Cyert, 1965).

This situation (agent-principal relationship and separation of ownership and management function) requires a monitoring system to make managers accountable to owners. Russell *et al.* (1989) suggested that financial statements "within agency contexts" act as primary tools to motivate and monitor managers. On the other hand, Williamson (1963) has developed a model of business behaviour that focuses on the self-interest-seeking behaviour of corporate managers. According to him,

> "this separation of ownership and management functions permits the managers of a firm to pursue their own self-interest, subject only to their being able to maintain effective control over the firm. In particular, if profits at any time are at an acceptable level, if the firm shows a reasonable rate of growth over time, and sufficient dividends are paid to keep the shareholders happy, then the managers are fairly certain of retaining their power"

It is widely accepted that reported profit is one of the key elements by which managers and others assess managerial performance. Watts and Zimmerman (1978) suggest a model for predicting and explaining the behaviour of managers. One of their most important factors is the effect on managers of reductions in corporate earnings. It also appears reasonable to claim that managers will show their interest in other areas in financial reports if these areas are used as tools to monitor their performance. Obviously, if the above arguments are valid, managers of firms will give serious consideration to accounting for goodwill issues because any treatment which is proposed and selected will affect the numbers in financial statements. Thus, the aim of FRS 10 to make management accountable for amounts spent on purchased goodwill and to alert the readers of financial statements to any decline in the health of acquired businesses (Brown, 1996) is not surprising.

CHAPTER 3

ACCOUNTING FOR GOODWILL

3.1 Introduction

The conceptual and theoretical issues related to accounting for goodwill in the UK have been presented in the previous chapter, including historical and regulative perspectives. Goodwill has been the subject of many works produced by academics and practitioners and related issues have been the subject of many debates. As mentioned by Lee (1971), the debate was initiated by Francis More in 1891 and it has been continued over the years by eminent accountants and academicians such as Paton (1944), Nelson (1953), Spacek (1964), Lee (1971), Ma and Hopkins (1988), Grinyer *et al.* (1990), Bryer (1990), Nobes (1992), Tearny and Johnson (1993) and more recently by McCarthy and Schneider (1995), Jennings *et al.* (1996), Higson (1998) and Deng and Lev (1998). Many of the earlier papers in which goodwill issues were discussed were analytical and descriptive in nature. In recent years, however, a number of empirical studies have been published. This chapter will review some of the previous work on accounting for goodwill, concentrating on the empirical work that has appeared over the past 10 years. Some of the earlier papers relating to the theoretical and regulatory issues have already been discussed in Chapter 2; thus, some of the discussion in this chapter is complimentary to that of the previous chapter. This chapter is divided into six main sections: valuation and treatment (3.2), amortisation of goodwill (3.3), capitalisation of goodwill (3.4), standardisation and harmonisation (3.5), management and SSAP 22 (3.6) and the value-relevance of goodwill (3.7). Section 3.8 provides a brief summary of this chapter.

3.2 Valuation and Treatment

ED 47 (*Accounting for Goodwill*) was published by the Accounting Standards Committee in 1990. The proposed UK Standard would require goodwill to be capitalised and amortised over an arbitrary period. This proposal aroused substantial controversy, and was countered by suggestions that goodwill should remain as an asset unless its value diminished. Egginton (1990) addresses the issue of whether practical methods can be devised to test

the value of goodwill. Basically, his models are based on how to calculate the market capitalisation and have that computed, we then compare this with the carrying value of asset included goodwill. He proposes four basic models which might be used as a broad framework for testing goodwill namely: Stock Market Capitalisation, Net Present Value, Value as a Function of Current Earnings and Value as a Function of Causal Variables. All the four models will be explained briefly below.

3.2.1 Stock Market Capitalisation

According to Egginton, stock market capitalisation is the most obvious test of goodwill to the market. This model is based on the assumption that the value of the firm equals the number of shares issued times their current Stock Market price. Symbolically,

$V = NP$

where,

V is the value of the equity of the company

N is the number of shares in issue

P is the current price per share

If the accounting value placed on net assets (including goodwill) (VNA) were less than V (VNA < V), the accounting value would be acceptable. If VNA were greater than V (VNA > V), it would require a reduction in goodwill to bring net assets down to the stock market value.

3.2.2 Net Present Value

The net present value model is based on the following equation:

$$V = \sum_{t=0}^{\infty} \frac{C_t}{(1+k)^t}$$

where,

V is value of the equity of the company

C_t is the net cash flow of the business segment at time t

k is the firm's weighted average cost of capital

As explained by Egginton, there is some difficulty with this model because companies do not project their cash flows to infinity. Nevertheless, companies commonly prepare planning budgets with horizons of three or five years. In order to assess the stability of the company's

earning power and to judge whether NPV appears to have been maintained, the auditor could use such budgets in cash flow or profit terms. Egginton mentions two set drawbacks of this approach; *i.e.*, that the budgets are prepared by management and that the short time horizon does not allow sufficient discounting in order to obtain an explicit NPV.

3.2.3 Value as a Function of Current Earnings

This model is based on the price-earning ratio which can be viewed as the reciprocal of a discount rate; in effect, earnings are assumed constant and discounted as perpetuity to a present value. Symbolically:

$V = Y_e/K_e$

Where,

V is value of the equity of the company

Y is the most recent net profit attributable to shareholders of the company

K is the company's equity cost of capital

According to Egginton, this model is analogous to the value function developed in a paper on the theory and value of earnings by Ohlson (1989). In the present context, the last period's earnings are used as a proxy for the next period's earnings in the face of uncertainty. In using V in a goodwill test against net book value it would be necessary to adapt the definitions appropriately. One example given by Egginton is that in considering the profits of a segment, the earnings considered would need to be before both interest and tax, and the cost of capital would be in a corresponding gross form. The cost of capital should also be related to the risk of the segment's activities.

3.2.4 Value as a Function of Causal Variables

The fourth model mentioned by Egginton is based on the belief that the value of a company might be loosely characterised as being derived from a number of causal variable factors. Among these would be the markets for goods and services that the company produces. The nature of the competition faced in those markets is determined by the company's command over tangible assets and its strategic assets, which are effectively separable intangibles. These elements are brought together by the entrepreneurial and operating skills of management and work force, (labelled as X-efficiency).

The implied value relationships could be stated thus:

$V = f(M,C,T,S,X)$

Where,

V is the value of the equity of the company

M is the potential value of the markets in which the company operates

C is a measure of the strength of competition

T is the value of the company's tangible assets

S is the value of its strategic or separable intangible assets

X is the X-efficiency within the company

Egginton realised, however, that it is impossible to measure all these elements objectively. He argued that in practice none are measured objectively since accountants normally use the proxy of historical cost for the value of net tangible assets and separable intangibles. The broad principles of the model could be used as a basis for selecting proxies for elements in the formulation of valuation tests which could then be used in making judgements about the maintenance of goodwill.

According to the author, the models are not mutually exclusive. Given the limitations of the models and the subjectivity of the tests, the suspicion with which intangibles are traditionally regarded, and the caution of accountants, these models might be used in combination.

Another report produced by Arnold *et al.* (1992) which was initiated by the ASB also focuses on accounting for goodwill in the UK. The study is based on a theoretical framework which adopts the premises that accounting reports are needed: (a) for decision-useful information to satisfy diverse needs but with common interests as typified by those of investors and (b) for the control of accounting choice by means of standards in an agency situation involving moral hazard. Arnold *et al.* divided goodwill into three elements; namely, separately identifiable intangibles, benefits arising from monopoly profits and accounting measurement errors.

Arnold *et al.* argued that the practice of immediate write-off following corporate acquisitions is subject to creative accounting which attempts to avoid the issue of goodwill by constructing transactions in such a way that accounting for goodwill is not required. The authors see the existing situation as full of inconsistency and needing specified criteria to deal with alternative situations. They recommend that these criteria should include relevance and reliability, prudence, consistency and comparability. The proposed system of

accounting for goodwill is based on the full disclosure of all intangibles that can be verified as existing. All goodwill is to be decomposed into:

1. the fair value of separable intangibles
2. the present value of profits arising from market imperfections, and
3. over or under payment

Accounting treatment for (3) is to write it off immediately against income and to write (1) and (2) off to income over their useful economic lives, ensuring that their net book value is below their recoverable amount. Companies are to be given the option of occasionally revaluing that intangible but they have to disclose the basis of valuation as well as details of the value.

In a different context, Wines and Ferguson (1993) examine the accounting policies adopted for goodwill and for identifiable intangible assets by a sample of 150 Australian Stock Exchange listed companies over the five-year period from 1985 to 1989 inclusive. The general research objective in this study was to examine the financial statements from the above sample in order to ascertain any trends in accounting policies adopted for goodwill and identifiable intangible assets. The first Australian Accounting Standard relating to intangible assets was AAS 18 (*Accounting for Goodwill*) which was issued in March 1984.

According to the authors, Australian companies had previously adopted a wide variety of accounting treatments for goodwill. With the introduction of AAS 18, however, which required companies to capitalise and amortise goodwill over the time during which benefits were expected to arise, many companies failed to comply with the requirement for various reasons preferring immediate write off. It required the introduction of ARSB 1013 which has statutory backing for compliance to be more effectively enforced. This approved accounting standard applies to companies reporting in financial periods ending after 18 June 1988.

Against this background, they developed their first hypothesis. It stated that, over the period 1985 to 1989, an increasing percentage of companies reporting goodwill adopted the accounting policy of capitalisation and systematic amortisation. The second hypothesis addresses the question of whether there has been a change in the accounting policies adopted for identifiable intangible assets. With companies recognising identifiable intangibles in an effort to reduce the impact on reported operating profits of the requirements of AAS 18 and ASRB 1013 for the amortisation of goodwill, it would be expected that a decreasing percentage of companies reporting identifiable intangibles would have adopted the accounting policy of capitalisation and systematic amortisation.

Tables 3.1 and 3.2 summarise the goodwill accounting policies and the categories of identifiable assets in this study. Wines and Ferguson reveal a general decrease in the diversity of goodwill accounting policies over the study period but the converse is the case for identifiable intangible policies. In particular, they find an increase in the percentage of companies electing not to amortise identifiable intangibles. The study therefore provides evidence to support claims that companies have been recognising identifiable intangibles in order to reduce the impact on the reported operating profits of amortising goodwill because of the change in the accounting standard.

Table 3.1: Goodwill Practices of Australian Companies (1985 - 1989)

Accounting Policy	1985 (%)	1986 (%)	1987 (%)	1988(%)	1989(%)
1.Systematic Amortisation	43.7	52.2	55.0	63.1	86.8
2.Non-systematic	0.0	0.0	1.3	1.2	0.0
Amortisation	4.2	4.3	1.3	1.2	0.0
3.Extraordinary Amortisation	4.2	2.9	1.3	1.2	0.0
4.No Amortisation	4.2	4.3	1.3	0.0	0.0
5.Dangling Debit	26.8	26.1	27.5	19.0	2.4
6.Written-off Extraordinary	9.9	4.4	2.4	0.0	0.0
7.Written-off Reserves	0.0	0.0	1.2	2.4	0.0
8.Written-off Abnormal	7.0	5.8	8.7	10.7	10.8
9.Both 1 and 6	0.0	0.0	0.0	1.2	0.0
10.Both 1 and 8	100.0	100.0	100.0	100.0	100.0
Total					

(Source: Wines and Ferguson, 1993)

Table 3.2: Categories of Identifiable Intangible Assets Recognised

Accounting Policy	1985	1986	1987	1988	1989
Trademarks/Names	5	9	18	24	24
Patents	8	11	16	21	16
Licences	7	8	10	13	14
Rights	8	8	12	13	11
Brand	1	3	6	10	9
Other	1	1	1	2	1
Mastheads	1	1	1	1	1
Titles	1	1	1	1	1
Intellectual Property	0	0	1	1	1
Technological	0	0	1	1	1
Assets	0	0	1	1	0
Franchises	0	0	0	0	1
Television Licences					
Total	32	42	68	88	80

[Source: Wines and Ferguson (1993)]

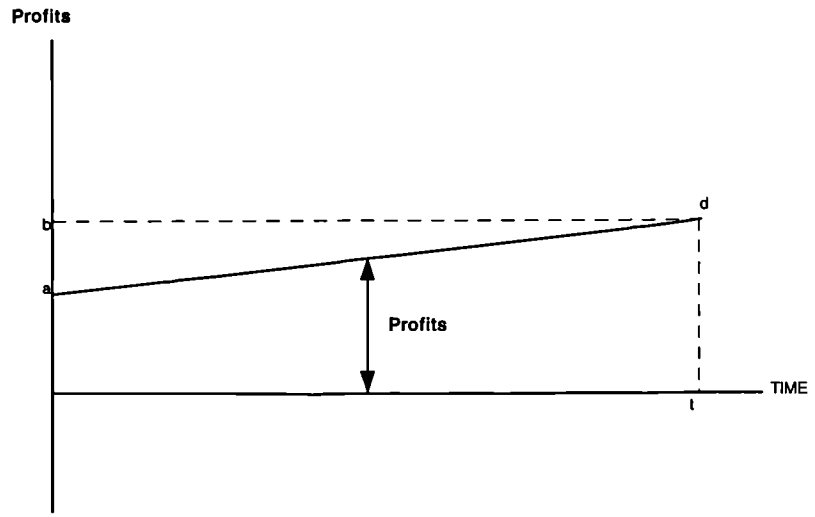
3.3 The Amortisation of Goodwill

In his 1995 paper, Grinyer discussed the basic concepts of accounting theory related to accounting for goodwill. The most important issue presented in his paper is a new idea for amortising goodwill, which is based on the momentum theory of goodwill established by Nelson in 1953. According to Grinyer, acquisition is frequently an alternative to self-start

investment, the creation of businesses with the characteristics desired by the managers of the acquisitive firm. It follows that the acquisition of an established business saves the bidder the very substantial costs of getting to the same position by the alternative self-start option. Assuming that the bidder would have proceeded with the alternative investment if acquisition was not a possible option, then the savings of the outlays associated with the self-start option represent the equivalent to cash benefits deriving from the acquisition. Such benefits might be as follows:

1. the acquisition of profits during the build up period of the alternative business investment, since new businesses in a competitive environment are rarely profitable in the phase of their early development; and
2. the avoidance of the uncertainty associated with a new business, given that new concerns typically face a greater number of unknown factors in both the production and marketing areas than established businesses.

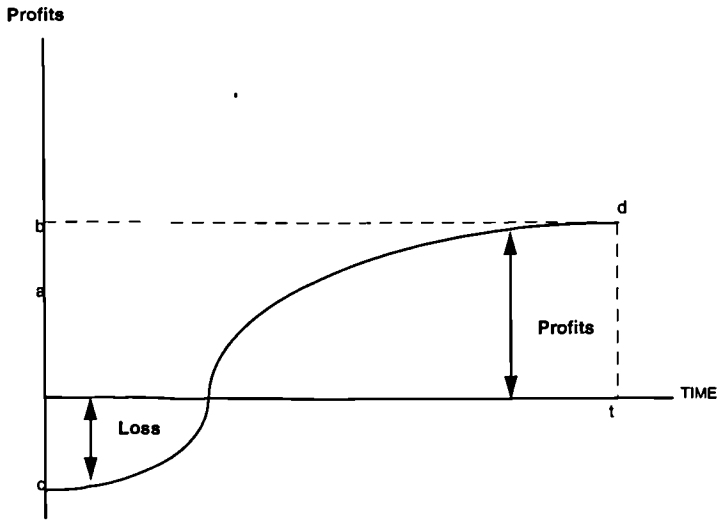
Figure 3.1: Profitability of Acquisition



[Source: Grinyer (1995)]

Figure 3.2 depicts the self-start alternative where it is assumed that heavy investment in revenue expenses would have been incurred in order to achieve profit 'b' by time 't' (the characteristics and profits of the alternative businesses are identical). The curve 'cd' is based on the assumption that the rate of such expenditure declines and the level of revenue achieved rises over time.

Figure 3.2: Profitability of Acquisition (Self-Start Business)



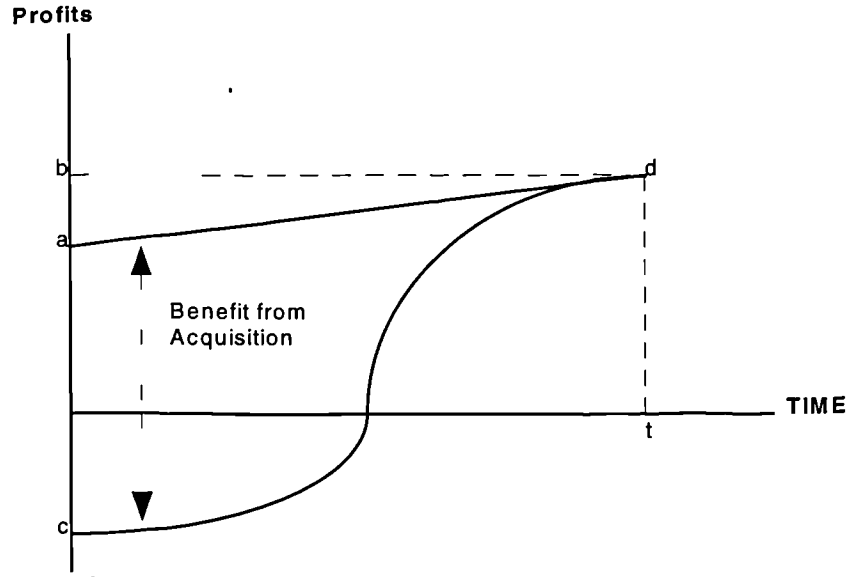
[Source: Grinyer (1995)]

Figure 3.3 combines both Figures 3.1 and 3.2 to allow one model to be developed where the pattern of additional costs associated with the self-start option are shown. These costs are the differences between the curves 'ad' and 'cd' in Figure 3.3. Grinyer argues that the curve 'ad' plots the profit stream of the acquisition and 'cd' plots that of the alternative self start business up to the time at which it is established as being equivalent to the acquisition. The difference between the curves is hypothesised as being attributable to a combination of the high costs of creating an internally generated business and the lead-time required to build up revenue in the start-up business. The difference in the curves are the savings achieved by reason of the acquisition and therefore the benefits obtained by purchasing goodwill.

Furthermore, Grinyer believes that Figure 3.3 reflects the perceptions that:

1. A significant element of the benefit from acquiring an existing company is the avoidance of the start up costs of establishing the infrastructure of the alternative business, its production and service capacity and skills and the market for its product.
2. Those costs are likely to fall particularly heavily on the early years of a new business. It is likely that the pattern of the start up costs will show a decline over time and the costs will not be incurred over a very lengthy period.
3. One element of the benefit derived from acquisitions is the additional profit made on the higher sales volume that is likely to underlie curve 'ad' during period 1 to t - 1.

Figure 3.3: Profitability of Acquisition (Combination of Figure 3.1 and 3.2)



[Source: Grinyer (1995)]

Based on the above arguments, Grinyer proceeds to the following hypotheses that:

1. All of the benefits gained by acquisition decline in value over time,
2. The period over which they extend could be expected to be no longer than the time usually required to form and establish a company with similar characteristics to the one acquired, and
3. Given (1) and (2), if it is to comply with the conventional concepts of matching based depreciation, the pattern of amortisation of goodwill should reflect the declining pattern of benefit.

Basically, the discussion offered by Grinyer is based on a deductive argument which proceeds from the stated assumptions and is consistent with the concept of matching based accrual accounting which underlies most practice and is open to empirical observations.

In contrast to Grinyer's study, Hall (1991) seeks to establish that in the United States, Under accounting Principles Board Opinion 70 (1970), managerial choice would be restricted to a single method of amortising over a fixed period of 40 years or less, if the guideline could be interpreted in a uniform way. This reflects the desire of the APB to restrict alternative choices. However because there is substantial discretion in the choice of period for amortisation an opportunity for management opportunism exists. Hall seeks to identify how management behaviour of the type identified by Watts and Zimmerman (1978) would influence the choice of accounting policy. To do this he establishes three hypotheses:

1. Firms operating near their debt covenant constraints choose longer amortisation periods for goodwill (leverage ratio is used to proxy for the nearness to debt constraints).
2. Large firms choose shorter amortisation periods for goodwill (net sales are used as the measure of firm size).
3. Firms with high ownership concentration choose shorter amortisation periods for goodwill (ownership concentration is measured as the percentage of the firm owned by insiders).

Hall estimated the following regression model:

$$YEARS = \alpha_0 + \alpha_1 LEV + \alpha_2 SIZE + \alpha_3 OWNER$$

where,

YEARS	= Maximum number of years over which goodwill is amortised
LEV	= Total Debt/Total Assets if Moody's reports a debt covenant sensitive to goodwill accounting choices; zero otherwise
SIZE	= Net Sales
OWNER	= Percentage of the firm owned by insiders

The results of the regression analysis performed by Hall are presented in Table 3.3 which shows that the length of the goodwill amortisation period is related to the size of the firm and, for those firms with debt contract provision sensitive to goodwill accounting, to the firm's leverage. Thus, it appears that managers take economic consequences into consideration when deciding the number of years over which goodwill is amortised. In particular, political costs and debt contracting costs are considered. This is in contrast to a strict interpretation of APB17, which requires that goodwill be amortised over the periods when a company is estimated to have benefited.

Table 3.3: Goodwill amortisation as a Function of Debt, Sales and Ownership

	α_1	α_2	α_3	R^2	N
Predicted Sign	+	-	-		
Estimate	16.887	-0.240	0.058	0.273	48
t-statistics	1.804	-2.932	0.941		
Probability	0.078	0.005	0.352		

Model: YEARS = $\alpha_0 + \alpha_1$LEV + α_2SIZE + α_3OWNER
(Source: Hall, 1993)

3.4 The Capitalisation of Goodwill

In the UK, Russell *et al.* (1989) produced The Chartered Association of Certified Accountants (CACA) Research Report 13 that concentrated on Accounting for Goodwill in the UK. Russell *et al.* examined the accounts of 229 UK companies for the five-year period from 1982 to 1986. One of the aspects of this report concerns the effects of accounting for acquired goodwill on the average levels of reported company profitability. Russell *et al.* recalculated the accounting rates of return for those companies by using two different treatments of acquired goodwill: immediate write-off and a five-year amortisation period. The results of this study are presented in Table 3.4. The table reveals that one of the main effects of shifting from immediate write off to the five year amortisation of goodwill would be to reduce the average level of reported profitability by about three percentage points.

Table 3.4: Effect of the Accounting Treatment of Goodwill on Reported Accounting Rates of Return

	Immediate Write off	Five year Amortisation
	%	%
Mean	14	11
25th Percentile	10	7
Median	15	11
75th Percentile	18	16

[Source: Russell *et al.* (1989)]

As can be seen in Table 3.4, the 1986 arithmetic mean level of the accounting rates of return of the companies in the sample was 14 percent under immediate write-off compared with 11 percent under five year amortisation. At the same time the 25th percentile, the median and the 75th percentile shifted down by three, four and two percentage points respectively.

Colley and Volkan (1988) suggest that the issue of the capitalisation of goodwill will continue to be a source of controversy because changes in accounting standards for business combinations must inevitably involve goodwill. They suggest that what is currently recognised as goodwill should be separately identified and capitalised as specific intangible assets. Any unidentifiable portion of goodwill would then be immediately written off to stockholders' equity on the acquisition date, due to fundamental uncertainty as to its make up.

Part of Colley and Volkan's focus is on the financial consequences of the non-capitalisation of purchased goodwill for US companies for the years 1980 to 1984. Specifically, they examine the magnitude of the impact on the risk (debt-to-equity) and performance (return

on investment) ratios of the change from capitalised to non-capitalised purchased goodwill in accounting policy. In order to determine the credit ratings and stock prices of companies, financial analysts extensively use both ratios. In order to analyse these changes, the authors compute the debt to equity (DTE) and net income to total asset (ROA) ratios of the firms in their sample for each of the five years. Finally they repeat this step, assuming that the goodwill amount has been deducted from total assets and total equity and that its amortisation has been added back to net income (NEWROA and NEWDTE, respectively).

Table 3.5: Financial Consequences of Non-Capitalisation

Year	Number of Firms	ROA	NEW ROA	Diff Amount	Diff (%)	Goodwill to Asset Ratio
1980	59	0.0840	0.0878	0.0038	4.5	0.0318
1981	60	0.0838	0.0875	0.0038	4.5	0.0320
1982	62	0.0749	0.0790	0.0041	5.5	0.0373
1983	64	0.0762	0.0800	0.0038	5.0	0.0350
1984	65	0.0833	0.0875	0.0042	5.0	0.0359
Year	**Number of Firms**	**DTE**	**NEW DTE**	**Diff Amount**	**Diff (%)**	**Goodwill to R/E Ratio**
1980	59	0.9090	0.9811	0.0721	7.9	0.0807
1981	60	0.9277	0.9943	0.0666	7.2	0.0785
1982	62	0.9817	1.0837	0.1020	10.4	0.0913
1983	64	0.9298	1.0117	0.0819	8.8	0.0960
1984	65	0.9924	1.0843	0.0919	9.3	0.0988

[Source: Colley and Volkan (1988)]

Table 3.5 shows the results of their observations which can be summarised as follows:

1. The average ROA is 0.0804 while the average NEWROA is 0.0844 indicating an increase of 0.4 percentage points with a range of 0 to 1.7 percentage points.
2. The average DTE is 0.9481 while the average NEWDTE is 1.0310 indicating an increase of 8 percentage points with a range of 0.2 to 110.0 percentage points.
3. The average ratio of goodwill to total assets is 0.034
4. The average ratio of goodwill to retained earnings is only 0.089.

According to the authors, the average impact of the suggested change in accounting policy on the ROA may be viewed as immaterial (according to the five percent criterion) while the impact on DTE is modest, indicating an increase in these ratios of 4.9 percent and 8.7 percent respectively.

3.5 Standardisation and Harmonisation

The main theme of Nobes' (1992) paper is the cyclical pattern of standard setting. The paper contains a case study of UK standard setting on the subject of goodwill. The two most important aspects of Nobes' study are his explanation of political influences and a discussion of the cyclical pattern of the standard setting for accounting for goodwill. Nobes identifies several interested parties which are involved in the political process of standard setting and outlines their motives and their influence on the Accounting Standard Committee (ASC).

According to Nobes, corporate managers lobbied vigorously against the 1980 Discussion Paper and again against ED 47. The most plausible explanation of their behaviour was the effect that a reduction in earnings might have on share prices, company reputation and compensation. However, there were directors who felt that in order to avoid political inference, they should keep profits low and thus would have no incentive to lobby for or against ED30, SSAP22 or ED47 since all these propose making amortisation charges voluntary or compulsory. However, Nobes believes that these managers would still oppose the idea of compulsory write-off to reserves, an idea which did not gain agenda entrance.

On the other hand, Nobes noted that the auditors were comfortable with ED 30 and SSAP 22 because a standard practice of immediate deduction from reserves reduces uncertainty more than does the need for estimates of the life of goodwill or appraisals of its impairment. Some large firms responded to ED 47 by favouring capitalisation followed by the appraisal technique, which is more uncertain and difficult to audit, compared to immediate write-off or capitalisation and amortisation over a given period. All the largest firms opposed systematic amortisation. According to Nobes, this public stance was consistent with the clearly revealed strong preference of their clients and potential clients rather than their personal preference. According to Nobes, the views of the users of accounts were hard to ascertain. However several editorials in professional journals and newspapers were in favour of ED 47, suggesting that it provided better accountability and more complete information.

Government also expressed its view through the DTI which stated clearly to the ASC that goodwill, where capitalised, must be systematically amortised. Legal council confirmed this view. As for international opinion, Nobes mentioned that there was no direct pressure from the FASB, SEC or COB for the removal of the deduction from reserve treatment, although their views were well known. The most obvious pressure came from the desire of the ASC

to contribute to the world wide harmonisation attempts of the IASC through the removal of options as recommended in E32.

Nobes' study illustrates the cyclical pattern of standard setting in a case study of accounting for goodwill in the UK. According to Nobes, accounting for goodwill in the UK exhibits four features which can be considered as a cyclical model of standard setting namely; the start point, stimulus for action, the downward force and the upward force. Figure 3.4 presents an representation of Nobes's goodwill cycle showing the degree of standardisation proposed by the ASC document.

The cycle starts from a point of varied practice. In the goodwill case, Nobes has noted that there were a great variety of practices in the 1970s. Goodwill was treated as a fixed asset, or as an asset classified as neither fixed nor current, nor as a separate deduction from reserves, or else as a non-distributable reserve (negative reserve) or as a write off or write back either to profit retained for the year or to reserves. The varied practices during that period might be due to the fact that managers face different circumstances which might dictate their choice of accounting treatment. These include differences in the size of available "accounting" reserves, the amounts of goodwill, the level of earnings and the extent to which companies are vulnerable to take-over (Nobes, 1992).

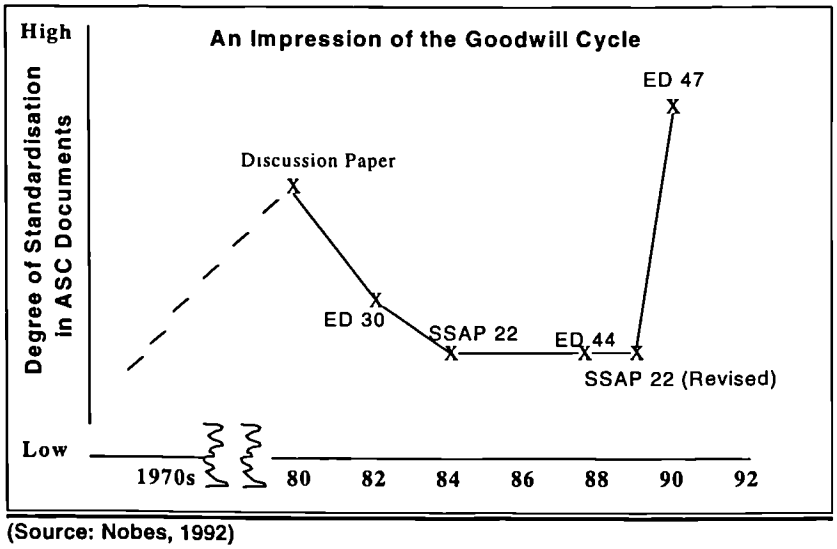
According to the survey done by Lee in 1971, one could conclude that the most favourable accounting treatment during this period was immediate write-off, out of the five accounting treatments, immediate write-off was used in 49% of cases in 1962 and 58% in 1971. Of the companies that disclosed a separate asset value for goodwill, only between 10 percent and 17 percent amortised that amount. The various stimuli for ASC action noted in his paper come in two chronological groups. First, in the 1970s, there was the prior existence of US rules, the awareness of diversity of practice and the publication of the drafts of the EC Fourth and Seventh Directives. A second wave of stimuli in the late 1980s led to the need to revise SSAP 22. These included an increase in take-over activity in a bull market, and the related increase in the amounts of goodwill with resultant difficulties in write off.

The first point on the graph in Figure 3.4 is the 1980 Discussion Paper, which shows the influence of the upward force: the proposal was for the standard practice of capitalisation and amortisation. The resultant the downward force produced a two-stage retreat to the permissive SSAP 22. This was followed by amendments but to disclosure rules only, in ED 44 and SSAP 22 (revised). However, according to Nobes, criticism of the result of SSAP 22 from members of the profession, the press and the DTI, as well as the opinion of

international bodies, led to a review of SSAP 22 and to another opportunity for the upward force to assert itself in the form of ED 47.

The model predicts that the next stage in the cycle will be a retreat from income reducing proposals and the publication of a standard that allows more room for judgement and thus for choice. Nobes mentions that the standard setting arrangements changed in 1990 and this itself has been blamed on the ASC's performance on goodwill. Judging from the latest standard published by the ASB which is based on the six alternative treatments; *i.e.,* that goodwill should be written off over a maximum of 20 years except where it can be demonstrated that the goodwill might have an indefinitely long life and, requires no depreciation; and that where goodwill is depreciated over more than 20 years or not at all, its value should be subject to an `impairment test', Nobes prediction is almost perfect!

Figure 3.4: An Impression of the Goodwill Cycle



(Source: Nobes, 1992)

The European Union also considers Accounting for Goodwill to be one of the important items in a program of accounting harmonisation which (as normally understood in the literature) will lead to a situation of maximum harmony in which particular financial statement items will be dealt with using the same accounting methods by all member states.

However, Archer *et al.* (1996) argue in their paper that this notion ignores the possibility that companies may be subject to different circumstances which arguably justify the use of correspondingly different accounting methods in respect to a particular item. As a result,

they develop a statistical model of international accounting harmonisation, which is based on an alternative notion of international harmony. According to this notion, a state of international harmony exists when, all things being equal, the odds of selecting a given accounting method are identical in each country.

Although the main purpose of their paper is to show how the measurement of harmonisation over time can be analysed by means of a nested hierarchy of log-linear models, the use of purchased goodwill as one of the variables in this study reveals how the accounting practices for purchased goodwill have changed over time and also the degree of harmonisation in the European Union in respect to goodwill.

Archer *et al.* focus on accounting for goodwill and deferred tax for two periods, 1986/87 and 1990/91. Their cross-classification of goodwill accounting methods is given in Table 3.6. There is little change overall if we compare 1986/87 and 1990/91. From Table 3.6, it is obvious that the majority of companies use method B. Of the UK companies (if we ignore method E), 94 percent use method B, in which are eliminated against reserves in the year of acquisition. This is consistent with other studies.

Table 3.6: Goodwill Practices of European Companies (1986 - 1992)

	1986/87 Accounting Method						1990/91 Accounting Method					
	A	B	C	D	E	Total	A	B	C	D	E	Total
Belgium	0	0	0	4	0	4	0	0	0	4	0	4
France	0	1	0	11	0	12	0	1	0	11	0	12
Germany	3	10	2	6	1	22	0	11	0	8	3	22
Ireland	1	2	0	0	1	4	1	2	0	0	1	4
Netherlands	0	12	0	0	0	12	0	9	0	1	2	12
Sweden	1	2	0	10	0	13	0	4	0	9	0	13
Switzerland	0	0	0	2	2	4	0	2	0	2	0	4
U.K	0	15	0	1	2	18	0	15	0	1	2	18
Total	5	42	2	34	6	89	1	44	0	36	8	89

Key: A = Written off against profit and loss account in the year of acquisition; B = Eliminated against reserves in the year of acquisition; C = Shown as an asset and not amortised; D = Shown as an asset and amortised through the profit and loss account over more than one year; E = Other or unspecified.
[Source: Archer *et al.* (1996)]

Table 3.7 presents goodwill comparability indices from the study which indicate that constant comparability in a state of static harmony which stands at 39.22 per cent overall. The near absence of harmonisation effects is reflected in the index values given under the dynamic model of harmonisation which changed little from 1986/87 (38.33 per cent) to 1990/91 (40.25 per cent). The study shows that in the area of purchased goodwill, little progress in harmonisation took place between 1986/87 and 1990/91.

Table 3.7: Goodwill Comparability Indices

	Within-Country Comparability		Between-Country Comparability		Total Comparability	
	1986/87	1990/91	1986/87	1990/91	1986/87	1990/91
Conditional independence	14.66	14.66	18.75	18.75	18.11	18.11
Static Harmony	36.01	36.01	39.82	39.82	39.22	39.22
Dynamic Harmonisation	35.00	37.17	38.95	40.82	38.33	40.25
Full Model	54.87	56.35	35.27	37.26	38.33	40.25
Observed Values	58.17	53.92	34.66	37.71	38.33	40.25

[Source: Archer *et al.* (1996)]

In another study, Brunovs and Kirsch (1991) study goodwill accounting in six selected countries in relation to the harmonisation of international accounting standards prior to 1990. One purpose of their study is to make a comparative analysis of national accounting standards covering five areas of goodwill in the sample countries. These areas are internal goodwill, the measurement of goodwill, amortisation, reassessment and disclosure policy. According to Brunovs and Kirsch, the most significant finding of their analysis is the conceptual difference which exists between the goodwill accounting standards issued in the United Kingdom and Ireland and the rest of the countries under study.

The UK standard advocated that goodwill be eliminated immediately on acquisition by write-off directly against reserves, whereas the other countries require goodwill to be carried forward in the balance sheet and systematically amortised against income over the estimated useful life of that goodwill. There are significant discrepancies between the various accounting standards as to the acceptable method for the calculation of the amount of goodwill at the acquisition date. The UK standard allowed the reorganisation costs associated with an acquisition to be included in the determination of the fair value of the net assets at acquisition. These costs will, consequently, form part of the cost of goodwill. As a result, the UK standard provided the opportunity for inherently conservative calculations in the highly subjective area of estimating future reorganisation costs to be incorporated in the calculation of goodwill on acquisition. The overall comparison of the standards in this study can be seen in Table 3.8.

Table 3.8: Various National Accounting Standards Covering Goodwill

Issue	Australia	Canada	Ireland	New Zealand	UK	USA
Accounting for internally generated goodwill	No cost carry forward	Not specifically addressed	No cost carry forward	Not specifically addressed	No cost carry forward	No cost carry forward
Measurement of Goodwill:						
Assign fair value to assets acquired	Yes	Yes	Yes	Yes	Yes	Yes
Assign fair value to identifiable and separable intangible assets	Yes	Yes	Yes	Not specifically addressed	Yes	Yes
Amortisation:						
Basis	Systematic (not specified)	Straight Line Method	Eliminate immediately against reserves or amortise	Not specifically addressed	Eliminate immediately against reserves or amortise	Systematic, usually straight line basis
Period	Period of expected benefit	Estimated life	Useful economic life if amortised	Not specifically addressed	Useful economic life if amortised	Estimated life
Maximum period	20 years	40 years	Not specified	Not specifically addressed	Not specified	40 years
Reassessment:						
Accounting	Loss charged against income	Loss charged either before extraordinary or as extraordinary item	Loss charged against income. Gain not allowed	Goodwill to be written down when permanently impaired	Loss charged against income. Gain not allowed	Gain/loss charged against income. Disclose reason for extraordinary
Disclosure:						
Policy	Yes	No	Yes	No	Yes	Yes
Amortisation period	No	Yes	Yes	No	Yes	Yes
Amortisation expense	Yes	No	Yes	No	Yes	No
Cost of acquisition	No	No	Yes	No	Yes	No

[Source: Brunovs and Kirsch, 1991)

3.6 Management Choices and SSAP 22

Grinyer *et al.* (1991) carry out an empirical examination of management choices of accounting for goodwill subsequent to acquisition. Their paper explores the behaviour of managers when assigning values to net tangible assets following the acquisition of other companies. The authors make the assumption that people select accounting practices so as to maximise their own welfare. In the period under study (1987), the UK managers were able to choose between alternative treatments of accounting for goodwill: either immediate write off or of the capitalisation and amortisation. Moreover, in practise the UK managers also had considerable discretion when assigning figures to book values of tangible assets and consequently to the recorded value of goodwill.

There is evidence that the managers of UK companies have usually regarded the stream of earnings as important and that they wish to maximise the level of profits over time. Such an objective may motivate them to be biased by reducing the value assigned to the acquired tangible assets. However, lowering the book value of tangible assets would lead to a higher post acquisition figure of balance sheet gearing for firms with borrowing. As a result Grinyer *et al.* suggest that there would have been a trade-off between increasing the reported book value of net tangible assets and thus strengthening the balance sheet and inflating post acquisition earnings. Even though goodwill written off against reserves would have no impact on current and future reported earnings, it might cause a reduction in the value of net assets that could be used as collateral for borrowing. This would in turn provide incentives to the managers of firms which were going to have high gearing ratios in their balance sheet to reduce the ratios by placing a relatively higher value on tangible assets to allow more flexible borrowing capacity to firms.

The study by Grinyer *et al.* is based on their 'trade-off' hypothesis which states that the proportion of the acquisition price assigned to goodwill was negatively related to both post-acquisition gearing and to the size of the price paid for the acquired firm relative to the post-acquisition market value of the acquirer, and positively associated with the availability of merger relief reserves. The 'trade-off ' hypothesis was tested using the Russell *et al.* (1989) database relating to a random sample of 264 companies selected from the 400 UK listed companies with the largest sales values in 1987. Purchased goodwill was regressed on price, leverage and on a dummy variable signifying whether or not management took advantage of the merger relief. The authors used the following linear model using ordinary least square (OLS) regression:

$G_{it} = \alpha_0 + \alpha_1 M_{it} + \alpha_2 V_{it} + \alpha_3 D_{it} + \varepsilon_{it}$

where α_0, α_1, α_2 and α_3 are the regression parameters to be estimated and

G_{it} = purchased goodwill written off by firm i in year t divided by the total value of the recorded prices of all acquisitions by firm i in company year t;

M_{it} = a dummy variable for firm i taking the value 1 for years t in which advantage was taken of the merger relief provisions and zero otherwise.

V_{it} = total acquisition price for all acquisitions by firm i in year t divided by the post acquisition market value of the acquirer's equity in that year;

D_{it} = the post acquisition gearing level of firm i in company year t (calculated as one minus shareholders' funds as a proportion of total assets net of current liabilities, which are equivalent to long term loans as a proportion of total assets net of current liabilities).

Table 3.9 presents the results arising from the OLS estimation based on the Grinyer *et al*. model. Their findings are consistent with the trade-off hypothesis where the proportion of acquisition price assigned to goodwill is negatively related to post-acquisition leverage and the cost of the acquired firm, and positively related to the availability of merger relief reserves.

Table 3.9: Goodwill amortisation as a Function of Merger Relief, Acquisition Price and Post-acquisition Gearing

	α_0	α_1	α_2	α_3	R^2	N
Estimate	0.540	0.195	-0.204	-0.265		
White Standard Error	0.034	0.035	0.057	0.117	0.093	362
t-value	16.050	5.640	-3.560	-2.270		

Model: $G_{it} = \alpha_0 + \alpha_1 M_{it} + \alpha_2 V_{it} + \alpha_3 D_{it} + \varepsilon_{it}$
[Source: Grinyer *et al.* (1992)]

A further study by Bryer (1995) treats the controversy of SSAP 22, and in particular the reduction of capital due to immediate write off as an anomaly requiring explanation. In the first part of his paper, Bryer discusses the concepts of Marx's political economy in order to elaborate on the conventional method[10] of accounting treatment of goodwill which is argued to be necessary to allow the capital markets to observe the generation and realisation of profit and the rate of return on capital. Information on the realised rate of return on capital is

[10] According to Bryer (1995), "in late 19th century Britain it was widely accepted by leading authorities that goodwill was simply the purchase of sufficient expected 'surplus profits' to persuade the owners of a business to part with its net assets and control, and that this expenditure should be capitalised and amortised against those surplus profits as they realised".

useful to investors because it provides them with a collective basis for controlling management, and also because it ensures equity between individual investors who represent fractions of total social capital. Bryer questions the ASC's preference for immediately writing-off goodwill against reserves instead of using capitalisation and amortisation which are more transparent to the capital markets. He outlines that a popular explanation for the implementation of the write-off option has been the dominant interests of management. For example, he refers to the study by Grinyer *et al.* (1991) which is based on the assumption that people select accounting practices so as to maximise their own welfare and concludes that it is reasonable to assume that managers of UK public companies would usually have wished to maximise the level of reported profit over time. Moreover, Grinyer *et al.* link the maximising of reported profits to the financial interests of management because (a) bonuses are frequently linked to accounting profit and (b) current and future salaries are also linked to accounting profit.

Bryer dismisses this argument by quoting a study by Gregg *et al.* (1992) of 288 of the UK's top 500 companies between 1983 and 1991 which shows that the relationship between the salary and bonus of the highest paid directors and both the capital market and accounting measures of performance (other than sales growth) was very weak. In fact, no serious correlation has been found between management pay and profits in any country (Rosen, 1990). Bryer offers another alternative hypotheses to explain why companies choose to write off immediately purchased goodwill even though the capital markets usually want purchased goodwill to be capitalised and amortised.

According to Bryer, during the recession of the early 1980's many British companies closed substantial parts of their operations in the acquisitions and merger boom. At the same time, dividends were substantially increased. On a historical cost basis, by the early 1980's the typical pay out ratio of UK companies increased from 16% in the mid-1970's to around 25%. During the later part of the 1980's this rose to around 35% and by the early 1990's it was running at as high as 55%. If goodwill had been amortised and had reduced profit by a modest 10%, in 1991 the pay out ratio would have been an unprecedented 62%. Thus, Bryer believes that there is evidence of a potential need for creative accounting for goodwill. The motive offered by Bryer is that the writing-off of purchased goodwill against capital was in the collective interest of the investor because it helped to hide from public view the fact that dividends were being paid from capital.

3.7 Value-Relevance of Goodwill

Amir *et al.* (1993) employ several methods to test the value relevance of the information provided on Form 20-F to reconcile non-US GAAP earnings and stockholders' equity to US GAAP earnings and stockholders' equity. One of the components that causes the differences between non-US GAAP and GAAP is capitalised goodwill and amortisation. The authors conduct an event study, which includes both long and short windows and its association with returns, and a market to book ratio analysis. The approach which is the most relevant to this thesis is the market to book ratio analysis. According to Amir *et al.*, this approach evaluates the value-relevance of reconciliation items in order to ascertain whether they can explain the difference between the market value (P) and the book value of shareholders' equity (BV).

The difference between P and BV is unrecorded goodwill, which is related to the market's perception of expected earnings and especially any excess or abnormal earnings. The authors explain that P and BV might also differ because of accounting differences; for example, the ratio of P to BV will be higher when conservative practices are used. Hence, if reconciliation to US-GAAP reflects value relevant measurement practices these should be expected to help the market-to-book ratio when BV is measured in non US-GAAP. Based on the overall findings for the market to book value ratio analysis, the authors conclude that investors view capitalised goodwill as value relevant; *i.e.*, the reconciliation of accounting data to US GAAP increases the association between accounting measures and price.

In another paper, Deng and Lev (1998) analyse a sample of 375 cases where USA public companies disclosed the fair market values of acquired R&D-in-process, and then proceeded to fully expense them. One aspect of this study that relates to accounting for goodwill is the question of whether the investors consider R&D-in-process-valuation as credible and value-relevant. In order to answer the above question, the authors assess the reliability of the R&D valuations by observing investors' actions around the times of public announcements of the valuation, as reflected in stock prices and returns. In other words, if the stock prices and returns of the acquiring companies during the period of acquisition are found to be correlated with the fair market values of R&D-in-process, it can be concluded that the investors regarded the R&D information as credible and value-relevant. Deng and Lev use three cross-sectional models to estimate the association which can observed between the fair values of acquired R&D and capital markets as follows:

$$R_{it} = \alpha_0 + \alpha_1 E_{it} + \alpha_2 \Delta E_{it} + \alpha_3 RD_{it} + \alpha_4 DUM + e_{it}$$

$$P_{it} = \alpha_0 + \alpha_1 BV_{it} + \alpha_2 E_{it} + \alpha_3 RD_{it} + \alpha_4 DUM + e_{it}$$

$$M_{it}/ BV_{i,t-1} = \alpha_0 + \alpha_1 (BV_{it}/ BV_{i,t-1}) + \alpha_2 (E_{it}/ Bv_{i,t-1}) + \alpha_3 (RD_{it}/ BV_{i,t-1}) + \alpha_4 DUM + e_{it}$$

where,

R_{it} = quarterly stock return (raw and market-adjusted) of firm i in quarter t. Return cumulating starts with the beginning of the second month of the quarter and ends two days after quarter t's earnings announcement.

E_{it} and ΔE_{it} = reported quarterly earnings before extraordinary items) and the change in earnings relative to same quarter a year earlier, respectively.

RD_{it} = fair market value assigned to acquired R&D-in-process.

P_{it} = share price two days after earnings announcement.

BV_{it} = book value at end of quarter t.

Table 3.10: Capital Market Values and R&D-In-Process

Dependent Variable	Intercept	Earnings	ΔEarnings	Book Value	R&D-in-process	Dummy	R^2
Quarterly Raw Returns	0.041 (1.56)	0.810 (1.60)	0.027 (0.06)	-	1.175 (3.21)	0.003 (0.07)	0.02
Quarterly Market Adjusted Returns	0.005 (0.21)	0.790 (1.69)	-0.017 (-0.04)	-	1.033 (3.06)	0.012 (0.31)	0.02
Five Day Raw Returns	0.001 (0.07)	0.354 (2.27)	-0.202 (-1.36)	-	0.172 (1.52)	0.046 (3.59)	0.06
Stock Price	5.957 (3.91)	3.394 (2.81)	-	2.169 (13.14)	6.252 (4.01)	6.132 (3.34)	0.47
Market to Book	1.486 (2.00)	0.152 (0.130)	-	2.784 (4.56)	3.977 (2.69)	0.367 (0.52)	0.35

[Source: Deng and Lev (1998)]

Table 3.10 provides Deng and Lev's results for all three models. The main empirical findings in these tables indicate that investors consider, on average, the acquired R&D-in-process a valuable asset (considerably more than the firms' tangible assets). The authors conclude that, the fair market valuation of R&D by management appears, on average, to be credible, and its expensing in financial reports is appropriate.

On the other hand, a thesis by Henning (1994) identifies two potential sources of goodwill: *i.e.*, pre-bid and premium, which together comprise total purchased goodwill. He defines

pre-bid goodwill as the difference between the pre-take-over bid market price and the fair value of the firm's identifiable net assets. Premium goodwill is the excess that acquiring firms pay over the pre-take-over bid share price. Consequently, premium goodwill reflects the increased price which occurs immediately prior to the take over and which relates exclusively to the occurrence of a particular business combination.

One of the chapters in Henning's study presents evidence on the components of premium goodwill in US companies. According to him, since premium goodwill is the largest source of purchased goodwill, evidence of its components plays an important role when assessing the economic substance of the asset goodwill. The distinction between pre-bid and premium goodwill is important for at least two reasons. First, the managers of acquiring firms pay large premiums over market value to gain control over target firms. Second, there is less consensus on the economic benefits derived from premium goodwill. For example, if pre-bid goodwill has underlying substance related to operating assets or other intangible assets, there is less uncertainty surrounding future economic benefits.

Conversely, the benefits associated with transaction-specific premium goodwill are less obvious. According to Henning, if premium goodwill exhibits more uncertainty as to its economic substance, then the informativeness of reported premium goodwill accounting numbers, based on their ability to explain market value, is diminished. This result is consistent with investors' uncertainty about the economic benefits associated with premium goodwill. On the other hand, part of Henning's thesis examines various factors which increased premium goodwill in take-over activities. Based on agency theory and the factor of synergy for take-over, he formulates two hypotheses to test the relationship between these factors with premium goodwill. The hypotheses are as follows:

1. Premium goodwill is positively associated with a target firm's agency cost of outside equity, and with combination of high free cash flow and slack-poor firms.
2. A difference in capital assets and R&D resource allocation patterns between acquiring and target firms is positively related to premium goodwill.

There are other factors which affect the amount of premium goodwill in specific acquisitions. In order to increase the reliability of his empirical analysis, Henning includes three additional transactions-specific factors in his model; *i.e.*, leverage, the presence of rival bidders and the method of acquisition. The following model is used to evaluate the ability of agency cost and synergy variables to explain premium goodwill:

$$PREM_j = \alpha_0 + \alpha_1 OWNT_i + \alpha_2 OWNA_j + \alpha_3 OWNA_{LO} \times OWNT_{LO} + \alpha_4 OWNA_{LO} \times OWNT_{HI} + \alpha_5 SP_{i(j)} \times HFCF_{j(i)} + \alpha_6 DEBT_{ij} + \alpha_7 CAP_{ij} + \alpha_8 R\&D_{ij} + \alpha_9 METHOD_j + \alpha_{10} RIVAL_j + \varepsilon_j$$

where the subscript i (j) denotes the target and acquiring firms, respectively.

The variables are defined as follows:

- PREM is measured as the difference between the final purchase price and the market value of the target firm ten trading days prior to the first take-over announcement, deflated by the total purchase price.
- OWNT (OWNA) is measured as the percentage of shares held by officers, directors, and principal owners of the target (acquiring firm). The LO (HI) subscript on the ownership variables means that the variable takes on the value of one if the percentage of shares held by officers, directors, and principal owners of the target or acquiring firm is below (above) the median value for all target or acquiring firms.
- SP takes on the value of one if the firm is slack poor (i.e., if the firm has low liquidity and high growth prospects). HFCF takes on the value of one if the firm is a high free cash flow firm (*i.e.,* if the firm has high liquidity and low growth prospects).
- DEBT is measured as the absolute value of the difference in the ratio of total debt to total assets of the target and acquiring firms.
- CAP is measured as the absolute value of the difference between the 3-year average capital expenditure of the target and acquiring firms.
- R&D is measured as the absolute value of the difference between the three year average R&D expense of the target and acquiring firms.
- METHOD takes on the value of one if the take-over results from a tender (cash) offer
- RIVAL takes on the value of one if there is one or more rival bidders during the negotiation process.

Table 3.11 shows the empirical results based on the above model. Henning divided his analysis into three models: agency, synergy and the full model. The full model brings together in a single model various factors that have been hypothesised to affect the premium paid in business combinations.

According to Henning, there are several important conclusions to be drawn from this study. His evidence suggests that the target firm's agency cost of outside equity is a significant determinant of premium goodwill. In other words, managers of acquiring firms value these anticipated savings. Furthermore, while the findings indicate that operating synergy, method

of payment, and the presence of competing bidders are positive determinants of acquisition premium, it is not clear what economic benefit market participants attach to these components of premium goodwill.

Table 3.11: Goodwill, Agency Costs and Synergy

Variables	Agency Model	Synergy Model	Full Model
Intercept	95.37 (0.12)	92.10 (0.09)	63.27 (0.06)
OWNT	-1.19 (0.02)		-0.61 (0.03)
OWNA	-0.42 (0.15		-0.25 (0.21)
$OWNA_{LO} \times OWNT_{LO}$	1.07 (0.08)		0.98 (0.11)
$OWNA_{LO} \times OWNT_{HI}$	0.83 (0.13)		0.78 (0.16)
$SP_{i(j)} \times HFCF_{j(i)}$	6.48 (0.00)		5.98 (0.02)
DEBT	0.72 (0.02)		0.60 (0.00)
CAP		0.53 (0.05)	0.14 (0.07)
R&D		1.09 (0.03)	1.34 (0.01)
METHOD	21.38 (0.03)	22.67 (0.02)	20.89 (0.05)
RIVAL	26.52 (0.01)	27.69 (0.01)	23.72 (0.02)
Observation Adjusted R^2	738 0.19	738 0.22	738 0.57

Model: $PREM_j = \alpha_0 + \alpha_1 OWNT_i + \alpha_2 OWNA_j + \alpha_3 OWNA_{LO} \times OWNT_{LO} + \alpha_4 OWNA_{LO} \times OWNT_{HI} + \alpha_5 SP_{i(j)} \times HFCF_{j(i)} + \alpha_6 DEBT_{ij} + \alpha_7 CAP_{ij} + \alpha_8 R\&D_{ij} + \alpha_9 METHOD_j + \alpha_{10} RIVAL_j + \varepsilon_j$
[Source: Henning (1994)]

3.8 Summary

Almost all the studies related to the UK environment which are reviewed in this chapter were carried out after the publication of SSAP 22 and opposed the "immediate write-off" treatment of accounting for goodwill. Nobes (1992), Arnold *et al.* (1992), Egginton (1993), Bryer (1995) and Grinyer (1995) have written analytical and descriptive studies of goodwill issues and all of them suggest that the accounting treatment for purchased goodwill as proposed by SSAP 22 is controversial and needs to be reconsidered. Empirical studies by Russell *et al.* (1989) and Grinyer *et al.* (1991) suggested that the choices of preferred method of accounting for purchased goodwill have been influenced by management interests in maximising their own welfare by publishing favourable financial indicators. Amir *et al.* (1993) support critics of SSAP 22 by showing that investors view capitalised goodwill as value relevant: thus the reconciliation of accounting data to US GAAP increases the association between accounting measures and price. Archer *et al.* (1996) mention that little progress in harmonisation took place between the two periods of their study, and that the UK is an outlier.

The above studies combined with other studies - Colley and Volkan (1998), Brunovs and Kirsch (1991), Hall (1993), Wines and Ferguson (1993), Henning (1994), and Deng and Lev (1998) - lead us to conclude that the debate on goodwill is controversial but relevant. In the next chapter we will discuss the previous research in accounting literature that has employed market and book value relationship in order to provide a background for our discussion, in Chapter 6, of the research design and method of the present study.

CHAPTER 4

MARKET VALUE AND BOOK VALUE

4.1 Introduction

The main objective of this thesis is to provide evidence of whether the market takes into consideration the amount of goodwill write-off in the determination of a company's valuation. We propose to apply a cross-sectional market value regression model that is based on the modified balance sheet identity. Models based on a relation between market value and book values employing balance sheet variables are used only occasionally, but continuously, in the accounting research literature. Landsman (1986), Harris and Ohlson (1987), Barth (1991), Shevlin (1991), Gopalkrishnan and Sugrue (1993), McCarthy and Schneider (1995), Jennings *et al.* (1996), Pfeiffer (1998) are among the researchers who have based their work on this model.

This chapter will review some of the previous empirical work in accounting literature that has employed the relationship between market value and book value. In this review, we will concentrate on the previous studies that employed the balance sheet identity model with some modification. These include research in areas such as pension fund property rights, market valuations of banking firms, research and development (R&D), and Intangible assets and goodwill. This chapter will also highlight some econometric issues raised by various authors.

4.2 Pension Fund Property Rights

Landsman (1986) empirically examined whether pension fund assets and liabilities associated with corporate-sponsored defined benefit pension plans are valued by the securities markets as corporate assets and liabilities based on balance sheet identity. The data used in his study was taken from US companies over three annual accounting periods, from 1979 to 1981.

Landsman employed an equity valuation model based on the balance sheet identity, which permitted pension and non-pension assets and liabilities to have separate empirical

coefficient values. His model was based on the fundamental accounting identity which holds that shareholders' equity is the residual of corporate assets less corporate liabilities. By using this equation, Landsman was able to compare the coefficient values of non-pension assets and liabilities to their pension counterparts. The basic model can be written as follows:

$$MVE = \alpha_1 MVA + \alpha_2 MVL + \alpha_3 PA + \alpha_4 PL$$

where

MVE	=	the market value of the shareholders' equity
MVA	=	market value of the firm's non-pension assets
MVL	=	the market value of the firm's non-pension debt
PA	=	pension assets
PL	=	pension debt

According to Landsman, because the above model is stated in terms of market value rather than accounting book value, the tautology of the accounting identity is not necessarily preserved. For example, the market value of the residual claim may in fact exceed the market value of corporate assets less the market value of corporate liabilities as the Miller and Modigliani (1966) models of capital market equilibrium suggest.

In order to estimate the above equation, Landsman introduced the intercept value (α_0) and the error term (ε_t), which is simply the disturbance term from a regression model, into the equation. If the theoretical model is correct, then the empirical value of α_0 should be zero. The market value of shareholders' equity (MVE) is defined to be price times the number of shares outstanding as of December 31 for each year. The book value of total non-pension assets (ASBV) and book value of total non-pension liabilities (LIBV) are used as proxies for its respective market value quantities (MVA and MVL) because the latter two are not observable. As for the other variables, pension assets (PA) are recorded at market value for those assets within the pension fund that are held in marketable securities. Non-marketable securities are valued by the reporting firm if their market value is not available. Pension Liabilities (PL) are represented by the actually determined present value of the accrued benefit pension obligation as reported by each firm. Two sets of regressions are estimated for the basic model for each year using the reported pension liability (PLU) and the adjusted pension liability (PL10) to reflect a 25-year, ten per cent annuity assumption.

Landsman list four econometric problems associated with estimation of the model. One of the major econometric problems when estimating the cross-sectional valuation model is the problem of heteroscedastic disturbance. This problem arises from the fact that large or small firms tend to produce large or small disturbance. Quoting Johnson (1972) and Kmenta (1971), Landsman mentions that the researcher could use generalised least squares (GLS) to produce more efficient estimates than those obtained using ordinary least squares (OLS).

Landsman used another technique to reduce the heteroscedastic problems; he transformed the variables by deflating them with the independent variable. This procedure implies that the true error variance is proportional to the square of the independent variable. The procedure adopted in his study is based on Park (1966) who suggested that one should estimate the power of the independent variable involved in the proportion (instead of assuming it to be two) by regressing the natural log of the residual variance, on the natural log of the independent variable. The independent variable used in Landsman's study is the total sales value of the firm.

Another common econometric problem discussed by Landsman is measurement error in the regressors. In his model, the market values for each of the explanatory variables are not directly observable. This circumstance may result in biased coefficients resulting from measurement error in those variables. According to the author, without knowledge of (a) the specific form of measurement error and (b) the covariance structure of the measurement error of the explanatory variables, it is difficult to predict what bias to expect in the estimates of the regression coefficients. Landsman offered three specific models of the measurement error of the regressors in his study. Two sets of regressions were estimated for the basic model for each year using reported pension liability (PLU) and adjusted pension liability (PL10) to reflect a 25-year, ten per cent annuity assumption. The motivation for adjusting PLU in this model was to reflect a common interest rate was to improve estimation by reducing the potential measurement error. The purpose of second model was to examine whether historical cost assets and liabilities systematically understated the market value of the assets and liabilities. Landsman compared the coefficient values of the non-pension assets and liabilities when PA and PL are both excluded and included as regressors. If the hypothesis was correct, then the coefficient values of the non-pension variables should move closer to one (in absolute) when PA and PL are included as regressors than when they are not.

Landsman also discussed the problem of multicollinearity due to the existence of a linear relationship among the explanatory variables of a regression model. The presence of a severe multicollinearity problem could result in misleading inferences being drawn from sample *t*-statistics. In particular, in a case where the sample *t*-statistics are unbiased, if there are no other econometric problems, it is difficult to determine whether the sampling variances are large because of multicollinearity, or whether the variance of the true population is large. In order to reduce this problem, Landsman estimated his model using the net asset form; i.e., using net non-pension assets (MVA-MVL) and net pension assets (PA - PL). However, estimation using net asset form can be employed only if (a) the theoretical coefficient values for MVA and MVL and for PA and PL were the same in absolute value, and (b) the estimated coefficients provided statistical evidence to support the economic model; *i.e.*, the coefficient of MVA was equal to the minus coefficient of MVL.

Table 4.1: Market Value as a Function of Book Assets, Liabilities and Pension Plan Assets and Obligation (Landsman, 1986)

	α_0	α_1	α_2	α_3	α_4	R^2	DFE
1979 PLU Model							
Estimate	12.66	1.08	-1.31	0.95	-0.89	0.44	230
t-ratio	3.24	9.27	-7.70	1.61	-1.85		
Prob> |t|	0.0014	0.0001	0.0001	0.1068	0.0644		
1979 PL10 Model							
Estimate	27.57	1.07	-1.30	1.60	-1.82	0.47	230
t-ratio	3.22	9.11	-7.59	2.63	-2.94		
Prob> |t|	0.0015	0.0001	0.0001	0.0089	0.0035		
1980 PLU Model							
Estimate	41.61	0.96	-1.09	0.44	-0.83	0.25	616
t-ratio	6.57	13.12	-11.65	1.03	-2.38		
Prob> |t|	0.0001	0.0001	0.0001	0.2784	0.0174		
1980 PL10 Model							
Estimate	61.57	1.10	-1.33	0.74	-1.21	0.31	616
t-ratio	6.34	14.64	-12.92	2.08	-3.30		
Prob> |t|	0.0001	0.0001	0.0001	0.0373	0.0010		
1981 PLU Model							
Estimate	29.45	1.07	-1.32	0.89	-1.09	0.47	619
t-ratio	6.56	19.26	-16.25	3.29	-4.21		
Prob> |t|	0.0001	0.0001	0.0001	0.0010	0.0001		
1981 PL10 Model							
Estimate	28.68	1.08	-1.32	1.02	-1.34	0.50	619
t-ratio	6.21	19.31	-16.29	3.97	-4.91		
Prob> |t|	0.0001	0.0001	0.0001	0.0001	0.0001		

DFE = degrees of freedom of regression error.

Model: $MVE_t = \alpha_0 + \alpha_1 ASBV_t + \alpha_2 LIBV_t + \alpha_3 PA_t + \alpha_4 PL_t + \varepsilon_t$
[Source: Landsman, 1986]

Table 4.2: The Effect on Market Value of Netting Book Assets and Liabilities

	α_0	α_1	α_2	R^2	DFE
1979				0.44	232
Estimate	1102.73	0.82	0.88		
t-ratio	2.524	13.63	1.80		
Prob> |t|	0.0114	0.0001	0.0721		
1980				0.33	618
Estimate	379.62	0.85	0.88		
t-ratio	4.87	17.05	2.66		
Prob> |t|	0.0001	0.0001	0.0079		
1981				0.36	621
Estimate	121.03	0.69	1.09		
t-ratio	6.05	17.72	3.69		
Prob> |t|	0.0001	0.0001	0.0002		

DFE = degrees of freedom of regression error. NETNPA = ASBV - LIBV; NETPA = PA

Model: $MVE_t = \alpha_0 + \alpha_1 NETNPA_t + \alpha_2 NETPA + \varepsilon_t$
[Source: Landsman (1986)]

Tables 4.1 and 4.2 show Landsman's results from the basic model and net asset form. The empirical findings of this study show the market prices the assets and liabilities of pension funds as part of the corporate assets and liabilities. However, the most important aspect of this study from our perspective is related to the balance sheet equation model employed by Landsman which, compared to the equity valuation model, is new and can be explored further.

Gopalakrishnan and Sugrue (1993) extend the work of Landsman (1986) in pension fund property rights. The main area of their study focuses on the pension fund property rights of projected benefit obligations and pension plan assets. Based on Landsman (1986), they develop the following model to examine the association between the market value of equity and projected benefit obligation:

$$MVE_i = \alpha_0 + \alpha_1 ASSET_i + \alpha_2 LIABY_i + \alpha_3 PASSET_i + \alpha_4 PBO_i + \varepsilon_i$$

Where

MVE	=	market value of shareholder equity
ASSET	=	book value of total non-pension assets
LIABY	=	book value of total non-pension liabilities
PASSET	=	market value of pension assets
PBO	=	projected benefit obligation

G&S tested two hypotheses:

H_1 : The market participants do not regard PASSET of a firm as an asset in assessing the market value of the firm's equity.

H_2 : The market participants do not regard PBO of a firm as a liability in assessing the market value of the firm's equity.

The authors argued that if pension fund property rights were to lie fully with the firm opposed to with the pension trust, then the coefficients α_3 and α_4 corresponding to the variables PASSET and PBO should be statistically significant. More specifically, α_3 and α_4 should be >0 and <0 respectively. If either H_1 or H_2 or both are not rejected, this would imply that market participants do not consider pension assets and pension liabilities when valuing the market value of the firm's equity.

Table 4.3 shows the result reported by G&S. The results indicate that the non-pension variables, ASSET and LIABY have coefficients that are both highly significant and have the correct sign that is consistent with the findings of Landsman (1986). According to G&S, the main findings of their study indicate that investors perceive pension assets and liabilities as part of corporate assets and liabilities. Furthermore, it appears that pension assets and liabilities have significant information content beyond what is conveyed by non-pension assets and liabilities.

Table 4.3: Market Value as a Function of Book Assets, Liabilities and Pension Plan Assets and Projected Benefits (Gopalakrishnan and Sugrue, 1993)

	α_0	α_1	α_2	α_3	α_4	R^2	DFE
PANEL A							
Individual Years							
1987							
Estimate	—	1.71	-1.75	1.18	-1.99	0.77	654
t-ratio		31.88	-29.55	5.10	-6.27		
Prob> |t|		0.0001	0.0001	0.0001	0.0001		
1988							
Estimate	—	1.37	-1.39	1.22	-0.98	0.69	734
t-ratio		26.79	-25.16	5.22	-2.98		
Prob> |t|		0.0001	0.0001	0.0001	0.0001		
PANEL B - Pooled							
Estimate	—	1.73	-1.78	1.42	-1.70	0.78	1393
t-ratio		45.10	-42.79	9.57	-8.00		
Prob> |t|		0.0001	0.0001	0.0001	0.0001		

Model: $MVE_i = \alpha_0 + \alpha_1 ASSET_i + \alpha_2 LIABY_i + \alpha_3 PASSET_i + \alpha_4 PBO_i + \varepsilon_i$
[Source: Gopalakrishnan and Sugrue (1993)]

4.3 Market's Valuation of Banking Firms

The main objective the study by Beaver *et al.* (1989) is to examine whether cross-sectional differences in market-to-book ratios for bank equities are captured by supplemental disclosure. They focus on the banking industry and supplemental disclosures with respect to default risk (non-performing loan data) and interest-rate risk (loan maturity data). Their sample is based on 149 banks in the US with financial statement data on the 1983 Compustat tape. They develop a model that relates the market value of banks' common equity (CE^M) to the book value of common equity (CE^B) and to non-performing loans (NPL), allowance for loan losses (ALL), and the maturity structure of the loan portfolio (MAT). The basic final model of their study is as follows:

$$\frac{CE_{it}^{M}}{CE_{it}^{B}} = \beta_{0t} + \beta_{1t}\frac{NPL_{it}}{CE_{it}^{B}} + \beta_{2t}\frac{ALL_{it}}{CE_{it}^{B}} + \beta_{3t}\frac{MAT_{it}}{CE_{it}^{B}} + \varepsilon_{it}$$

According to the authors, if the model is correct, β_1 is expected to be negative because the generally accepted accounting principles do not require the book value of loans to be written down to market value for many non performing loans. The maturity variable (MAT) is intended to capture the valuation errors induced by unanticipated changes in interest rates since the inception of the loans. If market interest rates have increased (decreased) unexpectedly since the dates of loan origination or acquisition, β_3 would be expected to be negative (positive). On the other hand, the inclusion of allowance for loan losses (ALL) as an explanatory variable ensures that supplemental data in the form of non-performing loans are not proxying for the allowance for loan losses. Beaver *et al.* argue that both variables should relate directly to default risk. As a result β_2 can be negative, zero or positive. Accordingly, it is important to include ALL in the model since the authors are interested in testing for the incremental ability of these supplemental disclosures to explain cross-sectional variation in common shareholders' equity market-to-book ratios beyond that provided by the financial statement variable; *i.e.*, allowance for loan losses.

Table 4.4 reports the results of annual regressions (1979-83) of the market-to-book ratio for common shareholders' equity on the book values of loan-loss reserves, non-performing loans, and the maturity variable of this study. The coefficient on non-performing loans is negative in each of the five years, and the *t*-statistics range from 3.190 to 4.380. The coefficients have the predicted sign and are statistically significant at conventional levels. The loan-loss variable (β_2) has a positive coefficient in all years. According to them, conditional on the level of non-performing loans, the market-to-book ratio is higher for banks

with larger allowances for loan losses. This results are consistent with contentions in the popular financial press that increasing the allowance for loan losses is actually 'good news', because it indicates that management perceives the earning power of the bank to be sufficiently strong that it can withstand a 'hit to earnings' in the form of additional loan-loss provisions.

Table 4.4: Modelling the Market-to-Book Ratio (Beaver *et al.*, 1989)

Variables	1979	1980	1981	1982	1983
Intercept	0.750 (10.440)	0.640 (7.050)	0.720 (7.900)	0.830 (9.33)	0.990 (9.370)
NPL/CE	-0.570 (4.260)	-0.680 (3.510)	-0.770 (3.540)	-0.530 (3.190)	-0.650 (4.380)
ALL/CE	0.378 (0.580)	2.160 (2.760)	2.650 (3.350)	1.360 (1.660)	1.400 (1.610)
MAT/CE	0.020 (0.440)	-0.060 (1.250)	-0.120 (2.180)	-0.090 (1.630)	-0.080 (1.370)
Sample Size	91	91	91	91	91
R^2	0.200	0.180	0.250	0.190	0.250

Model: $$\frac{CE_t^M}{CE_t^B} = \beta_{0t} + \beta_{1t}\frac{NPL_t}{CE_t^B} + \beta_{2t}\frac{ALL_t}{CE_t^B} + \beta_{3t}\frac{MAT_t}{CE_t^B} + \varepsilon_t$$

Beaver *et al.* interpreted the coefficients on the maturity variable based on the pattern of nominal interest rates in the 1979 through 1983 period. According to them, the time series pattern of the coefficient is as expected if promised rates on loans are a lagged function of current nominal rates. In addition to the year by year regression model, they include Pooled Fixed-Effects and a Pooled Regression Model in their study. The overall results suggest that supplemental disclosures with respect to various characteristics of the loan portfolio do possess incremental explanatory power beyond that provided by the allowance for loan losses. Non-performing loan and loan maturity variables contribute in a statistically significant manner to an explanation of cross-sectional variation in market-to-book ratios, over and above the explanatory power of a number of financial statements variables that might be expected to be correlated with the supplemental disclosure variables.

Kane and Unal (1990) report on their empirical investigation of structural and temporal variation in the market's valuation of banking firms. The main objective of reviewing their paper is to compare their, Statistical Market-Value Accounting Model (*SMVAM*) with the basic balance sheet identity model mentioned by Landsman (1986). One particular area of

their work which can be considered relevant to accounting for goodwill in the UK concerns the hidden reserves that might exist by writing-off purchased goodwill in the year of acquisition.

Kane and Unal developed a model to capture the hidden reserves in US banking firms'. According to the authors, hidden capital exists whenever the accounting measure of a firm's net worth diverges from its economic value. Such unbooked capital has on-balance-sheet and off-balance-sheet sources. Their study develops a model to estimate both forms of hidden capital and to test hypotheses about their determinants. The model makes direct use of accounting information on the bookable position of a firm and separates bookable from unbookable sources of value. K&U use regression analysis to partition the market value of a firm's stock into two components: recorded capital reserves and unrecorded (or hidden) net worth. According to them, hidden capital is, in turn, allocated between values that are either unbooked but bookable through asset turnover or write-downs on a historical-cost balance sheet under GAAP or values which GAAP currently designates as an unbookable off balance-sheet item.

Basically, the model developed by K&U is based on balance sheet identity as mentioned by Landsman (1986). However, K&U interpret their model differently. According to them, a firm's market capitalisation, MV, is the product of its share price and the number of shares outstanding. Invoking the principle of value additivity, they express MV as the market value of bookable and unbookable assets, $(A_m + A'_m)$, minus the market value of bookable and unbookable liabilities $(L_m + L'_m)$.

K&U proceed by arguing that, since bookable assets and liabilities are carried at historical cost, even $(A_m - L_m)$ cannot be observed directly. A parsimonious way to proceed is to assume that market participants estimate the market value of elements of bookable equity by applying the appropriate mark-up or mark-down ratio, k_a and k_l, to the accounting values reported by the firms. As a result, the following equation can be obtained:

$$MV = (A'_m - L'_m) + K_a A_b - K_l L_b$$

where subscripts a, l, b represent assets, liabilities, and booked values, respectively. According to K&U, in principle, A_b and L_b are jointly determined variables, affected by many of the same unknown exogenous variables. Treating A_b and L_b as separate and exogenous regressors could introduce interpretative problems. They argue that at every date for every

bank class (in their sample), the coefficient constraint that $k_a = k_l$, not only proves impossible to reject, but is virtually an unconstrained regression result. This supports simplifying the model by applying a single valuation ratio, k to each institution's book equity, $BV = A_b - L_b$. Expressing the market value of unbookable equity ($A'_m - L'_m$) as U and allowing for approximation error, the authors obtain this equation:

$$MV = U + kBV + \varepsilon.$$

According to them, the model's coefficients describe the de facto deceptiveness of GAAP. Unless both U = 0 and k = 1, the accounting or book value of a bank's capital represent a biased estimate of the market value of stockholder equity. If the estimated intercept is significantly positive (negative), unbookable assets and liabilities serve as a net source of (drain on) institutional capital. According to K&U, financial analysts know the problems exist in both directions. They cite an example on the drain side: at yearend 1986, off-balance-sheet liabilities of the five largest U.S. banking firms totalled $1.16 trillion. This value was more than twice the $546 billion book value of these banks' assets.

4.4 Research and Development (R&D)

Shevlin (1991) investigates whether capital market investors, in assessing the market values of R&D firms' equity, view R&D limited partnerships (LP) as increasing both the assets and liabilities of the R&D firms. His findings show that, the contract terms between R&D firms and the LPs suggest interpreting the LP as a call option held by the R&D firm and using option pricing theory to estimate the assets (the present value of the LP-funded R&D project) and liabilities (the present value of the exercise) components of the option. Shevlin estimates the LP variables from information provided in footnote disclosure items by R&D firms. The estimates of the LP variables are included as explanatory variables in a cross-sectional market value regression model that is based on the balance sheet identity that is similar to Landsman (1986). The model can be written as follows:

$$S = A_j - D_j,$$

where

S = the market value of shareholders' equity
A = the market value of the assets
D = the market value of the liabilities

of firm j.

A and D may be decomposed into the market value of the reported assets and liabilities on the balance sheet and of non-reported assets and liabilities. According to Shevlin, one non-reported asset for the R&D firms could be the market value of in-house R&D expenditure (IHRD). The after-tax present value of the R&D funded by the LP (LPCA), together with the after-tax present value of the expected exercise price to acquire the developed technology (LPCD), could also be used by investors in assessing the market value of a R&D firm. The Model becomes:

$$S = A_j - D_j + IHRD_j + LPCA_j + LPCD_j$$

The samples used in this study are US firms. The market value of equity is estimated as the fiscal year-end share price times the number of common shares outstanding. The market value of reported debt is estimated as the sum of the book value of current liabilities and the market (or present) value of long-term debt. For long-term debt, market price data are collected for the issues listed in Moody's Bond record. If the market prices are not available, present value techniques are used to estimate market values.

As mentioned by Landsman (1986), one of the major or common econometric problems with valuation regression models is heteroscedastic disturbance terms. In order to reduce this problem, Shevlin deflates the variables in the model using the book value of shareholder's equity. The coefficients and t-statistics from the study are presented in Table 4.3. According to Shevlin, the results from the basic model (regression 1) suggest that the empirical model is misspecified since the intercept term is non-zero and the regression coefficients on the reported asset and liability variables are significantly greater, in absolute terms, than unity. To improve the specification, Shevlin offered three alternative estimates of the LP variables. The results are reported in Table 4.5 as regression 2 to 4.

Several implications arise from Shevlin's study. The empirical results are consistent with the argument that footnote disclosures allow investors to make some estimate of the value of the LP to the firm. The results also indicate that in addition to the reported assets and debt on the face of the balance sheet, investors use information in the footnotes to help assess the market value of firms. Finally, Shevlin's results add further support to the empirical usefulness of the balance sheet identity approach as used by Landsman (1986) to develop a cross-sectional valuation model to address off-balance sheet issues.

Table 4.5: Market Value as a Function of R&D Expenditure (Shevlin, 1991)

Predicted Sign	α_0	α_1 +	α_2 -	α_3 +	α_4 +	α_5 -	Adj. R^2	F-Stat
1. Margrabe	7.05	2.54	-3.89	1.06	0.84	-1.88	0.84	34.10
t-stat (H_0: α=0)	3.89	11.88	-9.37	5.37	10.49	-5.19		(p=0.000)
t-stat (H_0: α=1)		7.21	-6.97	0.30	-2.00	-2.43		
2. Variables trimmed	6.47	3.46	-4.89	0.42	1.24	-2.93	0.57	37.89
t-stat (H_0: α=0)	4.11	13.57	-11.93	2.01	9.44	-7.34		(p=0.000)
t-stat (H_0: α=1)		9.65	-9.49	-2.74	1.82	-3.02		
3. Industry k	6.56	2.67	-3.92	1.05	2.46	-5.54	0.86	6.45
t-stat (H_0: α=0)	3.95	13.09	-10.04	5.81	13.36	-7.97		(p=0.001)
t-stat (H_0: α=1)		8.19	-7.48	0.27	7.92	-6.53		
4. k * 0.50	7.05	2.54	-3.89	1.06	1.68	-3.77	0.84	9.747
t-stat (H_0: α=0)	3.90	11.89	-9.37	5.37	10.49	-5.19		(p=0.000)
t-stat (H_0: α=1)		7.22	-6.96	0.30	4.24	-3.81		

Model: $S_j = \alpha_0 + \alpha_1 A_j + \alpha_2 D_j + \alpha_3 IHRD_j + \alpha_4 LPCA_j + \alpha_5 LPCD_j + \varepsilon_j$
The F-Statistic tests the null hypothesis that $\alpha_1 = \alpha_4$ and $\alpha_2 = \alpha_5$
The Estimation based on 53 sample firms with 145 yearly observations. All variables are deflated by the book value of equity. Regression 1 uses the Margrabe (1978) option pricing model to estimate the LP variable LPCA and LPCD. Regression 2 trims the variables at three standard deviations. Regression 3 uses industry estimates of the R&D capitalisation factors k to estimate the LP variables. Regression 4 uses the time-varying R&D capitalisation Factors reduced by 50 percent to estimate the LP variables.
The First row of t-statistics test the null hypothesis that the α_i=0 for i=0 to 5. The second row of t-statistics test the null hypothesis that α_i =1 for i=1,3 and 4, α_i =-1 for i=2 and 5.

4.5 Intangible Assets and Goodwill

The main objective of a thesis by Henning (1994) is to study the relationship between goodwill numbers and market valuation. In particular, this study tests the market valuation of goodwill conditional on the source of goodwill and accounting practice in the US market; in other words, the effects of differential accounting policies and sources on the ability of goodwill accounting numbers to track market value. Henning's sample consists of all US firms that listed goodwill in their 1992 annual reports.

Henning argues that if a company is amortising goodwill over a single or multiple period of less than 40 years, this may, on average, reflect management's' attempt to report goodwill assets rather than reflecting the economic substance of the underlying transactions. Alternatively, amortising goodwill over 40 years implies that the sources and components of goodwill cannot be identified or measured, and that goodwill accounting policies are selected without regard for the economic substance of the assets, or that the assets indeed have economic lives of 40 (or more) years. Therefore, while single or multiple amortisation periods of less than 40 years may significantly improve the ability of accounting numbers to

track market valuation, uniform uses of 40 years amortisation periods will likely diminish the ability of accounting numbers to track market valuations.

According to Henning, market participants' valuations of goodwill accounting practices may also be conditional on source. If pre-bid goodwill has underlying substance related to the operating assets or other intangible assets, there is less uncertainty surrounding future economic benefits. This diminished uncertainty may lead to accounting practices that are consistent with the nature of the goodwill asset. On the other hand, if the benefits associated with transaction specific premium goodwill are less obvious, then it is more difficult to adopt accounting practices that are consistent with the economic substance of the goodwill asset[11]. Henning develops his argument by saying that the interaction between accounting policies and source may have a significant effect on the association between reported accounting numbers and market value. For example, if the range of the amortisation periods allowed includes the true useful life for virtually any situation, and if future economic benefits surrounding pre-bid goodwill are less uncertain, then firms with a high proportion of pre-bid goodwill that amortise over periods of less than 40 years are likely to exhibit a higher association between reported goodwill accounting numbers and market valuations. On the other hand, firms with a high proportion of premium goodwill over 40 years are likely to exhibit a lower association.

Henning also considers goodwill arising from contingent payments as another factor that affects the relationship between the goodwill and market valuation of a firm. Contingent payment goodwill is recorded only after evidence of future economic benefits are realised through excess current earnings. In this case, the uncertainty surrounding the anticipated future benefit of this premium goodwill greatly diminishes. The remaining uncertainty determines the number of future periods to which this realised benefit relates. However, the task of adopting an appropriate accounting policy is considerably easier since the specific component creating the goodwill is known. Therefore, the expectation is that the reported goodwill numbers will be better able to track market values for firms utilising contingent payment purchase agreements.

Based on the above arguments, Henning developed two hypotheses to be tested, which are as follows:

[11] Pre-bid goodwill can be defined as the difference between pre-take-over-bid market price and the fair value of the firm's identifiable net assets. Premium goodwill is the excess that acquiring firms pay over the pre-take-over-bid share price (Henning, 1994).

H1: The association between reported goodwill accounting numbers and market valuations improves for firms with higher proportions of pre-bid goodwill that amortise over fewer periods and diminishes for firms with high proportion of premium goodwill that amortise over 40 years.

H2: The association between reported goodwill accounting numbers and market values improves for firms utilising contingent-payment purchase agreements.

The above hypotheses are tested on the following pooled Cross-Sectional regression models:

$$MV_{jt} = \alpha_0 + \alpha_1 BV_{it} + \alpha_2 GW_{jt} + \alpha_3 GW_{j,t} \times LONG_j + \alpha_4 GW_{j,t} \times MULT_{40,j} + \alpha_5 GW_{it} \times PREM_j + \alpha_6 GW_{jt} \times PREBID_j + \alpha_7 GW_{jt} \times PREM_j \times LONG_j + \alpha_8 GW_{jt} \times PREM_j \times SHORT_j + \varepsilon_j \quad (1)$$

And

$$MV_{jt} = \alpha_0 + \alpha_1 BV_{it} + \alpha_2 GW_{jt} + \alpha_3 GW_{j,t} \times CONTING_j + \varepsilon_j \quad (2)$$

where;

1. MV is the market value of common stock outstanding at the end of fiscal year t.
2. BV is the book value of common stock outstanding minus the book value of purchased goodwill at the end of fiscal year t.
3. GW is the book value of goodwill at the end of fiscal year t.
4. LONG is the accounting method dummy variable that takes on the value of one if the specified amortisation periods are boilerplate or 40 years.
5. MULT is the accounting method dummy variable that takes on the value of one when multiple amortisation periods include 40 years
6. PREM is the dummy variable that takes on the value of one if firm i have a ratio of premium to total goodwill in the sample's upper quartile.
7. PREBID is the dummy variable that takes on the value of one if firm i have a ratio of premium to total goodwill in the sample's lower quartile.
8. SHORT is the accounting dummy variable that takes on the value of one for single (multiple) amortisation periods less 40 years.
9. CONTING is a dummy variable that takes on the value of one if firm i make contingent purchase price payments based on operating results.

If model (1) is correct, Henning expects the goodwill number to be positively related to the market value and the use of long or multiple periods that include 40 years to negatively

affect the valuation relevance of goodwill measures. Furthermore, if the 40 year range of the amortisation period is likely to include the true useful life of virtually all goodwill, then amortising goodwill over more than 40 years should diminish the association between goodwill and market value beyond the diminution that occurs by amortising goodwill over multiple periods that include 40 years ($\alpha_3 < \alpha_4 < 0$).

Similarly, if the future economic benefits for pre-bid goodwill are less certain, then the coefficient on pre-bid goodwill should be positive, while the coefficient on premium goodwill should be negative. Finally, premium goodwill that is amortised over long periods should diminish the association between goodwill and market value, while pre-bid goodwill amortised over short periods should enhance this association. The results from Henning's study (shown in Table 4.6) are consistent with the predictions which indicate that goodwill accounting policy and source, as well as interactions between these factors, significantly enhance the ability of the goodwill asset to explain market values.

Table 4.6: Market Value as a Function of Book Value of Purchased Goodwill (Henning, 1994)

Model	α_0	α_1	α_2	α_3	α_4	α_5	α_6	α_7	α_8	R^2
1. Amortisation	0.09	2.89	3.38	-0.26	-0.12					0.71
(Obs: 5839)	(.13)	(.01)	(.00)	(.03)	(.06)					
2. Source	1.08	2.08	2.94			-0.21	0.15			0.67
(Obs: 1821)	(.10)	(.01)	(.00)			(.08)	(.06)			
3. Both 1&2	1.29	2.13	2.67	-0.21	-0.10	-0.18	0.12			0.77
(Obs: 1821)	(.07)	(.01)	(.00)	(.05)	(.04)	(.06)	(.09)			
4. Full Model	1.32	1.99	2.43	-0.23	-0.13	-0.18	0.12	-0.14	0.18	0.81
(Obs: 1821)	(.06)	(.01)	(.04)	(.06)	(.07)	(.07)	(.09)	(.05)	(.01)	

Model: $MV_{jt} = a_0 + a_1BV_{it} + a_2GW_{jt} + a_3GW_{j,t} \times LONG_j + a_4GW_{j,t} \times MULT_{40,j} + a_5GW_{it} \times PREM_j + a_6GW_{jt} \times PREBID_j + a_7GW_{jt} \times PREM_j \times LONG_j + a_8GW_{jt} \times PREM_j \times SHORT_j + e_j$
[Source: Henning (1994)]

Henning's second hypothesis, that contingent-payment goodwill enhances the association between reported goodwill accounting numbers and market value, is tested by estimating model (2). The results from this model are presented in Table 4.7. They indicate that the positive relation between the goodwill asset and the market value is enhanced by contingent-payment goodwill. This evidence supports the second hypothesis, that conditioning tests of market association on these features of the goodwill transaction improves the explanatory power of goodwill accounting measures.

Table 4.7: The Effect on Market Value of Contingent Payment Contracts

Obs	α_0	α_1	α_2	α_3	R^2
5839	0.136	2.267	3.189	0.231	0.66
	(.13)	(.01)	(.00)	(.02)	

Model: $MV_{jt} = \alpha_0 + \alpha_1 BV_{it} + \alpha_2 GW_{jt} + \alpha_3 GW_{j,t} \times CONTING_j + \varepsilon_j$
[Source: Henning (1994)]

McCarthy and Schneider (1995) analyse the market perception of goodwill as an asset in the determination of a firm's valuation in the US market. They also examine how the market perceives goodwill in relation to all other assets. In order to test how the market perceives purchased goodwill when assessing the value of the firm, they estimate the following regression model:

$$ME_i = \alpha_0 + \alpha_1 ALGW_i + \alpha_2 GW_i + \alpha_3 LIAB_i + \alpha_4 INC_i + \varepsilon_i$$

where ME, ALGW, GW, LIAB and INC are the market values of common stock, book value of assets less goodwill, book value of goodwill , book value of liabilities and an income variable. ME is calculated by multiplying the number of common shares in issue times the price per share of stock at the end of the fiscal year. Since the market value of firms' assets and liabilities cannot be observed directly, the authors take book values of assets and liabilities as proxies for market value. The above model is similar to Landsman (1986) except that McCarthy and Schneider include variables from the income statement. They argue that the market value of a firm's equity might be explained better by a model that includes both parts of financial accounting: a stock concept of value (book value) and a flow concept of value (earning adjusted for dividends or clean surplus). They offer several values that could serve as proxies for income, namely: clean surplus, net income for the period, or abnormal returns. The authors report their results using net income as an income variable.

In this study, the main interest is the coefficient of goodwill. If the market places value on the reported goodwill of a firm, then goodwill should be significant and positively correlated with the firm's market value. To establish the presence of this relationship, they tested the following null hypothesis:

$H_1 : \alpha_2 = 0$

If goodwill is a significant variable, another test will be carried out to ascertain whether goodwill is priced differently from all other assets by using the following null hypothesis:

$H_2 : \alpha_1 = \alpha_2$

Similar to Landsman (1986) and previous researchers, M&S discuss several econometric problems which can arise when estimating the regression equation. The first is, the heteroscedasticity problem. If heteroscedasticity is present, then the standard errors are understated resulting in overstated t-statistics. M&S report all regression standard errors, t-statistics and p-value based on White's procedure (1980).

The second problem in the regression model is multicollinearity. There is very high correlation between total assets less goodwill and total liabilities. To reduce this problem, M&S estimate a different model by netting ALGW and LIAB, the variables that are highly correlated and the cause of multicollinearity. The results from this regression related to goodwill are consistent with the basic model.

The third potential problem in the regression model is measurement error in the regressors due to use of the book value of assets and liabilities instead of the market value. The authors explained that without knowledge of the specific form of measurement error and the covariance structure of the measurement error of the explanatory variables, it is difficult to predict what bias, if any, to expect in the estimates of the regression coefficients. In order to explore the robustness of their findings, they use several alternative model specifications, in reduced and deflated form. All the results from these regressions are consistent with the basic model.

Table 4.8 shows McCarthy and Schneider's results for the first hypothesis. The coefficient of goodwill is positive and significant at the 0.000 level in all years yielding a rejection of Hypothesis 1. This finding suggests that investors perceive goodwill as an asset when valuing a firm. Given that goodwill is significant in valuing a company, the authors proceed to test the second hypothesis which examines the magnitude of the market perception, by comparing the coefficients of goodwill and other assets. If the coefficients are significantly different, then the market perceives reported goodwill differently from the other assets. If the two coefficients are not statistically different, then this would suggest the market treats goodwill the same as other assets.

Table 4.8: Market Value as a Function of the Book Value of Purchased Goodwill (McCarthy and Schneider, 1995)

Year	Variable	Parameter	std error	White t	p-value	Adj. R^2	N
1988	Intercept	20.942	23.076	0.907	0.3642	0.9449	1106
	ALGW	1.134	0.206	5.495	0.0001		
	GW	1.636	0.330	5.109	0.0001		
	LIAB	-1.166	0.207	-5.626	0.0001		
	INC	4.312	1.293	3.334	0.0001		
1989	Intercept	79.370	53.382	1.486	0.1374	0.8253	1172
	ALGW	0.923	0.212	4.338	0.0001		
	GW	2.637	0.521	5.061	0.0001		
	LIAB	-1.006	0.228	-4.398	0.0001		
	INC	6.024	2.326	2.589	0.0096		
1990	Intercept	114.945	21.198	5.422	0.0001	0.9202	1227
	ALGW	0.164	0.171	0.961	0.3362		
	GW	0.881	0.248	3.544	0.0001		
	LIAB	-0.171	0.172	-0.992	0.3214		
	INC	9.727	1.413	6.880	0.0001		
1991	Intercept	20.921	46.647	0.488	0.6538	0.8403	1260
	ALGW	2.080	0.177	11.719	0.0001		
	GW	2.134	0.386	5.515	0.0001		
	LIAB	-2.152	0.195	-11.015	0.0001		
	INC	7.384	1.509	4.893	0.0001		
1992	Intercept	47.375	44.777	1.058	0.2902	0.8448	1451
	ALGW	2.095	0.356	5.879	0.0001		
	GW	2.181	0.484	4.500	0.0001		
	LIAB	-2.051	0.390	-5.253	0.0001		
	INC	3.343	0.908	3.678	0.0001		

Model: $ME_i = \alpha_0 + \alpha_1 ALGW_i + \alpha_2 GW_i + \alpha_3 LIAB_i + \alpha_4 INC_i + \varepsilon_i$
Variab es:
ME = Market value of common stock
GW = Book value of goodwill
ALGW = Book value of assets less goodwill
LIAB = Book value of liabilities
INC = Income variable - net income
[Source: McCarthy and Schneider (1995)]

Table 4.9 shows the results reported by McCarthy and Schneider for the second hypothesis. In absolute value, the estimated coefficient for goodwill is greater than for the other assets in all five years. However, the null hypothesis of equal coefficient can be rejected in only two of the five years tested. According to the authors, these results are not consistent over the entire five-year period. Even though the coefficient for goodwill is higher than the coefficient for all other assets in all five years and significantly higher in two of the five years, it cannot be generally concluded that the market perceives goodwill as having a higher value than other assets. However, a more conservative interpretation of this finding, according to M&S, is that goodwill appears to be perceived by the market with a value at least equal to other assets and possibly greater. As an overall conclusion, the results of this study suggest that

the market includes goodwill when valuing a company. Another major finding is that, relative to book values, goodwill is valued by the market at least as much as other assets.

Table 4.9: A Comparison of the Capitalisation Ratio for Goodwill and Other Assets

	Coefficient			
Year	GW	ALGW	chi-square	p-value
1988	1.636	1.134	3.6871	0.0548
1989	2.637	0.923	13.5795	0.0002
1990	0.881	0.164	24.6443	0.0001
1991	2.134	2.080	0.0165	0.8975
1992	2.181	2.095	0.0277	0.8678

Notes:
ALGW - Book value of assets less goodwill
GW - Book value of goodwill
(Source: McCarthy and Schneider, 1995)

Jennings *et al.* (1996) also studies the relationship between purchased goodwill and market value. In the first part of their study, the authors examine the relation between equity values and accounting goodwill numbers in the United States during the period 1982 - 1988. In order to examine whether recorded amounts for purchased goodwill are reflected in the distribution of equity values, they estimate the cross-sectional regression for each of the years, similar to Landsman (1986), Harris and Ohlson (1987), Barth (1991), Shevlin (1991) and Gopalakrishnan and Sugrue (1993). They estimate the following regression model:

$$MV_i = \alpha_0 + \alpha_1 ABGWP_i + \alpha_2 GW_i + \alpha_3 PPE_i + \alpha_4 LIAB_i + \varepsilon_i$$

where

MV	=	market values of common stock measured three months after the end of the year
ABGWP	=	book value of total assets exclusive of goodwill and property plant and equipment,
GW	=	book value of net goodwill
PPE	=	book value of net property, plant and equipment
LIAB	=	sum of the book values of liabilities and the preferred stock component of stockholders' equity

This study focuses on α_2, the slope coefficient for the book value of net goodwill. According to Jennings *et al.*, at the time of an acquisition, the amount recorded as purchased goodwill represents the present value of a stream of expected cash flows. If the book value of purchased goodwill continues to reflect these expected cash flows, there should then be a positive association between equity values and recorded amounts for purchased goodwill. If

the correspondence between the book value of purchased goodwill and its economic value diminishes rapidly following the acquisition, the authors would expect to observe no association between recorded goodwill and equity values.

Table 4.10: Market Value as a Function of Book the Book Value of Purchased Goodwill (Jennings, 1996)

	α_0	α_1	α_2	α_3	α_4	R^2	N
Panel A : Year by Year Regression							
1988							
Estimate	-2.82	1.36	1.76	1.76	-1.18	0.72	246
t-ratio	-2.10	10.98	6.55	11.85	-7.56		
1987							
Estimate	-0.54	1.52	2.10	1.75	-1.39	0.69	248
t-ratio	-0.55	9.15	5.30	8.90	-5.45		
1986							
Estimate	-3.10	2.21	3.38	2.27	-2.11	0.67	213
t-ratio	-1.10	6.96	5.54	7.79	-5.00		
1985							
Estimate	-3.93	2.86	3.88	2.26	-2.87	0.76	191
t-ratio	-1.19	11.35	7.94	12.36	-10.06		
1984							
Estimate	-1.85	2.18	3.24	1.85	-2.31	0.72	178
t-ratio	-0.56	9.72	8.68	8.94	-7.38		
1983							
Estimate	-3.50	2.53	3.44	1.97	-2.81	0.62	160
t-ratio	-1.27	5.48	5.86	5.54	-4.39		
1982							
Estimate	-1.21	2.55	4.00	1.88	-2.67	0.55	145
t-ratio	-0.29	5.72	5.95	9.25	-5.53		
Avg. coefficient		2.17	3.11	1.96	-2.19		
Avg. *t*-statistic		8.48	6.54	9.23	-6.48		
Panel B: Fixed Effects Regression							
Avg. Coefficient		1.16	0.68	1.11	-0.98		
Avg. *t*-statistic		11.29	2.99	9.07	-9.42		
p-value		0.00	0.00	0.00	0.00	0.90	1381

Model: $MV_i = \alpha_0 + \alpha_1 ABGWP_i + \alpha_2 GW_i + \alpha_3 PPE_i + \alpha_4 LIAB_i + \varepsilon_i$

[Source: Jennings *et al.* (1996)] Notes: In Panel A, the table shows OLS coefficient estimates (row 1) and *t*-statistics based on White's (1980) consistent covariance estimator (row 2) for each year. The last two lines show average coefficient estimates and the average *t*-statistics across the seven year by year regressions. In Panel B, the table reports results from a 'fixed effects' regression that includes separate intercepts for each firm and separate intercepts and slope coefficients for each year.

As mentioned previously, one of major econometric problems when estimating cross-sectional valuation model is that of heteroscedastic disturbance and, in order to reduce such a problem all variables are deflated by total assets at the end of the year. Furthermore, all the *t*-statistics reported in this study are based on White's (1980) consistent covariance

estimator. Table 4.10 shows the estimation results for the study. The results from this study indicate a strong cross-sectional relation between equity values and accounting assets and liabilities. The estimated coefficients for recorded net goodwill are positive and highly significant in each of the seven years. According to Jennings *et al.,* this result suggests that, in the view of investors, purchased goodwill represents an economic resource. The estimated coefficient for GW is generally larger than those for ABGWP and PPE. One explanation given by the authors is that, on average, either purchased goodwill is amortised 'too quickly' or other assets are expensed too slowly. This explanation is consistent with the hypothesis that investors continue to view purchased goodwill as an economic resource after the date of acquisition.

In the second part of their study, Jennings *et al.* examine whether purchased goodwill is reflected in equity values as a wasting resource. Their motivation is the fact that all US firms are required to amortise goodwill over periods not to exceed 40 years. This requirement is based on the argument that purchased goodwill declines in value over time because the underlying stream of cash flows is likely to be of limited duration. However, some theorists believed that purchased goodwill may retain its value indefinitely and that the amortisation requirement is therefore inappropriate. In order to answer the above question, Jennings *et al.* estimate a cross-sectional regression based on income statement issues that involve regressing equity values on components of expected future earnings, including expected goodwill amortisation. They employed the following model:

$$MV_i = \alpha_0 + \alpha_1 EEBGWD_i + \alpha_2 EGWE_i + \alpha_3 EDEPR_i + \alpha_4 PRED_i + \alpha_5 \Delta ROE_i + \alpha_6 GW_i + \alpha_7 PPE_i + \varepsilon_i$$

where

MV	=	market value of equity
EEBGWD	=	a measure of expected future earnings exclusive of goodwill amortisation and depreciation
EGWE	=	a measure of expected goodwill amortisation
EDEPR	=	a measure of expected depreciation expenses
PRED	=	a measure of risk
ΔROE	=	a measure of projected growth in earnings
GW	=	goodwill asset balance at end of year
PPE	=	property, plant and equipment at end of year

In order to reduce problems associated with heteroscedasticity, all variables are deflated by total assets at year-end.

This study focuses on α_2 the slope coefficient for a measure of expected goodwill amortisation. Jennings *et al.* assume that the expected cash flows associated with purchased goodwill are impounded in projections of earnings and earning growth (*i.e.,* in EEBGWD and ΔROE). They argued that if the stream of cash flows is expected to be finite, goodwill amortisation should be negatively associated with equity values and conditional on other components of projected earnings. In contrast, if purchased goodwill is expected to generate cash flows indefinitely, there should be no association between equity values and goodwill amortisation. The authors also separate depreciation from the other elements of income. According to them, both depreciation and goodwill amortisation are recognised based on the assumption that the life of the related assets is limited.

Table 4.11: The Effect on Market Value of Component of Expected Earnings

	α_0	α_1	α_2	α_3	α_4	α_5	α_6	α_7	R^2 / N
1988									
Estimate	-30.41	12.14	-38.71	-11.80	0.76	6.45	1.39	-0.03	0.89
t-ratio	-1.81	13.89	-2.57	-6.13	2.43	4.14	3.61	-0.17	148
1987									
Estimate	-38.79	11.40	-8.49	-10.67	0.73	4.05	0.48	0.01	0.91
t-ratio	-2.46	14.18	-0.73	-5.10	2.82	2.20	1.23	0.08	140
1986									
Estimate	-80.27	16.42	-15.54	-17.77	0.76	9.83	0.90	0.04	0.92
t-ratio	-3.59	14.84	-1.69	-9.01	2.13	3.42	2.29	0.22	125
1985									
Estimate	-37.36	17.35	-51.04	-20.43	0.39	6.14	1.86	0.04	0.91
t-ratio	-2.46	18.44	-3.21	-9.01	1.46	5.30	2.71	0.25	115
1984									
Estimate	1.21	12.79	-68.78	-13.95	0.37	2.56	1.88	-0.11	0.89
t-ratio	0.07	13.64	-3.90	-6.33	0.79	1.94	3.38	-0.70	107
1983									
Estimate	-40.11	12.49	-38.03	-13.96	0.32	6.96	1.59	-0.30	0.85
t-ratio	-1.93	7.16	-2.55	-5.67	1.13	3.26	2.30	-1.58	97
1982									
Estimate	-49.96	15.95	-50.93	-21.37	1.16	8.63	0.24	0.36	0.79
t-ratio	-1.11	7.10	-1.72	-4.22	1.46	1.85	0.23	0.85	88

Model: $MV_i = \alpha_0 + \alpha_1 EEBGWD_i + \alpha_2 EGWE_i + \alpha_3 EDEPR_i + \alpha_4 PRED_i + \alpha_5 \Delta ROE_i + \alpha_6 GW_i + \alpha_7 PPE_i + \varepsilon_i$
[Source: Jennings (1996)] Notes: The table shows OLS coefficient estimates (row 1) and t-statistics based on White's (1980) consistent covariance estimator (row 2) for each year. In all cases, all elements of the data matrix are deflated by total assets at year end.

However, there is general agreement that the underlying assets have an identifiable finite life. Thus, the coefficient on expected depreciation expense can provide evidence of the

ability of the authors' specification to detect a negative relation between equity values and changes in the value of an economic resource that is known to be declining in value. On the other hand, the results from the balance sheet identity model suggest that the recorded value of purchased goodwill is associated with the expected cash flow. Therefore, the authors also include GW and PPE into this model. The estimation results for the above model reported in Table 4.11, show that the estimated coefficient on EGWE is significantly negative for five of the seven years. On the other hand, the coefficient on GW is significantly positive in six of the seven years at the five- percent confidence level. In the light of all the results of their study, Jennings *et al.* have draw the following conclusions:

1. The results indicate a strong positive cross-sectional association between equity values and recorded goodwill assets amounts after controlling for other components of net assets.
2. The results find evidence of a negative association between equity values and goodwill amortisation after controlling for other components' expected earning. However, this evidence is somewhat weak, suggesting that the relation between equity values and goodwill amortisation may vary substantially across firms.

Aboody and Lev (1998) examine the relevance to investors of information on the capitalisation of software costs which has been promulgated in 1985 by Financial Accounting Standards Board No. 86 (SFAS 86). The main motivation of their study is to provide empirical evidence as a result of the industry petition to abolish the capitalisation standard (SFAS 86). The major argument of that petition was that, given the technological and competitive changes that had occurred since SFAS 86 came into effect, capitalisation of software development cost did not benefit investors. As a result, the main question addressed in this study is as follows:

> "Is reported information on software capitalisation - the annual development cost capitalised, the book value of the software asset and the amortisation of this value - relevant to investors' assessment of securities' values?"

The main relevance in this paper to the present thesis is the way in which the value-relevance of software capitalisation is tested using the following price model which is similar to that used by Landsman (1986):

$P_{it} = \alpha_0 + \alpha_1 X_{it} + \alpha_2 BV_{it} + \alpha_3 CAPSOFT_{it} + \varepsilon_i$

Where;

P_{it} = price per share three months after fiscal year end

X_{it} = reported net income

BV_{it} = Book value of equity minus the capitalised software asset

$CAPSOFT_{it}$ = the net balance of the software assets

All right-hand variables are divided by the number of outstanding shares at year-end.

Table 4.12: The Market Value and Software Capitalisation (Aboody and Lev, 1998)

Dependent Variable	Intercept	X_{it}	BV_{it}	$CAPSOFT_{it}$	Adj. R^2
Stock Price (Total Sample)	13.375 (5.85)	3.509 (10.97)	2.189 (19.37)	0.570 (2.06)	0.57
Stock Price (Top 25% of sample firms ranked on Capitalisation intensity)	2.231 (2.90)	1.406 (3.57)	1.771 (14.19)	1.325 (8.39)	0.72

Model: $P_{it} = \alpha_0 + \alpha_1 X_{it} + \alpha_2 BV_{it} + \alpha_3 CAPSOFT_{it} + \varepsilon_i$

The estimation of the above model is reported in Table 4.12 for two sample sizes: the total sample and for the 25 percent of sample cases with the highest capitalisation intensity (the ratio of the annual capitalised development cost to total development cost). The result from the total sample indicates that the coefficient of the software asset (balance sheet value) is statistically significant and positive as expected. The estimates of the equation run on the total sample indicate that the coefficient of the software asset (balance sheet value) is statistically significant and positive. The result for the reduced sample is also positive and highly statistically significant. Based on these results, the authors argue that the coefficient of the software asset (1.325), is only slightly lower than the coefficient of equity (book value - 1.771), indicating that investors value, on average, the capitalised software asset slightly less than a firm's tangible assets. The subjectivity associated with the valuation of the intangible asset (software) leads to some, but not substantial, discounting by investors. The authors conclude that their results find no evidence that somewhat subjective software capitalisation values are irrelevant to investors' decisions.

Finally, we review Pfeiffer's (1998) paper that examines the extent to which off-balance-sheet items are reflected in firms' security prices. He focuses on one off-balance-sheet item: originated mortgage servicing rights.

According to Pfeiffer, mortgage-servicing rights are contractual rights to receive compensation for performing primarily collection-related duties associated with mortgage loans. These servicing rights, which relate to mortgages originated and then sold by the holder of the rights, are not recorded as assets in the balance sheet under FASB 1982, even though they clearly have economic value. The main research question in this study is to answer the following question; do stock prices reflect estimates of off-balance-sheet assets derived from information available in the notes to the financial statements?. To answer this question, Pfeiffer regresses the following model:

$$MVE_{it} = \alpha_0 + \alpha_1 OTHASSETS_{it} - \alpha_2 LIABS_{it} + \alpha_3 OBSMSR_{it} + \alpha_4 REVENUE_{it} + \varepsilon_i$$

where

MVE	=	the market value of common equity for firm I on the last day of fiscal year t.
OTHASSETS	=	the book value of all recorded assets
LIABS	=	the book value of all liabilities
OBSMSR	=	the estimated value of off-balance-sheet servicing right
REVENUE	=	total revenues as reported in the income statement.

The model is estimated in undeflated form. According to the author, this can potentially lead to two scale-related problems, scale bias and heteroscedastic disturbance. Pfeiffer addresses scale bias by including a proxy for size in the model which is total revenue (REVENUE). The problem of heteroscedasticity is addressed by using *White-corrected t-statistics.*

Table 4.13: Market Value and Off Balance Sheet Items (Pfeiffer, 1998)

	α_0	α_1	α_2	α_3	α_4	N / R^2
Coefficient	-25.240	0.559	-0.477	0.659	0.120	65
OLS t	-2.250*	13.210*	-10.480*	4.770*	0.86	0.96
White t	-2.870*	9.070*	-6.990*	4.380*	0.78	

Model: $MVE_{it} = \alpha_0 + \alpha_1 OTHASSETS_{it} - \alpha_2 LIABS_{it} + \alpha_3 OBSMSR_{it} + \alpha_4 REVENUE_{it} + \varepsilon_i$

The results for the above regression model, presented in Table 4.13, below, indicate that estimated off balance sheet servicing appears to be priced. Its coefficient (0.659) is significantly positive according to both of the measures of significance, OLS *t* and White-corrected *t*.

4.6 Conclusion

In our review of the literature, several econometric problems associated with the estimation of models have been mentioned by writers such as Landsman (1986), Gopalakrishnan and Sugrue (1993), Kane and Unal (1993), Shevlin (1991), McCarthy and Schneider (1995), Jennings *et al.* (1996) and Pfeiffer (1998). The three major problems that were discussed were (i) heteroscedasticity, (ii) measurement error in the regressors, and (iii) multicollinearity. Each of these econometric problems will be discussed in further detail in Chapters 5 and 6.

To summarise, the review reported in this chapter shows that models based on a relation between market value and book values are used extensively in the accounting literature. Many balance sheet items have been empirically tested using this model. These include pension fund property, research and development, purchased goodwill, intangible assets and assets and liabilities valuation in banking industry. The next chapter will discuss the research design and method of the present study, which has been based on the relation between market value and book value.

CHAPTER 5

RESEARCH DESIGN AND METHOD

5.1 Introduction

The previous chapters have focused on three main areas. First, we discussed the theoretical, regulatory and historical issues relating, in general to the accounting for goodwill but with special reference to the environment of the UK. We observed that the controversy surrounding goodwill could be clearly seen in the theoretical issues. We then reviewed the literature on accounting for goodwill in Chapter 3, which mentioned that although much empirical research have been done in this area, it has only focused on the reactions and behaviour of the managers. The main interest of the present thesis is to investigate whether or not purchased goodwill is one of the significant variables in determining a firm's valuation. We, employ a model based on the relationship between market and book value with special reference to the balance sheet variables. In Chapter 4, we reviewed the previous research using the same model.

The present chapter will concentrate on the research design and method, which is the backbone of this thesis. Section 5.1 will discuss the proposed research, focusing on some of the issues which led to the choice of research questions. Section 5.2 develops a model based on the research questions raised in Section 5.1. Section 5.3 briefly discusses the potential econometric problems associated with the estimation of the model in Section 5.2. Finally, Section 5.4 will briefly discuss the overall perspective of this chapter.

5.2 The Proposed Research

The competing claims over a preferred method of dealing with purchased goodwill have received much attention, by authors such as Jennings *et al.* (1996), McCarthy and Schneider (1995), Grinyer (1995), Bryer (1995), Henning (1994) and Russell *et al.* (1989). It is evident that each of the different methods of accounting for goodwill has its own justifiable economic rationale in appropriate circumstances, as illustrated in Table 2.2. Indeed, no

single method will be superior to another. Nevertheless, in practice, the opposition to the preferred treatment recommended in SSAP 22 has been strong, and is based on the two main arguments set out below.

The first is that management should be required to justify its acquisition of other companies by demonstrating that cash inflows expected from the acquisition exceed the cash outflows incurred when making the investment. It is argued that appropriate reporting for the monitoring and control of management can only be achieved if the cash outlay committed to generate future inflows in terms of increased profit is charged as a cost in the income statement at some time. To do otherwise is analogous to treating gross profit as the net gain from trading during a particular period by charging all the overhead costs to reserves. This argument is reflected in the objectives of FRS 10, which seek to ensure that purchased goodwill and intangible assets are charged in the profit and loss account in the periods in which they are depleted and that sufficient information is disclosed in the financial statements to enable users to determine the impact of goodwill and intangible assets on the financial position and performance of the reporting entity. The force of these arguments can be seen in Appendix III of FRS 10, which states that:

> "The practice of eliminating goodwill against reserves has weaknesses... management is not held accountable for the amount that it has invested in goodwill; it is not taken into account when measuring the assets on which a return must be earned, and there is no requirement to disclose a loss if the value of the goodwill is not maintained..."

The second major argument against SSAP 22 has been, as mentioned earlier, that internationally the treatment of goodwill was to capitalise and amortise. Indeed the IASC has recently updated IAS 22 to extend the recommended period for amortisation to 20 years from 5 years, in order to bring its policy more into line with treatment in the US. Now, the choice of goodwill method in FRS 10 has brought the UK much more into line with the rest of the world. One conclusion that can be drawn from the objectives of FRS 10 is that purchased goodwill is seen as a key variable in the valuation of firms. The measurement of goodwill and its recognition on the face of the balance sheet can therefore be considered justifiable, at the very least because this might reduce search costs for analysts, but more specifically because it will provide new information to the market

In addition to the above points, it may be argued that an acquisition giving rise to goodwill is frequently an alternative to self-start investment which would create a business that possesses the characteristics desired by the managers of the acquisitive company, as explained by Nelson (1953) and Grinyer (1995). If this is the case, then it is reasonable to

hypothesise that the benefits gained by acquisition (purchased goodwill) decline in value over time and that the period over which the benefits extend could be expected to be no longer than the time usually required to form and establish a company with similar characteristics to the one acquired. In these circumstances, to comply with conventional concepts of matching-based depreciation, the pattern of amortisation of goodwill should reflect the declining pattern of benefit. The approach advocated in FRS 10 is to spread the cost of goodwill through successive profit and loss accounts on the basis of a combination of systematic amortisation over a limited period and an annual impairment review. In the case of amortising over a limited period, FRS 10 gives little guidance on how to predict an asset's useful economic life. However, the standard states that (i) there is a rebuttable presumption that the useful economic life is 20 years or less (only in specific circumstances will there be good reason for assigning a longer useful economic life); (ii) uncertainty about the useful economic life is not a good reason for choosing one that is unrealistically short; and (iii) such uncertainty is not a good reason for adopting a 20 year useful economic life by default.

Thus, whatever the useful economic life chosen, the company should be able to justify it, and it should be reviewed annually and revised if appropriate. Indeed, the asset should have an impairment review after the first year to ensure that its performance has been as expected. If this review shows that the results are as predicted, no other review will be required unless events or changes in the future indicate that the value of the goodwill may not be recoverable. If the review shows that the post-acquisition performance is poorer than anticipated, a full review is required in accordance with FRS 11, *Impairment of Fixed Assets and Goodwill.*

Considering these arguments, FRS10 leads us to consider a number of research questions; which are:

(I) ' whether *purchased goodwill is an important component of a firm's market value*';

(ii) *'whether purchased goodwill which is off balance sheet is given a significant weighting in arriving at market value*'; and

(iii) *'whether purchased goodwill shows a decline in value such that the impairment test required by FRS 10 is relevant'.*

5.3 Market Value Test Methodology

The main objective of this study is to examine whether the market perceives purchased goodwill as an important variable in the determination of the value of a company. The second objective is to test whether the market treats purchased goodwill in the same manner as other assets. The third is to analyse whether purchased goodwill declines in value.

McCarthy and Schneider (1995) mention that there are several ways in which these objectives can be achieved. One approach is to use a return/earnings study. However this type of study can only be employed if the accounting treatment of purchased goodwill is amortisation since it is through amortisation that goodwill affects earnings. As the present study focuses on companies that choose to eliminate purchased goodwill immediately against reserves, this method is obviously not suitable for this study.

An alternative to the above approach is to study the ratio of a share's price to its book value. Using this approach leads to several limitations; namely, that firms with negative net worth must be eliminated; 'outliers' occur, because of small firms with small book values; and the ratio of dependent variables cause the distributional properties to be very complex. In order to overcome the above problems, McCarthy and Schneider employed a level approach in their study. They mentioned that choosing a level approach has several advantages. First, no estimates of the variables are required. Second, no firms have to be discarded or become potential outliers as a result of negative book values or small book values, thus, all firms in a level study will have positive market value.

The model adopted for this study is developed from the balance sheet identity first introduced in this context by Landsman (1986), in which the book value of equity is written as Shareholders' Equity (Net Assets) = Total Assets - Total Liabilities. Denoting these as book values of equity (*BVE*), assets (*BVA*) and liabilities (*BVL*) for company *j* in year *t*, we get

$$BVE_{jt} = BVA_{jt} - BVL_{jt}. \qquad (1)$$

Likewise, the market value of shareholders' equity (*MVE*) can be written as:

$$MVE_{jt} = MVA_{jt} - MVL_{jt} \qquad (2)$$

where *MVA* and *MVL* denote the market value of the on- and off-balance sheet assets and liabilities of company *j* in year *t*.

This assumes that the market values of assets and liabilities are linearly and additively related to equity value. However, because the above model is stated in terms of market values rather than of book values, the accounting identity is not necessarily preserved. For example, the market value of the residual claim may exceed the market value of corporate assets less the market value of corporate liabilities, as the Miller and Modigliani (1966) models of capital market equilibrium suggest. Following Landsman, the market value of shareholders' equity given by Equation 2 may be restated as:

$$MVE_{jt} = a_0 + a_1 MVA_{jt} - a_2 MVL_{jt} + e_{jt} \qquad (3)$$

Landsman uses the model in Equation (3) to test the market's perception of firms' pension assets and liabilities. If the theoretical model is correct, then the empirical value of a_0 should be zero. While the market value of shareholders' equity is defined as the number of shares outstanding as of December 31 for each year, multiplied by the share price, the book value of assets and the book value of total liabilities are used as a proxy for the respective market values *MVA* and *MVL*, as the latter are not observable. In theory, according to Miller's (1977) model, the pricing mechanism would ensure that the coefficients of *MVA* and *MVL* are +1 and -1 respectively.

The present study focuses on market perceptions regarding the amount reported for goodwill, other assets and liabilities. Following McCarthy and Schneider (1995) and Jennings *et al.*, (1996), we may incorporate into the right hand side of Equation (2) book values instead of market values, while also separating reported assets into goodwill and assets net of goodwill. The expanded version (2) can now be written as follows:

$$MVE_{jt} = a_0 + a_1 BVOA_{jt} - a_2 BVL_{jt} + a_3 BVGW_{jt} + e_{jt} \qquad (4)$$

where,

MVE_{jt}	=	Market value of shareholders' equity in firm j in year t
$BVGW_{jt}$	=	Book value of the goodwill of firm j in year t
$BVOA_{jt}$	=	Book value of the assets of firm j in year t excluded goodwill
BVL_{jt}	=	Book value of the liabilities of firm in year t

Both of the above-mentioned studies used balance sheet data for firms operating in the US, where goodwill is capitalised and amortised, and the net amount appears in the balance sheet amongst assets. If we follow the argument of Kane and Unal (1990), the intercept in equation (4) would be interpreted as unbooked assets and liabilities. In the UK context, we would expect a_0 to be positive and significant because all the companies in the present study choose to write off purchased goodwill against reserves in the year of acquisition, and goodwill appeared in neither the balance sheet nor the income statement. Nevertheless, UK companies are required to disclose information about the treatment of goodwill in the notes to the accounts. Introducing an estimate of goodwill based on amounts eliminated would cause a_0 to decline. To do so, one option would be to accumulate the purchased goodwill that has been eliminated over n years. For instance, if $n = 1$, this would be equivalent to estimating the off-balance sheet goodwill of a UK company as the amount eliminated in the current period, implying that the appropriate amortisation schedule would be 100% depletion in the second period. For greater values of n, the implicit assumption is that goodwill retains its full value for the period of n years and is then fully depleted. It is on the basis of this reasoning that our analysis proceeds, inferences being drawn from the behaviour of a_0. In summary, we estimate the off-balance sheet goodwill of the j^{th} firm at the end of period t on the basis of eliminated goodwill. GWE_j, accumulated over n prior periods; *i.e.,*

$$GWn_{jt} = \sum_{t-n}^{t} GWE_j$$

leading to

$$MVE_{jt} = a_0 + a_1 BVOA_{jt} - a_2 BVL_{jt} + a_3 GWn_{jt} + e_{jt} \qquad (5)$$

Finally, it should be noted that the above models consider only the balance sheet in trying to explain the market value of a company. Elsewhere, others have included only income statement items in their model. For instance, in order to estimate the market valuation of pension costs reported in the income statement, Barth *et al.* (1992) model shareholders equity as $MVE = a_1 NI + e$, where a_1 is the inverse of a discount rate and net income (NI) is separated into sales, the different components of pension expenses and non-pension expenses. According to Ohlson (1995), however, a model that includes both a stock concept of value and a flow concept of earnings might better explain the market value of a company's equity. There are various proxies for earnings (see McCarthy and Schneider,

(1995), for instance), one being clean surplus earnings, that is the change in the net book value of the firm from the beginning to the end of the fiscal year plus cash dividends less new equity raised, and others being unexpected income or net income itself. For the purpose of this study, a measure of net income is used in the form of income earned for ordinary shareholders (*EARN*); *i.e.,* net profit after tax, minority interest and preference dividends but before any post-tax extraordinary items. On the basis of the above, Equation (5) would be expanded as follows:

$$MVE_{jt} = a_0 + a_1 BVOA_{jt} - a_2 BVL_{jt} + a_3 GWn_{jt} + a_4 EARN_{jt} + e_{jt} \qquad (6)$$

With the introduction of a flow concept or income variable into the model, the theoretical values for the coefficients become different. According to Ohlson (1995), the coefficients will still add up to one, when averaged over the balance sheet variables and flow variables. In addition there is a multiplier associated with the flow of income.

5.4 The Model and Expected Coefficient Values

The previous section discussed the development of the models, that is, a more general version of the accounting identity which holds that the net assets equal total assets less total liabilities. For instance, net assets represent a residual claim that corporate shareholders have to corporate assets after deducting the claims of debt holders. According to Landsman (1986), if the identity is stated in terms of market values, then the net assets represent the market value of that residual claim. However, once the identity is stated in terms of market values rather than accounting book values, the tautology of the accounting is not necessary preserved. For example, the market value of the residual claim may in fact exceed the market value of corporate assets less the market value of corporate liabilities as the Miller and Modigliani (1966) model of capital market equilibrium suggests. In his study, Landsman used historical cost accounting as a proxy for the market value of assets and liabilities because the two are unobservable.

An extension of this model that included both parts of financial accounting; *i.e.*, a stock concept of value (book value) and a flow concept of value (earnings) was used by McCarthy and Schneider (1995) and by Pfeiffer (1998) in order to better explain the market value of a firm's equity. As a result, our final selection of the model for this thesis (which is based on 8

years cumulative purchased goodwill) follows Equation (6), explained in the previous section as:

$$MVE_{jt} = a_0 + a_1 BVOA_{jt} - a_2 BVL_{jt} + a_3 GWn_{jt} + a_4 EARN_{jt} + e_{jt}$$

The first research question to be addressed in this study is whether purchased goodwill should be considered as an important element when determining a firm's market value. In order to answer this question, a_3 is the coefficient of main interest. If the market places value on the reported goodwill of a firm, then goodwill should be significant and positively correlated with the firm's market value. To check for this relationship the following null hypothesis is tested:

H1: $a_3 = 0$

If a_3 is positive and statistically significant, it represents evidence that investors look beyond the face of the financial statements to information contained in the notes to the accounts, and that they can identify past write-offs and include them in current valuations. Moreover, if goodwill is long-lived, a_3 is expected to decline in absolute value as the number of years of accumulation increases. If goodwill is a significant variable, then further examination should test how the market perceives goodwill in relation to all other assets. In other words, is it priced differently from other assets?

To answer this question, we established the following null hypothesis:

H1: $a_1 = a_3$

Again, as *GW* is obtained through accumulation, then we expect a_1 to increase in absolute value compared to a_3 when the number of years of cumulative *GW* is increased. The third issue is that of determining whether and how purchased goodwill declines in value. If Equation (6) allows *GW* as a cumulative figure, then we expect a_0 to be significant and positively related to the market value of the firm when the accumulation period is short, reflecting the understatement of booked assets attributable to the goodwill proxy. We expect the a_0 to decrease in absolute value with an increase in n, the number of years over which goodwill elimination is accumulated. It follows that the behaviour of a_0 will provide a basis on which to draw inferences about the expected life of goodwill.

5.5 Econometric Issues

In Chapter 4, we discussed previous studies that were based on the relationship between market value and book value. Several potential econometric problems associated with the estimation of Equation 9, were noted in models which are relevant to the present study; *e.g.* in Landsman (1986), Harris and Ohlson (1987), Barth (1989), Shevlin (1991), Gopalakrishnan and Sugrue (1993), McCarthy and Schneider (1995) and Jennings *et al.* (1996), several potentials econometric problem associated with estimation of equation (9) were mentioned. Three of these problems - heteroscedasticity, multicollinearity and measurement errors - are briefly discussed in this section and will be dealt with further in the discussion of the data in Chapter 6.

One potential econometric problem when estimating valuation models is the problem of heteroscedastic disturbance, which arises from the fact that, large (small) companies tend to produce large (small) disturbances. If heteroscedasticity is present, then the standard errors are understated, resulting in overstated *t*-statistics. The second potential problem in the regression model is multicollinearity. The estimates of regression coefficients are unbiased if multicollinearity is present, but there are several potential problems; *e.g.*, the imprecision of estimation (high sampling variances); and a high degree of sensitivity in the estimates of the coefficients to particular sets of sample data. The presence of a severe multicollinearity problem could result in drawing misleading inferences from sample *t*-statistics. In particular, even if the sample *t*-statistics are unbiased (there are no other econometric problems), it is still difficult to determine whether the sampling variances are large because of multicollinearity, or whether the variance of the true population is large.

The third potential problem in the regression model (Equation 6) is measurement error in the regressors. This is because none of the market values for each of the explanatory variables in Equation (6) are directly observable; thus the estimation of Equation (6) may result in biased coefficients. However without knowledge of (a) the specific form of measurement error; *i.e.*, whether it is systematic or random noise and (b) the covariance structure of the measurement error of the four explanatory variables, it is difficult to predict what bias - if any - to expect in the estimates of the regression coefficients. These issues and ways to overcome the problems will be discussed again in the following chapters.

CHAPTER 6

EMPIRICAL ANALYSIS: OVERVIEW AND DATA

6.1 Introduction

The previous chapter developed the research questions, and presented three hypothesises and a description of the research method to be employed in this thesis. The main purpose of this thesis is to address part of the controversy surrounding purchased goodwill that has been eliminated in the year of acquisition in the UK environment. The most important question is whether that 'goodwill number' has value-relevance for investors when they are determining the value of a company. Another important question is how they relate purchased goodwill to other assets. Does purchased goodwill decline in value? In this chapter, the data used to assess these questions are described. We explain the data source and describe the sample and selection criteria in Section 6.2. Section 6.3 defines the variables required in the regression models and Section 6.4 reports the descriptive statistical analysis of the data. Section 6.5 presents the exploratory analysis. We began with a discussion of the overall relationship between market value and book value using the balance sheet model as employed by Kane and Unal (1990). The analysis incorporates the growth of accounting goodwill mentioned by Higson (1998). We then elaborate on the main econometric issues relating to the model. Finally, Section 6.6 presents a brief summary of this chapter.

6.2 Data and Sample Selection

The empirical analogue of the theoretical model developed in Chapter 5 is:

$MVE_{jt} = a_0 + a_1 BVOA_{jt} - a_2 BVL_{jt} + a_3 GWn_{jt} + a_4 EARN_{jt} + e_{jt}$

Where

MVE_{jt}	=	Market value of shareholders' equity of firm j in year t
BVA_{jt}	=	Book value of the assets of firm j in year t
BVL_{jt}	=	Book value of the liabilities of firm j in year t
GWn_{jt}	=	Cumulative acquired goodwill of firm j in year t for n year
$EARN_{jt}$	=	Net Profit after tax of firm j in year t

In this study we examine the market valuation of UK firms reporting the elimination of purchased goodwill in the three-year period 1994-96. Into the valuation model we incorporate estimates based on the accumulation of goodwill elimination over a longer period; *i.e.* the ten years from 1987 through 1996. We have chosen this as the relevant time period for the following reasons: first, because the ASC published the Statement of Standard Accounting Practice 22 (the SSAP recommending that positive goodwill should be eliminated reserves in the period in which it is acquired) in 1985. A study by Russell *et al.* (1989) and Higson (1990) shows that, by 1987, almost all the UK companies had chosen the immediate elimination treatment for goodwill.

Secondly, the ASB issued Financial Reporting Standard FRS *10 (Goodwill and Intangible Assets)* in December 1997, requiring purchased goodwill to be capitalised and amortised. Although this standard was effective only in financial statements relating to accounting periods ending on or after 23 December 1998, we chose the sample year 1996 as a final accounting year end, thus excluding the impact of companies which voluntarily changed their accounting policy in advance, with prior knowledge of the FRS10 ruling.

The data for this study were obtained from *Datastream*, and our selection procedures are summarised in Table 6.1. We organised the sample selection on the basis of two criteria: (i) to include any listed company, except firms in the banking sector, that recorded the elimination of goodwill on acquisition in any year from 1994 to 1996; (ii) to exclude any company which recorded an intangible asset in the balance sheet during the previous eight years, thus avoiding companies which changed their accounting policy on the treatment of purchased goodwill. As a result, the final sample consists of 137 companies, with 275 eliminations made by the sampled companies in the three years from 1994 to 1996. The maximum number of firm-year observations for this sample would be 411 (*i.e.* 3 x 137).

Table 6.1: Selection of Companies

First Step	Second Step	Third Step	Final Sample
Select All companies - Datastream Total Market Listing at 31 Dec. 1996 (mnemonic LTOTMKUK)	Exclude companies without purchased goodwill for any year during 1994 - 1996	Exclude companies which recorded Intangible assets in the Balance Sheets for any year during 1994 - 1996	137 Companies: Eliminating goodwill in : 1996 : 68 companies 1995 : 99 companies 1994 : 108 companies 275 companies years

Table 6.2: Years of Cumulative Purchased Goodwill, Sample Size, Number of Companies and Accounting Year-ends

Accounting Year End	Number of Companies
31 January	3
28 February	3
31 March	29
30 April	8
31 May	2
30 June	4
31 July	1
31 August	3
13 September	1
30 September	11
31 October	2
31 December	70
Total	**137**

Year of Cumulative Purchased Goodwill	Sample Size
1	1996: 68 1995: 99 1994: 108 Total: 275
2	1996: 110 1995: 137 1994: 119 Total: 366
3	1996: 132 1995: 136 1994: 123 Total: 391
4	1996: 131 1995: 137 1994: 127 Total: 395
5	1996: 134 1995: 137 1994: 128 Total: 399
6	1996: 135 1995: 137 1994: 129 Total: 401
7	1996: 135 1995: 137 1994: 130 Total: 402
8	1996: 137 1995: 137 1994: 130 Total: 404

Sector	Number of Company	Percentage
1. Alcoholic Beverages	1	0.73
2. Diversified Industrial	1	0.73
3. Oil & Gas	1	0.73
4. Electricity	2	1.46
5. Mining	2	1.46
6. Pharmaceuticals	2	1.46
7. Retailer, Food	2	1.46
8. Telecommunications	2	1.46
9. Water	2	1.46
10. Constructions	4	2.92
11. Breweries, Pubs & Rest	4	2.92
12. Electronic & Elect	5	3.65
13. Engineering. Vehicles	5	3.65
14. Leisure & Hotel	5	3.65
15. Media	5	3.65
16. Distributors	6	4.38
17. Chemicals	7	5.11
18. Household Goods and Text	7	5.11
19. Retailer, General	7	5.11
20. Transport	8	5.84
21. Printing and Paper	9	6.57
22. Support Services	9	6.57
23. Food Manufacturer	11	8.03
24. Building Materials	12	8.76
25. Engineering	18	13.14
Total	**137**	**100.00**

The models are estimated on pooled samples of firm-years, with subsampling based on the number of years, n, over which purchased goodwill is accumulated (*i.e.* from one to eight years). Hence, a firm which reports elimination of positive goodwill in 1996 and 1992 would be included as a firm-year observation once in the case of GW_1 (1996), once in the case of GW_2 (1995-6), twice in the case of GW_3 (1994-6 and 1992-4), and so on. The subsample sizes increase from 275 when n=1 to 404 when n=8, a small number of negative goodwill elimination in prior years causing the shortfall from the maximum possible sample size. A summary of the number of companies in each subsample is presented in Table 6.2; along with an industry decomposition of the sample as a whole showing the broad spread of companies involved. Details concerning accounting year-ends are also provided. As can be seen in the table which indicates that the sample largely comprises firms with December and, to a lesser extent, March year ends.

6.3 Definition of Variables

The Market value of shareholders' equity (MVE) is defined as share price (mnemonic - P) multiplied by the number of shares in issue adjusted for rights and script issues subsequent to the accounting year-end. In order to get the number of shares outstanding, earned income for ordinary (item 625) is divided by net earning per share (item 254). In this study, prices are drawn from Datastream on two different dates, at the accounting year-end and three months after the year-end. The book value of total assets (BVOA) and book values of total liabilities (BVL) are also taken from Datastream using five different Datastream variables. We add the total assets employed (item 391) to current liabilities (item 389) for the book value of total assets. For total liabilities we add current liabilities to total loan capital (item 321) and preference capital (item 306). Data on purchased goodwill[12] are drawn from Datastream (item 498, goodwill on acquisition).

For the purpose of this study, we traced back all the goodwill on acquisition for the past eight years in order to determine the cumulative figure that had been written off. As a result, the data for purchased goodwill consist of eight-year periods for each of the accounting year-ends of 1994, 1995 and 1996. To ensure that no company recorded purchased goodwill in any year, we check item 343 (goodwill and other intangibles). According to Ohlson (1993), a model that includes a stock concept of value and a flow concept of earnings might better explain the market value of a company's equity. For the purpose of this study, a measure of net income in the form of earned income for ordinary (item 625) will

[12] We validate item 498 with data set used by O'Hanlon (1997). This data was obtained directly from financial Statements.

be used as a proxy. The summary of the Datastream variables required for the regression models is presented in Table 6.3.

Table 6.3: Definition of Variables

Variables Required for Regression		Datastream Variables	Datastream Item No.
Market Value of Equity	MVE	Share Price x Ordinary Share outstanding	P 625 254
Book Value of Total Assets	BVOA	Total Asset Employed + Current Liabilities	391 389
Book Value of Total Liabilities	BVL	Current Liabilities + Total Loan Capital + Preference Capital	389 321 306
Eliminated Purchased Goodwill	GW	Goodwill on acquisition	498
Earnings	EARN	Earned for Ordinary	625
Book Value of Equity	BVE	BVOA - BVL	
Other Variables used:			
( ) Deflator: Total Sales		Total Sales	104
(ii) Exclusion of companies capitalising goodwill: Book Value of Goodwill and Other Intangibles		Goodwill and Other Intangible	343
(ii) Calculation of ordinary Shares outstanding: Earned for ordinary Net Earning per share		Earned for ordinary Net Earning per Share	625 254

Definitions of each of the Datastream variables are as follows[13]:

- Earned for Ordinary (625) - This is the net profit, after tax, minority interest and preference dividends but before any post-tax extraordinary items.
- Net Earning per Share (254) - This is the published earned for ordinary (item 625) divided by the year end number of shares. The average number of shares is adjusted for rights and script issues subsequent to the year-end.
- Total assets employed (391) - This shows the sum of all assets less all current liabilities.
- Current liabilities (389) - This includes current provisions, creditors, borrowings repayable within one year and any other current liabilities. It also includes trade accounts payable after one year.
- Total loan capital (321) - This relates to all loans repayable in more than one year.

[13] All definitions are drawn from Datastream Manual.

Loans from group companies and associates are included.

- Preference capital (306) - This shows capital that has a fixed dividend and does not participate further in the company's profit.
- Goodwill on acquisition (498) - This is the excess of consideration over the net book value of assets acquired.
- Total Sales (104) - The amount of sales of goods and services to third parties, relating to the normal activities of the company. This amount does not include Value Added Tax or any other taxes relating directly to turnover, and will be net of trade discounts.
- Goodwill and other Intangibles (343) - This includes goodwill on consolidation and represents the excess of consideration over the book value of subsidiaries' assets acquired, less any amounts subsequently written off. The item also includes patents, trade marks, copyrights, concessions, start-up costs, deferred charges, costs attributable to other years, and preliminary expenses and concessions.

6.4 Descriptive Statistics

The ratio of purchased goodwill to book value of assets is presented in Table 6.4. It can be seen that the goodwill acquired which has been written off for the past eight years was over 16% of the total assets. If we take a one year cumulative figure, the ratio was nearly 4%, which can be considered as a significant amount.

Table 6.4: Ratio of Cumulative Purchased Goodwill to Total Assets

Number of Years	Total BVA (%)
GW_1	3.25
GW_2	6.29
GW_3	7.78
GW_4	8.89
GW_5	10.27
GW_6	12.27
GW_7	14.52
GW_8	16.56

As mentioned earlier, various studies in the literature show that most of the companies in the UK choose the immediate write-off treatment. According to Rutteman (1990), in extreme cases the consolidated balance sheets of some companies started showing negative net worth following the elimination of reserves due to goodwill write-offs. Indeed, the goodwill policies of some companies made their accounts look too weak; *i.e.*, their gearing ratios became so high as to endanger covenants or to cause acute embarrassment when raising finance (Nobes, 1992).

In order to assess how material the purchased goodwill written off for the past eight cumulative years was, we present the ratio of purchased goodwill to net assets in Table 6.5. It can clearly be seen that the goodwill acquired and written off was very material and significant over net assets. The ratio is slightly above 5% for the one-year cumulative figures and nearly 35% if we consider the 8 years cumulative figures. The descriptive statistics for cumulative purchased goodwill are based on year to year figures. They can be seen in Table 6.6. The overall descriptive statistics for Market Value (*MVE*), Book Value Assets (*BVOA*), Book Value of Liabilities (*BVA*) and Earnings (*EARN*) are presented in Table 6.7. The Pearson Correlation Coefficients are presented in Table 6.8.

Table 6.5: Ratio of Cumulative Purchased Goodwill to Net Assets

Number of Years	Net Assets (%)
GW_1	6.45
GW_2	12.50
GW_3	15.45
GW_4	17.65
GW_5	20.40
GW_6	24.38
GW_7	28.84
GW_8	32.89

Table 6.6: Descriptive Statistics - Purchased Goodwill (Deflated by Sales)

Statistics	Year	GW_1	GW_2	GW_3	GW_4	GW_5	GW_6	GW_7	GW_8
Mean	1996	0.092	0.128	0.152	0.167	0.173	0.192	0.206	0.217
	1995	0.135	0.143	0.162	0.172	0.191	0.201	0.222	0.240
	1994	0.083	0.100	0.111	0.132	0.149	0.166	0.186	0.196
	Total	0.104	0.124	0.142	0.157	0.172	0.189	0.205	0.218
Std. Deviation	1996	0.216	0.295	0.322	0.327	0.325	0.337	0.336	0.334
	1995	0.414	0.396	0.401	0.401	0.408	0.406	0.406	0.408
	1994	0.241	0.242	0.242	0.260	0.260	0.261	0.268	0.269
	Total	0.310	0.322	0.331	0.336	0.338	0.341	0.342	0.343
Median	1996	0.024	0.034	0.047	0.055	0.068	0.079	0.091	0.108
	1995	0.022	0.033	0.040	0.054	0.067	0.088	0.098	0.112
	1994	0.018	0.027	0.040	0.057	0.082	0.099	0.108	0.117
	Total	0.021	0.032	0.041	0.055	0.069	0.087	0.099	0.113

Table 6.7: Descriptive Statistics - Market Value of Equity, Book Values of Assets and Liabilities, and Earnings

Variables	N	Mean	Std. Deviation	Median
GW1	275			
Market Value of Equity 1		2.680	4.125	1.513
Market Value of Equity 2		2.727	4.048	1.543
Book Value of Assets		1.082	1.069	0.836
Book Value of Liabilities		0.513	0.528	0.394
Earnings		0.180	0.439	0.086
GW2	366			
Market Value of Equity 1		2.593	3.866	1.450
Market Value of Equity 2		2.651	3.829	1.507
Book Value of Assets		1.053	1.006	0.827
Book Value of Liabilities		0.501	0.508	0.392
Earnings		0.168	0.411	0.081
GW3	391			
Market Value of Equity 1		2.722	3.977	1.506
Market Value of Equity 2		2.795	4.044	1.554
Book Value of Assets		1.079	1.090	0.837
Book Value of Liabilities		0.503	0.497	0.393
Earnings		0.173	0.425	0.082
GW4	395			
Market Value of Equity 1		2.703	3.962	1.495
Market Value of Equity 2		2.778	4.029	1.543
Book Value of Assets		1.075	1.086	0.836
Book Value of Liabilities		0.501	0.495	0.392
Earnings		0.173	0.423	0.082
GW5	399			
Market Value of Equity 1		2.695	3.944	1.495
Market Value of Equity 2		2.771	4.012	1.543
Book Value of Assets		1.073	1.082	0.828
Book Value of Liabilities		0.499	0.493	0.392
Earnings		0.172	0.421	0.082
GW6	401			
Market Value of Equity 1		2.698	3.935	1.506
Market Value of Equity 2		2.772	4.002	1.554
Book Value of Assets		1.072	1.079	0.828
Book Value of Liabilities		0.499	0.492	0.392
Earnings		0.172	0.420	0.082
GW7	402			
Market Value of Equity 1		2.692	3.932	1.501
Market Value of Equity 2		2.766	3.999	1.549
Book Value of Assets		1.070	1.078	0.828
Book Value of Liabilities		0.497	0.492	0.390
Earnings		0.171	0.420	0.082
GW8	404			
Market Value of Equity 1		2.691	3.922	1.510
Market Value of Equity 2		2.763	3.989	1.556
Book Value of Assets		1.071	1.076	0.832
Book Value of Liabilities		0.498	0.491	0.392
Earnings		0.172	0.419	0.082

Table 6.8: Sample Correlation Matrix

Accumulation Period	Sample	Variable	BVOA	BVL	GW_n	EARN
n = 1	1996: 68	MVE1	0.676	0.600	0.225	0.860
	1995: 99	MVE2	0.678	0.596	0.238	0.834
	1994: 108	BVOA		0.957	0.536	0.499
	Total: 275	BVL			0.587	0.404
		GW				-0.106
n = 2	1996: 110	MVE1	0.650	0.544	0.229	0.848
	1995: 137	MVE2	0.648	0.534	0.241	0.828
	1994: 119	BVOA		0.943	0.489	0.466
	Total: 366	BVL			0.556	0.338
		GW				-0.099
n = 3	1996: 132	MVE1	0.666	0.541	0.223	0.825
	1995: 136	MVE2	0.690	0.527	0.231	0.782
	1994: 123	BVOA		0.883	0.416	0.427
	Total: 391	BVL			0.528	0.034
		GW				-0.078
n = 4	1996: 131	MVE1	0.667	0.543	0.222	0.825
	1995: 137	MVE2	0.691	0.528	0.229	0.782
	1994: 127	BVOA		0.884	0.410	0.428
	Total: 395	BVL			0.519	0.336
		GW				-0.076
n = 5	1996: 134	MVE1	0.667	0.543	0.214	0.825
	1995: 137	MVE2	0.691	0.529	0.221	0.428
	1994: 128	BVOA		0.884	0.402	0.337
	Total: 399	BVL			0.511	0.337
		GW				-0.076
n = 6	1996: 135	MVE1	0.667	0.542	0.201	0.825
	1995: 137	MVE2	0.691	0.528	0.208	0.782
	1994: 129	BVOA		0.883	0.395	0.428
	Total: 401	BVL			0.503	0.336
		GW				-0.081
n = 7	1996: 135	MVE1	0.667	0.542	0.194	0.825
	1995: 137	MVE2	0.691	0.528	0.201	0.782
	1994: 130	BVOA		0.883	0.390	0.428
	Total: 402	BVL			0.502	0.337
		GW				-0.085
n = 8	1996: 137	MVE1	0.667	0.542	0.189	0.825
	1995: 137	MVE2	0.691	0.528	0.196	0.782
	1994: 130	BVOA		0.957	0.536	0.499
	Total: 404	BVL			0.587	0.404
		GW				-0.106

6.5 Exploratory Data Analysis

We divided the exploratory data analysis (EDA) into four main sections. Firstly, we will discuss the overall perspective of the market value and book value relationship in the spirit of Kane and Unal (1990) for the UK market from 1980 to 1996. Based on this analysis, we will incorporate the growth of goodwill accounting (Higson, 1998) from 1976 to 1991 in order to give some early indication of the relationship between market value, book value and goodwill.

Secondly, we will run the regression using the same model employed in this thesis for "the left-over" samples. This sample includes companies that do not have any purchased goodwill or recorded purchased goodwill in the balance sheets. The results from this analysis will be compared with the main results.

Thirdly, we will perform variance analysis for each of variables to determine whether any of the variables in the sample size are statistically significantly different due to the different year factors. Finally we will discuss the econometric issues.

6.5.1 Market Value and Book Value Analysis

The empirical analysis of this study is based on the market value and book value relationship. As introduced by Landsman (1986), this analysis can be performed by using the balance sheet identity (accounting figures):

$$MVE_{jt} = a_0 + a_1 BVE_{jt} + e_{jt}$$

where

MVE_{jt} = Market value of shareholders' equity of firm j in year t

BVE_{jt} = Book value of shareholders' equity of firm j in year t

e_{jt} = error term

Kane and Unal (1990) believe that hidden capital exists whenever the accounting measure of a firm's net worth diverges from its economic value. They identify two sources of hidden capital: accountants' misvaluations of portfolio positions that accounting principles designate as on-balance-sheet items and the systematic neglect of off-balance-sheet sources of value that these principles do not permit to be formally booked. Using the above model ($MVE_{jt} = a_0 + a_1 BVE_{jt} + e_{jt}$), they estimate both forms of hidden capital.

The model's coefficients describe the *de facto* deceptiveness of Generally Accepted Accounting Principles (GAAP). Unless both $a_0 = 0$ and $a_1 = 1$, the accounting or book value of a firm's capital represents a biased estimate of the market value of stockholder equity. If the estimated intercept is significantly positive (negative), unbookable assets and liabilities serve as a net source of (drain on) institutional capital, and this problem exist in both directions. The present study estimates a_0 *and* a_1 using the same model for UK firms for 16 years, from 1981 to 1996. The main objective of this analysis is to see whether there was any pattern, in particular related to the unbookable assets and liabilities. This interest is relevant to the UK environment, especially the discussion of accounting for goodwill that has been eliminated in the year of acquisition, which might influence the coefficient of intercept over times.

Table 6.9 reports the result of the analysis. The regressions show that the accounting representations of the economic performance of all firms are illusory. For all the years, the *Wald test* of restrictions imposed on parameters rejects the combined $a_0 = 0$ and $a_1 = 1$, condition necessary for recorded equity to be an unbiased estimate of market value. The values for a_1 are significant at the 5% level throughout 16 years under study. In 11 out of the16 years under study, the coefficient shows a significant premium ($a_1 > 1$). During the 1981-86 period the coefficient shows a significant premium ranging from 4.978 (1984) to 1.074(1986). However the coefficient drops significantly below unity for five years from 1987 to 1992 (except for 1989 when the coefficient is 1.429). From 1993 until 1996, the coefficient raises significantly above unity, ranging from 1.812 (1994) to 2.982 (1995).

The most interesting result is related to the intercept value. Deviations of a_0 from zero show a definite time pattern. Before 1985, the market value of unbookable equity is negative and significant. This suggests that off-balance-sheet items serve as a drain on capital value before 1985 and becomes positive but insignificant in 1985. During the 1986-92 period, the intercept value becomes positive and highly significant (except for 1989, which is significant at the 10 percent level). We plot the intercept values over time in Figure 6.1. We might conclude that during the 1986-92 period, unbookable equity is relatively very high and significant compared to the 1981-85 period. One major reason for this situation is that during the 1980's, acquisitions had been increasingly common as a means of growth. As the relative size of acquisition grew, so too did both the amount and the proportion of the purchase price assigned to goodwill that was eliminated straight away to the reserves account. Higson (1998) describes the accounting goodwill in UK take-overs between 1976 and 1992. He documents the dramatic growth of goodwill in the mid-1980s (Figure 6.2)

which are consistent with Russell *et al.* (1989) and Bryer (1995). At face value, a comparison of Figure 6.1 and 6.2 might result in the conclusion some relationships exist between the intercept value (Figure 6.1) and the growth of goodwill (Figure 6.2). This issue will be discussed further when we discuss the results in Chapter 7.

Table 6.9: Market Value to Book Value Regressions: Time-varying parameters

Year	a_0	a_1	N	Adj. R^2	Wald Test CHSQ	Wald Test *p*-Value
1981	-1.259***	3.822***	187	0.866	30.853	0.000
white - *t*	-5.536	7.391				
1982	-0.364***	1.900***	192	0.846	27.051	0.000
white - *t*	-4.680	11.066				
1983	-1.542***	4.559***	201	0.884	27.975	0.000
white - *t*	-5.170	6.630				
1984	-1.630***	4.978***	211	0.847	15.030	0.001
white - *t*	3.652	4.840				
1985	0.148	1.498***	217	0.445	48.583	0.000
white - *t*	1.504	6.383				
1986	0.419***	1.074***	222	0.338	97.466	0.000
white - *t*	7.599	9.745				
1987	0.785***	0.719***	240	0.661	138.684	0.000
white - *t*	10.328	14.890				
1988	0.638***	0.785***	256	0.548	70.227	0.000
white - *t*	8.043	5.382				
1989	0.675*	1.429**	274	0.477	25.478	0.000
white - *t*	1.825	2.196				
1990	0.480***	0.865***	286	0.528	29.421	0.000
white - *t*	5.104	5.953				
1991	0.498***	0.823***	294	0.644	78.751	0.000
white - *t*	6.908	8.213				
1992	0.707***	0.562**	303	0.246	95.382	0.000
white - *t*	6.478	3.190				
1993	0.001	2.159***	315	0.526	77.628	0.000
white - *t*	0.005	4.536				
1994	0.295**	1.812***	337	0.934	75.796	0.000
white - *t*	2.180	12.689				
1995	-0.273	2.982***	348	0.654	45.410	0.000
white - *t*	0.865	5.997				
1996	0.538	2.131***	360	0.401	95.303	0.000
white - *t*	1.178	2.724				

Notes: The table indicates significance at 1% (***), 5% (**) and 10% (*) levels.
Model: $MVE_{jt} = a_0 + a_1 BVE_{jt} + e_{jt}$:Parameter Restrictions: $a_0 = 0$ and $a_1 = 1$

Figure 6.1:Intercept Value (1981-96)
Model: $MVE_{jt} = a_0 + a_1 BVE_{jt} + e_{jt}$

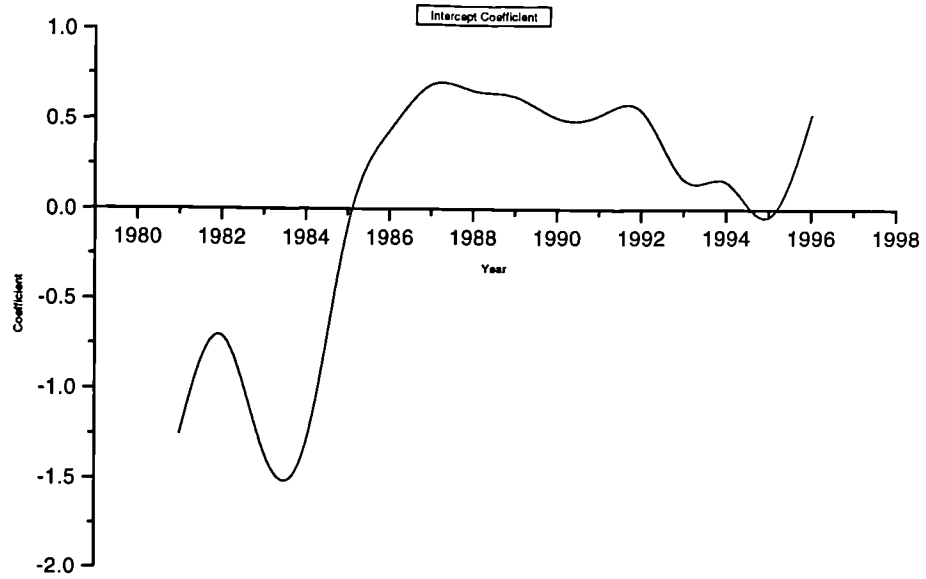
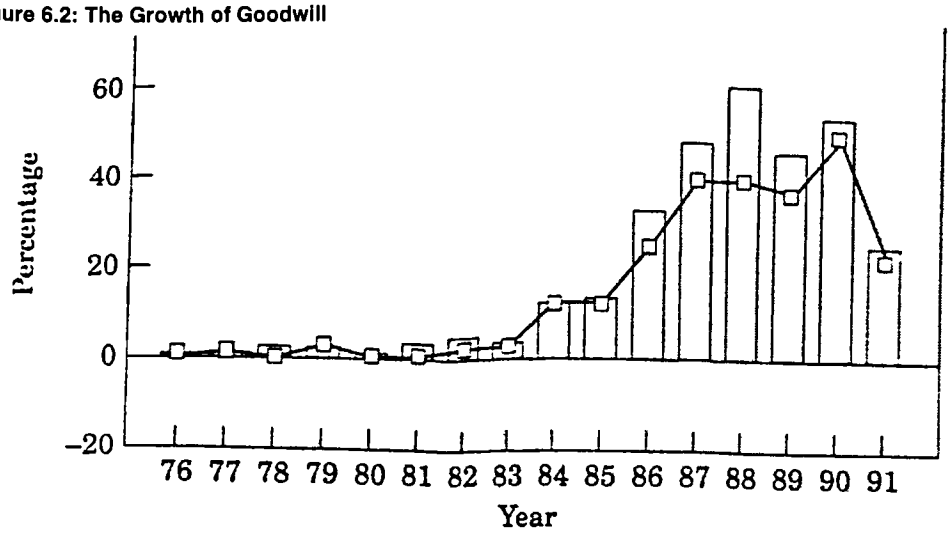


Figure 6.2: The Growth of Goodwill



Note: This figure plots the annual equal-weighted average ratio of the accounting goodwill in each take-over to the book net worth of the acquirer at its previous accounting year end, with the bottom and top quartile excluded. The solid line shows the median (Scanned from Higson, 1998)

6.5.2 Market Value and Book Value Analysis (Company without Goodwill)

The main purpose of this study is to determine whether purchased goodwill has value-relevance to investors when they determine the value of a company. The criteria for selecting our sample were: (i) to include any listed company, except firms in the banking sector, that recorded the elimination of goodwill on acquisition in any year from 1994 to 1996; (ii) to exclude any company which recorded an intangible asset in the balance sheet during the previous eight years, thus avoiding companies which changed their accounting policy on the treatment of purchased goodwill. Therefore, the excluded companies are those that did not make any acquisitions during the period under study or companies that recorded purchased goodwill on the face of balance sheet. It is interesting to assess whether these companies have some special characteristic that can be compared with our main results presented in Chapter 7. For the purpose of comparison we regress the samples using the basic model introduced in Chapter 5 and mentioned earlier in this chapter but without purchased goodwill. The model is as follows:

$$MVE_{jt} = a_0 + a_1 BVNA_{jt} + a_2 EARN_{jt} + e_{jt}$$

where:

MVE_{jt} = Market value of shareholders' equity of firm j in year t

$BVNA_{jt}$ = Book value of shareholders' equity of firm j in year t

$EARN_{jt}$ = Net Profit after tax of firm j in year t

e_{jt} = error term

Table 6.10: Market Value to Book Value Regressions: Fixed Effects
Based on White's Heteroscedasticity adjusted S.E.'s

Dependent variable is MVE
623 observations used for estimation from 1 to 623

Regressor	Coefficient	Standard Error	T-Ratio[Prob.]
Intercept	0.1879	0.1484	1.2666[.206]
BVNA	1.3557	0.3246	4.1758[.000]
EARN	5.0791	2.6166	1.9411[.053]

$R^2 = 0.4567$

Model: $MVE_{jt} = a_0 + a_1 BVNA_{jt} + a_2 EARN_{jt} + e_{jt}$

Table 6.10 reports this result. The intercept value is positive but not statistically significant. The coefficients of *BVNA* (1.3557) and *EARN* (5.0791) are positive and statistically significant at 1% and 6% respectively. The most interesting result is that the intercept value is consistent with the overall analysis presented in Table 6.9. As the sample run in this model is without the elimination of purchased goodwill in the year of acquisition, and if the arguments of Kane and Unal (1990) are valid, the coefficient value of the intercept is justifiable. This result will be discussed again in Chapter 7.

6.5.3 Analysis of Variance

We mentioned previously that the models in this study are estimated on pooled samples of firm-years from 1994 - 96. We next perform analysis of variance in order to see whether each of the variables in the sample size exhibits a statistically significant difference due to the different year factors. Table 6.11 reports results from this analysis which show that none of the variables are statistically significantly different for the three years under study.

Table 6.11: Analysis of Variance

Source/Variable	DF	BVOA	BVL	GW_n	EARN
GW_1					
Adj MS - Year	2	0.7040	0.2717	0.0778	0.0281
Adj MS - Error	272	1.1460	0.2790	0.0960	0.1937
F-test		0.6100	0.9700	0.8100	0.1400
p-Value		0.5410	0.3790	0.4660	0.8650
GW_2					
Adj MS - Year	2	0.4880	0.1343	0.0619	0.0212
Adj MS - Error	363	1 0140	0.2588	0.1040	0.1699
F-test		0.4800	0.5200	0.6000	0.1200
p-Value		0.6180	0.5950	0.5520	0.8830
GW_3					
Adj MS - Year	2	0 2380	0.1326	0.0929	0.0047
Adj. MS - Error	388	1.1930	0.2474	0.1093	0.1816
F-test		0.2000	0.5400	0.8500	0.0300
p-Value		0.8190	0.5860	0.4280	0.9740
GW_4					
Adj MS - Year	2	0.3020	0.1468	0.0601	0.0030
Adj MS - Error	392	1.1850	0.2456	0.1131	0.1798
F-test		0.2500	0.6000	0.5300	0.0200
p-Value		0.7750	0.7750	0.5880	0.9840
GW_5					
Adj MS - Year	2	0.3120	0.1541	0.0600	0.0038
Adj MS - Error	396	1.1740	0.2434	0.1142	0.1781
F-test		0.2700	0.6300	0.0200	0.2700
p-Value		0.7670	0.5310	0.9790	0.7670
GW_6					
Adj MS - Year	2	0.3160	0.1641	0.0552	0.0043
Adj MS - Error	398	1.1690	0.2424	0.1165	0.1773
F-test		0.2700	0.6800	0.4700	0.0200
p-Value		0.7630	0.5090	0.6230	0.9760
GW_7					
Adj. MS - Year	2	0.3400	0.1718	0.0442	0.0038
Adj. MS - Error	399	1.1660	0.2419	0.1173	0.1769
F-test		0.2900	0.7100	0.3800	0.0200
p-Value		0.7470	0.4920	0.6860	0.9790
GW_8					
Adj. MS - Year	2	0.3400	0.1696	0.0654	0.0025
Adj. MS - Error	401	1.1610	0.2409	0.1177	0.1765
F-test		0.2900	0.7000	0.5600	0.0100
p-Value		0.7460	0.4950	0.5740	0.9860

6.5.4 Econometric Issues

The discussion in Chapter 5 touched on several potential econometric problems associated with estimation of the model. These problems are related to the procedure for the estimation of the parameters of a population regression line provided by the ordinary least squares (OLS) method. A number of assumptions about the variables and the error term of OLS must be satisfied in order to ensure that the interpretations of the regression estimates are valid. Five major assumptions will be discussed in this section: normality, serial correlation, linearity, heteroscedasticity and multicollinearity assumptions.

According to Gujarati (1995), under these assumptions, the OLS estimators of the regression coefficients are the best linear unbiased estimator (BLUE). Therefore, the results presented in the next chapter depend on whether or not our regression model has satisfied the standard assumptions of the OLS estimation. All the calculations, and diagnostic tests for the validity of these assumptions were carried out using MICROFIT, an interactive econometric software package introduced by Pasaran and Pasaran (1997). These tests employed the following model (mentioned in Section 6.2), where MVE is based on two dates [three months after year-end (model 1) and year-end (model 2)]:

$$MVE_{jt} = a_0 + a_1 BVOA_{jt} - a_2 BVL_{jt} + a_3 GWn_{jt} + a_4 EARN_{jt} + e_{jt}$$

6.5.4.1 Serial Correlation Assumption

One of the important assumptions of the classical linear model is that there is no autocorrelation or serial correlation among the disturbances ε_i entering into the population regression function; *i.e.*,

$$E(\varepsilon_i, \varepsilon_j) = 0 \text{ where } i \neq j$$

Serial Correlation is defined by Kendall and Buckland (1971) as "correlation between members of series of observations ordered in time (as in time series data) or space (as in cross-sectional data). If serial correlation is present then the usual OLS estimators, although unbiased, no longer exhibit minimum variance among all linear unbiased estimators. In short, they are no longer BLUE (Gujarati, 1995). In the MICROFIT software package, the Langrange multiplier (LM) test statistics are included in the diagnostic test table, and is

applicable to models with and without lagged dependent variables. The LM is appropriate for testing the hypothesis; that the disturbances are serially uncorrelated against the alternative hypothesis; that they are autocorrelated of order p (either as autoregressive or moving average processes). Symbolically;

$$u_t = p_1 u_{t-1} + p_2 u_{t-2} + p_3 u_{t-3} + \ldots\ldots p_p u_{t-p} + e_t$$

where e_t is a purely random disturbance term with zero mean and constant variance. The null hypothesis H_0 is: $p = p_2 = p_3 = \ldots p_p = 0$, that all autoregressive coefficients are simultaneously equal to zero; that is, there is, no autocorrelation of any order. Table 6.12 reports the LM statistics test from the regression of the basic model. In all cases for both models, the null hypotheses of no serial correlation was not rejected.

Table 6.12: Diagnostic Test for the Serial Correlation Assumption

Cum. Goodwill	Model 1		Model 2	
	CHSQ	p-value	CHSQ	p-value
GW 1	0.9103	0.3400	1.3699	0.2420
GW 2	0.4563	0.4990	1.0609	0.3030
GW 3	1.1761	0.2780	1.6604	0.1980
GW 4	0.8100	0.3680	1.7816	0.1820
GW 5	0.6980	0.4130	1.5208	0.2170
GW 6	0.2069	0.6490	0.8561	0.3550
GW 7	0.2137	0.6440	0.8684	0.3510
GW 8	0.2671	0.6050	0.8411	0.3590

*Langrange Multiplier test of residual serial correlation
Model: $\mathbf{MVE_{jt} = a_0 + a_1 BVOA_{jt} + a_2 BVL_{jt} + a_3 GWn_{jt} + a_4 EARN_{jt} + e_{jt}}$

6.5.4.2 Linearity Assumption

The classical linear regression model assumes that the relationship between the dependent and independent variables is correctly specified by means of a linear functional form. The linearity assumption for the basic models ($MVE_{jt} = a_0 + a_1 BVOA_{jt} + a_2 BVL_{jt} + a_3\ GWn_{jt} + a_4 EARN_{jt} + \varepsilon_{jt}$) is tested using a general test of specification error called RESET (Regression Specification Error Test) proposed by Ramsey (1969). The RESET test statistic follows the Chi-square distribution with 1 degree of freedom $\chi^2_{1,\alpha}$ under the null hypothesis that the true model is linear at significance level α. If the RESET statistics value exceeds the critical value at the chosen level of significance, then the regression model is misspecified. In the MICROFIT software package, the diagnostic test for the linearity assumption is reported as a part of the standard results using RESET. Table 6.13 reports the RESET statistics from the regression of the basic model. Just one case for the two models, the null hypotheses that the true model is linear is rejected at the 1-% level of significance.

Table 6.13: Diagnostic Test for the Linearity Assumption

Cum. Goodwill	Model 1		Model 2	
	CHSQ	p-value	CHSQ	p-value
GW 1	10.3978	0.0010	4.9587	0.0260
GW 2	0.2360	0.6270	0.4637	0.4960
GW 3	0.4634	0.4960	0.2360	0.6270
GW 4	0.7441	0.3880	0.4774	0.4900
GW 5	1.0427	0.3070	0.7112	0.3990
GW 6	0.9494	0.3300	0.6586	0.4170
GW 7	0.8933	0.3450	0.6047	0.4370
GW 8	0.5799	0.4460	0.3696	0.5430

*Ramsey's RESET test using the square of the fitted values
Model: $MVE_{jt} = a_0 + a_1BVOA_{jt} + a_2BVL_{jt} + a_3GWn_{jt} + a_4EARN_{jt} + e_{jt}$

6.5.4.3 Heteroscedasticity Assumption

One of the major econometric problems when estimating cross-sectional valuation models is the problem of heteroscedastic disturbances that arises from the fact that large (small) firms tend to produce large (small) disturbances. According to Gujarati (1995), if heteroscedasticity is present, then the usual OLS estimators, although unbiased, no longer exhibit minimum variance among all linear unbiased estimators. In short, they are no longer BLUE.

Previous researchers such as Landsman (1986), Gopalakrishnan and Sugrue (1993), Kane and Unal (1993), Shevlin (1991), McCarthy and Schneider (1995), Jennings *et al.* (1996) mentioned problems of heteroscedasticity in their studies (see Chapter 4). According to Landsman (1986), to produce more efficient estimates, one can, in principle, transform the variables in a particular regression model to produce a constant (but still unknown) variance. One common deflation technique involves transforming the variables by deflating by the independent variable. This procedure implies that the true error variance is proportional to the square of the independent variable. Studies by McCarthy and Schneider (1995) and Landsman (1986) used total sales as a deflator. However, Landsman, instead of simply deflating by sales, generalises a technique by Park (1966) to deflate the variables.

On the other hand, Shevlin (1991) and Jennings *et al.* (1996) used the book value of shareholders' equity and total assets, respectively, as the deflators. All the elements of data previously discussed are deflated by total sales to reduce the heteroscedasticity problems. Because heteroscedasticity has been a major problem in previous studies, it is necessary to test the heteroscedasticity assumption for the basic models in order determine whether the variance of the residuals in the basic models is constant throughout the sample.

Symbolically,

$$\text{Var}(\varepsilon_t) = \sigma^2 \quad t = 1, 2...n$$

In the MICROFIT software package, the diagnostic test for heteroscedasticity is reported as a part of the standard results using the Langrange Multipliers (LM) test. The test statistic is performed by regressing the square of the residual ε_t^2 as the dependent variable on the predictive values, MVE_{jt}, symbolically,

$$\hat{\varepsilon}_{jt}^2 = \beta_0 + \beta_1 \hat{MVE}_{jt} + u_{jt}$$

We then calculate LM = nR^2 which is $\chi^2_{1,\alpha}$ with 1 degrees of freedom under the null hypothesis that the error term is homoscedastic where n and R^2 are the sample size and coefficient of determination receptively, obtained from the above regression. Table 6.10 reports the heteroscedasticity test statistics, which are $\chi^2_{1,\alpha}$ with 1 degree of freedom under the null hypothesis. The null hypothesis that the variance of the residuals of the model is constant throughout the whole sample is rejected at the 1-% level of significance for all cases for both models. Thus, there is evidence that the variance of the residuals is not constant in the sample.

Table 6.14: Diagnostic Test for Heteroscedasticity Assumption

Cum. Goodwill	Model 1		Model 2	
	CHSQ	p-value	CHSQ	p-value
GW 1	17.6566	0.0000	17.1427	0.0000
GW 2	27.5067	0.0000	21.3814	0.0000
GW 3	32.1299	0.0000	24.8916	0.0000
GW 4	30.5309	0.0000	24.1302	0.0000
GW 5	30.0805	0.0000	24.2026	0.0000
GW 6	28.3658	0.0000	22.9599	0.0000
GW 7	27.7199	0.0000	22.5598	0.0000
GW 8	27.3530	0.0000	22.4042	0.0000

*Ramsey's RESET test using the square of the fitted values
Model: $MVE_{jt} = a_0 + a_1 BVOA_{jt} + a_2 BVL_{jt} + a_3 GWn_{jt} + a_4 EARN_{jt} + e_{jt}$

6.5.4.4 Multicollinearity Assumption

Another major assumption of the classical regression model is that there is no multicollinearity among the regressors included in the regression model. According to Gujarati (1995), the term multicollinearity is used where the variables (regressors) are intercorrelated (perfect or non-perfect). Symbolically, it can be written as follows:

$$\lambda_1 X_1 + \lambda_2 X_2 + \ldots\ldots\ldots \lambda_k X_k + v_i = 0$$

where v_i is a stochastic error term.

If multicollinearity is perfect, the regression coefficients of the X variables are indeterminate and their standard errors are infinite. If multicollinearity is less than perfect, the regression coefficients, although determinate, possess large standard errors (in relation to the coefficients themselves), which means that the coefficients cannot be estimated with great precision or accuracy. Therefore, the presence of a severe multicollinearity problem could result in drawing misleading inferences from sample *t*-statistics. The simple correlation (based on the Pearson product moment coefficient of correlation) of BVOA and BVL, as presented in Table 6.5, exceed 0.88. Further tests by using Spearman's p (rank correlation coefficient) confirm that BVOA and BVL are highly correlated. Apparently, the correlation coefficients can be considered high enough to create problems of multicollinearity.

Table 6.15: Spearman's Rank Correlation

Cumulative Goodwill	Coefficients Correlation	*P*
GW 1	0.9574	0.000
GW 2	0.9429	0.000
GW 3	0.8834	0.000
GW 4	0.8837	0.000
GW 5	0.8836	0.000
GW 6	0.8834	0.000
GW 7	0.8834	0.000
GW 8	0.8834	0.000

(Rank correlation coefficients between BVOA and BVL)

6.5.4.5 Normality Assumption

Under the normality assumption, the error term (ε_{jt}) follows a normal distribution for all j. We were able to establish that the OLS estimators of the regression coefficients follow the normal distribution, that $(n - k)$ $(\hat{\sigma}^2 / \sigma^2)$ has the χ^2 distribution and that one could use the *t* and *F* tests to test various statistical hypotheses regardless of the sample size. However, according to Gujarati (1995), the normality assumption is not essential if the objective is merely estimation. A commonly quoted justification of least-squares estimation, called the *Gauss-Markov theorem*, states that the least-squares coefficients are the most efficient unbiased estimator; that is, linear functions of the observation y_i. This result depends on assumptions of linearity, constant error variance, and independence, but does not require normality (Fox, 1991).

Furthermore, if the residuals are not normally distributed, then the *t* and *F*-tests are only valid asymptotically in large samples. The sample sizes in this study vary from 275 to 404, which can be considered large. As a result, the test for normality is not absolutely necessary for these sizes of sample. However, the results of this test are also reported. In the MICROFIT software package, the diagnostic test for the normality assumption is reported as a part of the standard results based on a test of skewness and kurtosis of residuals. Table 6.6 reports the diagnostic test results for the normality assumption from the regression of the basic model. In all cases, the null hypothesis that the residuals in the model are normally distributed is rejected.

Table 6.16: Diagnostic Test for the Normality assumption

Cum. Goodwill	Model 1		Model 2	
	CHSQ	p-value	CHSQ	p-value
GW 1	5064.8	0.0000	2678.8	0.0000
GW 2	4956.5	0.0000	3363.5	0.0000
GW 3	3719.0	0.0000	2488.9	0.0000
GW 4	3992.0	0.0000	2641.3	0.0000
GW 5	4189.7	0.0000	2720.9	0.0000
GW 6	4347.4	0.0000	2774.5	0.0000
GW 7	4446.8	0.0000	2825.0	0.0000
GW 8	4513.7	0.0000	2861.6	0.0000

*Based on a test of skewness and kurtosis of residuals

Model: $MVE_{jt} = a_0 + a_1 BVOA_{jt} + a_2 BVL_{jt} + a_3 GWn_{jt} + a_4 EARN_{jt} + e_{jt}$

6.6 Summary

This chapter has described the source, sample and selection of the data and has also presented an exploratory data analysis to test whether the data sets used in this study satisfy a number of assumptions under the OLS method. We tested five major assumptions in this chapter: normality, serial correlation, linearity, heteroscedasticity and multicollinearity assumptions. We discovered that there are major problems of heteroscedasticity and multicollinearity. The normality test also showed that the distribution of the residuals is not normal. These problems will be discussed again (along with the techniques used to deal with these issues) when we present the empirical results in the next chapter.

CHAPTER 7

MARKET VALUE, BOOK VALUE AND GOODWILL
Results and Interpretations

7.1 Introduction

The two previous chapters have discussed the research design, method and overview of the data employed in this study. This chapter will present the empirical results of the study. Just for a brief refreshing introduction we would like, once again, to highlight the three research questions and the model employed in this study.

Research Question 1

"Is purchased goodwill considered as an important element when determining a firm's market value?"

Research Question 2

"If the market perceives purchased goodwill as an important element when determining a firm's market value, how does the market perceive purchased goodwill in relation to all other assets?"

Research Question 3

"Does purchased goodwill decline in value in such a way that the impairment test required by FRS 10 is relevant?"

Multiple regression analysis is used to test the theoretical model in Equation (6). The empirical model is:

$MVE_{jt} = a_0 + a_1 BVOA_{jt} - a_2 BVL_{jt} + a_3 GWn_{jt} + a_4 EARN_{jt} + e_{jt}$

where

MVE_{jt} = Market value of shareholders' equity of firm j in year t

$BVOA_{jt}$ = Book value of the assets of firm j in year t

BVL_{jt} = Book value of the liabilities of firm j in year t

GWn_{jt} = Cumulative acquired goodwill of firm j in year t that has been written off to reserves

$EARN_{jt}$ = Net Profit after tax of firm j in year t

The organisation of the empirical results is as follows. Section 7.2 provides the results to the question of whether purchased goodwill that has been written off in the year of acquisition is of value-relevance to investors when they value a company. These results are presented after taking into consideration the econometric issues discussed earlier. Section 7.3 presents the Wald's test to determine the relationship between purchased goodwill and other assets. Section 7.4 provides evidence as to whether purchased goodwill declines in value, in response to the third research question. Section 7.5 briefly discusses value-relevance of off-balance sheet information and Section 7.6 concludes.

7.2 Value - Relevance of Purchased Goodwill

To test the value - relevance of purchased goodwill which has been written-off in the year of acquisition, Tables 7.1 and 7.2 provide estimates from the models mentioned in Section 7.1. We focus on a_3, the slope coefficient for purchased goodwill that has been written off during the year of acquisition. If the market places value on the reported goodwill of a firm, then purchased goodwill should be significant and positively correlated with the firm's market value. Tables 7.1 (Model 1) and 7.2 (Model 2) list the summary statistics from the basic regression models that have defined the market value of shareholders' equity (MVE) as the share price times the number of shares outstanding three months after the year-end and also as the share price at year-end. The reason for using the share price three months after the year-end is based on the assumption that all the information contained in this study is released to the market via annual financial reports. However, we believe that some of the information is already available to the market earlier than that date. Thus, the main purpose of using both share prices is to ensure that the results presented in this chapter are more robust.

There are several prominent general findings associated with the results appearing in these tables. The key findings now can be summarised as follows; first, BVOA, BVL, GW and EARN consistently have coefficients of either above 1 or above -1 in absolute value for the MVE which is calculated using share prices three months after the year-end. The only difference is in Model 2 where BVOA and BVL shows that the absolute value is below 1 for the first year and -1 for the first and two years of cumulative goodwill. All the variables have coefficients of the correct sign. This finding is consistent with the hypothesis that the empirical version of BVOA and BVL may systematically understate the true values of the theoretical variables. According to Landsman (1986), the book value historical cost

measures of total assets and total liabilities may systematically understate the market value for a variety of reasons.

These include: (a) book value measures do not include measures of off-balance assets and liabilities; and (b) book value measures do not adequately capture the magnitude of the many intangible assets owned by the firm. Although the model allows purchased goodwill as a separate variable, non-purchased goodwill remains unknown. These arguments are completely similar to those of Kane and Unal (1990), (see Chapter 6) who believe that the accountants' misvaluations of portfolio positions that accounting principles designate as on-balance-sheet items and also the systematic neglect of off-balance-sheet sources of value that these principles do not permit to be formally booked become sources of hidden capital.

Second, the intercept term (a_0) is significantly non-zero for the first three years of cumulative goodwill at the 5% level. Normally, the presence of a statistically significant intercept term for the first three years of cumulative goodwill suggests that the empirical intercept may be picking up part of the explanatory power of some omitted variables. Another possible explanation might be due to the fact that the intercept may include an amount of acquired goodwill that was not included in the first three years of cumulative goodwill. According to Kane and Unal (1990), the intercept of this model can be interpreted as a hidden reserve, and in the present study, it seems that this occurs in the firms that are most likely to have written off purchased goodwill. Our findings show that the intercept decreases in absolute value and becomes zero when the cumulative goodwill increases.

The most important feature of this finding concerns a_3, the slope coefficient for purchased goodwill that has been written off during the year of acquisition. The coefficient is significantly non-zero for both models. The absolute value is above 1 and decreases when the cumulative goodwill increases. At face value, these findings suggest that the market takes into consideration the amount of goodwill write-off in its determination of the company's valuation. One could argue that this value does not diminish for at least two years after acquisition has taken place. However, there are several potential econometric problems associated with estimation of the above model. The exploratory data analysis in Chapter 6 showed evidence of two major econometric problems in this model, namely heteroscedasticity and multicollinearity. We will now discuss the techniques we have used to deal with these issues and also presents the extension results.

Table 7.1: Basic Model Regression Summary Statistics (Share Price 3 months after year-end)

Predicted Sign	a_0 ?	a_1 +	a_2 -	a_3 +	a_4 +	Adj. R^2	N
GW_1	0.452**	1.266***	-1.351*	3.177***	7.063***	0.815	275
OLS - t	2.934	3.349	-1.844	6.682	21.662		
p-Value	0.004	0.001	0.066	0.000	0.000		
GW_2	0.402**	1.473***	-1.671***	2.954***	6.966***	0.810	366
OLS - t	3.138	4.967	-2.965	8.402	25.474		
p-Value	0.002	0.000	0.003	0.000	0.000		
GW_3	0.286**	2.563***	-3.329***	2.559***	6.099***	0.809	391
OLS - t	2.220	13.960	-8.016	7.603	24.899		
p-Value	0.027	0.000	0.000	0.000	0.000		
GW_4	0.232*	2.552***	-3.244***	2.414***	6.073***	0.808	395
OLS - t	1.815	13.921	-7.859	7.401	24.857		
p-Value	0.070	0.000	0.000	0.000	0.000		
GW_5	0.192	2.550***	-3.165***	2.249***	6.038***	0.805	399
OLS - t	1.506	13.889	-7.675	6.997	24.693		
p-Value	0.133	0.000	0.000	0.000	0.000		
GW_6	0.157	2.547***	-3.092***	2.084***	6.010***	0.802	401
OLS - t	1.224	13.825	-7.491	6.572	24.469		
p-Value	0.222	0.000	0.000	0.000	0.000		
GW_7	0.119	2.558***	-3.101***	2.049***	6.009***	0.802	402
OLS - t	0.930	13.873	-7.485	6.480	24.436		
p-Value	0.353	0.000	0.000	0.000	0.000		
GW_8	0.086	2.569***	-3.122**	2.055***	5.999***	0.801	404
OLS - t	0.671	13.941	-7.540	6.545	24.421		
p-Value	0.615	0.000	0.000	0.000	0.000		

Notes: The table indicates significance at 1% (***), 5% (**) and 10%(*) levels.
Model: $MVE_{jt} = a_0 + a_1BVOA_{jt} + a_2BVL_{jt} + a_3GWn_{jt} + a_4EARN_{jt} + e_{jt}$

Where:
MVE_{jt} = Market value of shareholders' equity of firm j in year t
$BVOA_{jt}$ = Book value of the assets of firm j in year t
BVL_{jt} = Book value of the liabilities of firm j in year t
GWn_{jt} = Cumulative acquired goodwill of firm j in year t for n year
$EARN_{jt}$ = Net Profit after tax of firm j in year t
e_{jt} = error term

Table 7.2: Basic Model Regression Summary Statistics (Share Price as at year-end)

Predicted Sign	a_0 ?	a_1 +	a_2 -	a_3 +	a_4 +	Adj. R^2	N
GW_1	0.379**	0.813**	-0.529	3.159***	7.598***	0.848	275
OLS - t	2.657	2.328	-0.781	7.188	25.213		
p-Value	0.008	0.021	0.436	0.000	0.000		
GW_2	0.317**	1.047***	-0.808	2.784***	7.342***	0.833	366
OLS - t	2.621	3.737	-1.516	8.377	28.410		
p-Value	0.009	0.000	0.130	0.000	0.000		
GW_3	0.253**	1.749***	-1.808***	2.380***	6.662***	0.827	391
OLS - t	2.101	10.182	-4.655	7.559	29.073		
p-Value	0.036	0.000	0.000	0.000	0.000		
GW_4	0.201*	1.738***	-1.733***	2.251***	6.640***	0.826	395
OLS - t	1.686	10.139	-4.488	7.381	29.058		
p-Value	0.093	0.000	0.000	0.000	0.000		
GW_5	0.166	1.737***	-1.665***	2.108***	6.609***	0.824	399
OLS - t	1.391	10.124	-4.319	7.018	28.921		
p-Value	0.165	0.000	0.000	0.000	0.000		
GW_6	0.136	1.738***	-1.604***	1.949***	6.583***	0.821	401
OLS - t	1.133	10.088	-4.156	6.575	28.663		
p-Value	0.258	0.000	0.000	0.000	0.000		
GW_7	0.101	1.748***	-1.613***	1.918***	6.585***	0.821	402
OLS - t	0.840	10.141	-4.164	6.488	28.623		
p-Value	0.401	0.000	0.000	0.000	0.000		
GW_8	0.071	1.758***	-1.628***	1.915***	6.572***	0.820	404
OLS - t	0.587	10.203	-4.206	6.523	28.615		
p-Value	0.558	0.000	0.000	0.000	0.000		

Notes: The table indicates significance at 1% (***), 5%(**) and 10%(*) level of confidence.
Model: $MVE_{jt} = a_0 + a_1 BVOA_{jt} + a_2 BVL_{jt} + a_3 GWn_{jt} + a_4 EARN_{jt} + e_{jt}$

Where:
MVE_{jt} = Market value of shareholders' equity of firm j in year t
$BVOA_{jt}$ = Book value of the assets of firm j in year t
BVL_{jt} = Book value of the liabilities of firm j in year t
GWn_{jt} = Cumulative acquired goodwill of firm j in year t for n year
$EARN_{jt}$ = Net Profit after tax of firm j in year t
e_{jt} = error term

7.2.1 Heteroscedasticity

One potential econometric problem when estimating cross-sectional valuation models is the problem of heteroscedasticity. Small companies tend to produce small disturbance and large ones, large disturbance. If the models are estimated in undeflated form, this also potentially leads to another scale-related problems, scale bias. To address these issues we transformed the entire variable by deflating by means of the independent variable; in this case total sales in order to produce a constant (but still unknown) variance. By using this 'deflation technique' we hope to remove the scale bias and the heteroscedasticity problems. This technique is not new in the accounting literature but has already been employed by the previous researchers such as Landsman (1986), Gopalakrishnan and Sugrue (1993), Shevlin (1991), McCarthy and Schneider (1995), and Jennings *et al.* (1996).

All the elements of data for the basic models reported in the previous section are deflated by total sales to reduce the heteroscedasticity problems. We have already tested the heteroscedasticity assumption for the basic models in the Chapter 6. Table 6.10 reports the heteroscedasticity test statistics. The null hypothesis that the variance of the residuals of the model is constant throughout the whole sample is rejected at the 1% level of significance for all cases for the both models. Thus, there is evidence that the variance of the residuals in not constant in the sample. The standard testing procedure reported in Tables 7.1 and 7.2 might be very misleading although the heteroscedasticity does not destroy the unbiasedness and consistency properties of the OLS estimators (Gujarati, 1995).

White (1980) established a procedure, which is known as the heteroscedasticity-consistent covariance matrix estimators (HCCME) to obtain consistent estimates of the variances and covariances of OLS estimators even if there is heteroscedasticity. White's heteroscedasticity-corrected standard errors are available with the MICROFIT software package as a standard output. Thus it is possible to compare the results from the regular OLS (as reported in Tables 7.1 and 7.2) with the adjusted one. Tables 7.3 (Model 1) and 7.4 (Model 2) list the summary statistics from the basic regression models that are based on White's heteroscedasticity adjusted standard errors. Comparing these two results, it is obvious that the White's heteroscedasticity-corrected standard errors are considerably larger than the OLS standard errors and therefore the estimated *t* values are much smaller than those obtained by OLS. Although the *t* values are smaller, the overall results are consistent with the results reported in Section 7.1. Based on these findings, it appears that the market takes into consideration the amount of goodwill write-off in determining of a

company's valuation. Therefore, even after taking into consideration the heteroscedasticity problems in the models, we still can conclude that purchased goodwill written-off in the year of acquisition is value - relevant to the investor.

Table 7.3: Basic Model Regression Summary Statistics
Based on White's Heteroscedasticity Adjusted S.E.'s (Share Price 3 months after year-end)

	a_0	a_1	a_2	a_3	a_4		
Predicted Sign	**?**	**+**	**-**	**+**	**+**	**Adj. R^2**	**N**
GW_1	0.452**	1.266**	-1.351	3.177**	7.063***	0.815	275
t-statistics	2.123	2.649	-1.350	2.232	9.519		
p-Value	0.035	0.009	0.178	0.026	0.000		
GW_2	0.402**	1.473***	-1.671**	2.954**	6.966***	0.810	366
t-statistics	2.515	3.674	-2.216	2.699	10.895		
p-Value	0.012	0.000	0.027	0.007	0.000		
GW_3	0.286	2.563***	-3.329***	2.559**	6.099***	0.809	391
t-statistics	1.613	6.450	-4.055	2.779	10.444		
p-Value	0.108	0.000	0.000	0.006	0.000		
GW_4	0.232	2.552***	-3.244***	2.414**	6.073***	0.808	395
t-statistics	1.329	6.479	-3.996	2.732	10.511		
p-Value	0.185	0.000	0.000	0.007	0.000		
GW_5	0.192	2.550***	-3.165***	2.249**	6.038***	0.805	399
t-statistics	1.105	6.506	-3.908	2.585	10.403		
p-Value	0.270	0.000	0.000	0.000	0.000		
GW_6	0.157	2.547***	-3.092***	2.084**	6.010***	0.802	401
t-statistics	0.903	6.522	-3.838	2.432	10.414		
p-Value	0.367	0.000	0.000	0.015	0.000		
GW_7	0.119	2.558***	-3.101***	2.049**	6.009***	0.802	402
t-statistics	0.685	6.627	-3.858	2.414	10.458		
p-Value	0.494	0.000	0.000	0.016	0.000		
GW_8	0.086	2.569***	-3.122**	2.055**	5.999***	0.801	404
t-statistics	0.489	6.720	-3.911	2.468	10.528		
p-Value	0.625	0.000	0.000	0.014	0.000		

Notes: The table indicates significance at 1% (***), 5% (**) and 10%(*) levels.
Model: $MVE_{jt} = a_0 + a_1 BVOA_{jt} + a_2 BVL_{jt} + a_3 GWn_{jt} + a_4 EARN_{jt} + e_{jt}$

Where:
MVE_{jt} = Market value of shareholders' equity of firm j in year t
$BVOA_{jt}$ = Book value of the assets of firm j in year t
BVL_{jt} = Book value of the liabilities of firm j in year t
GWn_{jt} = Cumulative acquired goodwill of firm j in year t for n year
$EARN_{jt}$ = Net Profit after tax of firm j in year t
e_{jt} = error term

Table 7.4: Basic Model Regression Summary Statistics
Based on White's Heteroscedasticity Adjusted S.E.'s (Share Price as Year-end)

	a_0	a_1	a_2	a_3	a_4		
Predicted Sign	**?**	**+**	**-**	**+**	**+**	**Adj. R^2**	**N**
GW_1	0.379**	0.813*	-0.529	3.159**	7.598***	0.848	275
t-statistics	2.126	1.730	-0.604	2.413	11.536		
p-Value	0.034	0.085	0.546	0.016	0.000		
GW_2	0.317**	1.047**	-0.808	2.784**	7.342***	0.833	366
t-statistics	2.358	2.764	-1.245	2.797	12.645		
p-Value	0.019	0.006	0.214	0.005	0.000		
GW_3	0.253*	1.749***	-1.808***	2.380**	6.662***	0.827	391
t-statistics	1.829	7.084	-3.341	2.880	13.146		
p-Value	0.068	0.000	0.001	0.004	0.000		
GW_4	0.201	1.738***	-1.733***	2.251**	6.640***	0.826	395
t-statistics	1.485	7.105	-3.252	2.838	13.222		
p-Value	0.138	0.000	0.001	0.005	0.000		
GW_5	0.166	1.737***	-1.665**	2.108**	6.609***	0.824	399
t-statistics	1.229	7.129	-3.126	2.698	13.115		
p-Value	0.220	0.000	0.002	0.007	0.000		
GW_6	0.136	1.738***	-1.604**	1.949**	6.583***	0.821	401
t-statistics	1.008	7.191	-3.033	2.527	13.137		
p-Value	0.314	0.000	0.003	0.012	0.000		
GW_7	0.101	1.748***	-1.613**	1.918***	6.585***	0.821	402
t-statistics	0.744	7.345	-3.051	2.508	13.189		
p-Value	0.457	0.000	0.002	0.013	0.000		
GW_8	0.071	1.758***	-1.628**	1.915**	6.572***	0.820	404
t-statistics	0.512	7.479	-3.103	2.549	13.277		
p-Value	0.609	0.000	0.002	0.011	0.000		

Notes: The table indicates significance at 1% (***), 5%(**) and 10%(*) level of confidence.
Model: $MVE_{jt} = a_0 + a_1 BVOA_{jt} + a_2 BVL_{jt} + a_3 GWn_{jt} + a_4 EARN_{jt} + e_{jt}$

Where:
MVE_{jt} = Market value of shareholders' equity of firm j in year t
$BVOA_{jt}$ = Book value of the assets of firm j in year t
BVL_{jt} = Book value of the liabilities of firm j in year t
GWn_{jt} = Cumulative acquired goodwill of firm j in year t for n year
$EARN_{jt}$ = Net Profit after tax of firm j in year t
e_{jt} = error term

7.2.2 Multicollinearity

Another major assumption of the classical regression model is that there is no multicollinearity among the regressors included in the regression model. If multicollinearity is perfect, the regression coefficients of the X variables are indeterminate and their standard errors are infinite. If multicollinearity is less than perfect, the regression coefficients, although determinate, possess large standard errors (in relation to the coefficients themselves), which means that the coefficients cannot be estimated with great precision or accuracy. Therefore, the presence of a severe multicollinearity problem could result in drawing misleading inferences from sample *t*-statistics.

As mentioned by Kmenta (1971), "multicollinearity is a question of degree and not of kind. The meaningful distinction is not between the presence and the absence of multicollinearity, but between its various degrees. Therefore we do not "test for multicollinearity" but can, if we wish, measure its degree in any particular sample". In our discussion of the data and exploratory analysis in Chapter 6, we have show that the simple correlation of BVOA and BVL exceeded 0.88 for the basic models in the results of our regression analysis. This simple correlation was also supported by Spearman's *p*, which is significant at 1 percent for all cases.

We also perform the variance inflation factor test (VIF) for the basic model presented in Table 7.5. Briefly, the variance inflation factor (VIF) is a measure of how much the variance of an estimated regression coefficient increases if the predictors are correlated (multicollinear). The length of the confidence intervals for the parameter estimates will be increased by the square root of the respective VIFs as compared to the case of uncorrelated predictors. If X1, X2, X_k are the k predictors, the VIF for predictor j is 1/(1 - $R^{**}2_j$), where $R^{**}2_j$ is the R**2 from regressing X_j on the remaining k - 1 predictors. If the correlation of X_j with the other predictors is zero, the VIF will be 1. The VIF increases as X_j becomes more highly correlated with the remaining predictors. Montgomery and Peck [1982] suggest that if VIF is between 5 and 10, then the regression coefficients are poorly estimated. Apparently, the three tests described above show that the correlation coefficients could be considered high enough to create problems of multicollinearity.

Table 7.5: Basic Model: Variance Inflation Factor (VIF)

Cum. Goodwill	BVOA	BVL	GWn	EARN	N
GW_1	14.8	13.6	2.0	1.9	275
GW_2	11.6	10.7	1.7	1.7	366
GW_3	5.0	5.3	1.5	1.4	391
GW_4	5.0	5.3	1.5	1.3	395
GW_5	5.0	5.3	1.5	1.3	399
GW_6	5.0	5.3	1.5	1.3	401
GW_7	5.0	5.3	1.5	1.3	402
GW_8	5.0	5.3	1.5	1.4	404

Model: $MVE_{jt} = a_0 + a_1 BVOA_{jt} + a_2 BVL_{jt} + a_3 GWn_{jt} + a_4 EARN_{jt} + e_{jt}$

As mentioned earlier, the presence of a severe multicollinearity problem (in this case the correlation between BVOA and BVL) could result in drawing misleading inferences from sample *t*-statistics. One possible way of increasing the precision of the estimates of the coefficients in basic models is to estimate the model in net assets; *i.e.*, to use BVNA or NAV (Book Value of Equity or Net Assets Value, that is, BVOA - BVL) as explanatory variables. In principle, BVOA and BVL are jointly determined variables, affected by many of the same unknown exogenous variables. Treating BVOA and BVL as separate exogenous regressors could introduce interpretative problems. Therefore, we try to improve the basic model into the following model (Net Assets Model):

Model: $MVE_{jt} = a_0 + a_1(BVOA - BVL)_{jt} + a_2 GWn_{ji} + a_3 EARN_{jt} + e_{jt}$

However, estimation of the above model is justifiable only if the estimated coefficients provide statistical evidence that supports the theoretical economic model; *e.g.*, Pr ($a_1 + a_2 = 0$) $\geq 1 - w$, where w represents the confidence level imposed by the researcher (Landsman, 1986). A test of these restrictions can be readily carried out using MICROFIT. The test is a well known as a Wald Test.

Tables 7.6 (Model 1) and 7.7 (Model 2) contains the results corresponding to the Wald Test of restrictions imposed on $a_1 + a_2 = 0$. The results from the test show that in all cases that the null hypothesis that $a_1 + a_2 = 0$ can be accepted. This result supports simplifying the basic model by applying a single estimation coefficient to the net assets value. Following the test, it is appropriate to extend the basic model in order to address the problem of multicollinearity by attempting to increase the precision of the estimated coefficients. The

summary statistics for the estimation of the net assets model appear in Tables 7.7 and 7.8 based on White's heteroscedasticity adjusted standard errors.

Table 7.6: Wald Test Restriction Imposed on Parameters of the Basic Model Asset and Liability Coefficients Equalised (Share Price 3 months after year-end)

	Coefficient			
Cum. Goodwill	a_1	a_2	Chi-square	*p*-Value
GW_1	1.266	-1.351	0.015	0.903
GW_2	1.473	-1.671	0.152	0.696
GW_3	2.563	-3.329	1.965	0.161
GW_4	2.552	-3.244	1.657	0.198
GW_5	2.550	-3.165	1.317	0.251
GW_6	2.547	-3.092	1.050	0.305
GW_7	2.558	-3.101	1.038	0.308
GW_8	2.569	-3.122	1.094	0.296

Model: $MVE_{jt} = a_0 + a_1 BVOA_{jt} + a_2 BVL_{jt} + a_3 GWn_{jt} + a_4 EARN_{jt} + e_{jt}$
Restriction: $a_1 + a_2 = 0$, based on White's Heteroscedasticity Adjusted S.E.'s

Table 7.7: Wald Test Restriction Imposed on Parameters of the Basic Model Asset and Liability Coefficients Equalised (Share Price as at Year-end)

	Coefficient			
Cum. Goodwill	a_1	a_2	Chi-square	*p*-Value
GW_1	0.813	-0.529	0.242	0.622
GW_2	1.047	-0.808	0.343	0.558
GW_3	1.749	-1.808	0.021	0.884
GW_4	1.738	-1.733	0.002	0.989
GW_5	1.737	-1.665	0.033	0.856
GW_6	1.738	-1.604	0.115	0.735
GW_7	1.748	-1.613	0.044	0.834
GW_8	1.758	-1.628	0.109	0.741

Model: $MVE_{jt} = a_0 + a_1 BVOA_{jt} + a_2 BVL_{jt} + a_3 GWn_{jt} + a_4 EARN_{jt} + e_{jt}$
Restriction: $a_1 + a_2 = 0$, based on White's Heteroscedasticity Adjusted S.E.'s

Net assets, which are defined as BVOA - BVL, are denoted as BVNA in both tables. The expected signs of a_1 should be positive. An examination of Tables 7.7 and 7.8 reveals that in all cases the BVNA coefficients are significantly non-zero at the one per cent level. At an informal level, this compares favourably with the basic model regression results (see Tables 7.3 and 7.4) in which assets and liabilities have unrestricted coefficients.

The results for the basic model show that the coefficients of liabilities are not significantly non-zero for the first year of cumulative goodwill for Model 1 and for the first two years of cumulative goodwill for Model 2. This differs from the net assets model. The most important results are those regarding coefficients of goodwill, which show a positive sign which is consistent with the basic model. Another point worth mentioning about the model is the decreasing absolute value of the intercept from the model which the market value based on

the share price 3 months after the year-end. The absolute value for the intercept decreases in absolute value from 0.406 (significantly non-zero) to -0.088 (insignificantly non-zero).

Again, if we accept Kane and Unal's (1990) arguments and interpretation, the positive and significant non-zero intercept shows the existence of hidden reserves. However by introducing the cumulative goodwill (year by year), the absolute value of the intercept decreases to an insignificant non-zero. In general, the net assets model improves the basic model. The most likely cause of the increase in robustness is the reduction in the collinearity of the two regressors, BVOA and BVL. In addition, the VIF (Table 7.10) used to detect multicollinearity provides results which suggest that this is not a problem with the Net Assets Models.

Table 7.8: Net Asset Model Regression Summary Statistics
Based on White's Heteroscedasticity Adjusted S.E.'s, (Share Price 3 months after year-end)

	a_0	a_1	a_2	a_3		
Predicted Sign	**?**	**+**	**+**	**+**	**Adj. R^2**	**N**
GW_1	0.444**	1.212**	3.136**	7.057***	0.816	275
t-statistics	2.501	2.446	2.476	9.725		
p-Value	0.013	0.015	0.014	0.000		
GW_2	0.382**	1.348***	2.861***	6.966***	0.810	366
t-statistics	2.698	3.301	2.951	10.838		
p-Value	0.007	0.001	0.003	0.000		
GW_3	0.148	2.289***	2.095**	5.963***	0.806	391
t-statistics	0.797	5.122	2.348	9.768		
p-Value	0.426	0.000	0.019	0.000		
GW_4	0.113	2.301***	2.0133**	5.953***	0.805	395
t-statistics	0.617	5.298	2.365	9.866		
p-Value	0.538	0.000	0.019	0.000		
GW_5	0.091	2.325***	1.902**	5.933***	0.803	399
t-statistics	0.501	5.515	2.286	9.873		
p-Value	0.617	0.000	0.023	0.000		
GW_6	0.073	2.347***	1.784**	5.917***	0.801	401
t-statistics	0.398	5.719	2.201	9.937		
p-Value	0.691	0.000	0.028	0.000		
GW_7	0.042	2.358***	1.750**	5.916***	0.800	402
t-statistics	0.222	5.826	2.195	9.983		
p-Value	0.824	0.000	0.029	0.000		
GW_8	0.010	2.364***	1.752**	5.903***	0.780	404
t-statistics	0.057	5.873	2.236	10.027		
p-Value	0.955	0.000	0.026	0.000		

Notes: The table indicates significance at 1% (***), 5% (**) and 10% (*) levels.
Model: $MVE_{jt} = a_0 + a_1 BVNA_{jt} + a_2 GWn_{jt} + a_3 EARN_{jt} + e_{jt}$
Where:
MVE_{jt} = Market value of shareholders' equity of firm j in year t
$BVNA_{jt}$ = Book value of shareholders' equity of firm j in year t
GWn_{jt} = Cumulative acquired goodwill of firm j in year t for n year
$EARN_{jt}$ = Net Profit after tax of firm j in year t
e_{jt} = error term

Table 7.9: Net Asset Model Regression Summary Statistics
Based on White's Heteroscedasticity Adjusted S.E.'s, (Share Price as at Year-end)

	a_0	a_1	a_2	a_3		
Predicted Sign	**?**	**+**	**+**	**+**	**Adj. R^2**	**N**
GW_1	0.406**	0.991**	3.295**	7.616***	0.848	275
t-statistics	2.653	2.140	2.836	11.906		
p-Value	0.008	0.033	0.005	0.000		
GW_2	0.340**	1.197**	2.896***	7.342***	0.833	366
t-statistics	2.838	3.179	3.322	12.684		
p-Value	0.005	0.002	0.001	0.000		
GW_3	0.242**	1.727***	2.344**	6.652***	0.827	391
t-statistics	2.020	6.951	3.342	13.615		
p-Value	0.044	0.000	0.001	0.000		
GW_4	0.202*	1.741***	2.255**	6.641***	0.826	395
t-statistics	1.700	7.302	2.341	13.690		
p-Value	0.090	0.000	0.001	0.000		
GW_5	0.178	1.763***	2.148**	6.622***	0.824	399
t-statistics	1.447	7.692	3.241	13.613		
p-Value	0.140	0.000	0.001	0.000		
GW_6	0.156	1.787***	2.023**	6.606***	0.821	401
t-statistics	1.277	8.096	3.104	13.651		
p-Value	0.202	0.000	0.002	0.000		
GW_7	0.120	1.798***	1.993**	6.606***	0.821	402
t-statistics	0.947	8.301	3.104	13.703		
p-Value	0.344	0.000	0.002	0.000		
GW_8	0.088	1.806***	1.986**	6.595***	0.820	404
t-statistics	0.671	8.448	3.145	13.780		
p-Value	0.502	0.000	0.002	0.000		

Notes: The table indicates significance at 1% (***), 5% (**) and 10% (*) levels.
Model: $MVE_{jt} = a_0 + a_1 BVNA_{jt} + a_2 GWn_{jt} + a_3 EARN_{jt} + e_{jt}$

Where:
MVE_{jt} = Market value of shareholders' equity of firm j in year t
$BVNA_{jt}$ = Book value of shareholders' equity of firm j in year t
GWn_{jt} = Cumulative acquired goodwill of firm j in year t for n year
$EARN_{jt}$ = Net Profit after tax of firm j in year t
e_{jt} = error term

Table 7.10: Net Asset Model: Variance Inflation Factor (VIF)

Cum. Goodwill	BVNA	GWn	EARN	N
GW_1	2.30	1.60	1.80	275
GW_2	1.90	1.40	1.70	366
GW_3	1.40	1.10	1.30	391
GW_4	1.40	1.10	1.30	395
GW_5	1.40	1.10	1.30	399
GW_6	1.40	1.10	1.30	401
GW_7	1.40	1.10	1.30	402
GW_8	1.40	1.10	1.30	404

Model: $MVE_{jt} = a_0 + a_1 BVNA_{jt} + a_2 GWn_{jt} + a_3 EARN_{jt} + e_{jt}$

7.2.3 The Reduced Model

We have discussed the results for the basic model in the previous section. Five tests were performed to diagnose whether the basic models met the standard assumptions of the OLS estimation of Chapter 6. The main implications from these test results are that the models have problems of heteroscedasticity and multicollinearity. In order to overcome the heteroscedasticity problem, we used statistics based on White's heteroscedasticity adjusted standard errors for the basic regression models. In dealing with the multicollinearity problem, we estimated the model in net asset form; *i.e.*, by netting BVOA - BVL. Before that, we tested a necessary statistical condition for netting BVOA and BVL (coefficients BVOA + coefficients BVL = 0) by using the Wald test. We found that the coefficients of BVOA and BVL were equal in all cases and, thus, it was justifiable to estimate the model in net asset form.

In general, results from the basic model and the net asset model suggest that the market prices purchased goodwill as an important factor when determining the market value of the companies under study. We introduced a cumulative figure for purchased goodwill in the models that had been written off during the year of acquisition. This cumulative figure was added (year one to year eight) in order to see whether the coefficients of GWn and the intercept value would change the overall results and interpretation. The results from the both models are consistent from the previous studies (for example McCarthy and Schneider (1995) and Jennings *et al.* (1996)) which show that the coefficient of goodwill is significantly different from zero. The difference between this study and the previous ones is related to treatment of purchased goodwill: in previous studies, purchased goodwill was recorded in the balance sheet. However, the results reported in this thesis are based on the write-off value of purchased goodwill; *i.e.*, non-balance sheet items. Kane and Unal (1990) discussed the relationship between this non-balance sheet item (purchased goodwill that has been written off) and the market value of the companies. They considered the non-balance sheet items (assets) to be hidden reserves. By introducing cumulative goodwill figures, the regression results show that the intercept values decrease in value from significant non-zero to zero. One could argue that these changes are due to the fact that purchased goodwill is significant in determining the market value of companies. On the other hand, purchased goodwill might also diminish in value a few years after acquisition.

As a general conclusion, the most favourable model used in this study is the net asset model using statistics based on White's heteroscedasticity adjusted standard errors. However, the sample size employed in this study varies from 274 to 404 for the three years

accounting period. The results reported in this chapter might be influenced by the fact that there are difference numbers of companies for each of the years in which cumulative purchased goodwill is recorded. To ensure that the net asset models are robust, we rerun the regression analysis using the same sample size of 275. This sample is composed of the companies that have purchased goodwill between 1994 and 1996. We also added back the purchased goodwill that had been written off for the past eight years. Tables 7.11 (Model 1) and 7.12 (Model 2) contain summary statistics for this restricted sample size. The results from both the models seem to be consistent with the net asset models where the sample size varies from 275 to 404.

Table 7.11: Net Asset Model Regression Summary Statistics Based on White's Heteroscedasticity Adjusted S.E.'s, (Share Price 3 months after Year-end, Constant Sample)

	a_0	a_1	a_2	a_3		
Predicted Sign	**?**	**+**	**+**	**+**	**Adj. R^2**	**N**
GW_1	0.444**	1.212**	3.136**	7.057***	0.816	275
t-statistics	2.501	2.446	2.476	9.725		
p-Value	0.013	0.015	0.014	0.000		
GW_2	0.309*	1.278**	2.986**	7.026***	0.828	275
t-statistics	1.916	2.856	2.819	10.351		
p-Value	0.056	0.005	0.005	0.000		
GW_3	0.248	1.342***	2.800**	6.943***	0.829	275
t-statistics	1.580	3.254	2.997	10.625		
p-Value	0.115	0.001	0.003	0.000		
GW_4	0.207	1.398***	2.651**	6.896***	0.826	275
t-statistics	1.335	3.523	2.946	9.866		
p-Value	0.183	0.001	0.004	10.754		
GW_5	0.169	1.427***	2.598**	6.880***	0.825	275
t-statistics	1.079	3.631	2.890	10.749		
p-Value	0.282	0.000	0.004	0.000		
GW_6	0.122	1.437***	2.587**	6.881***	0.824	275
t-statistics	0.760	3.657	2.863	10.763		
p-Value	0.448	0.000	0.005	0.000		
GW_7	0.078	1.468***	2.530**	6.861***	0.823	275
t-statistics	0.472	3.084	2.843	10.827		
p-Value	0.637	0.000	0.005	0.000		
GW_8	0.040	1.490***	2.497**	6.850***	0.780	275
t-statistics	0.233	3.927	2.859	10.882		
p-Value	0.816	0.000	0.005	0.000		

Notes: The table indicates significance at 1% (***), 5% (**) and 10% (*) levels.
Model: $MVE_{jt} = a_0 + a_1 BVNA_{jt} + a_2 GWn_{jt} + a_3 EARN_{jt} + e_{jt}$
Where:
MVE_{jt} = Market value of shareholders' equity of firm j in year t
$BVNA_{jt}$ = Book value of shareholders' equity of firm j in year t
GWn_{jt} = Cumulative acquired goodwill of firm j in year t for n year
$EARN_{jt}$ = Net Profit after tax of firm j in year t
e_{jt} = error term

Table 7.12: Net Asset Model Regression Summary Statistics Based on White's Heteroscedasticity Adjusted S.E.'s, (Share Price as at Year-end, Constant Sample)

Predicted Sign	a_0 ? ·	a_1 +	a_2 +	a_3 +	Adj. R^2	N
GW_1	0.406**	0.991**	3.295**	7.616***	0.848	275
t-statistics	2.653	2.140	2.836	11.906		
p-Value	0.008	0.033	0.005	0.000		
GW_2	0.263**	1.106**	3.017**	7.539***	0.858	275
t-statistics	2.039	2.788	3.165	12.764		
p-Value	0.042	0.006	0.002	0.000		
GW_3	0.202	1.184**	2.795***	7.443***	0.857	275
t-statistics	1.586	3.187	3.342	13.109		
p-Value	0.114	0.002	0.001	0.000		
GW_4	0.160	1.238***	2.650***	7.398***	0.855	275
t-statistics	1.269	3.413	3.288	13.206		
p-Value	0.205	0.001	0.001	0.000		
GW_5	0.122	1.264***	2.608***	7.386***	0.853	275
t-statistics	0.961	3.500	3.241	13.194		
p-Value	0.338	0.001	0.001	0.000		
GW_6	0.074	1.270***	2.605***	7.390***	0.853	275
t-statistics	0.576	3.515	3.220	13.207		
p-Value	0.565	0.001	0.001	0.000		
GW_7	0.029	1.300***	2.555**	7.372***	0.852	275
t-statistics	0.222	3.639	3.206	13.272		
p-Value	0.825	0.000	0.002	0.000		
GW_8	-0.088	1.324***	2.514***	7.358***	0.852	275
t-statistics	-0.061	3.759	3.213	13.326		
p-Value	0.951	0.000	0.001	0.000		

Notes: The table indicates significance at 1% (***), 5% (**) and 10% (*) levels.
Model: $MVE_{jt} = a_0 + a_1 BVNA_{jt} + a_2 GWn_{ji} + a_3 EARN_{jt} + e_{jt}$

Where:
MVE_{jt} = Market value of shareholders' equity of firm j in year t
$BVNA_{jt}$ = Book value of shareholders' equity of firm j in year t
GWn_{jt} = Cumulative acquired goodwill of firm j in year t for n year
$EARN_{jt}$ = Net Profit after tax of firm j in year t
e_{jt} = error term

7.2.3.1 Dummy Variable Regressions

The discussion has so far has focused on the model based on the pooled data from 1994 to 1996. Pooled data is also used by Landsman (1986), Aboody and Lev (1998) and Pfeiffer (1998). However, as emphasised by previous researchers such as McCarthy and Schneider (1995) and Jennings *et al.* (1996), the year effects might influence the results presented in this section. Since the estimation uses pooled data for three years, a time dummy is included to allow for any significant time effects between these years. We rerun the reduced

model by introducing three dummy variables, namely; D(94), D(95) and D(96), each of which takes the value of one when the other two dummy variables are zero,

Tables 7.13 (Model 1) and 7.14 (Model 2) contain summary statistics for the restricted sample size with the dummy variables. Results from both the models suggest that there are no significant year effects in the models at the 5% confidence level. We also rerun the reduced model, including an "industrial dummy" to allow for any significant industrial effects. Appendix 2 reports these results, which suggest that there are no significant industrial effects in the models at the 5% confidence level.

Table 7.13: Net Asset Model Regression Summary Statistics with Dummy Variables, Based on White's Heteroscedasticity Adjusted S.E.'s, (Share Price 3 months after Year-end, Constant Sample)

	a_0	a_1	a_2	a_3	a_4	a_5		
Predicted Sign	**?**	**+**	**+**	**+**			**Adj. R^2**	**N**
GW_1	0.480*	1.198**	3.104**	7.070***	0.205	-0.256	0.817	275
t-statistics	1.840	2.407	2.467	9.759	0.726	-1.197		
p-Value	0.067	0.017	0.014	0.000	0.468	0.232		
GW_2	0.278	1.264**	2.954**	7.040***	0.272	-0.145	0.830	275
t-statistics	1.105	2.818	2.801	10.334	0.985	-0.713		
p-Value	0.270	0.005	0.005	0.000	0.325	0.477		
GW_3	0.156	1.323**	2.781**	6.945***	0.351	-0.062	0.830	275
t-statistics	0.617	3.179	2.964	10.550	1.240	-0.310		
p-Value	0.538	0.002	0.003	0.000	0.216	0.757		
GW_4	0.119	1.372***	2.641**	6.924***	0.370	-0.087	0.828	275
t-statistics	0.467	3.419	2.923	10.683	1.289	-0.432		
p-Value	0.641	0.001	0.004	0.000	0.199	0.666		
GW_5	0.094	1.402***	2.587**	6.907***	0.356	-0.107	0.826	275
t-statistics	0.367	3.529	2.870	10.689	1.241	-0.533		
p-Value	0.714	0.000	0.004	0.000	0.216	0.594		
GW_6	0.064	1.413***	2.574**	6.906***	0.337	-0.131	0.826	275
t-statistics	0.246	3.560	2.846	10.718	1.181	-0.656		
p-Value	0.806	0.000	0.005	0.000	0.239	0.512		
GW_7	0.035	1.440***	2.522**	6.889***	0.331	-0.163	0.825	275
t-statistics	0.134	3.692	2.832	10.791	1.160	-0.816		
p-Value	0.893	0.000	0.005	0.000	0.247	0.415		
GW_8	0.007	1.467***	2.481**	6.873***	0.306	-0.165	0.824	275
t-statistics	0.026	3.833	2.845	10.856	1.084	-0.826		
p-Value	0.979	0.000	0.005	0.000	0.280	0.410		

Notes: The table indicates significance at 1% (***), 5% (**) and 10% (*) levels.
Model: $MVE_{jt} = a_0 + a_1 BVNA_{jt} + a_2 GWn_{jt} + a_3 EARN_{jt} + a_4 D95 + a_5 D94 + e_{jt}$

Where:
MVE_{jt} = Market value of shareholders' equity of firm j in year t
$BVNA_{jt}$ = Book value of shareholders' equity of firm j in year t
GWn_{jt} = Cumulative acquired goodwill of firm j in year t for n year
$EARN_{jt}$ = Net Profit after tax of firm j in year t
e_{jt} = error term

Table 7.14: Net Asset Model Regression Summary Statistics with Dummy Variables, Based on White's Heteroscedasticity Adjusted S.E.'s, (Share Price as at Year-end, Constant Sample)

	a_0	a_1	a_2	a_3	a_4	a_5		
Predicted Sign	**?**	**+**	**+**	**+**			**Adj. R^2**	**N**
GW_1	0.464**	0.989**	3.288**	7.617***	-0.017	-0.013	0.848	275
t-statistics	2.018	2.115	2.840	11.792	-0.064	-0.631		
p-Value	0.045	0.035	0.005	0.000	0.949	0.529		
GW_2	0.251	1.104**	3.012**	7.542***	0.054	-0.014	0.857	275
t-statistics	1.168	2.758	3.161	12.591	0.213	-0.076		
p-Value	0.244	0.006	0.002	0.000	0.831	0.939		
GW_3	0.129	1.177**	2.800***	7.453***	0.133	0.067	0.856	275
t-statistics	0.590	3.128	3.327	12.870	0.508	0.345		
p-Value	0.556	0.002	0.001	0.000	0.612	0.730		
GW_4	0.092	1.229***	2.653***	7.409***	0.153	0.042	0.854	275
t-statistics	0.414	3.338	3.267	12.952	0.572	0.215		
p-Value	0.679	0.001	0.001	0.000	0.568	0.830		
GW_5	0.066	1.255***	2.610***	7.396***	0.139	0.021	0.853	275
t-statistics	0.296	3.428	3.222	12.949	0.522	0.113		
p-Value	0.767	0.001	0.001	0.000	0.602	0.910		
GW_6	0.035	1.262***	2.604**	7.399***	0.119	-0.002	0.852	275
t-statistics	0.154	3.449	3.204	12.974	0.453	-0.011		
p-Value	0.878	0.001	0.002	0.000	0.651	0.992		
GW_7	0.006	1.290***	2.554**	7.382***	0.114	-0.035	0.852	275
t-statistics	0.024	3.566	3.189	13.036	0.431	-0.180		
p-Value	0.981	0.000	0.002	0.000	0.667	0.857		
GW_8	-0.022	1.318***	2.510**	7.365***	0.089	-0.036	0.851	275
t-statistics	-0.098	3.700	3.201	13.109	0.339	-0.189		
p-Value	0.922	0.000	0.002	0.000	0.734	0.850		

Notes: The table indicates significance at 1% (***), 5% (**) and 10% (*) levels.
Model: $MVE_{jt} = a_0 + a_1 BVNA_{jt} + a_2 GWn_{jt} + a_3 EARN_{jt} + a_4 D95 + a_5 D94 + e_{jt}$

Where:
MVE_{jt} = Market value of shareholders' equity of firm j in year t
$BVNA_{jt}$ = Book value of shareholders' equity of firm j in year t
GWn_{jt} = Cumulative acquired goodwill of firm j in year t for n year
$EARN_{jt}$ = Net Profit after tax of firm j in year t
e_{jt} = error term

7.2.3.2 The Log-linear Model

Another possibility to test whether the model can be improved further is by transforming the variables into natural logarithms, for which a normal plot shows a better approximation to normality. By introducing the log model we actually test the functional form of the regression; *i.e.* a choice between a linear regression model (the regressor is a linear function of the regressors) or a log-linear regression model (the log of the regressor is a function of the logs of the regressors). The functional form of the linear regression model

employed in the previous section shows that just one case for the two models, the null hypotheses that the true model is linear is rejected at the 1-% level of significance. Thus, results based on the log model presented in this section are just another alternative to explore the data set.

We perform a test proposed by MacKinnon, White, and Davidson (MWD test) to choose between the two models. This test indicates that we cannot reject the hypothesis that the true model is log-linear or linear. We then compare the two models using the residual diagnostics test. Table 7.15 shows the residual diagnostic test comparison between the two models. As reported in Chapter 6, the linear model suffers from a heteroscedasticity problem that can be corrected using the White-*t* procedures. Heteroscedasticity is not a problem in the log-linear model but here we face a serial correlation problem. If serial correlation is present then the usual OLS estimators, although unbiased, will no longer exhibit minimum variance among all the linear unbiased estimators. In short, they are no longer BLUE (Gujarati, 1995). As a result, we conclude that the linear models are more suitable to our study.

Table 7.15: Residual Test Diagnostic

Residual Test	Linear Model	Log-linear Model
Serial Correlation	-	✔
Heteroscedasticity	✔	-
Functional Form	-	-
Normality	✔	✔

Nonetheless, we present the results for the log-linear model from the reduced model for comparison purposes. Two samples were eliminated because their BVNA is negative. Tables 7.16 (Model 1) and 7.17 (Model 2) contain summary statistics for the log-linear regression model. The results from both the models show that the entire coefficients are significantly non-zero for the two models. According to this model, purchased goodwill is still highly significant to investors when they are determining the value of a firm. At face value, the intercept is decreases in value when we increase the cumulative purchased goodwill. However, these changes are not statistically significant. Another point that should be highlighted is the lower value of R^2 compared to the linear models, which shows that the model has lost its explanatory power.

Table 7.16: The Log-linear Model
Share Price 3 month after year-end (Constant Sample)

	a_0	a_1	a_2	a_3		
Predicted Sign	**?**	**+**	**+**	**+**	**Adj. R^2**	**N**
GW_1	0.473***	0.654***	0.080**	1.565***	0.459	273
t-statistics	8.650	9.020	3.050	7.620		
p-Value	0.000	0.000	0.003	0.000		
GW_2	0.466***	0.654***	0.089**	1.544***	0.460	273
t-statistics	8.930	9.040	3.140	7.560		
p-Value	0.000	0.000	0.002	0.000		
GW_3	0.449***	0.659***	0.084**	1.523***	0.456	273
t-statistics	8.800	9.100	2.830	7.440		
p-Value	0.000	0.000	0.005	0.000		
GW_4	0.451***	0.654***	0.095**	1.532***	0.457	273
t-statistics	8.860	8.990	2.900	7.480		
p-Value	0.000	0.000	0.004	0.000		
GW_5	0.438***	0.660***	0.089**	1.537***	0.452	273
t-statistics	8.450	9.040	2.410	7.460		
p-Value	0.000	0.000	0.016	0.000		
GW_6	0.436***	0.658***	0.096**	1.545***	0.452	273
t-statistics	8.490	9.000	2.410	7.490		
p-Value	0.000	0.000	0.017	0.000		
GW_7	0.436***	0.659***	0.102**	1.551***	0.453	273
t-statistics	8.610	9.040	2.480	7.520		
p-Value	0.000	0.000	0.014	0.000		
GW_8	0.428***	0.663***	0.096**	1.549***	0.451	273
t-statistics	8.570	9.090	2.320	7.490		
p-Value	0.000	0.000	0.021	0.000		

Model: $lnMVE_{jt} = a_0 + a_1 lnBVNA_{jt} + a_2 lnGWn_{ji} + a_3 lnEARN_{jt} + e_{jt}$

Table 7.17: The Log-linear Model
Share Price as at year-end (Constant Sample)

Predicted Sign	a_0 ?	a_1 +	a_2 +	a_3 +	Adj. R^2	N
GW_1	0.452***	0.662***	0.075**	1.590***	0.461	273
t-statistics	8.190	9.060	2.840	7.710		
p-Value	0.000	0.000	0.005	0.000		
GW_2	0.444***	0.662***	0.084**	1.575***	0.462	273
t-statistics	8.450	9.080	2.920	7.650		
p-Value	0.000	0.000	0.002	0.000		
GW_3	0.431***	0.666***	0.080**	1.556***	0.459	273
t-statistics	8.380	9.130	2.690	7.550		
p-Value	0.000	0.000	0.008	0.000		
GW_4	0.434***	0.661***	0.092**	1.565***	0.460	273
t-statistics	8.470	9.030	2.800	7.600		
p-Value	0.000	0.000	0.006	0.000		
GW_5	0.425***	0.665***	0.091**	1.572***	0.457	273
t-statistics	8.160	9.070	2.450	7.590		
p-Value	0.000	0.000	0.015	0.000		
GW_6	0.424***	0.663***	0.099**	1.581***	0.457	273
t-statistics	8.220	9.020	2.470	7.620		
p-Value	0.000	0.000	0.014	0.000		
GW_7	0.424***	0.664***	0.106**	1.587***	0.458	273
t-statistics	8.350	9.060	2.560	7.650		
p-Value	0.000	0.000	0.011	0.000		
GW_8	0.415***	0.668***	0.098**	1.585***	0.456	273
t-statistics	8.280	9.020	2.360	7.630		
p-Value	0.000	0.000	0.019	0.000		

Model: $lnMVE_{jt} = a_0 + a_1 lnBVNA_{jt} + a_2 lnGWn_{ji} + a_3 lnEARN_{jt} + e_{jt}$

7.2.3.2 The Balance Sheet Identity Model

The fourth reduced model includes only the balance sheet variables in the regression equation, as in Landsman (1986). By removing earnings as one of the explanatory variables, there is no longer a weighted average between the income variable and the balance sheet variable. Furthermore, we have estimated this model in undeflated form. As explained before, this potentially leads to two scale-related problems: scale bias and heteroscedastic disturbances. Following Pfeiffer (1998), we address scale bias by including a proxy for size in each model. In this case we use total sales (*Sales*) as a size proxy. Tables 7.18 (Model 1) and 7.19 (Model 2) contain summary statistics for the balance sheet regression model.

The results from both models show that all the coefficients are significantly non-zero for the two models. According to these models, purchased goodwill is still highly significant to investors when they are determining the value of a firm. The intercept is decreases in value when we increase the cumulative purchased goodwill for the first five years and increase thereafter. These results show some inconsistency with our earlier arguments relating to the relationship between the intercept value and the eliminated goodwill. This model also has a lower value of R^2 compared to our earlier models, which show that the model has lost its explanatory power.

The *Sales* coefficient which is a size proxy, is negative and significant. Nonetheless, it suggests a cautious interpretation of the results. We then analysed the residuals from this model and found out that the entire residual diagnostic test was statistically significant (*i.e.* the model suffered serious econometric problems such as normality, serial correlation, linearity, and heteroscedasticity). Therefore, we concluded that the combination of balance sheet and income variables in the model specification is more suitable for our study, which are consistent with the results of Ohlson (1989, 1995) and McCarthy and Schneider (1995).

Table 7.18: Balance Sheet Identity Regression Summary Statistics
Share Price 3 month after year-end

Predicted Sign	a_0 ?	a_1 +	a_2 +	a_3 +	Adj. R^2	N
GW_1	820684**	4.929***	5.545***	-0.948**	0.607	275
t-statistics	2.554	5.525	4.562	-1.974		
p-Value	0.011	0.000	0.000	0.049		
GW_2	776105**	4.820***	5.464***	-0.961**	0.605	275
t-statistics	2.405	5.369	4.052	-1.981		
p-Value	0.017	0.000	0.000	0.049		
GW_3	733633**	4.754***	5.423***	-0.948**	0.608	275
t-statistics	2.289	5.386	4.011	-1.974		
p-Value	0.023	0.000	0.000	0.044		
GW_4	686994**	4.731***	5.620***	-1.007**	0.617	275
t-statistics	2.198	5.430	4.376	-2.149		
p-Value	0.029	0.000	0.000	0.032		
GW_5	640085**	4.718***	5.666***	-1.055**	0.620	275
t-statistics	2.144	5.441	4.245	-2.378		
p-Value	0.033	0.000	0.000	0.018		
GW_6	756260**	4.451***	5.280**	-1.091**	0.608	275
t-statistics	2.455	4.737	3.135	-2.434		
p-Value	0.015	0.000	0.002	0.016		
GW_7	849475**	4.358***	4.826**	-1.156**	0.601	275
t-statistics	2.707	4.469	2.568	-2.552		
p-Value	0.007	0.000	0.011	0.011		
GW_8	884881**	4.475***	4.430***	-1.249**	0.594	275
t-statistics	2.772	4.452	2.309	-2.632		
p-Value	0.006	0.000	0.022	0.000		

Model: $MVE_t = a_0 + a_1 BVNA_{jt} + a_2 GWn_{ji} + a_3 Sales_{jt} + e_{jt}$

Table 7.19: Balance Sheet Identity Regression Summary Statistics
Share Price as at year-end

Predicted Sign	a_0 ?	a_1 +	a_2 +	a_3 +	Adj. R^2	N
GW_1	737559**	5.161***	6.441***	-1.062**	0.649	275
t-statistics	2.364	5.497	4.748	-2.232		
p-Value	0.019	0.000	0.000	0.026		
GW_2	682270**	5.017***	6.464***	-1.075**	0.650	275
t-statistics	2.181	5.526	4.580	-2.253		
p-Value	0.030	0.000	0.000	0.025		
GW_3	633373**	4.945***	6.380***	-1.092**	0.654	275
t-statistics	2.032	5.576	4.490	-2.309		
p-Value	0.043	0.000	0.000	0.022		
GW_4	584980*	4.940***	6.468***	-1.131**	0.661	275
t-statistics	1.920	5.629	4.662	-2.459		
p-Value	0.056	0.000	0.000	0.015		
GW_5	531666*	4.927***	6.508***	-1.187**	0.664	275
t-statistics	1.823	5.623	4.554	-2.742		
p-Value	0.069	0.000	0.000	0.007		
GW_6	659225**	4.583***	6.234***	-1.229**	0.654	275
t-statistics	2.214	5.130	3.593	-2.834		
p-Value	0.028	0.000	0.000	0.005		
GW_7	767396**	4.447***	5.798**	-1.308**	0.648	275
t-statistics	2.563	4.969	3.057	-2.996		
p-Value	0.011	0.000	0.002	0.003		
GW_8	809644**	4.581***	5.347**	-1.420**	0.640	275
t-statistics	2.643	5.001	2.750	-3.057		
p-Value	0.009	0.000	0.006	0.000		

Model: $MVE_{jt} = a_0 + a_1 BVNA_{jt} + a_2 GWn_{jt} + a_3 Sales_{jt} + e_{jt}$

7.3 The Market Valuation of Goodwill

Given that goodwill appears to be a significant factor in the valuation of a company, our second hypothesis examines the magnitude of the market: book multiplier compared to other assets. This hypothesis is tested by comparing the coefficients of GWn and BVOA. If the two coefficients are not significantly different, then this would suggest that the market treats goodwill like other assets. Answering this question will provide an insight into the relative importance of reported goodwill in valuing a firm compared to other assets, and, consequently, such results will provide additional evidence for the recognition of goodwill as required by FRS 10.

First, let us discuss the absolute values of the coefficients of BVOA and GW from the two basic models presented in Section 7.2. Figures 7.1 and 7.2 present the pattern of both

coefficients over changes in GW. It is obvious that the absolute values of GW's coefficients are higher than BVOA in both models for the first three years of cumulative purchased goodwill. This indicates that, on average, investor value purchased goodwill is higher than the firms' BVOA. If we go into further detail for each of the models, the model using the year-end share price reveals that the coefficient of GW is higher than that of BVOA for all cases. However, results from the other model (share price three months after year-end) shows that the coefficient of GW is only slightly lower than the coefficient of BVOA.

To summarise, this analysis indicates that investors value GW more highly than BVOA at a certain point. However, it is obvious that GW decreases in value once the cumulative figure of purchased goodwill increases.

Figure 7.1: Pattern of Coefficient Value: Goodwill Compared to Other Assets
Share Price 3 Months after year end

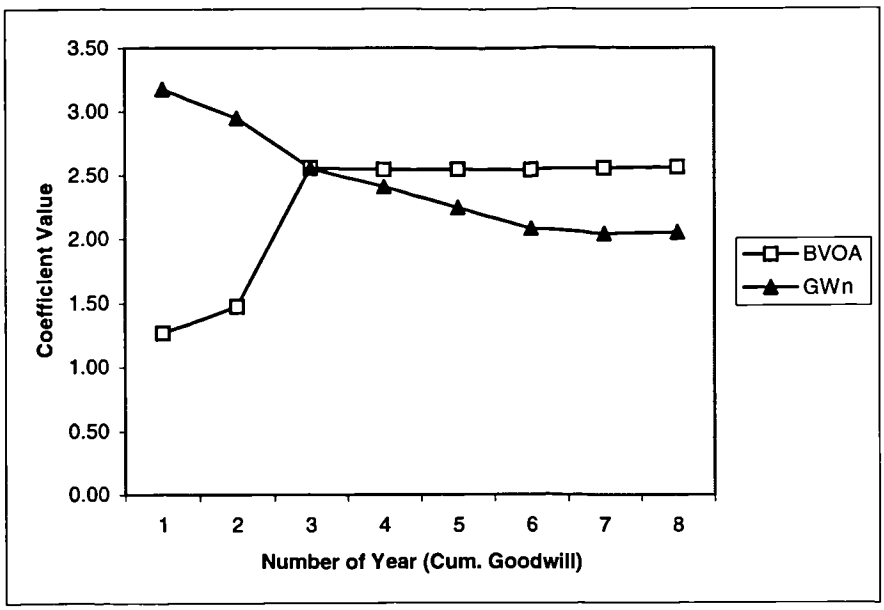
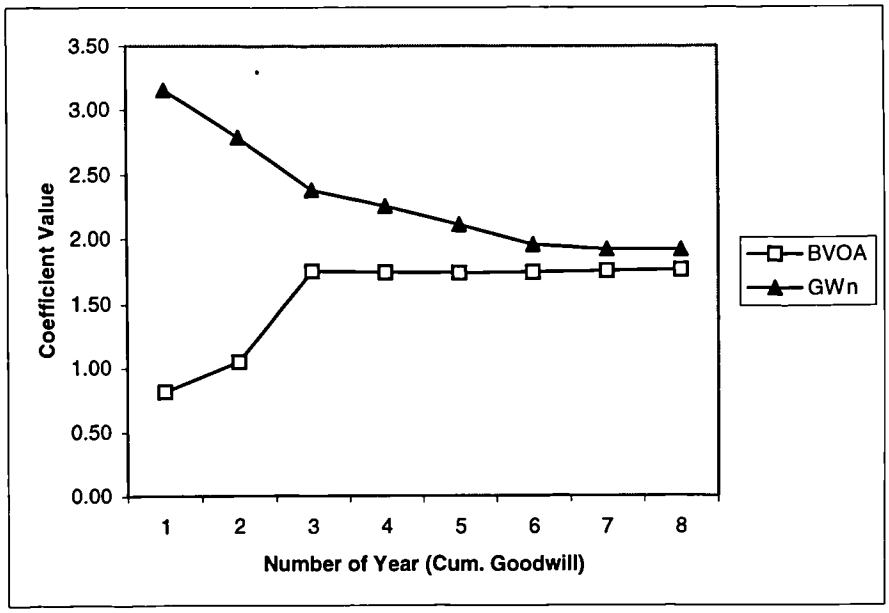


Figure 7.2 Pattern of Coefficient Value: Goodwill Compared to Other Assets
Share Price as at year-end



Secondly, after considering the absolute values of both coefficients, we test the hypothesis in order to examine the magnitude of the market perception of purchased goodwill in relation to other assets. The results of this test are presented in Tables 7.20 and 7.21. The null hypothesis of equal coefficients is rejected for GW_1 and GW_2 for both models. Given our earlier analysis and the results, it can be generally concluded that on average (in this sample) the market perceives purchased goodwill as having a higher value than other assets at a certain point in the economic life of purchased goodwill. As mentioned by previous researchers, such as Jennings *et al.* (1996) and McCarthy and Schneider (1995), one statistical problem with this study is the use of book values to proxy for market values.

The market value of purchased goodwill is unknown. However the other variable, BVOA, which represents the remaining assets has some components in which the market value is equal to the book value, such as cash and debtors, as well as some components where the market value may be greater than the book value, such as stock and property, plant and equipment. This most likely result in measurement error. The extent of influence measurement error has on the results is unknown.

Therefore, previous researchers have preferred a conservative interpretation, and concluded that purchased goodwill appears to be perceived by the market with a value at least equal to other assets and possibly greater. However, in our context, we believe that

the rejection of the null hypothesis of equal coefficients for GW_1 and GW_2 signal the fact that investors differentiate significantly the 'age' of the purchased goodwill. This analysis gives more evidence to the proposition that investors do perceive purchased goodwill as an asset in the determination of the firm's valuation, as raised by the first research question.

Table 7.20: Wald Test Restriction Imposed on Parameters of the Basic Model Asset and Goodwill Elimination Coefficients Equalised (Share Price 3 months after year-end)

	Coefficient			
Cum. Goodwill	a_1	a_3	**Chi-square**	***p*-Value**
GW_1	1.266	3.117	8.961	0.003
GW_2	1.473	2.954	9.850	0.002
GW_3	2.563	2.559	0.008	0.993
GW_4	2.552	2.414	0.139	0.709
GW_5	2.550	2.249	0.680	0.410
GW_6	2.547	2.084	1.644	0.200
GW_7	2.558	2.049	2.007	0.157
GW_8	2.569	2.056	2.073	0.150

Model: $MVE_{jt} = a_0 + a_1 BVOA_{jt} + a_2 BVL_{jt} + a_3 GWn_{jt} + a_4 EARN_{jt} + e_{jt}$
Restriction: $a_1 - a_3 = 0$

Table 7.21: Wald Test Restriction Imposed on Parameters of the Basic Model Asset and Goodwill Elimination Coefficients Equalised (Share Price after year-end)

	Coefficient			
Cum. Goodwill	a_1	a_3	**Chi-square**	***p*-Value**
GW_1	0.813	3.160	15.799	0.000
GW_2	1.047	2.784	15.148	0.000
GW_3	1.749	2.380	3.200	0.074
GW_4	1.738	2.251	2.211	0.137
GW_5	1.737	2.108	1.184	0.277
GW_6	1.738	1.949	0.391	0.532
GW_7	1.748	1.918	0.256	0.613
GW_8	1.758	1.915	0.224	0.636

Model: $MVE_{jt} = a_0 + a_1 BVOA_{jt} + a_2 BVL_{jt} + a_3 GWn_{jt} + a_4 EARN_{jt} + e_{jt}$
Restriction: $a_1 - a_3 = 0$

7.4 The Depletion of Goodwill

The previous two sections have addressed the first two research questions: the value-relevance of purchased goodwill and magnitude of the relationship with other assets. This section will present arguments relating to whether the purchased goodwill that has been written off has declined in value or not. According to Zeff and Thomas (1973), it is over-conservative to write goodwill off the books when it has not depreciated in value below the purchase price. To write off goodwill in such a case creates a secret reserve while to recognise this reserve is thought to be unorthodox accounting. Goodwill suffers no actual decline in value so long as the earning capacity of the firm is maintained. However, there is good reason to suspect that goodwill will decline in value.

For instance, the 'momentum theory' of goodwill (Nelson, 1953) assumes that the buyer of a company normally pays for the goodwill in order to obtain a going concern, rather than to start fresh in similar business and devote effort over a period of time in order to develop a market presence. In effect, the buyer acquires momentum, and this investment ought to be charged against income over the estimated life of the momentum, which is unlikely to take a lengthy period to build from scratch. In this context, Grinyer (1995) suggests that the useful economic life of purchased goodwill would be shorter than that suggested by the amortisation periods normally recommended in accounting standards.

In our study sample, all companies write-off their purchased goodwill against reserves in the year of acquisition. If we believe that purchased goodwill is of value relevance to investors, the coefficient of (GW), a_3 should be significant and positive. On the other hand, if part of the purchased goodwill is not recorded, and that amount still has value-relevance for investors, then we would expect that the estimated intercept also would also be positive and significant. This argument is consistent with that of Kane and Unal (1990) who suggested that the estimated intercept serve as a net source of (drain on) unbookable assets and liabilities.

The results presented in the previous section provided evidence that a_3 is significant and positive and that a_0 is significantly non-zero for the first two years of goodwill accumulation only, suggesting that the intercept may include an amount of unbooked goodwill in excess of that eliminated in the current and previous years. In fact, our findings show that the intercept decreases in absolute value towards zero as the accumulation period increases. Figures 7.3 and 7.4 present the pattern of Intercept's coefficient values over a number of

years of cumulative purchased goodwill. The intercept decreases in absolute value towards zero as the accumulation period increases, and the market value arising from purchased goodwill increases as a result (see Figures 7.5 and 7.6). However, the capitalised value of current earnings remains constant in the face of the increasing goodwill accumulation, while the market value placed on net assets also absorbs the intercept term. In other words, the higher the book value of purchased goodwill; *i.e.* the lower its book to market ratio, the more that a (potentially synergistic) unrecorded asset is perceived as adding value to the net asset base.

Figure 7.3: Intercept Estimates for Goodwill Elimination Accumulations (Share Price 3 months after Year End)

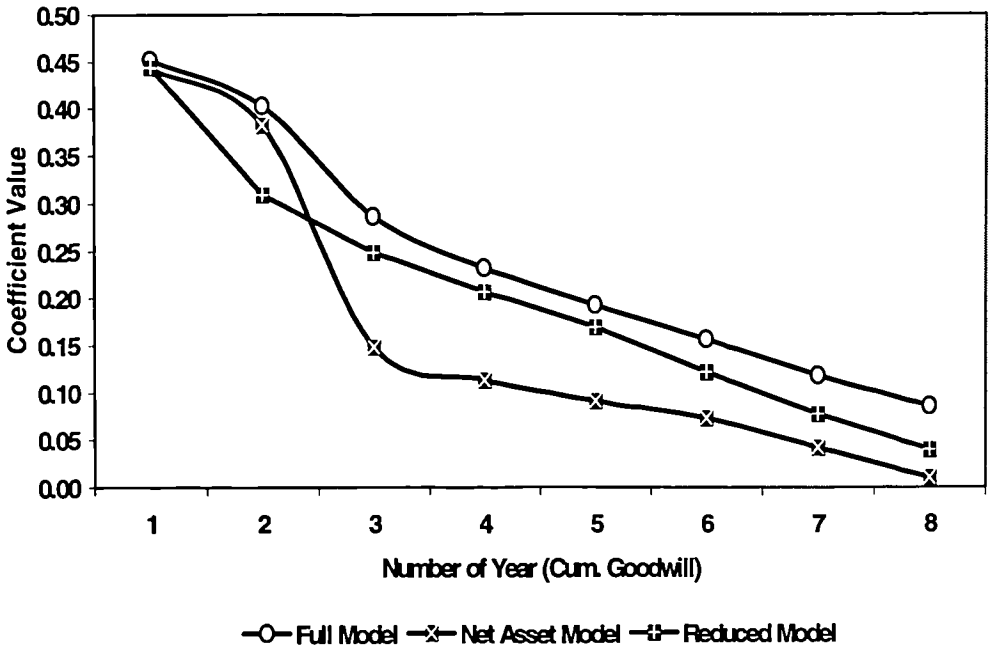


Figure 7.4: Intercept Estimates for Goodwill Elimination Accumulations (Share Price as at Year End)

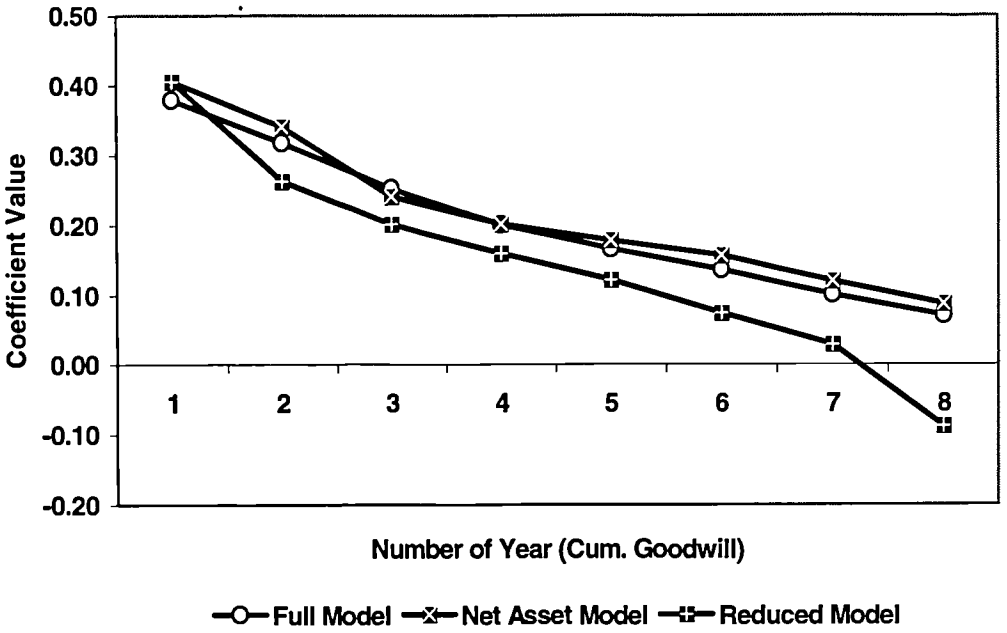
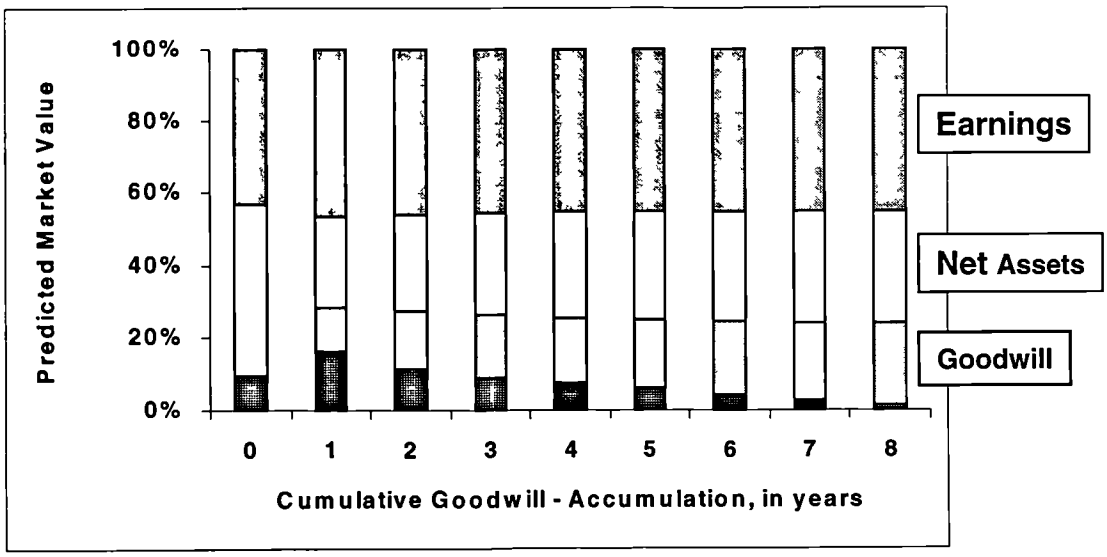
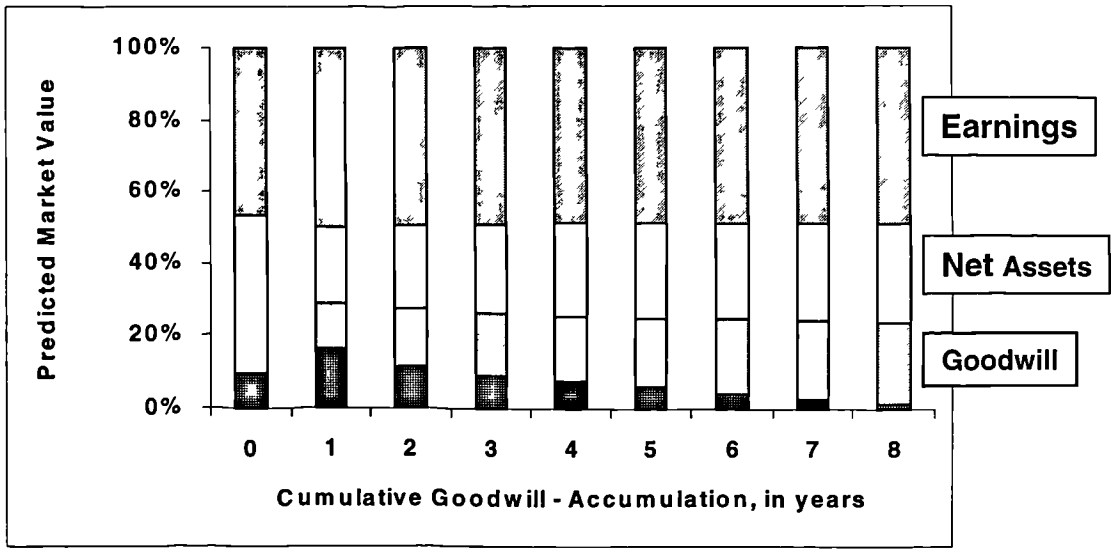


Figure 7.5: Components of the Linear Predictor
Share Price 3 Months after Year-end



Model: $MVE_{jt} = a_0 + a_1 BVNA_{jt} + a_2 GWn_{jt} + a_3 EARN_{jt} + \theta_{jt}$

Figure 7.6: Components of the Linear Predictor
Share Price as at Year-end



Model: $MVE_{jt} = a_0 + a_1 BVNA_{jt} + a_2 GWn_{ji} + a_3 EARN_{jt} + e_{jt}$

As a general conclusion, it can be said that the overall pattern of the absolute value of the intercept (in this case represented by purchased goodwill that has been written off) declines in value once the cumulative figures have increased. One interesting finding is that purchased goodwill that has been written off has value-relevance to the investor. Purchased goodwill does have a useful economic life and it seems to us, on average, that the investor values purchased goodwill within a very limited time frame. This result might not be conclusive because of the nature of the data; but it nonetheless it gives some empirical support to the ASB relating to the amortisation and impairment required by FRS 10.

7.5 Value Relevance of Off-Balance sheet Information

This thesis examines the extent to which purchased goodwill that has been written-off is reflected in a firm's market value. Results from the previous sections suggest that purchased goodwill has value-relevance to the investor, and that, in term of value, it can be considered equal to or higher, than other assets within certain useful economic life. At the same time it can, on average, show a decline in value. All the information relating to purchased goodwill does not appear on the face of the financial statements because it is not capitalised or amortised. Since the coefficients of BVNA, GW and EARN are significant for all cases, the indirect implication of this finding is that the investor considers all value-

relevant information conveyed by firms' financial reports; that is, both the information on the face of the financial statements and in the accompanying disclosures.

The changes in the intercept value from significant to non-significant also suggest that the intercept picks-up some value of purchased goodwill that has been written off in the early years. At a certain point, the increase in cumulative purchased goodwill is irrelevant to the market value. As a general conclusion, the results indicate that, in addition to the reported variables on the face of the balance sheet, investors use information in the accompanying disclosures. Of course, this finding is not new. Bowman (1980), Dhaliwal (1986), Landsman (1986), Beaver *et al.* (1988), Shevlin (1990), Barth (1994), Amir and Lev (1996), and Pfeiffer (1998), among others have reported similar findings.

7.6 Summary and Conclusion

This chapter has presented the empirical results of the thesis. Firstly, the overall results of this study suggest that the market perceives purchased goodwill as an asset and incorporates information pertaining to goodwill in the valuation of a company. Secondly, the empirical results show that the market appears to perceive purchased goodwill with a value equal (if not higher) to other assets. Thirdly, our empirical evidence suggests that the cumulative purchased goodwill show a decline in values over times and finally, our results indicate that investors' decision reflect all value-relevant information conveyed by company's financial reports, both the information on the face of the financial statements and in the accompanying disclosures. Several implications arise from the results of this study in light of the ASB's concerns about the accounting for goodwill saga. First, it is quite obvious that purchased goodwill is important information to the investor. Thus, `capitalised and amortised' treatment should provide more useful information to them about how to motivate or to control managers. Second, the impairment test required by FRS10 is justifiable compared to systematic amortisation. It is reasonable to claim that the cumulative purchased goodwill, on average, declines in value. It seems reasonable to support the arguments of Grinyer (1995), who believes that the useful economic life of purchased goodwill declines faster than any period suggested by any existing standards. Finally, based on the overall results of this study, we believe that FRS 10 is theoretically and empirically justifiable.

CHAPTER 8

SUMMARY AND CONCLUSIONS

8.1 Summary and Conclusions

The purpose of this thesis has been to increase the general understanding of the controversy surrounding purchased goodwill which has been eliminated in the year of acquisition. Specifically, the goals of this study were to test the association between goodwill accounting numbers and market values; to describe the relationship between purchased goodwill and other assets; and to explain the pattern of goodwill values over time. This topic is of concern to those who set accounting standards in the UK, given the new requirement that goodwill be capitalised and amortised with an impairment test. Thus, to demonstrate that an accounting standard is consistent with the nature of the underlying assets would be both relevant and timely.

In essence, our market association test is able to substantiate the concerns expressed over goodwill accounting in contemporary accounting research by providing evidence that purchased goodwill that has been written off is an important determinant of market value. These results are consistent with the overall findings by Henning (1994), McCarthy and Schneider (1995) and Jennings *et al.* (1996) which stated that goodwill numbers are of value-relevance to investors. However, it should be noted that their research differs from the present study in two respects: ours is based on companies in the UK, where the accounting treatment is to eliminate purchased goodwill through reserves in the year of acquisition, whereas prior research has been concerned with US firms which capitalised and amortised their purchased goodwill. Secondly, our analysis also confirms that goodwill is an asset of considerable magnitude; however we show that although goodwill is valued higher than other assets at the beginning of its useful economic life, it seems that much of the value in goodwill is short-lived.

As a general conclusion, our results indicate that, in addition to the reported variables on the face of the balance sheet, investors may usefully acquire information from the

accompanying notes. Of course, this finding is not new to the literature: Bowman (1980), Dhaliwal (1986), Landsman (1986), Beaver *et al.* (1988), Shevlin (1990), Barth (1994), Amir and Lev (1996), Aboody (1996), Aboody and Lev (1998) and Pfeiffer (1998), among others, report similar findings. More specifically, however, our results suggest that not only is unbooked goodwill of value-relevance to investors, but that the valuation ratio can also be considered to be similar to that of other assets, while the market's perception of the useful life is relatively short.

8.2 Comparison with Previous Studies

The present study is similar to the previous studies by McCarthy and Schneider (1995) and Jennings *et al.* (1996) which were both conducted in the US where purchased goodwill is capitalised and amortised. However, it is interesting to analyse and compares both results with those of current study.

McCarthy and Schneider found that investors include goodwill when valuing a firm: the goodwill variable was significant across all five years under study but the intercept value was significant only for one year. In a different study, Jennings *et al.* (1996) found that the estimated coefficients for recorded net goodwill were positive and highly significant for each of the seven years. Similar to McCarthy and Schneider, their intercept value was not significant for any of the years except for 1988. These results would normally indicate a good model. However, as explained earlier, the intercept value may indicate the movement of hidden reserves.

In the UK environment, however, it is quite obvious that the amount of goodwill elimination has some effect on the intercept value. Our preliminary analysis as reported in Chapter 6 together with the main results in Chapter 7, have proved this relationship. It might be relevant to pose questions from previous studies - (i) is the significant value of the intercept related to the amount of goodwill amortisation? or (ii) does the insignificant value of intercept imply that the amortisation rate used by the US firms is consistent with the economic value of purchased goodwill?.

Looking at the results from our main models, the intercept value is significant for the first two years of cumulative goodwill. Once we increase the goodwill cumulative figures, the intercept value becomes insignificant but the coefficient value for purchased goodwill remains positive and significant. When seen in the light of the US studies, it is obvious that

to some extent that amount of goodwill eliminated in the UK may have contributed to hidden reserves, as described by Kane and Unal (1990).

McCarthy and Schneider examined the magnitude of the market perception of purchased goodwill in relation to all other assets. They found that the estimated coefficient for goodwill was greater than other assets in all five years. However, the null hypothesis of equal coefficients was rejected in only two of the five years tested. As a result, they concluded that goodwill appears to be perceived by the market to have a value at least equal to other assets and possibly greater.

On the other hand, Jennings *et al.* report that the absolute value for the estimated coefficients for goodwill are generally larger than those for the book value of total assets exclusive of goodwill and property, plant and equipment, and for the book value of net property, plant and equipment (they segregated total assets into these two categories). No formal test was conducted to test the null hypothesis of equal coefficients. Jennings *et al.* concluded that, on average, either purchased goodwill is amortised 'too quickly' or other assets are expensed too slowly which is consistent with the hypothesis that investors continue to view purchased goodwill as an economic resource after the date of acquisition. These overall findings are consistent with McCarthy and Schneider (1995).

In the present study we found that the estimated coefficient of purchased goodwill was higher than the other assets in all eight years of cumulative goodwill for Model 1 and for at least the first 3 years of goodwill accumulation in second model. When we tested the null hypothesis of equal coefficients, the first two years of cumulative figures rejected this hypothesis for both models. In other words, investors value purchased goodwill more highly than other assets for only two years after acquisition has taken place. We believe that the "two year" factor in the intercept term (*t*-test of which is positive and significant) and this hypothesis (hypothesis of equal coefficients) is interrelated. One possible explanation is related to the age of purchased goodwill. In previous studies, the amount of goodwill has been the summed amount ranging from 1 to 40 years in a single sum. In our study, the cumulative figures represent the age of purchased goodwill. Our results show some consistency with the findings of previous studies but further exploration has indicated that, although goodwill is valued higher than other assets at the beginning of its useful economic life, it seems that much of the value in goodwill is short-lived.

Many other studies have investigated the relationship between market value and book value. These studies have been reviewed in Chapter 4. We would like to compare the coefficient values of the variables from the previous studies with those of the present one. This comparison is necessary to study the pattern of the coefficient values of the previous studies. One of the important elements that needs further consideration is whether the deviations of the coefficient values observed in this study (theoretically *BVOA* and *BVL* should be 1 and -1 respectively) is an isolated case or whether this is also the case in other studies.

Table 8.1 presents this comparison. All the previous studies are based either on the share price at year-end or on the price three months after year-end. In the present study our results are based on two prices: the year-end price and the price three months after year-end.

The main concern of this study is the coefficient values of purchased goodwill. The coefficient values of purchased goodwill in this study are consistent (ranging between 1.939 and 3.309) compared with the previous studies by McCarthy and Schneider (1995) (ranging between 1.636 and 2.637) and Jennings *et al.* (1996) (ranging between 1.76 to 4.00). Secondly, the coefficient values of book value of assets in the previous studies are between 0.560 and 2.550, while in the present result, the coefficient values are between 0.81 and 2.56, and are consistent with the previous researches. Thirdly, the coefficient values of liabilities of this study range from 0.524 to 3.123 while in the previous studies, they vary from 0.477 to 2.87. Fourthly, McCarthy and Schneider report coefficient values of earning between 3.343 and 9.727. In this study, however the coefficient values of earning are more stable, ranging from 5.913 to 7.622. Finally, the coefficient values of net assets in the net asset model in this study are range from 0.994 to 2.364 compared to 2.189 (a study by Aboody and Lev, 1998) and 2.784 (a study by Deng and Lev, 1998). As a general conclusion, the coefficient values of the variables in this thesis are consistent with those in the previous studies.

Table 8.1: A Comparison with Previous Results

Variables	Authors A	B	C	D	E	F	G	H	I
Intercept	12.660 to 61.570[a]	-25.240*[b]	13.375[c]	1.486[d]	20.921 to 114.945*[e]	-3.930 to -0.540[f]	0.071 to 0.452[g]	0.010 to 0.444[h]	-0.088 to 0.444[f]
Asset	0.960 to 1.100	0.559	-	-	0.923 to 2.095	1.360 to 2.550	0.813 to 2.569	-	-
Liability	-1.090 to -1.330	-0.477	-	-	-0.171 to -2.152	-1.180 to -2.870	-0.529 to -3.329	-	-
Net Assets	-	-	2.189	2.784	-	-	-	0.991 to 2.364	0.991 to 1.490
Goodwill	-	-	-	-	1.636 to 2.637	1.760 to 4.000	1.915 to 3.177	1.750 to 3.295	2.497 to 3.295
Earning	-	-	-	0.152	3.343 to 9.727	-	5.999 to 7.598	5.903 to 7.616	6.850 to 7.616
Other Variables	0.440 to 1.600	0.659	0.570	3.977	-	-	-	-	-
R^2	0.250 to 0.500	0.960	0.570	0.350	0.820 to 0.940	0.550 to 0.860	0.801 to 0.848	0.780 to 0.848	0.780 to 0.848

Notes:
*Model is estimated in undeflated form
A = Landsman, 1986 (Pension Fund), [a]All of the intercept values are significant at 5%.
B = Pfeiffer, 1998 (Mortgage), [b]The intercept values is significant at 5%.
C = Aboody and Lev, 1998 (Software Capitalisation), [c]The intercept values is significant at 5%.
D = Deng and Lev, 1998 (Research and Development), [d]The intercept values is significant at 5%.
E = McCarthy and Schneider, 1995 (Goodwill), [e]One out of five of the intercept value is significant at 5%.
F = Jennings *et al.*, 1996 (Goodwill), [f]One out of seven of the intercept value is significant at 5%.
G = Present Study (Basic Models), [g]The intercept values are significant at 5% for the first two years of cumulative goodwill.
H = Present Study (Net Asset Models), [h]The intercept values are significant at 5% for the first two years of cumulative goodwill.
I = Present Study (Reduced Models), [i]The intercept values are significant at 5% for the first two years of cumulative goodwill.

8.3 Suggestions for Future Research

The evidence gathered in this study is based on companies which write off goodwill against reserves in the year of acquisition. The implementation of FRS 10 which requires purchased goodwill to be capitalised and amortised and which came into effect for financial statements relating to accounting periods ending on or after 23 December 1998, provides an opportunity to explore a data set which appears on the face of the balance sheet. On the other hand, part of the goodwill will be amortised through the profit and loss using the impairment test or systematic amortisation. This situation would enable a study based on income statement valuation to be conducted. It would be useful to explore the relationship between purchased goodwill, earnings and market value in the UK environment based on that model.

Research could also be conducted into the use of the impairment test by managers as a method of "manipulating" amortisation charges between periods. The success of the impairment test and its application will be a significant determine in the success of FRS 10, since the impairment test could be used as an avoidance measure by managers.. Another area that could be explored is how managers react to FRS 10 and, consequently, how investors react to the goodwill number in the balance sheet. Previous studies of US Companies [for example, Hall (1991) and Henning (1994)] have suggested that managers select amortisation periods without regard for the economic substance of the goodwill in order to minimise the impact of amortisation expense on reported net income.

APPENDIX 1

ACCOUNTING FOR GOODWILL: EFFECT ON EPS, GEARING AND RESERVES

A1.1 Background

Bryer (1990) mentioned that during the 1980s acquisitions were increasingly used as a means of growth. Some companies had to absorb a large amount of goodwill write-off through their shareholders' fund. According to Rutteman (1990) the consolidated balance sheets of some companies started showing negative net worth. In extreme cases the companies' goodwill policies made their accounts look too weak; *i.e.*, their gearing ratios became so high as to endanger covenants or to cause acute embarrassment when raising finance (Nobes, 1992). To avoid these phenomena, some companies tried to reflect in their balance sheets the value of brands or trademarks (as opposed to the cost) which had previously been considered part of acquired goodwill (the difference between purchase price and the fair value of tangible net assets when one company acquires another company).

The Woodhead-Faulkner Report (*Brand and Goodwill Accounting Strategies: 1990*) identified 15 companies which reacted to the problem of accounting for goodwill by introducing "brands" or "trademarks" on their balance sheets. One company, Rank Hovis McDougall went one step further by capitalising acquired and home-grown brands. In the early stage of our study, we attempt to analyse the effects which an alternative goodwill accounting approach, and the inclusion of brands or trademarks onto the balance sheets, would have had on EPS, gearing and reserves on Rank Hovis McDougall and three other companies (for comparative purposes) against a backdrop of the issues relating to accounting for goodwill outlined above. We consider these analyses as preliminary studies, relevant to the controversy surrounding accounting for goodwill. Although we have not

include these findings on the main thesis[14], the results might be useful for an overall understanding of the issues, especially relating to the effect of the different accounting treatments: capitalisation and amortisation *v.s* write-off against reserves.

A1.2 The Issues

Based on the Woodhead-Faulkner special report on Brands and Goodwill, we selected Rank Hovis McDougall as an extreme case for this study due to the facts that they were the first company which capitalised acquired and home-grown brands in 1988. The other three companies (Cadbury Schweppes, Grand Metropolitan and Guinness) were selected for comparative purposes. The accounts of these companies (1988[15] to 1991) drawn from DATASTREAM and Financial Reports were analysed to gain insights on the following issues:

1. the effect of shifting from immediate write-off to five year amortisation[16] on the published earnings per share figures
2. the effects on the gearing ratios[17] of including brands or trademarks as an assets on the balance sheet
3. the effects on the reserves of including brands or trademarks as assets on the balance sheet

A1.3 Effects on Earning per Share (EPS)

Over the period 1988 to 1991 all the selected companies adopted the immediate write-off option for accounting for acquired goodwill. Table A1.1 presents data from 1988 to 1991 on the reduction of EPS if the companies did not used immediate write-off but had instead capitalised goodwill and amortised it over five years. A comparison between reported ad adjusted EPS for individual companies can be drawn from Figure A1. Table A1.1 shows that all the companies would have reported significantly lower EPS figures if they had chosen to capitalise and amortise goodwill. It is also interesting to note that Grand Metropolitan and Guinness have showed very contradictory results in EPS under both accounting treatments. In 1989, Grandmet reported 55.6 pence in EPS. If the company had chosen to amortise their goodwill, the EPS of the company would have been reduced to -13.5 pence. On the other hand, Guinness also reported a positive EPS of 19 pence in 1988. After taking into

[14] The main objective of this thesis is to provide empirical evidence whether the value of purchased goodwill that has been write-off in the year of acquisition is value-relevance to the market when they determine the market value of the firms. This analysis is not relevant to answer the research questions raised in this thesis. However the analysis presented in this appendix is consistent with the claimed that "managers factors" might influence in the regulation process as mentioned in Chapter 2.

[15] All of the selected companies (except for Cadbury) started to capitalise brands and trademarks from this year.

[16] Five year amortisation is chosen as suggested by International Accounting Standard E32 (IASC E32).

[17] Gearing Ratio is calculated based on this formula: Total Debt less Provision for Liabilities divided by total asset (with and without brand or trademark).

account the alternative amortisation treatment the EPS figure would have dropped to -1 pence.

Table A1.1
Percentage Reduction of EPS if Companies had Chosen to Capitalise and Amortise Goodwill Over a Five Year period

Company	1988 (%)	1989 (%)	1990 (%)	1991 (%)
Rank Hovis	25	34	44	42
Cadbury	44	92	94	73
Guinness	107	87	71	56
Grandmet	63	124	100	100

Figure A.1
Comparison between Reported and Adjusted EPS

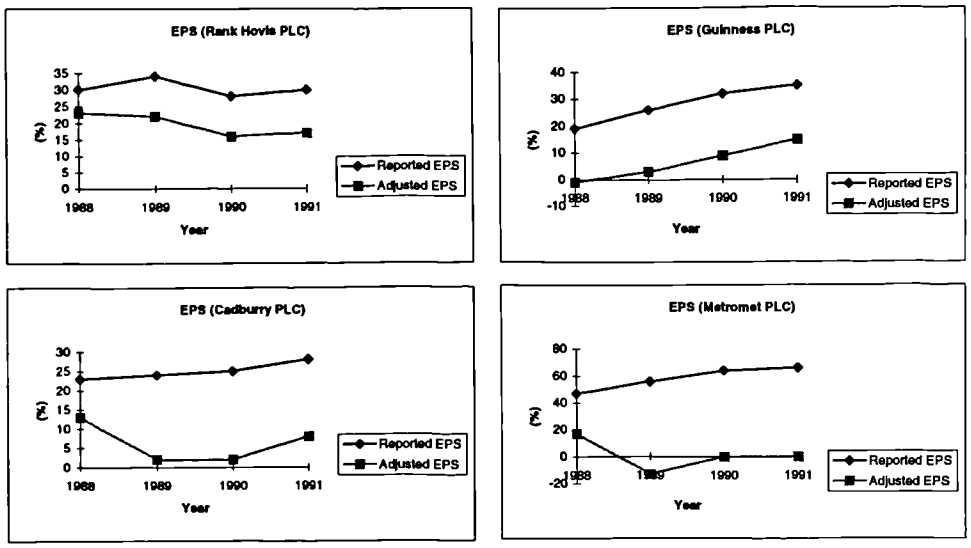


Table A1.2
Test of the Differences of Mean Values of EPS

Company	Rank Hovis	Cadbury	Guinness	Grandmet	All Company
Mean for Reported EPS	30.500	25.000	28.000	58.250	39.600
Mean for Adjusted EPS	19.500	6.250	6.500	1.000	10.500
t-value	5.090	6.540	4.320	7.610	7.820
Significance Level	0.004	0.007	0.008	0.001	0.000

Table A1.2 reports the results of the test of the difference of mean (between reported and adjusted EPS) for each of the companies and for all the companies as a whole. The results show that all the reported means for EPS are significantly different from the adjusted means

for EPS. These results reveal that all the EPS figures of the companies would have reduced significantly (using trends and t-test of the differences of means analysis), if they had chosen to capitalise and amortise goodwill.

A1.4 Effects on Gearing Ratio

Table A1.3 presents data from 1988 to 1991 on the percentage increase in gearing ratio if the selected companies had chosen not to put brands or trademarks on the balance sheet. As an alternative comparison, Table A1.4 presents data from the same period on the percentage of brands or trademarks to total assets. Comparisons of gearing ratios for individual companies can bee seen from Figure A1.2. Table A1.3 reveals that all the companies show a higher gearing ratio if they do not capitalise brands or trademarks as assets. For example, Rank Hovis's gearing ratio would have risen to more than 80% in 1989 if the calculation had not take account of brands as an assets. Arguably, this figure is less favourable than the lower figure (if the companies capitalise brands as assets) which would be interpreted as a negative financial indicator. On the assumption that managers of companies seek stable and low gearing ratios, the decision to include brands or trademarks in the balance sheet can be rationalised.

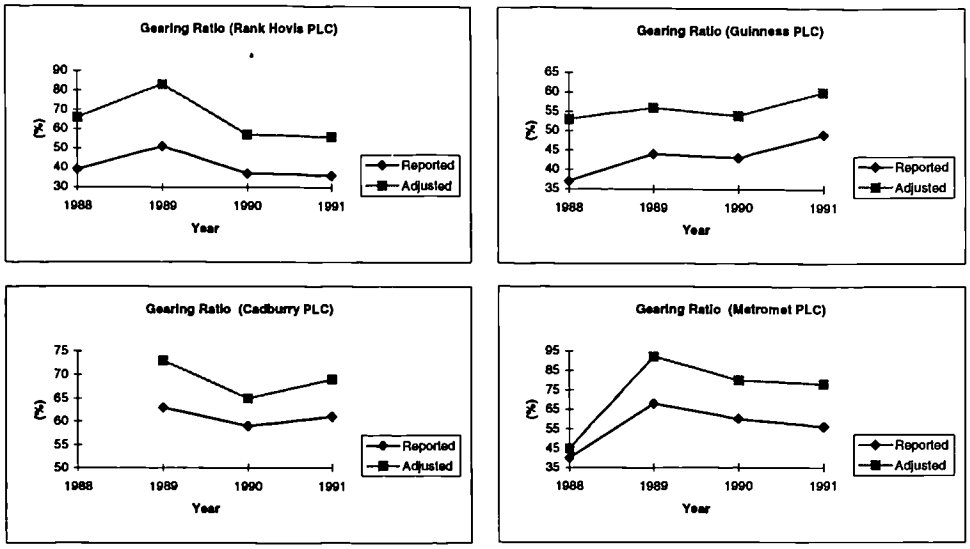
Table A1.3
Percentage Increase in Gearing Ratio if Companies do not Include Brands or Trademarks as Assets

Company	1988 (%)	1989 (%)	1990 (%)	1991 (%)
Rank Hovis	28	31	21	21
Cadbury	NA	10	9	8
Guinness	15	12	11	11
Grandmet	5	26	20	21

Table A1.4
Percentage Value of Brand or Trademarks to Total Assets

Company	1988 (%)	1989 (%)	1990 (%)	1991 (%)
Rank Hovis	41	38	36	37
Cadbury	NA	14	13	12
Guinness	29	22	21	18
Grandmet	10	28	25	27

Figure A.1.2
Comparison between Reported and Adjusted Gearing Ratio



A1.5 Effects on Reserves

Table A1.5 presents data from 1988 to 1991 on the reduction of total reserves if companies had chosen not to include brands or trademarks in the balance sheet. This choice implies that companies should classify brands or trademarks as goodwill and that the accounting treatment for goodwill should be to write goodwill off immediately against reserves (as this was the practice followed by all the companies during this period). As a result the total amount of reserves will be reduced by the amount of goodwill written off. Although it can be predicted that the total reserves figure will be decreased if companies choose not to include brands or trademarks in their balance sheets, it is interesting to note the actual percentage reduction as revealed in Table A1.5. The most dramatic figure is for Grandmet whose reserves in 1989 show percentage reductions of 115%. In other words the total reserves of that company for that particular year would have been negative!. In general all the selected companies would had suffered a reduction of more than 40% in 1990 onwards.

Table A1.5
Percentage Reduction of Total Reserves if Companies do not Include Brands or Trademarks as Assets

Company	1988 (%)	1989 (%)	1990 (%)	1991 (%)
Rank Hovis	81	91	64	64
Cadbury	NA	73	51	44
Guinness	59	48	43	47
Grandmet	20	115	80	85

A1.6 Conclusion

The analysis in this appendix shows that all the selected companies choose accounting treatments for goodwill that gave favourable results to managers. A comparison between alternative treatment show that reported earnings per share would reduce significantly if companies choose to capitalise and amortise goodwill. There is also evidence that acquisitive companies have reacted to the adverse impact on their balance sheets of writing off goodwill by including brands and trademarks as assets. We hope the results will be useful for the overall understanding of the "goodwill issues" especially relating to the effect each type of accounting treatment: capitalising and amortising or writing-off against reserves.

APPENDIX 2

Dummy Variables Regressions - Industrial Effects

A2.1 Share Price 3 Months after year-end

Ordinary Least Squares Estimation
Based on White's Heteroscedasticity adjusted S.E.'s

Dependent variable is MVE (SHARE PRICE 3 MONTHS AFTER YEAR-END)
275 observations used for estimation from 1 to 275

Regressor	Coefficient	Standard Error	T-Ratio[Prob]
Intercept	-1.6582	3.7651	-.44042[.660]
BVE	1.6431	.45268	3.6297[.000]
GW1	1.7225	1.2128	1.4203[.157]
EARN	7.0553	1.2099	5.8314[.000]
IND1	2.4277	3.6539	.66441[.507]
IND2	1.9785	3.5850	.55189[.582]
IND3	2.0217	3.5685	.56653[.572]
IND4	2.1176	3.6377	.58211[.561]
IND5	1.3976	3.6497	.38293[.702]
IND6	1.6257	3.7024	.43908[.661]
IND7	3.3832	3.6506	.92675[.355]
IND8	3.1119	3.0617	1.0164[.310]
IND9	1.0050	3.7003	.27162[.786]
IND10	2.0708	3.6174	.57247[.568]
IND11	2.4656	3.6845	.66918[.504]
IND12	1.5179	3.7384	.40603[.685]
IND13	1.6489	3.6973	.44597[.656]
IND14	2.5360	3.6487	.69504[.488]
IND15	1.9921	3.5926	.55450[.580]
IND16	1.4112	3.6530	.38632[.700]
IND17	1.6479	3.6652	.44961[.653]
IND18	7.2740	4.1218	1.7648[.079]
IND19	2.2465	3.5856	.62654[.532]
IND20	1.6713	3.7114	.45030[.653]
IND21	1.8124	3.6765	.49296[.622]
IND22	1.2345	3.5924	.34363[.731]
IND23	1.9077	3.6479	.52296[.601]
IND24	2.8327	4.2458	.66717[.505]

Ordinary Least Squares Estimation

Based on White's Heteroscedasticity adjusted S.E.'s

****

Dependent variable is MVE (SHARE PRICE 3 MONTHS AFTER YEAR-END)

275 observations used for estimation from 1 to 275

****

Regressor	Coefficient	Standard Error	T-Ratio[Prob]
Intercept	-1.6613	3.8227	-.43459[.664]
BVE	1.5358	.43589	3.5234[.001]
GW2	2.0619	1.0086	2.0442[.042]
EARN	7.1297	1.1430	6.2376[.000]
IND1	2.2465	3.6881	.60911[.543]
IND2	2.0513	3.5831	.57250[.568]
IND3	2.0286	3.5919	.56478[.573]
IND4	2.0495	3.6653	.55916[.577]
IND5	1.4462	3.6744	.39359[.694]
IND6	1.6281	3.7332	.43613[.663]
IND7	3.3249	3.6910	.90083[.369]
IND8	3.1119	3.1207	.99718[.320]
IND9	.9507	3.7287	.25497[.799]
IND10	2.0340	3.6523	.55691[.578]
IND11	2.4826	3.7283	.66587[.506]
IND12	1.5189	3.7804	.40179[.688]
IND13	1.6400	3.7279	.43992[.660]
IND14	2.4082	3.6749	.65532[.513]
IND15	1.9282	3.6368	.53020[.596]
IND16	1.3977	3.6212	.38597[.700]
IND17	1.8096	3.6320	.49824[.619]
IND18	6.3102	3.9444	1.5998[.111]
IND19	2.1070	3.6185	.58228[.561]
IND20	1.6800	3.7509	.44788[.655]
IND21	1.8011	3.6986	.48697[.627]
IND22	.9730	3.6269	.26828[.789]
IND23	1.8420	3.7010	.49770[.619]
IND24	2.7983	4.2892	.65241[.515]

****

Ordinary Least Squares Estimation

Based on White's Heteroscedasticity adjusted S.E.'s

****

Dependent variable is MVE (SHARE PRICE 3 MONTHS AFTER YEAR-END)

275 observations used for estimation from 1 to 275

****

Regressor	Coefficient	Standard Error	T-Ratio[Prob]
Intercept	-1.7999	3.8819	-.46366[.643]
BVE	1.5701	.41349	3.7971[.000]
GW3	1.9994	.89057	2.2451[.026]
EARN	7.0944	1.1254	6.3038[.000]
IND1	2.3456	3.7399	.62717[.531]
IND2	2.1369	3.6172	.59076[.555]
IND3	2.1393	3.6388	.58790[.557]
IND4	2.1468	3.7141	.57801[.564]
IND5	1.5650	3.7216	.42053[.674]
IND6	1.7084	3.7775	.45226[.651]
IND7	3.4396	3.7440	.91868[.359]
IND8	3.2515	3.1713	1.0253[.306]
IND9	1.0361	3.7756	.27443[.784]
IND10	2.1188	3.6986	.57287[.567]
IND11	2.6145	3.7808	.69151[.490]
IND12	1.6141	3.8297	.42146[.674]
IND13	1.7437	3.7767	.46169[.645]
IND14	2.4661	3.7162	.66360[.508]
IND15	2.0595	3.6898	.55817[.577]
IND16	1.4063	3.6408	.38627[.700]
IND17	1.8247	3.6265	.50315[.615]
IND18	6.2405	3.9686	1.5725[.117]
IND19	2.2135	3.6711	.60294[.547]
IND20	1.8003	3.8035	.47334[.636]
IND21	1.8893	3.7417	.50492[.614]
IND22	1.0094	3.6740	.27474[.784]
IND23	1.9543	3.7434	.52206[.602]
IND24	2.9125	4.3505	.66946[.504]

****

Ordinary Least Squares Estimation

Based on White's Heteroscedasticity adjusted S.E.'s

****

Dependent variable is MVE (SHARE PRICE 3 MONTHS AFTER YEAR-END)

275 observations used for estimation from 1 to 275

****

Regressor	Coefficient	Standard Error	T-Ratio[Prob]
Intercept	-1.8239	3.8953	-.46825[.640]
BVE	1.5611	.40825	3.8238[.000]
GW4	1.9869	.84035	2.3644[.019]
EARN	7.0984	1.1237	6.3168[.000]
IND1	2.3584	3.7531	.62840[.530]
IND2	2.1631	3.6267	.59644[.551]
IND3	2.1618	3.6499	.59230[.554]
IND4	2.1453	3.7225	.57629[.565]
IND5	1.5944	3.7333	.42708[.670]
IND6	1.7168	3.7873	.45330[.651]
IND7	3.4568	3.7558	.92040[.358]
IND8	3.2786	3.1805	1.0309[.304]
IND9	1.0252	3.7826	.27103[.787]
IND10	2.1089	3.7055	.56913[.570]
IND11	2.6398	3.7928	.69600[.487]
IND12	1.6196	3.8396	.42182[.674]
IND13	1.7538	3.7866	.46316[.644]
IND14	2.4672	3.7259	.66216[.508]
IND15	2.0869	3.7026	.56362[.574]
IND16	1.4350	3.6514	.39301[.695]
IND17	1.8667	3.6369	.51327[.608]
IND18	6.2791	3.9802	1.5776[.116]
IND19	2.2102	3.6796	.60067[.549]
IND20	1.8202	3.8152	.47709[.634]
IND21	1.8960	3.7499	.50561[.614]
IND22	.8878	3.6686	.24200[.809]
IND23	1.9911	3.7566	.53003[.597]
IND24	2.9377	4.3659	.67287[.502]

****

Ordinary Least Squares Estimation

Based on White's Heteroscedasticity adjusted S.E.'s

Dependent variable is MVE (SHARE PRICE 3 MONTHS AFTER YEAR-END)

275 observations used for estimation from 1 to 275

Regressor	Coefficient	Standard Error	T-Ratio[Prob]
Intercept	-1.8709	3.8933	-.48054[.631]
BVE	1.6049	.40458	3.9667[.000]
GW5	1.8959	.83909	2.2595[.025]
EARN	7.0722	1.1253	6.2849[.000]
IND1	2.4014	3.7434	.64150[.522]
IND2	2.1501	3.6200	.59395[.553]
IND3	2.1795	3.6437	.59816[.550]
IND4	2.1727	3.7164	.58461[.559]
IND5	1.5796	3.7238	.42420[.672]
IND6	1.7296	3.7803	.45754[.648]
IND7	3.4909	3.7502	.93085[.353]
IND8	3.3197	3.1755	1.0454[.297]
IND9	1.0181	3.7709	.26999[.787]
IND10	2.1117	3.6955	.57142[.568]
IND11	2.6605	3.7865	.70264[.483]
IND12	1.6316	3.8319	.42578[.671]
IND13	1.7742	3.7810	.46925[.639]
IND14	2.4679	3.7154	.66423[.507]
IND15	2.1248	3.6969	.57475[.566]
IND16	1.4331	3.6448	.39318[.695]
IND17	1.8469	3.6279	.50909[.611]
IND18	6.3407	4.0044	1.5834[.115]
IND19	2.2409	3.6722	.61023[.542]
IND20	1.8546	3.8122	.48649[.627]
IND21	1.9128	3.7436	.51095[.610]
IND22	.93971	3.6586	.25685[.798]
IND23	2.0255	3.7462	.54069[.589]
IND24	2.9658	4.3670	.67913[.498]

Ordinary Least Squares Estimation

Based on White's Heteroscedasticity adjusted S.E.'s

Dependent variable is MVE (SHARE PRICE 3 MONTHS AFTER YEAR-END)

275 observations used for estimation from 1 to 275

Regressor	Coefficient	Standard Error	T-Ratio[Prob]
Intercept	-1.8857	3.8945	-.48420[.629]
BVE	1.6073	.40644	3.9547[.000]
GW6	1.8929	.83460	2.2681[.024]
EARN	7.0735	1.1225	6.3014[.000]
IND1	2.4076	3.7439	.64308[.521]
IND2	2.0810	3.6038	.57745[.564]
IND3	2.1601	3.6379	.59378[.553]
IND4	2.1629	3.7134	.58244[.561]
IND5	1.5929	3.7238	.42775[.669]
IND6	1.7101	3.7750	.45301[.651]
IND7	3.4973	3.7504	.93250[.352]
IND8	3.3320	3.1764	1.0490[.295]
IND9	.9881	3.7650	.26247[.793]
IND10	2.0759	3.6887	.56278[.574]
IND11	2.6190	3.7757	.69365[.489]
IND12	1.5943	3.8244	.41688[.677]
IND13	1.7630	3.7771	.46677[.641]
IND14	2.4372	3.7140	.65623[.512]
IND15	2.1060	3.6927	.57032[.569]
IND16	1.3813	3.6303	.38049[.704]
IND17	1.8570	3.6250	.51228[.609]
IND18	6.3584	4.0095	1.5858[.114]
IND19	2.2437	3.6719	.61103[.542]
IND20	1.8656	3.8124	.48937[.625]
IND21	1.9010	3.7395	.50836[.612]
IND22	.9182	3.6560	.25116[.802]
IND23	2.0343	3.7458	.54309[.588]
IND24	2.9615	4.3671	.67813[.498]

Ordinary Least Squares Estimation

Based on White's Heteroscedasticity adjusted S.E.'s

Dependent variable is MVE (SHARE PRICE 3 MONTHS AFTER YEAR-END)

275 observations used for estimation from 1 to 275

Regressor	Coefficient	Standard Error	T-Ratio[Prob]
Intercept	-1.8739	3.8888	-.48186[.630]
BVE	1.6172	.40480	3.9950[.000]
GW7	1.8757	.81275	2.3078[.022]
EARN	7.0602	1.1136	6.3402[.000]
IND1	2.3967	3.7396	.64089[.522]
IND2	2.0325	3.5883	.56642[.572]
IND3	2.1272	3.6266	.58655[.558]
IND4	2.1368	3.7056	.57665[.565]
IND5	1.5776	3.7152	.42462[.671]
IND6	1.6720	3.7644	.44415[.657]
IND7	3.4731	3.7427	.92795[.354]
IND8	3.3240	3.1721	1.0479[.296]
IND9	.9233	3.7518	.24610[.806]
IND10	2.0087	3.6750	.54659[.585]
IND11	2.5947	3.7673	.68872[.492]
IND12	1.5416	3.8123	.40439[.686]
IND13	1.7328	3.7676	.45991[.646]
IND14	2.3715	3.7035	.64034[.523]
IND15	2.0241	3.6764	.55056[.582]
IND16	1.3519	3.6183	.37364[.709]
IND17	1.8316	3.6077	.50769[.612]
IND18	6.3634	4.0170	1.5841[.114]
IND19	2.2242	3.6665	.60662[.545]
IND20	1.8501	3.8051	.48622[.627]
IND21	1.8314	3.7238	.49180[.623]
IND22	.8593	3.6477	.23560[.814]
IND23	1.9904	3.7309	.53347[.594]
IND24	2.9333	4.3630	.67231[.502]

Ordinary Least Squares Estimation

Based on White's Heteroscedasticity adjusted S.E.'s

****

Dependent variable is MVE (SHARE PRICE 3 MONTHS AFTER YEAR-END)

275 observations used for estimation from 1 to 275

****

Regressor	Coefficient	Standard Error	T-Ratio[Prob]
Intercept	-1.8840	3.8892	-.48440[.629]
BVE	1.6216	.40390	4.0149[.000]
GW8	1.8659	.78860	2.3660[.019]
EARN	7.0600	1.1090	6.3659[.000]
IND1	2.4079	3.7412	.64362[.520]
IND2	2.0390	3.5858	.56864[.570]
IND3	2.1023	3.6201	.58073[.562]
IND4	2.1231	3.7026	.57342[.567]
IND5	1.5820	3.7131	.42606[.670]
IND6	1.6637	3.7617	.44229[.659]
IND7	3.4729	3.7421	.92807[.354]
IND8	3.3317	3.1726	1.0501[.295]
IND9	.9186	3.7507	.24492[.807]
IND10	1.9678	3.6688	.53636[.592]
IND11	2.5928	3.7654	.68858[.492]
IND12	1.5081	3.8064	.39619[.692]
IND13	1.7268	3.7650	.45864[.647]
IND14	2.3227	3.6987	.62797[.531]
IND15	1.9766	3.6681	.53887[.590]
IND16	1.3314	3.6110	.36871[.713]
IND17	1.8343	3.6006	.50946[.611]
IND18	6.3858	4.0225	1.5875[.114]
IND19	2.2269	3.6667	.60734[.544]
IND20	1.8530	3.8038	.48714[.627]
IND21	1.8017	3.7169	.48474[.628]
IND22	.8449	3.6480	.23163[.817]
IND23	1.9969	3.7305	.53530[.593]
IND24	2.9322	4.3640	.67192[.502]

****

A2.2 Share Price as at Year-end

Ordinary Least Squares Estimation
Based on White's Heteroscedasticity adjusted S.E.'s

Dependent variable is MVE (SHARE PRICE AS AT YEAR END)
275 observations used for estimation from 1 to 275

Regressor	Coefficient	Standard Error	T-Ratio[Prob]
Intercept	.60607	3.4067	.17790[.859]
BVE	1.4431	.43858	3.2904[.001]
GW1	1.8589	1.1259	1.6510[.100]
EARN	7.1156	1.1281	6.3078[.000]
IND1	.0920	3.2741	.028116[.978]
IND2	-.1564	3.1094	-.050309[.960]
IND3	-.1131	3.2428	-.034881[.972]
IND4	-.1834	3.2380	-.056640[.955]
IND5	-.8060	3.2239	-.25003[.803]
IND6	-.5659	3.3011	-.17145[.864]
IND7	1.2895	3.3044	.39025[.697]
IND8	1.9220	2.6742	.71873[.473]
IND9	-1.2000	3.3083	-.36262[.717]
IND10	-.2084	3.2209	-.064728[.948]
IND11	.3987	3.3144	.12031[.904]
IND12	-.7254	3.3568	-.21611[.829]
IND13	-.6055	3.2991	-.18355[.855]
IND14	-.0851	3.1938	-.026619[.979]
IND15	-.2970	3.2067	-.092629[.926]
IND16	-.6260	3.1717	-.19738[.844]
IND17	-2.8039	3.3000	-.84965[.396]
IND18	4.6899	3.7758	1.2421[.215]
IND19	.0120	3.2044	.0037528[.997]
IND20	-.5946	3.3205	-.17909[.858]
IND21	-.4531	3.2615	-.13895[.890]
IND22	-1.0140	3.2312	-.31387[.754]
IND23	-.0307	3.2147	-.0095617[.992]
IND24	.3849	3.7112	.10373[.917]

Ordinary Least Squares Estimation

Based on White's Heteroscedasticity adjusted S.E.'s

****

Dependent variable is MVE (SHARE PRICE AS AT YEAR END)

275 observations used for estimation from 1 to 275

****

Regressor	Coefficient	Standard Error	T-Ratio[Prob]
Intercept	.56098	3.4286	.16362[.870]
BVE	1.3976	.39184	3.5666[.000]
GW2	2.0453	.93312	2.1919[.029]
EARN	7.1453	1.0790	6.6221[.000]
IND1	-.0399	3.2792	-.012186[.990]
IND2	-.0931	3.0976	-.030085[.976]
IND3	-.0882	3.2431	-.027220[.978]
IND4	-.2224	3.2424	-.068615[.945]
IND5	-.7447	3.2285	-.23068[.818]
IND6	-.5404	3.3084	-.16334[.870]
IND7	1.2682	3.3173	.38230[.703]
IND8	1.9628	2.6972	.72772[.467]
IND9	-1.2241	3.3127	-.36950[.712]
IND10	-.2144	3.2295	-.066402[.947]
IND11	.4452	3.3293	.13374[.894]
IND12	-.6931	3.3703	-.20567[.837]
IND13	-.5900	3.3060	-.17848[.858]
IND14	-.1773	3.1952	-.055511[.956]
IND15	-.3193	3.2196	-.099202[.921]
IND16	-.6533	3.1386	-.20816[.835]
IND17	-2.6948	3.2481	-.82964[.408]
IND18	3.8884	3.6363	1.0693[.286]
IND19	-.0863	3.2091	-.026901[.979]
IND20	-.5576	3.3328	-.16731[.867]
IND21	-.4451	3.2628	-.13643[.892]
IND22	-1.219	3.2377	-.37673[.707]
IND23	-.0498	3.2265	-.015464[.988]
IND24	.3909	3.7348	.10468[.917]

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Ordinary Least Squares Estimation

Based on White's Heteroscedasticity adjusted S.E.'s

Dependent variable is MVE (SHARE PRICE AS AT YEAR END)

275 observations used for estimation from 1 to 275

Regressor	Coefficient	Standard Error	T-Ratio[Prob]
Intercept	.41524	3.4759	.11946[.905]
BVE	1.4503	.36799	3.9412[.000]
GW3	1.9347	.82048	2.3580[.019]
EARN	7.0970	1.0688	6.6402[.000]
IND1	.0736	3.3193	.022191[.982]
IND2	-.0146	3.1277	-.0046871[.996]
IND3	.0236	3.2808	.0072107[.994]
IND4	-.1188	3.2819	-.036201[.971]
IND5	-.6272	3.2680	-.19194[.848]
IND6	-.4563	3.3455	-.13642[.892]
IND7	1.3907	3.3592	.41400[.679]
IND8	2.1092	2.7357	.77097[.441]
IND9	-1.1318	3.3511	-.33775[.736]
IND10	-.1229	3.2674	-.037631[.970]
IND11	.5807	3.3710	.17229[.863]
IND12	-.5923	3.4109	-.17367[.862]
IND13	-.4827	3.3462	-.14426[.885]
IND14	-.1086	3.2288	-.033651[.973]
IND15	-.1793	3.2607	-.055005[.956]
IND16	-.6485	3.1576	-.20539[.837]
IND17	-2.6984	3.2912	-.81991[.413]
IND18	3.8876	3.6613	1.0618[.289]
IND19	.0312	3.2506	.0096268[.992]
IND2	-.4334	3.3757	-.12839[.898]
IND21	-.3542	3.2990	-.10737[.915]
IND22	-1.163	3.2754	-.35512[.723]
IND23	.0732	3.2582	.022474[.982]
IND24	.5135	3.7885	.13554[.892]

Ordinary Least Squares Estimation

Based on White's Heteroscedasticity adjusted S.E.'s

Dependent variable is MVE (SHARE PRICE AS AT YEAR END)

275 observations used for estimation from 1 to 275

Regressor	Coefficient	Standard Error	T-Ratio[Prob]
Intercept	.39233	3.4882	.11247[.911]
BVE	1.4407	.36245	3.9748[.000]
GW4	1.9251	.77108	2.4966[.013]
EARN	7.1016	1.0671	6.6549[.000]
IND1	.0853	3.3319	.025613[.980]
IND2	.0110	3.1364	.0035348[.997]
IND3	.0454	3.2911	.013800[.989]
IND4	-.1206	3.2907	-.036656[.971]
IND5	-.5987	3.2786	-.18263[.855]
IND6	-.4484	3.3551	-.13368[.894]
IND7	1.4070	3.3705	.41744[.677]
IND8	2.1351	2.7449	.77784[.437]
IND9	-1.1428	3.3590	-.34022[.734]
IND10	-.1329	3.2752	-.040582[.968]
IND11	.6050	3.3821	.17890[.858]
IND12	-.5873	3.4207	-.17170[.864]
IND13	-.4731	3.3559	-.14099[.888]
IND14	-.1082	3.2380	-.033415[.973]
IND15	-.1533	3.2725	-.046859[.963]
IND16	-.6205	3.1672	-.19592[.845]
IND17	-2.6568	3.2941	-.80653[.421]
IND18	3.9215	3.6679	1.0691[.286]
IND19	.0275	3.2598	.0084491[.993]
IND20	-.4144	3.3867	-.12236[.903]
IND21	-.3479	3.3072	-.10520[.916]
IND22	-1.2820	3.2763	-.39129[.696]
IND23	.1083	3.2710	.033125[.974]
IND24	.5374	3.8027	.14133[.888]

Ordinary Least Squares Estimation

Based on White's Heteroscedasticity adjusted S.E.'s

Dependent variable is MVE (SHARE PRICE AS AT YEAR END)

275 observations used for estimation from 1 to 275

Regressor	Coefficient	Standard Error	T-Ratio[Prob]
Intercept	.34962	3.4882	.10023[.920]
BVE	1.4755	.36062	4.0914[.000]
GW5	1.8565	.76946	2.4127[.017]
EARN	7.0816	1.0684	6.6284[.000]
IND1	.1210	3.3261	.036396[.971]
IND2	.0013	3.1333	.4249E-3[1.00]
IND3	.0620	3.2878	.018867[.985]
IND4	-.0968	3.2878	-.029462[.977]
IND5	-.6127	3.2734	-.18719[.852]
IND6	-.4376	3.3515	-.13059[.896]
IND7	1.4368	3.3674	.42669[.670]
IND8	2.1722	2.7430	.79190[.429]
IND9	-1.1531	3.3523	-.34396[.731]
IND10	-.1334	3.2696	-.040815[.967]
IND11	.6236	3.3787	.18458[.854]
IND12	-.5782	3.4168	-.16924[.866]
IND13	-.4549	3.3534	-.13566[.892]
IND14	-.1122	3.2321	-.034738[.972]
IND15	-.1200	3.2698	-.036727[.971]
IND16	-.6205	3.1640	-.19612[.845]
IND17	-2.6678	3.3036	-.80754[.420]
IND18	3.9532	3.7000	1.0684[.286]
IND19	.0524	3.2559	.016110[.987]
IND20	-.3825	3.3860	-.11298[.910]
IND21	-.3328	3.3043	-.10073[.920]
IND22	-1.2411	3.2706	-.37948[.705]
IND23	.1374	3.2658	.042077[.966]
IND24	.5612	3.8050	.14750[.883]

Ordinary Least Squares Estimation

Based on White's Heteroscedasticity adjusted S.E.'s

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Dependent variable is MVE (SHARE PRICE AS AT YEAR END)

275 observations used for estimation from 1 to 275

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Regressor	Coefficient	Standard Error	T-Ratio[Prob]
Intercept	.3369	3.4890	.096586[.923]
BVE	1.4724	.36242	4.0628[.000]
GW6	1.8676	.76553	2.4396[.015]
EARN	7.0867	1.0652	6.6529[.000]
IND1	.1229	3.3272	.036953[.971]
IND2	-.0647	3.1222	-.020755[.983]
IND3	.0425	3.2839	.012951[.990]
IND4	-.1085	3.2860	-.033029[.974]
IND5	-.5994	3.2729	-.18316[.855]
IND6	-.4581	3.3478	-.13685[.891]
IND7	1.4408	3.3683	.42775[.669]
IND8	2.1824	2.7441	.79531[.427]
IND9	-1.1850	3.3486	-.35388[.724]
IND10	-.1709	3.2653	-.052367[.958]
IND11	.5816	3.3695	.17261[.863]
IND12	-.6168	3.4118	-.18081[.857]
IND13	-.4671	3.3505	-.13943[.889]
IND14	-.1459	3.2316	-.045166[.964]
IND15	-.1411	3.2672	-.043186[.966]
IND16	-.6702	3.1524	-.21263[.832]
IND17	-2.6520	3.3000	-.80364[.422]
IND18	3.9506	3.7046	1.0664[.287]
IND19	.0517	3.2562	.015891[.987]
IND20	-.3727	3.3859	-.11008[.912]
IND21	-.3453	3.3013	-.10461[.917]
IND22	-1.2691	3.2695	-.38815[.698]
IND23	.1430	3.2658	.043801[.965]
IND24	.5546	3.8050	.14576[.884]

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Ordinary Least Squares Estimation

Based on White's Heteroscedasticity adjusted S.E.'s

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Dependent variable is MVE (SHARE PRICE AS AT YEAR END)

275 observations used for estimation from 1 to 275

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Regressor	Coefficient	Standard Error	T-Ratio[Prob]
Intercept	.3515	3.4847	.10087[.920]
BVE	1.4745	.36141	4.0797[.000]
GW7	1.8705	.74588	2.5078[.013]
EARN	7.0791	1.0571	6.6966[.000]
IND1	.1060	3.3246	.031889[.975]
IND2	-.1110	3.1101	-.035701[.972]
IND3	.0089	3.2758	.0027465[.998]
IND4	-.1374	3.2803	-.041915[.967]
IND5	-.6142	3.2660	-.18807[.851]
IND6	-.4980	3.3401	-.14912[.882]
IND7	1.4134	3.3622	.42038[.675]
IND8	2.1718	2.7413	.79226[.429]
IND9	-1.2534	3.3396	-.37533[.708]
IND10	-.2416	3.2561	-.074220[.941]
IND11	.5553	3.3633	.16511[.869]
IND12	-.6723	3.4033	-.19756[.844]
IND13	-.4990	3.3435	-.14926[.881]
IND14	-.2167	3.2240	-.067239[.946]
IND15	-.2266	3.2559	-.069602[.945]
IND16	-.6981	3.1426	-.22216[.824]
IND17	-2.6689	3.2871	-.81193[.418]
IND18	3.9270	3.7103	1.0584[.291]
IND19	.0273	3.2526	.0084153[.993]
IND20	-.3896	3.3803	-.11526[.908]
IND21	-.4162	3.2897	-.12652[.899]
IND22	-1.3377	3.2647	-.40974[.682]
IND23	.0949	3.2551	.029170[.977]
IND24	.5229	3.8017	.13756[.891]

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Ordinary Least Squares Estimation

Based on White's Heteroscedasticity adjusted S.E.'s

Dependent variable is MVE (SHARE PRICE AS AT YEAR END)

275 observations used for estimation from 1 to 275

Regressor	Coefficient	Standard Error	T-Ratio[Prob]
Intercept	.3403	3.4844	.097679[.922]
BVE	1.4820	.36061	4.1097[.000]
GW8	1.8527	.72209	2.5657[.011]
EARN	7.0766	1.0530	6.7206[.000]
IND1	.1196	3.3250	.035974[.971]
IND2	-.1052	3.1071	-.033861[.973]
IND3	-.0152	3.2707	-.0046650[.996]
IND4	-.1497	3.2778	-.045691[.964]
IND5	-.6099	3.2635	-.18690[.852]
IND6	-.5053	3.3375	-.15141[.880]
IND7	1.4147	3.3615	.42085[.674]
IND8	2.1806	2.7412	.79549[.427]
IND9	-1.2563	3.3384	-.37632[.707]
IND1	-.2805	3.2516	-.086284[.931]
IND11	.5543	3.3612	.16494[.869]
IND12	-.7042	3.3991	-.20720[.836]
IND13	-.5041	3.3409	-.15091[.880]
IND14	-.2628	3.2205	-.081610[.935]
IND15	-.2718	3.2501	-.083647[.933]
IND16	-.7189	3.1362	-.22925[.819]
IND17	-2.6695	3.2829	-.81315[.417]
IND18	3.9608	3.7122	1.0670[.287]
IND19	.0322	3.2524	.0099068[.992]
IND20	-.3861	3.3786	-.11428[.909]
IND21	-.4447	3.2845	-.13541[.892]
IND22	-1.3477	3.2652	-.41276[.680]
IND23	.1034	3.2539	.031781[.975]
IND24	.5234	3.8026	.13766[.891]

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