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THE PRICING AND STRUCTURE OF SYNDICATED LOANS: THREE EMPIRICAL STUDIES

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THE PRICING AND STRUCTURE OF SYNDICATED LOANS: THREE EMPIRICAL STUDIES

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"Még egy kis ràadàst Gögikének, hadd daloljon!"

"Làtni, amit màr mindeki làtott – és azt gondolni ròla, amire még senki nem gondolt!"

Albert Szent-Györgyi, 1893-1986

Az Óhazàban élõ és a vilàgban elszòròdott csalàdomnak

FOREWORD

Il n'est pas pour moi un seul de ces soixante-neuf kilomètres de route qui ne soit recouvert de souvenirs et de sensations. L'enfance violente, les rêveries adolescentes dans le ronronnement du car, les matins, les filles fraîches, les plages, les jeunes muscles toujours à la pointe de leur effort, la légère angoisse du soir dans un cœur de seize ans, le désir de vivre, la gloire, et toujours le même ciel au long des années, intarissable de force et de lumière, insatiable lui-même, dévorant une à une, des mois durant, les victimes offertes en croix sur la plage, à l'heure funèbre de midi. Toujours la même mer aussi, presque impalpable dans le matin, que je retrouvai au bout de l'horizon dès que la route, quittant le Sahel et ses collines aux vignes couleur de bronze, s'abaissa vers la côte. Mais je ne m'arrêtai pas à la regarder. Je désirais revoir le Chenoua, cette lourde et solide montagne, découpée dans un seul bloc, qui longe la baie de Tipasa à l'ouest, avant de descendre elle-même dans la mer. On l'aperçoit de loin, bien avant d'arriver, vapeur bleue et légère qui se confond encore avec le ciel. Mais elle se condense peu à peu, à mesure qu'on avance vers elle, jusqu'à prendre la couleur des eaux qui l'entourent, grande vague immobile dont le prodigieux élan aurait été brutalement figé au-dessus de la mer calmée d'un seul coup. Plus près encore, presque aux portes de Tipasa, voici le vieux dieu moussu que rien n'ébranlera, refuge et port pour ses fils, dont je suis.

C'est en le regardant que je franchis les barbelés pour me retrouver parmi les ruines. Et sous la lumière glorieuse de décembre, comme il arrive une ou deux fois seulement dans des vies, qui, après cela, peuvent s'estimer comblées, je retrouvai exactement ce que j'étais venu chercher et qui, malgré le temps et le monde, m'était offert, à moi seul vraiment, dans cette nature déserte. Du forum jonché d'olives, on découvrait le village en contrebas. Aucun bruit n'en venait : des fumées légères montaient dans l'air limpide. La mer aussi se taisait, comme suffoquée sous la douche ininterrompue d'une lumière étincelante et froide. Venu du Chenoua, un lointain chant de coq célébrait seul la gloire fragile du jour. Du côté des ruines, aussi loin que la vue pouvait porter, on ne voyait que des pierres grêlées et des absinthes, des arbres et des colonnes parfaites dans la transparence de l'air cristallin. Il semblait que la matinée se fût fixée, le soleil arrêté pour un instant incalculable. Danse cette lumière et ce silence, des années de fureur et de nuit fondaient lentement. J'écoutais en moi un bruit presque oublié, comme si mon cœur, arrêté depuis longtemps, se remettait doucement à battre. Et maintenant éveillé, je reconnaissais un à un les bruits imperceptibles dont était fait le silence : la basse continue des oiseaux, les soupirs légers et brefs de la mer au pied des rochers, la vibration des arbres, le chant aveugle des colonnes, les froissements des absinthes, les lézards furtifs. J'entendais cela, j'écoutais aussi les flots heureux qui montaient en moi. Il me semblait que j'étais enfin revenu au port, pour un instant au moins, et que cet instant désormais n'en finirait plus.

Mais peu après, le soleil monta visiblement d'un degré dans le ciel. Un merle préluda brièvement et aussitôt, de toutes parts, des chants d'oiseaux explosèrent avec une force, une jubilation, une joyeuse discordance, un ravissement infini. La journée se remit en marche. Elle devait me porter jusqu'au soir.

Albert Camus : *L'été – Retour à Tipasa*

Return to Tipasa

To me, there is hardly any one of those sixty-nine kilometres of road that is not bristling with memories and feelings. Violent childhood, adolescent dreams in the puffing of the coach, mornings, blossoming girls, beaches, young muscles always at the peak of their effort, light evening anxiety in a sixteen year-old heart, the desire to live, glory, and always the same sky all along those years, with its never-ending strength and light, itself insatiable, gulping down, for months on end, its victims, laid out on the beach as sacrificial lambs at the fatal hour of twelve, noon. Always the same sea, too, almost impalpable in the morning; I found it unchanged at the end of the horizon as soon as the road, leaving the Sahel and its bronze-coloured vineyards, started to lead downhill towards the coast. I did not stop to look at it, though. I wished to see the Chenoua again, that heavy solid mountain, etched out in one block, that lies along the Tipasa bay on the West side, before it reaches down into the sea. It can be noticed from far away, long before one arrives, in the form of blue and light steam still mingling with the sky. But then it condenses little by little, as one moves towards it, until it takes the colour of the waters surrounding it, like a large, still wave, whose prodigious thrust had been brutally transfixed over the sea calmed down in between in a jiffy. Nearer still, at Tipasa's gates, here stands the old, mossy god that nothing will unseat; it is a haven for its sons and I am one of them.

As I was watching it, I stepped over the barbed wires and found myself among the ruins. In the glorious light of December, as happens only once or twice in a person's life, who may then consider it to be fulfilled, I found exactly what I was looking for. In spite of time and space, this was given to me, to me only, in this barren setting. From the forum ground scattered with olives, one could see the village down below. No sound came from there: some light smoke was rising from the clear air. The sea was silent too, as if suffocated by the uninterrupted flow of scintillating and cold light. A remote rooster's song could be heard coming from the Chenoua, alone to celebrate the fragile glory of the day. On the side of the ruins, only worn stones and absinthes, trees and erect columns could be seen as far as the eye could reach in the transparency of the crystal air. It seemed that the morning had become still as if the sun had stopped for and indefinite period. In this light and silence, years of fury and darkness were mingling slowly. I was listening to a long forgotten sound inside me, as if my heart had started beating again, after a long moment of rest. Awake again, I recognised one by one the imperceptible sounds that made silence: the continuous tone of the birds, the faint and brief sighs of the sea at the foot of the rocks, the vibration of the trees, the blind song of the columns, the light movement of the absinthes and the swift lizards. I could hare all this, I was listening to the joyous flows of emotions that were rising inside me. I felt as if I were home again, at least for an instant, and that this instant was everlasting.

But shortly afterwards, the sun rose slightly up in the sky. A blackbird gave a short preluding song and all at once from everywhere, the birds burst into singing with incredible strength, jubilation, joyous discord and infinite elation. The day was resuming slowly and was to lead me through to the evening.

Albert Camus text – free translation by Blaise Gadanecz

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When in Bangor, I mostly stayed at the Anglican Chaplaincy in a room offering soothing and inspiring views of the Menai Straits, a landmark of sunny Bangor which only the landscape described in that text by Albert Camus can match in calm and beauty. In the Chaplaincy and indeed in my University Department, meeting fellow students from all continents, especially Lorenc Hoxhallari from Albania, was a valuable experience. I should not forget to mention the presence of the friendly SBARD staff who were always ready to help – even when living out of cardboard boxes in the middle of office moves.

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Alexandre Dubois, but also Claudia Castellani, Nicole Charvagat, Ludi Johnson, David Marqués Ibañez, Daniel Pierce, Damien Régent, and Baptiste Venet. They are exceptional people who leave no stone unturned. It is a great gift and an honour to have their friendship. I would also like to convey my special thanks to Yves Rey for his friendship during my time in Basel.

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LIST OF ABBREVIATIONS

BIS	=	Bank for International Settlements
bn	=	billion (1,000,000,000)
bp	=	basis points
CDO	=	collateralised debt obligation
EURIBOR	=	Euro interbank offered rate
IDB	=	Inter-American Development Bank
IFC	=	International Finance Corporation
LIBOR	=	London Interbank Offered Rate
LPC	=	Loan Pricing Corporation
m	=	million (1,000,000)
M&A	=	Mergers and Acquisitions
MOF	=	Multiple Options Facility
NIF	=	Note Issuance Facility
OLS	=	Ordinary Least Squares
OPEC	=	Organisation of the Petroleum Exporting Countries
RUF	=	Revolving Underwriting Facility
S&P	=	Standard & Poor's

ABSTRACT

THIS THESIS EXPLORES the micro-structure of the market for syndicated loans from the demand and supply side and aims to provide a detailed micro-economic analysis. The focus is on the determinants of loan pricing to both developing and industrialised countries. Particular attention is paid to the characteristics of both lenders and borrowers. The thesis comprises four papers.

Paper 1 defines key concepts and provides a historical outlook on the international market for syndicated loans since the late 1970s.

Paper 2 analyses in an extensive risk-return framework the determinants of the pricing of syndicated credits granted to developing country borrowers between 1993 and 2001. It concludes that risk is properly reflected in loan pricing, although the effect of purely micro-economic price determinants is in several instances weaker when variables reflecting macro-economic conditions in borrowers' countries are also introduced into the model. Analysis of market structure allows us to make inferences about the effects of bank market power and perceived risk concentration in syndicated lending to developing country borrowers.

Paper 3 extends the second one in a first attempt to our knowledge to analyse the determinants of the pricing of developing and industrialised country loans and bonds taken together in the 1990s. On average, we find that developing country bonds have been riskier than developing country loans and industrialised country loans riskier than industrialised country bonds. We analyse how spill-over effects may have taken place from one market segment to the other in the wake of the Asian financial crisis. We also compare market access and structure on the respective market segments. We find that banks and investors may have exercised their market power to the greatest extent or that the penalising effect of higher perceived risk concentration may have been most pronounced in the case of bank loans being made to developing country borrowers.

Paper 4 is the first of its kind to investigate the effects of bank characteristics on the structure and pricing of syndicated loans at an international level, using a unique dataset. We show that the pricing of loans is likely to be lower as banks participating in those loans become less liquidity-constrained or better capitalised, or enjoy a regulatory advantage. The relationship between bank characteristics and loan pricing generally appears to be stronger in the case of senior banks than of junior banks. This confirms the stronger pricing power of senior banks when arranging loans, while junior participants tend to act more as price takers. Contrary to the existing literature we find evidence of senior banks offloading larger shares of riskier loans in a potentially opportunistic way to outsider junior banks with little knowledge of the borrower. They also tend to hold higher portions of loans they arrange when they are better capitalised. In addition, as information about the borrower becomes less transparent, junior banks rely more on the reputation of the senior bank, to determine their level of commitment, than when borrower information is widely available to the public.

GENERAL INTRODUCTION

1. Introduction

INTERNATIONAL SYNDICATED LENDING REPRESENTED $1.4 trillion in 2001, or more than one third of all new international financing on capital markets. Syndicated lending – where several banks form a group to lend to the same borrower – is deemed to have generated more underwriting revenue in recent years than either the equity or the bond market (Madan, Sobhani and Horowitz, 1999). At the time of writing, in 2002, many corporations were having difficulty financing themselves on international bond, commercial paper or equities markets, leaving them no choice but to turn to their bankers for loans. But twenty years ago, on the eve of the sovereign default by Mexico in 1982, most of developing countries' debt already consisted of syndicated loans. The default threatened large Western financial institutions and indeed parts of their countries' financial systems. The eventual restructuring of Mexican debt into Brady bonds, whereby creditors saw their loans exchanged for securities guaranteed by the US government, created a precedent in the way it changed the structure of financial markets.

Medium-term syndicated bank loans were the principal instrument for channelling foreign capital to the developing countries of Africa, Asia and especially Latin America between 1971 and 1982, as banks massively recycled OPEC countries' oil-related wealth by means of euro-dollar trading. Syndication – primarily intended to share risk – allowed smaller financial institutions to acquire exposure to emerging market borrowers without having to establish a local presence in those regions, in what seemed an advantageous risk-return combination. Syndicated lending to emerging market borrowers grew more than sixfold from $46 bn worth of facilities granted in 1972 to over $300 bn in August 1982. Lending came to an abrupt halt that year, after Mexico had suspended payments on its sovereign debt. This made lenders much warier about lending to emerging markets, which resulted in a sharp phase of contraction in syndicated lending to these countries, with volume bottoming out at $19 bn in 1985.

By the beginning of the 1990s, banks, which had been burnt by developing countries' debt crisis a decade before, had learnt some of the risk-based pricing techniques of the public corporate-bond market and started applying those techniques to syndicated lending. While banks became more sophisticated, much more data became available on

the performance of loans, and financial markets made it possible to trade loans between banks and sell them even to non-banks such as pension funds. Moreover, it became possible to buy protection against credit risk while keeping the loans on the balance sheet. Most importantly, corporations in industrialised countries developed an appetite for syndicated loans which they saw as a useful, flexible source of funds that could be arranged quickly and relied on to complement other sources of external financing such as equities or bonds. As a result, syndicated lending is now the largest financial market in America (Madan, Sobhani and Horowitz, 1999), generating more underwriting revenue than equities or bonds.

2. Research questions and methodology

The aim of this thesis is to examine the determinants of syndicated loan pricing and to provide a detailed micro-economic analysis. As noted in the introduction above, the international syndicated loan market is a very important segment of international financial markets and we seek to provide an in-depth analysis of how it operates. The resulting inferences about market structure and borrower market access have important implications for the global financial system as a whole.

It is rare and difficult for researchers to access banks' books to glean information on individual loan specifications. However, there exist commercially available facility-by-facility databases such as those of Dealogic Loanware where individual borrowings are recorded. Only recently have researchers started to analyse such facility-by-facility databases in a systematic risk-return framework. A wealth of facility-level information on loan specifications (such as pricing, maturity, size or purpose), together with the characteristics of borrowers (like sector or nationality) and lenders (bank name, nationality, role – junior or senior – and level of commitment) can be used in order to gain valuable information about borrowers' market access and lenders' price-setting power. But a great amount of effort is required to make the data suitable for empirical analysis.

The focus of our work is on both the determinants of loan pricing to developing and industrialised countries. Particular attention is paid to the characteristics of both lenders and borrowers. The main research objective of the PhD is to investigate how loan pricing and other characteristics are used to reach market equilibrium as supply and demand (risk) meet and resolve information asymmetry issues between borrowers and lenders on the one hand and among different lenders on the other. Loan demand and supply are analysed separately and the thesis comprises four papers, each looking at one particular area. The first paper provides a review of institutional and empirical issues. The second and third papers focus on the demand side. The second one contributes a detailed study of the pricing of developing country syndicated loans – these countries were historically among the first recipients of such loans – while the third one extends the analysis to industrialised country borrowers and also compares the characteristics of syndicated loans with those of bonds, one of the main alternative sources of financing to loans. The fourth paper pays particular attention to the supply side issues of syndicated lending.

Paper 2 explores the relationship between developing country economic structure and the pricing of syndicated credits to borrowers in emerging markets. It is reasonable to begin any analysis of the syndicated loan market with developing country borrowers as lending to sovereign developing countries was how syndicated loans came into existence in the first place in the 1970s and 80s, providing an indispensable source of financing for these countries by recycling the OPEC countries' oil wealth. As a result, some developing countries have become excessively dependent on foreign funds or aid, which has left them unable to escape the poverty trap by their own means (Grinols and Bhagwati, 1976). As early as twenty years ago, concerns were expressed about such countries' growing reliance on credits from private international banks (e.g. Buira Seira, 1979). Economic problems in developing countries have often triggered major international financial crises over the past three decades. The Mexican crisis of 1982 was among the first crises to have a major impact on the functioning of international capital markets, with the development of Brady bonds (Rhodes, 1996). More recently, the financial crises in South-East Asia (1997) and Russia (1998) also had a major impact on international lenders' behaviour (see, for instance, IMF, World Economic Outlook, October 1998). Several recent papers discuss bank lending to emerging markets (Van Rijckeghem and Weder, 2001; Goldberg, Dages and Kinney, 2000;

Goldberg, 2001) and crises (Kaminsky and Reinhart, 1999). The sustained availability of foreign credit to developing countries is viewed as one means for deepening capital markets in these countries and potentially reducing the severity of crises, when they occur (Goldberg, 2001). As some developing countries have nowadays become very dependent on syndicated lending by foreign banks to finance their development, raising funds on this market to a large extent, it is useful to examine how banks have reacted to this dependence and to borrower visibility on the market. How does a developing country's dependence on the market for international syndicated loans influence the pricing of foreign funds that are available to it? More generally, what is the relationship between borrower market share, market structure and developing country loan pricing, other micro- and macro-economic factors being equal? This is the main research question examined in the second paper, as an extension of the framework used in existing studies such as Eichengreen and Mody (2000).

The theory of financial liberalisation (McKinnon, 1973; Shaw, 1973; Fry, 1988) has for a long time considered that domestic financial liberalisation, i.e. channelling of domestic savings, was key to economic development. Inflows of foreign capital were deemed to be secondary and McKinnon (1973) goes as far as to suggest that they should be sterilised with a view to avoiding inflationary risk in a system of fixed exchange rates. The blatant failure of such policies undertaken in the 1970s has brought back to the fore the issues of lending to developing countries, the sustainability of foreign debt and financial liberalisation (e.g. Bekaert, Harvey and Lundblad, 2001). According to the theory of financial liberalisation, macro-economic stability is an absolute prerequisite for developing countries aspiring to obtain foreign loans. In this context, macro-economic stability should be understood to mean inflation and public deficits under control, but also a legal and political environment which can ensure financial deepening, i.e. legally enforceable contracts and efficient supervision of commercial banks by the central bank[1] or some other supervisory authority. King and Levine (1993) argue that better financial systems improve the probability of successful innovation and thereby accelerate economic growth. Similarly, financial sector distortions reduce the rate of economic growth by reducing the rate of innovation. One stream of academic literature,

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[1] For a review of the literature on the relationship between central bank independence and inflation, see Barro (1997). Barro also stresses the importance of parsimonious government consumption and the rule of law as determinants of real per capita GDP growth.

which started to appear in the late 1970s/early 1980s with the Latin American financial crisis, examines the effects of sovereign borrowers' macro-economic characteristics on the financing conditions obtained by them. The availability of foreign funds to developing countries has thus been related to these countries' solvency (Hanson, 1974; Harberger 1980; Sachs, 1981, 1984; Eaton and Gersovitz, 1981; Edwards, 1983), liquidity (Feder and Just, 1977; Edwards, 1983; Eichengreen and Mody, 2000), sovereign debt repudiation and rescheduling history (Boehmer and Megginson, 1990; Gooptu and Brun, 1992). The relationship between the availability of foreign funds and investment relative to economic output has also been analysed (Sachs, 1984; Edwards, 1983; Gersovitz, 1985) together with the effects of the economic growth rate (Eichengreen and Mody, 2000). More recent papers on secondary bond spreads study the determinants of spreads including local and global factors, (Mauro, Sussman and Yafeh, 2002; Forbes and Rigobon, 2002). Other papers on market discipline analyse the interest rates charged to different banks according to bank characteristics and macro-economic variables (Martinez Peria and Schmukler, 2001).

Yet, in addition to macro-economic considerations, banks also take into account micro-economic factors such as borrower business sector, loan purpose, maturity or guarantees, to determine the terms of their lending. Indeed, many banks these days, at least the larger ones, run sector as well as country desks and use their research as information inputs for their loan decisions. Information asymmetry theory (Leland and Pyle, 1977; Stiglitz and Weiss, 1981; Fama, 1985; Diamond, 1991) suggests that financial contracts should be formulated in such a way as to address the problems of adverse selection (supply of credit such that the less risky projects drop out of the market) and moral hazard (risk of non-repayment by the borrower, who has been prompted by a higher interest rate to choose a riskier project). The micro-economic characteristics of each loan contract are related to the equilibrium rate of interest in the theoretical and empirical literature. Smith and Warner (1979), Smith (1980), Bester (1985), Besanko and Thakor (1987), Berger and Udell (1990), Eicheingreen and Mody (2000) and Kleimeier and Megginson (2000) have among others analysed the relationships between loan pricing and size, maturity, collateral and guarantees, loan purpose and borrower sector.

Overall, the determinants of bank lending to developing countries have been examined in the existing academic literature within a risk-return framework, but the conclusions of earlier articles have often been only partial or contradictory. The availability of a comprehensive database of individual syndicated credit facilities allows us to apply the risk-return framework to study the determinants of syndicated lending to developing countries in a more systematic manner. We bring together the macro- and micro-economic determinants and gauge their relative importance. This is the analysis we undertake in the second paper. It begins by reviewing the existing academic literature on the pricing and availability of developing country syndicated credits. It then goes on to present a simple loan pricing model including both micro- and macro-economic factors as determinants of the loan price, discussing the expected effects of each variable. That pricing model is then estimated for a sample of 5,000-plus developing country loans signed between 1993 and 2001. Inferences are made about the relative influence of macro- and micro- economic variables as determinants of loan pricing. Furthermore, evidence is provided about the relationship between market structure (bank market power or perceived concentration of risk) on the one hand and loan pricing on the other.

In today's globalised financial environment, emerging and industrialised country borrowers compete for funds: for instance developing country bonds and loans compete for investors with US junk bonds (Cline and Barnes, 1997; Vine, 2001). This increases the potential of investor sentiment affecting developing country borrowers to impact industrialised country borrowers and vice versa. Thus, contagion – reflected, for instance, by higher spreads or flight to quality[2] – can happen between these market segments during times of crises or financial turbulence. After the Mexican sovereign default of 1982, the appearance of Brady bonds had implications for world financial markets as a whole. Likewise, commentators have argued that the Asian financial crisis for a while threatened the entire world economy (*The Economist*, 6 July 2002). While most of the earlier loan and bond pricing literature has focused on developing countries or on industrialised countries separately, our third paper makes a first attempt – to our knowledge – at comparing pricing mechanisms and market structure for industrialised and developing country loans and bonds, combining these two branches of the academic literature. While the international market for syndicated credits was, at its inception in

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[2] Van Rijckeghem and Weder (2001) discuss the relative importance of trade links and finance as sources of contagion. We focus here on the financial link.

the 1970s, driven by the financing needs of developing countries, the situation has since then reversed and industrialised country borrowers now raise far more funds on the syndicated loan market than developing countries. Indeed, the US nowadays drives the world market for syndicated loans. As suggested by Bekaert and Harvey (2002) and Bilson, Brailsford and Hooper (2002), we take account of the differences in the institutional operating environments (corporate governance, political environment, corruption) between industrialised and developing countries by explicitly introducing countries' corruption index into our loan and bond pricing models. Based on the research described in our second paper about developing country economic structure and the pricing of syndicated credits, the third article examines whether the market structure effects found for developing country borrowers trying to access bank loan markets are limited to that market segment. This allows to make inferences about those countries' overall access to foreign funds, including via bond markets.

There are a number of theoretical, practical and empirical justifications for comparing the characteristics of loan and bond instruments. The theoretical ones can be found in the information asymmetry literature which extensively compares the characteristics of bonds and loans from a monitoring, incentives and debt seniority perspective (Sachs and Cohen, 1982; Berlin and Loeys, 1988; Berlin and Mester, 1992; Eichengreen and Mody, 1998; Bolton and Freixas, 2000). Practitioners of financial markets actively compare the characteristics of bonds and loans when resorting to securitisation[3] of loans, issuance of backstop or liquidity credit facilities to refinance maturing bonds[4], or to arbitrage between highly leveraged transaction loans and high-yield bonds. Empirical research that compares the pricing of the two instruments (e.g. Kamin and von Kleist, 1999) finds many similarities in the two instruments' spreads to changes in factors such as credit rating or maturity.

Following the logic of the "pecking order theory" of finance, companies use internal money (retained profits) in the first instance to finance their development and when they subsequently seek external funds, they graduate from bank finance to bond finance as information about their creditworthiness becomes more complete (Myers, 1984; Myers

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[3] Removal of the claims from the bank's balance sheet and purchase by a special purpose vehicle (SPV) which issues securities that are subsequently serviced by the cash-flow from the loans, allowing some tranching of the risk in the process.

[4] Treasurers of large corporations often use loans and bonds as complementary means of financing.

and Majluf, 1984; Diamond, 1991; Carey, Prowse, Rea, and Udell, 1993; Bolton and Freixas, 2000). While this may be so for industrialised country borrowers, other authors (Edwards, 1986; Sachs and Cohen, 1982; McKinnon, 1984; Folkerts-Landau, 1985; Eichengreen and Mody, 2000) report that there is more risk in bonds than in bank loans in the case of developing country borrowers.

After a review of the loan and bond pricing literature, our third paper re-estimates refined versions of the developing country loan pricing model elaborated in the second article, for developed and industrialised country loans and bonds. It compares the riskiness of developing and industrialised country bonds and loans with reference to the pecking order theory, and explores how negative market sentiment – reflected by peaks in issuance spreads – may have spilled over from one market segment to the other. It draws inferences about the relative influences of market structure, perceived risk concentration and bank market power on pricing on each market segment.

The second and third papers of the thesis analyse how information asymmetry issues are being dealt with between borrowers and lenders by means of the pricing and structuring loan contracts. In syndicated lending, however, information asymmetries are taken one level further, as junior banks who participate in syndicates at a low level to provide funds have in practice much less information about the borrower than do senior banks who arrange the syndication. Diamond (1984) was among the first academics to explore the issue of delegated monitoring in financial intermediation theory. Monitoring a borrower (to ensure that he meets his contractual obligations laid down in the loan contract) typically involves increasing returns to scale, which implies that it is more efficiently performed by specialised firms. Therefore, individual investors tend to delegate the monitoring activity, instead of performing it themselves. This introduces the problem that the information produced by the monitor may not be reliable (Campbell and Krackaw, 1980). Thus, the monitor has to be given incentives to perform its job properly. In the case of one lender monitoring one or several borrower(s), deposits seem to be an efficient incentive to achieve this purpose (Diamond, 1984; Calomiris and Kahn, 1991). A bilateral loan with a single lender can give rise to a principal-agent relationship between the lender and the borrower. In a syndicated loan with multiple lenders, one can think of such a relationship between senior and junior lenders. Although in theory the junior lenders are responsible for making their own

analysis about the borrowers' riskiness, in practice they often act as principals who give a mandate to the senior arranger bank to screen and monitor the borrower. Some lead banks originating syndicated credits, especially when they are capital- or liquidity-constrained, may exploit the procedure by passing on risky loans to junior syndicate participants whose knowledge about the true level of risk involved may be limited. Senior banks' incentive to monitor the borrower is limited once the claim has been sold down from their balance sheet to junior participants (Gorton and Pennachi, 1995). Dell'Ariccia (2001) argues that asymmetric information and learning are among determinants of the structure of bank markets. They limit the number of competitors a market can sustain in equilibrium, provide incumbents with an advantage over new lending institutions, and induce banks to compete more intensely for market share. We surmise that junior participants in bank syndicates may accept to suffer temporary losses with the hope of getting to know the borrowers better, winning ancillary business from them and indeed arranging syndicated loans for them at a senior level in the future. A learning process is thus involved and junior syndicate members may be thought of as reasoning in terms of expected gains over the whole horizon of their relationship with the borrowers. The distinction between junior and senior bank roles also corresponds to a separation between traditional financial intermediation activities (earning an interest margin) and investment bank type (fee-generating) business[5]. This is of importance for the banks themselves as well as regulators and supervisors. For instance, banks with a diversified income mix can save on capital and supervisors may need fewer resources to monitor them (Stiroh, 2002).

Many authors[6] have analysed agency issues arising between syndicate members with different seniorities. Empirical tests using US regulatory data have found that senior banks' liquidity and capital constraints do influence their behaviour vis-à-vis junior syndicate members, although there is little evidence of senior banks deliberately selling bad loans to junior banks.

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[5] During the past decade, banks have tried to diversify away from traditional lending into fee-generating, trading and other activities with a view to reducing the volatility of their earnings. For an empirical analysis of the relationship between diversification and the volatility of bank earnings, see Stiroh (2002).

[6] See, for instance, Greenbaum and Thakor (1987), Pennachi (1988), Flannery (1989), Banerjee and Cadot (1996), Berlin and Mester (1992), Simons (1993), Angbazo, Mei and Saunders (1998), Dennis and Mullineaux (2000) and Jones, Wiliam and Nigro (2000).

Regulatory constraints, in particular those related to bank capital, influence how banks structure and price credits granted to borrowers, i.e. how they behave vis-à-vis the borrower itself as well as other syndicate members. Thakor (1996) has reported how capital constraints can result in credit rationing by banks. Pavel and Phillis (1987), Pennachi (1988) and Simons (1993) note that loan sales or syndications can be used by banks as a means of alleviating regulatory capital constraints. Chen, Mazumdar and Yan (2000) find that banks subject to differing regulatory or supervisory regimes have differing lending behaviours. More generally, we expect that lenders with different characteristics are likely to issue credits with different specifications, other things equal. The relationship between loan supply and lender characteristics also has important implications for the transmission of monetary policy through the so-called bank lending channel (Altunbaş, Fazylov and Molyneux, 2002). Banks transmit changes in monetary policy to the real economy by altering their supply of credit and it is found that this transmission mechanism differs depending on bank asset size, liquidity and capitalisation. Furthermore, the issue is also related to the credit crunch literature. Hancock and Wilcox (1998) find that between 1989 and 1992, small banks in the United States shrank their loan portfolios relatively more than did large banks in response to declines in their own bank capital. Berger and Udell (1994) and Peek and Rosengren (1995) empirically establish the relationship between capital constraints resulting from bank capital regulation and the shrinkage in US bank lending, distinguishing between different types of bank management and different sorts of borrowers[7].

Lastly, one important lender characteristic likely to have an effect on loan specifications is that of bank location. Sirmans and Bejamin (1990), Jones, William and Nigro (2000) and Sommerville (2001) make the case that conditions on local or relationship loans are really different from those on other types of loans while Petersen and Rajan (2000) are of the view that the availability of borrower credit records, as well as the greater ease of processing these, makes distance between lenders and borrowers less relevant[8].

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[7] Distinction is made between the (1) risk-based capital (2) leverage (3) loan examination and (4) voluntary retrenchment versions of the credit crunch hypothesis.

[8] For a review of the literature on distance issues in lending, see Degryse and Ongena, 2002.

To complement our two papers focusing on the demand for syndicated credits and how the resulting risk is priced, we subsequently undertake a study of the supply-side issues of syndicated lending. The aim is to explicitly control for the competitive effects identified in the preceding papers by introducing lender characteristics into the loan pricing model. This type of study has not yet been carried out at an international level as far as we know. The research objective of our fourth article is to investigate the relationships between the structure and pricing of syndicated loans and lender characteristics, using international data and distinguishing between banks with different seniorities present in the syndicates. First, we examine the effects of bank regulatory constraints on syndicated loan pricing. An international stock taking exercise on the relationship between bank capital and loan pricing is especially relevant as the Basel II Accord lays out new internationally applicable capital recommendations. Attention is then turned to agency issues in the syndication of loans, such as whether senior banks sell "lemons" to junior banks and how senior banks' reputations are related to the proportions of loans sold to junior banks. Lastly, the effect on loan specifications of lender location relative to that of the borrower is analysed.

After a review of the literature, the paper estimates a loan pricing model where borrower, loan and lender characteristics are all used as explanatory variables. Distinction is made between lenders of different seniorities in the syndicate with a view to gauging their relative price-setting power. Evidence is provided on the relationship between bank capitalisation and loan pricing, and the possible exploitation of private information about the borrowers by senior syndicate members vis-à-vis junior syndicate participants.

3. Structure of the thesis

The rest of the PhD is structured as follows. Paper 1 defines key concepts and provides a historical outlook on the international market for syndicated loans since the late 1970s. We first define the main features of a syndicated loan and explain why it lies on the borderline between public and private finance. The roles and motivations of the various parties (lender and borrower) to a syndicated credit are discussed and the

different components of pricing are clarified. The subsequent historical analysis – which helps to understand key concepts, together with the origins and evolution of the market – is divided into three parts: (i) the 1970s, when syndicated loans were a major source of finance for developing countries, (ii) the 1980s, marked by a period of sharp contraction in syndicated lending in the aftermath of the Mexican debt moratorium of 1982, (iii) the renaissance of the 1990s. Data on individual loan transactions is available to us starting in this third period of the 1990s and the first paper ends with a presentation of the richness of the breakdown available in these micro-level data. The evolution of various loan market segments is analysed, with particular attention paid to specific borrower types, nationalities, ratings, lender nationalities, facility types, currencies, purposes and maturities.

In the papers that follow, we examine the different demand- and supply-side factors that influence the availability of syndicated credits.

On the borrower side, we proceed to look at micro- and macro-economic factors for emerging country borrowers, together with market structure (Paper 2). We first review the academic foundations underlying our study: they can be found in the information asymmetry literature of the late 1970s and early 1980s (Leland and Pyle, 1977; Stiglitz and Weiss, 1981; Fama, 1985; Diamond, 1991) for the micro-economic part and in the external debt literature for the macro-economic part (Sachs, 1981, 1984; Eaton and Gersovitz, 1981, Edwards, 1983, 1986; Boehmer and Megginson, 1990, Eichengreen and Mody, 2000). We subsequently analyse the macro- and micro-economic determinants of developing country loan pricing separately and then in combination.

These pricing mechanisms are then compared to those for industrialised country borrowers and bonds (Paper 3). In addition to the literature reviewed in the second paper, here we also draw on work comparing pricing mechanisms on loan and bond markets such as Berlin and Mester, 1992; Bolton and Freixas, 2000. Refined versions of the developing country loan pricing model are then estimated first for developing country loans and bonds and then for industrialised country bonds and loans.

Turning to the lender side, we examine how the characteristics of banks involved in syndicated lending influence the pricing of loans (Paper 4). We first add lender

characteristics into a simple version of the loan pricing models of the second and third papers and distinguish between different bank seniorities in the lending syndicates. We then follow Simons (1993), Jones, William and Nigro (2000) and Dennis and Mullineaux (2000) to investigate the effects on pricing and risk taking of information sharing between various layers of lenders and the borrower.

A summary and a general discussion are provided in the final section of this thesis.

4. Contributions to the literature

Overall, the thesis makes several contributions to the existing academic literature on bond and loan pricing and bank market structure.

- Previous empirical literature has used spreads over a benchmark interest rate (e.g. LIBOR) to represent syndicated loan pricing. However, this does not represent the true economic cost of loans as additional pricing factors, such as fees, are typically charged in loan syndications. Our empirical analysis uses a pricing measure known as the drawn return which includes both fees and spreads, and is therefore a more comprehensive measure than looking at merely spreads.
- We distinguish between the notion of explicit guarantees and implicit guarantees as determinants of loan pricing: the former are explicit commitments by third parties while the latter can arise from ownership of the borrower by a parent company. We find different effects on loan pricing.
- We analyse the relative importance of macro- and micro-economic determinants of the pricing of syndicated loans granted to developing country borrowers; we find that macro-economic factors dominate micro-economic ones.
- Borrower market share and market structure variables are explicitly introduced into the analysis and conclusions are derived from this pertaining to banks' market power and the effects of perceived risk concentration on loan pricing.
- We establish that borrowers from developing countries that are more heavily dependent on syndicated loans are charged more to access funds.

- We find that the relationship between borrower creditworthiness and the form of financing (via retained profits, bank loans, bonds or equities) as suggested in the "pecking order theory" of finance is different for industrialised and developing country borrowers.
- Industrialised and developing country borrowers' access to bond and loan markets is analysed together, with a view to comparing pricing, market structure and spill-over effects from one market segment to another in times of financial turbulence.
- Accordingly, we find that market access conditions faced by developing country borrowers can influence those faced by industrialised country borrowers.
- Empirically, we establish differences in the way bonds and loans are priced, although theory suggests similarities. We also detect differences in pricing mechanisms between developing and industrialised countries.
- The effects of the corruption index are studied on loan and bond pricing for the first time for developing and industrialised country borrowers.
- We find differences in the way corruption and political risk influence market access conditions for developing country borrowers on the one hand and industrialised country borrowers on the other.
- The relationship between lender characteristics and loan specifications is explored at an international level for the first time. Most studies so far have used US data, mainly from regulatory, i.e. national returns. But non-US banks appear to have arranged 54% of loans for US borrowers in 2001 and funded 51% of them, so our study makes a contribution in analysing competitive effects in an important segment of the market.
- Distinction is made between banks of different seniorities within syndicates when analysing the relationship between lender characteristics and loan specifications for the first time as far as we know.
- Senior banks are found to have more pricing power in syndicates while junior banks tend to act more as price takers.
- Junior banks are found to rely more on the reputation of the senior banks when participating in syndications where information about the borrower is more opaque.
- Contrary to the previous literature, senior banks are found to behave in a potentially opportunistic way vis-à-vis junior banks by passing on relatively

larger shares of riskier loans to junior participants after they have syndicated them.

Literature cited

Altunbaş, Y., O. Fazylov and P. Molyneux, 2002: Evidence on the bank lending channel in Europe, Journal of Banking and Finance 26, 2093-2110

Angbazo, L. A., J. Mei and A. Saunders, 1998: Credit spreads in the market for highly leveraged transaction loans, Journal of Banking and Finance, 22(10-11), pp. 1249-1282.

Banerjee S. and O. Cadot, 1996: Syndicated lending under asymmetric creditor information, Journal of Development Economics, (49)2, pp. 289-306

Barro, R.J., 1997: Determinants of Economic Growth: A Cross-Country Empirical Study, Development Discussion Paper No. 579 (April), Harvard Institute for International Development

Berger, A. and G. Udell, 1990: Collateral, loan quality and bank risk, Journal of Monetary Economics 25, 21-42.

Berger, A. and G. Udell, 1994: Did Risk-Based Capital Allocate Bank Credit and Cause a "Credit Crunch" in the United States?, Journal of Money, Credit and Banking, Volume 26, Issue 3, 585-628

Bekaert, G., C.R. Harvey and C. Lundblad, 2001: Does financial liberalisation spur growth?, NBER Working Paper 8245, April

Bekaert, G. and C.R. Harvey, 2002: Research in emerging markets finance: looking to the future, Emerging Markets Review 3, 429–448

Berlin, M. and J. Loeys, 1988: Bond covenants and delegated monitoring, Journal of Finance 43, 397-412

Berlin, M. and L. Mester, 1992: Debt covenants and renegotiation, Journal of Financial Intermediation 2, 19-133

Besanko, D. and A. Thakor, 1987: Collateral and Rationing: Sorting equilibrium in monopolistic and competitive credit markets, International Economic Review, 671-689

Bester, H., 1985: Screening vs. rationing in credit markets with imperfect information, American Economic Review 75, 850-855.

Bilson, C.M., J. Brailsford and V.C. Hooper, 2002: The explanatory power of political risk in emerging markets, International Review of Financial Analysis 11, 1-27

Boehmer, E. and W. L. Megginson, 1990: Determinants of Secondary Market Prices for Developing Country Syndicated Loans, Journal of Finance, Volume 45, Issue 5 (December), pp. 1517-1540.

Bolton, P. and X. Freixas, 2000, Equity, Bonds and Bank Debt: Capital Structure and Financial Market Equilibrium Under Asymmetric Information, The Journal of Political Economy, Volume 108, Issue 2, April, 324-351

Buira Seira, A., 1979: The World Economy, External Debt and Prospects for Development Financing, World Development, Vol. 7, pp. 125-133

Calomiris, C.W. and C.M. Kahn, 1991: The role of demandable debt in structuring optimal banking arrangements. American Economic Review 81(3), 497-513

Campbell, T.S. and W.A. Kracaw, 1980: Information production, market signalling and the theory of financial intermediation. Journal of Finance 35, 863-82

Carey, M., S. Prowse, J. Rea, G. Udell, 1993: The economics of private placements: A new look, Financial Markets Institutions Instruments 2, 1-67

Chen, A.H., S.C. Mazumdar and Y. Yan, 2000: Monitoring and bank loan pricing, Pacific-Basin Finance Journal 8, 1-24

Cline, W. R. and K. J. S. Barnes, 1997, Spreads and Risk in Emerging Markets Lending, Institute of International Finance, IIF Research Papers No. 97-1.

Degryse, H. and S. Ongena, 2002: Distance, Lending Relationships and Competition, Centre for Studies in Economics and Finance Working Paper No. 80, Dipartimento di Scienze Economiche – Università degli Studi di Salerno

Dell'Ariccia, G., 2001: Asymmetric information and the structure of the banking industry, European Economic Review 45 1957-1980

Dennis, S. and D. Mullineaux, 2000: Syndicated loans, Journal of Financial Intermediation 9, 404-426

Diamond, D., 1984: Financial intermediation and delegated monitoring. Review of Economic Studies 51, 393-414

Diamond, D., 1991: Monitoring and reputation: The choice between bank loans and directly placed debt, Journal of Political Economy 99:688-721.

Eaton, J. and M. Gersovitz, 1981a: Debt with potential repudiation: Theoretical and empirical analysis, Review of Economic Studies 48, April, 208-309.

Eaton, J. and M. Gersovitz, 1981b: Poor country borrowing in private financial markets and the repudiation issue, Princeton Studies in International Finance, no. 47, International Finance Section, Princeton University, Princeton, NJ, June.

Edwards, S., 1983: LDC foreign borrowing and default risk: an empirical investigation, NBER working paper no. 1172, July.

Edwards, S., 1986: The pricing of bonds and bank loans in international markets, European Economic Review 30, 565-589.

Eichengreen, B. and A. Mody, 1998: Interest Rates in the North and Capital Flows to the South: Is there a missing link? Journal of International Finance, Volume 1 Issue 1 Page 35, October

Eichengreen, B. and A. Mody, 2000: Lending booms, reserves and the sustainability of short-term debt: inferences from the pricing of syndicated bank loans, Journal of Development Economics, Vol. 63, pp. 5-44.

Fama, E., 1985: What's different about banks?, Journal of Monetary Economics 15, 29-36.

Feder, G. and R.E. Just, 1977: An analysis of credit terms in the Eurodollar market, European Economic Review 9, May, 221-243.

Flannery, M., 1989: Capital regulation and insured banks' choice of individual loan default risks, Journal of Monetary Economics 24, 235-258

Folkerts-Landau, D.F.I., 1985: The changing role of international bank lending in development finance, IMF Staff Papers, June

Forbes, K.J. and R. Rigobon, 2002: No Contagion, Only Interdependence: Measuring Stock Market Comovements, Journal of Finance Vol LVII, No. 5, October

Fry, M. J., 1988: Money, interest and banking in economic development, Johns Hopkins University Press

Gersovitz, M., 1985: Banks' international lending decisions: What we know and implications for future research, in: G.W. Smith and J.T. Cuddington, eds., International debt and the developing countries (World Bank, Washington, DC).

Goldberg, L.S., B.G. Dages and D. Kinney, 2000: Foreign and Domestic Bank Participation in Emerging Markets: Lessons from Mexico and Argentina, National Bureau of Economic Research Working Paper 7714

Goldberg, L.S., 2001: When Is U.S. Bank Lending to Emerging Markets Volatile?, National Bureau of Economic Research Working Paper 8209

Gooptu, S. and R. Brun, 1992: The Role and Cost of Short-Term Trade Credit in Beyond Syndicated Credits, World Bank Technical Paper # 163, pp. 1-42.

Gorton, G. and G. Pennachi, 1995: Banks and loan sales: Marketing non-marketable assets, Journal of Monetary Economics, Vol. 35, pp. 389-411

Greenbaum, S.I. and A. Thakor, 1987: Bank funding models: Securitisation vs. deposits, Journal of Banking and Finance 11, 379-401

Grinols, E. and J. Bhagwati, 1976: Foreign Capital, Savings and Dependence, The Review of Economics and Statistics, Volume 58, Issue 4 (November), 416-425

Hancock, D. and J.A. Wilson, 1998: The "credit crunch" and the availability of credit to small business, Journal of Banking and Finance 22, 983-1014

Hanson, J.A., 1974: Optimal international borrowing and lending, American Economic Review 64, Sept. 616-630.

Harberger, A.C., 1980: Vignettes on the world capital market, American Economic Review Papers and Proceedings 70, 616-630.

IMF, 1998: World Economic Outlook, October, Chapter I: *Policy Responses to the Current Crisis*, International Monetary Fund, Washington, DC

Jones, J., W. Lang and P. Nigro, 2000: Recent Trends in Bank Loan Syndications: Evidence for 1995 to 1999, Economic and Policy Analysis Working Paper 2000-10, Comptroller of the Currency Administrator of National Banks

Kamin, S.B. and K. von Kleist, 1999: The evolution and determinants of emerging market credit spreads in the 1990s, BIS Working Papers, No. 68, May.

Kaminsky, G.L. and C.M. Reinhart, 1999: The Twin Crises: The Causes of Banking and Balance-Of-Payments Problems, American Economic Review, Volume 89, Issue 3 (June), 473-500

King, R. G. and R. Levine, 1993: Finance, entrepreneurship and growth, Journal of Monetary Economics, Volume 32, Issue 3, December, Pages 513-542

Kleimeier, S. and W. Megginson, 2000: Are project finance loans different from other syndicated credits?, Journal of Applied Corporate Finance, Vol. 13, Part 1, pp. 75-87.

Leland, H. and D. Pyle, 1977: Information asymmetries, financial structure and financial intermediaries, Journal of Finance 32, 371-87.

Madan, R., R. Sobhani and K. Horowitz, 1999: The Biggest Secret of Wall Street, Paine Webber Equity Research

Martinez Peria, M.S. and S.L. Schmukler, 2001: Do Depositors Punish Banks for Bad Behaviour? Market Discipline, Deposit Insurance and Banking Crises, Journal of Finance Vol LVI, No. 3, June

Mauro, P., N. Sussman and Y. Yafeh, 2002: Emerging market spreads: then versus now, The Quarterly Journal of Economics, May

McKinnon, 1973: Money and capital in economic development, Washington, D.C., Brookings Institution

McKinnon, R. I., 1984: The international capital market and economic liberalisation in LDCs, the Developing Economies 22, December, 476-481

Myers, S.C., 1984: The capital structure puzzle. Journal of Finance 39, 575–592.

Myers, S.C. and N. Majluf, 1984: Corporate financing and investment decisions when firms have information investors do not have. Journal of Financial Economics 13, 187–221.

Pavel, C. and D. Phillis, 1987: Why banks sell loans: an empirical analysis, Economic Perspectives, Federal Reserve Bank of Chicago 3-14

Peek, J. and E. Rosengren, 1995: Bank regulation and the credit crunch, Journal of Banking and Finance 19, 679-692

Pennachi, G., 1988: Loan sales and the cost of bank capital, Journal of Finance 43, 375-396

Petersen M.A. and R.G. Rajan, 2000: Does Distance Still Matter? The Information Revolution in Small Business Lending, Kellogg Graduate School of Management Northwestern University and Graduate School of Business University of Chicago, unpublished manuscript

Rhodes, T., 1996: Syndicated Lending Practice and Documentation, second edition, Euromoney books.

Sachs, J.D., 1981: The current account and macroeconomic adjustment in the 1970s, Brookings Papers on Economic Activity 1, 201-268.

Sachs, J.D., 1984: Theoretical issues in international borrowing, Princeton Studies in International Finance no. 54, July.

Sachs, J.D. and D. Cohen, 1982: LDC borrowing with default risk, National Bureau of Economic Research working paper no. 925, July.

Shaw, E. S., 1973: Financial deepening in economic development, New York, Oxford University Press

Simons, K., 1993: Why do banks syndicate loans? New England Economic Review, Federal Reserve Bank Boston, 45-52

Sirmans, C.F. and J.D. Benjamin, 1990: Pricing Fixed Rate Mortgages: Some Empirical Evidence, Journal of Financial Services Research 4: 191-202

Smith, C. and J. Warner, 1979: On financial contracting: An analysis of bond covenants, Journal of Financial Economics 7, 111-161.

Smith, C.W., 1980: On the theory of financial contracting: The personal loan market, Journal of Monetary Economics 6, 333-357.

Sommerville, C.T, 2001: A Booming Market is Where the Heart is: Local vs National Lenders and Real Estate Development Financing, University of British Columbia, unpublished manuscript

Stiglitz, J. and A. Weiss, 1981: Credit rationing in markets with imperfect information, American Economic Review 7(31): 393-410.

Stiroh, K., 2002: Diversification in Banking: is Noninterest Income the answer? Federal Reserve Bank of New York Working Paper.

Thakor, A., 1996: Capital requirements, monetary policy and aggregate bank lending: Theory and empirical evidence, Journal of Finance 51, No. 1 (March), 279-324

Van Rijckeghem, C. and B. Weder, 2001: Sources of contagion: is it finance or trade?, Journal of International Economics 54, 293-308

Vine, A., 2001: High-Yield Analysis of Emerging Markets Debt, *in* The Handbook of Fixed Income Securities, edited by F. Fabozzi, Sixth Edition, McGraw-Hill

PAPER 1

Review of institutional and empirical issues

THE MARKET FOR SYNDICATED LOANS represents a very important element of the global financial system today, amounting one third of total international financing in 2001. In this paper, we define what a syndicated credit is, discuss how syndicates of lending banks operate and what the roles and motivations of the various parties are. We also discuss the components of loan pricing and describe various loan facility types. We go on to present a historical analysis of the international market for syndicated credits since the 1970s. We distinguish between the 1970s, when syndicated loans were a prime source of external financing for developing countries, followed by a sharp reduction in syndicated lending during the 1980s, and a revival in the 1990s. Then, we analyse developments on various loan market segments during the 1990s, using micro-level data available to us for that period, focusing on borrower types, nationalities, ratings, lender nationalities, facility types, currencies, purposes and maturities. We finally describe the evolution of loan pricing during the past decade and combine this with all the preceding main points of the paper to present a logical model for the pricing of syndicated credits.

1. The syndicated loan: a borderline case between public and private finance

In this section, we explain how the syndicated loan lies on the borderline between public and private finance, and what the motivations of each party are to engage in such a transaction. We also describe the roles of the main parties to the deal, what the pricing structure is and what the most commonly used syndicated loan instruments are.

1.1 Definitions

In a syndicated loan, two or more banks (members of a *syndicate*) agree jointly to make a loan to a borrower. Every syndicate member has a separate claim on the borrower, although there is only a single loan agreement contract. One or several lender(s) will typically act as *arranger(s)* or *lead manager(s),* mandated by the borrower to bring together the consortium of banks prepared to lend money at a given set of terms. The borrower's relationship banks are often at the core of the syndicate and they may bring in other institutions according to the size, complexity and the pricing of the loan as well

as the desire of the borrower to increase the range of its banking relationships. According to Dennis and Mullineaux (2000), syndicated credits thus lie somewhere in between relationship loans and public debt (or transaction loans). While the lead bank(s) may have some form of relationship with the borrower, this is less likely to be the case for the banks participating in the syndicate at a more junior level.

Dennis and Mullineaux (2000) cite several potential motivations that banks originating a syndication (also called lead banks) may have for doing so. Syndication can be a means of avoiding excessive single-name exposure, to comply with regulatory limits regarding lending to a single borrower. Syndication may also reflect a voluntary diversification motive, a mechanism for managing interest rate risk or a strategy for enhancing fee income[9]. In the main, it allows agents and underwriters to deliver the funding commitments that borrowers demand without having to bear the market and credit risk alone.

Banks participating in a syndicated loan at a more junior level may be motivated by a lack of origination capabilities in certain types of transactions, geographic areas (as happened in the 1970s in emerging markets, see Robinson, 1996) or industrial sectors, or indeed a desire to cut down on origination costs. While junior participating banks typically earn low margins and hardly any fees, they may also hope that in return for their involvement, the client will reward them later with more profitable business, such as treasury management, corporate finance or advisory work (Allen, 1990)[10].

For borrowers, using the syndicated loan market represents the following advantages for borrowers (Allen, 1990):

- They can achieve spreads lower than what they might pay through a series of bilateral arrangements. An increase in the number of banks participating in the loan is likely to lead to more competitive pricing.
- Arranging a loan is less costly – in terms of origination fees – than issuing a bond.

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[9] On the various fees earned by the various syndicate members, see Table 1.
[10] In practice, though, these rewards fail to materialise in a systematic manner.

- Syndication can provide a more flexible funding structure, such as multiple currency options, which guarantee to the borrower the availability of funds in the currency of his choice[11].
- Financing via syndicated loans can constitute a way to widen a corporation's circle of lenders through syndicates that include foreign banks.
- A credit facility provides the borrower with a stable source of funds – of particular value in the event that other capital markets are subject to some form of disruption.
- The syndicated loan sector generally allows borrowers to raise larger sums than they would be able to obtain through either the bond or the equity markets under a time constraint[12].
- Syndicated credit facilities can be arranged quickly and discreetly, which may be of value for certain transactions such as takeovers.
- Commitments to lend can be cancelled relatively easily, contrary to borrowing in securities markets where such actions would dent investor confidence.

1.2 Roles of the different participants to the syndicated credit deal

The *arranger* or *mandated arranger*[13] bank is responsible for putting together the deal (Allen, 1990; Rhodes, 2000). In consultation with the borrower, the arranger bank prepares an 'information memorandum' that contains descriptive and financial information concerning the facility and the borrower (including projections of cash flows). Recipients of the memorandum sign a confidentiality agreement. The arranger will typically market the deal to prospective participating banks, explaining the credit, describing the borrower and its business, answering questions. The lead bank negotiates and drafts all the loan documents and the participants are not generally involved with the borrower. Acting as an intermediary, the lead bank attempts to satisfy the potentially competing objectives of the borrower and the syndicate members.

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[11] For a more thorough description of instrument types, see §1.4.

[12] Indeed, in order to bid for third generation mobile phone licenses in 2000 auctioned off by various European countries' governments, many European telecommunications firms tapped the syndicated credits market for large amounts in the first instance, subsequently aiming to refinance the initial short-term debt by later issuing medium or long term securities.

[13] The term *mandated* is to reflect the fact that the arranger has won a mandate from the borrower to put together the loan. In the case of several arrangers or mandated arrangers, some of them are sometimes called *lead arrangers* – this is in order to rank arrangers according to seniority.

If it is thought that the arranger may not be able to put together a syndicate which will come up with the required amount of credit at a given price, then, in exchange for an underwriting fee, the arranger bank may also co-ordinate for a group of banks to guarantee the availability of funds. Underwriters and sub-underwriters are brought together during the first phase of syndication called *primary syndication*. In a second phase or *secondary syndication*, new banks are invited to join the consortium. They are called, in decreasing order of seniority, co-lead managers, managers, co-managers, or participants[14]. The commitments of the underwriters get re-examined according to the success of the second phase of the syndication. If the deal fails to attract enough institutions in the second phase, underwriters may have to provide some of the funds they have guaranteed. If on the other hand the terms of the loan or the borrower are considered attractive by the market, the loan may well be oversubscribed. Then, the arranger may either invite the borrower to increase the size of the commitments or scales down every bank's participation *pro rata.*

Once the lending syndicate has been set up, the arranger(s) or lead manager(s) will thus eventually find themselves at the centre of a whole hierarchy of institutions, which may accept positions as co-lead managers, managers, co-managers, underwriters, sub-underwriters or just participant banks, depending on their pecuniary commitment and their contribution to the syndication process.

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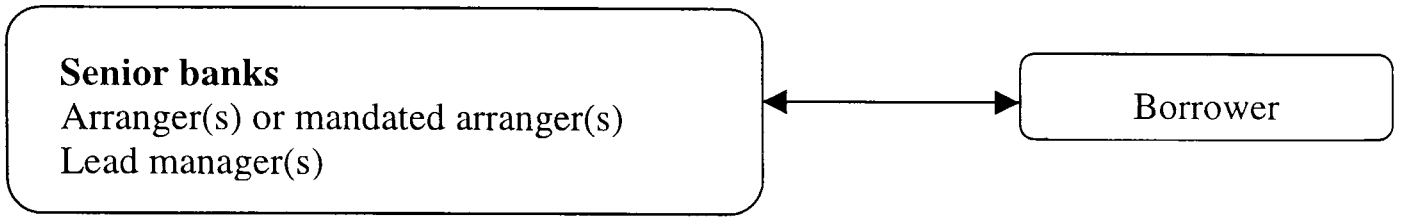
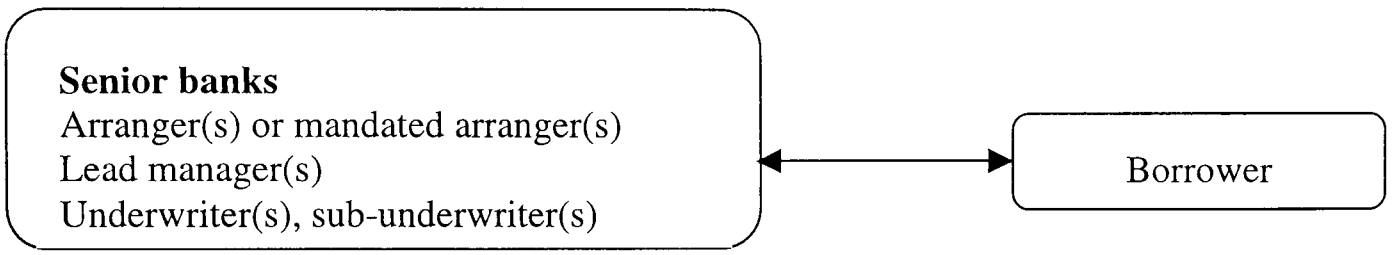
[14] A senior arranger bank can also allocate a certain portion of the loan of the loan to itself, i.e. also occupy a junior position.

Diagram A: Simplified representation of the various stages of the life of a syndicated loan and parties present

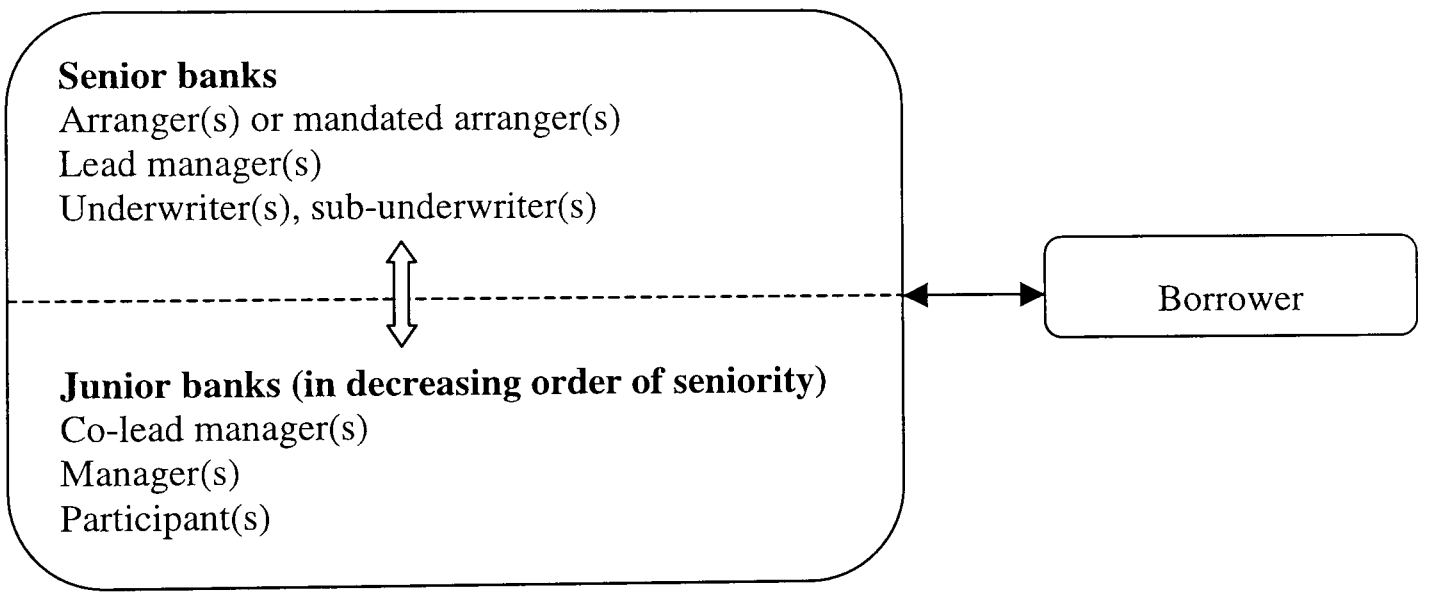
1. Origination stage



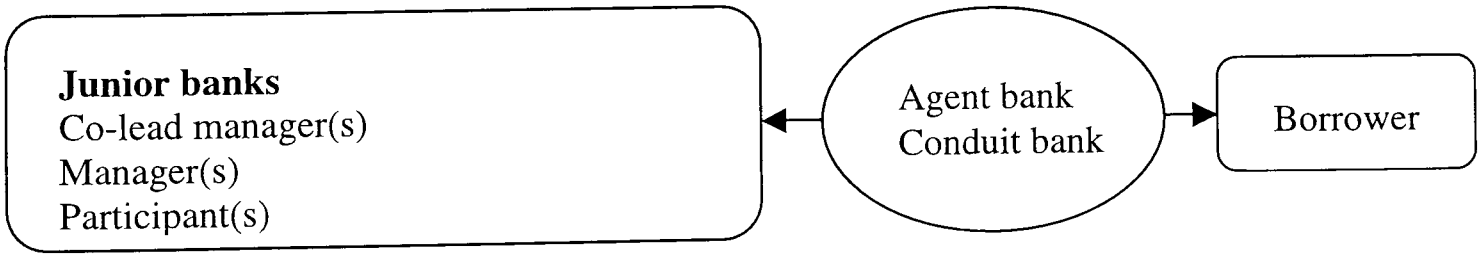
2. Underwriting stage



3. Syndication stage



4. During the life of the loan



Source: Diagram by author

One important role in the syndicate is that of the *agent bank* (often one of the arrangers) who administers the loan, typically acting as an intermediary between the borrower and participating banks, intervening throughout the life of the loan. The agent calculates

required interest payments, obtains waivers and amendments to the loan documents and, in case of a secured loan, holds all pledged collateral on behalf of syndicate members. He/she also ensures that information (annual financial statements, interim reports, certificates of compliance and other documents) are delivered on time by the borrower or an independent auditor. The agent is contractually exculpated from any potential liability to the syndicate members except where it results from 'gross negligence or wilful misconduct'. The agent may declare an event of default, but will typically seek the prior advice of the member banks. Indeed, the loan agreement will identify which decisions require the consent of a designated proportion of the member banks. Unanimity is normally required for any reduction in principal, interest or fees or for extensions of any terms of the credit.

Diagram A above summarises the different bank roles as they appear through various stages of the life of the syndicated loan.

1.3 Pricing structure: spreads and fees

As well as earning a margin over LIBOR (or any other benchmark) when the loan is drawn, banks in the syndicate receive various fees (Allen, 1990). The arranger and other members of the lead management team generally earn some form of upfront fee in exchange for putting the deal together. This is often called a *praecipium* or *arrangement fee*. The underwriters similarly earn an *underwriting* fee for guaranteeing the availability of funds. Other participants (those at least on the 'manager' and 'co-manager' level) may expect to receive a *participation fee* for agreeing to join the facility – the actual size of the fee generally varies with the size of the commitment. The most junior syndicate members typically only earn the spread over LIBOR or over a comparable market reference. Once the credit is established and as long as it is not drawn, the syndicate members often receive an annual *commitment* or *facility fee* (to compensate for the cost of regulatory capital that needs to be set aside against the commitment) again proportional to their commitments. As soon as the facility is drawn, the borrower may have to pay a *utilisation fee*, as often as not a means of separating it (i.e. not announcing to the market as included in the total cost) from the price that he is paying. The agent bank typically earns an *agency fee,* usually payable annually, to cover the costs of administering the loan. Loans sometimes incorporate a penalty clause,

whereby the borrower agrees to pay a *prepayment fee* or otherwise compensate the lenders in the event that it reimburses its debt prior to the specified term.

Table 1: Fees paid by the borrower using a syndicated loan

Fee	Type	Remarks
Arrangement fee	One-off	Also called *praecipium.* Received and retained by the lead arrangers in return for putting together the deal
Legal fee	One-off	Remuneration of the legal adviser
Underwriting fee	One-off	Price of the commitment to obtain finance during the first level of syndication
Participation fee	One-off	Received by the senior participants
Commitment fee	Per annum	Paid as long as the facility is not used, to compensate the lender for the tying up of the capital corresponding to his commitment.
Utilisation fee	Per annum	To boost lender's yield, to enable borrower to announce a lower spread to the market than what is actually being paid, as the utilisation fee does not always need to be publicised on the tombstone
Agency fee	Per annum	Remuneration of the agent bank's services
Conduit fee	One-off	Remuneration of the *conduit bank*[15]
Prepayment fee	One-off if prepayment	Penalty for prepayment

Source: Compiled by author

Table 1 above gives a summary of the most common fees that the user of a syndicated loan has to pay.

1.4 Instrument types

Syndicated credits may take the form of *term loans*[16] (specific amount for a set amount of time), of *revolving credit facilities*[17], *standby facilities* (essentially revolving facilities arranged for backup purposes), or *standby letters of credit* (whereby the bank enhances the borrower's credit risk in relation to a third party). Loans can have *multiple currency options* or compartments, can incorporate a *swap* or other types of instruments actually

[15] Institution through which payments are channelled with a view to avoiding payment of withholding tax.
[16] Two tranches of the same loan targeted at different classes of investors are called *A-Loan* and *B-Loan.*

[17] These also correspond to a specific amount for a set period of time, but they offer the flexibility to draw down, repay and redraw all or part of the loan at the borrower's discretion.

closer to securities than loans. In particular, *revolving underwriting facilities* (RUFs) and *note issuance facilities* (NIFs) constitute funding commitments on banks' behalf to a borrower; they can be combined together, or alternatively with other instruments into a *multiple options facility* (MOF). A MOF is the general name for a number of credit and money-market fund raising mechanisms[18]. Finally, a *mezzanine loan* is an instrument on the borderline between equity and debt.

Next we examine how the market for syndicated credits has behaved historically from the 1970s onwards.

2. Historical analysis

This section describes how international market for syndicated credits saw its first large wave of development in the 1970s with lending to emerging market borrowers, followed by a dominance of bond markets over loans in the 1980s, until syndicated credits again became an indispensable source of finance again in the 1990s.

2.1 The 1970s: syndicated loans as a major source of finance for developing countries

Helped by the advent of the eurodollar, the euromarkets and the LIBOR as an internationally standardised pricing reference, the intermediate term (1 to 5 year), floating-rate, general-obligation syndicated bank loan became the principal instrument between 1971 and 1982 for channelling capital to the developing countries of Africa, Asia and especially Latin America (Boehmer and Megginson, 1990). Developing country sovereign borrowers were the main recipients of funds, along with a limited number of non-sovereign ones, such as their government-controlled enterprises, local operations of multinational corporations and certain hard currency generating firms like privately owned international shipping companies (Robinson, 1996). The borrowing

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[18] These will typically comprise a revolving credit, a cash advance facility, banker's acceptances and note issuance facilities, packaging together a variety of banking services through one agent rather than a multitude of bilateral banking relationships.

governments essentially saw the loans as a way to promote exports and to mitigate the balance of payments problems stemming from the OPEC-related explosion of oil prices in the 1970s. A need to redistribute oil-related wealth led to the exponential development of euro-dollar trading by banks. Among other recipients of funds, the capital-hungry Latin American borrowers were a ready market. Syndicated loans soon began to displace traditional bilateral loans and club deals[19], to the extent that they allowed smaller, primarily domestic banks in many countries to lend directly to emerging market borrowers without having to establish a local presence in those regions. Furthermore, the banks were offered diversification and were able to earn high yields (in line with higher risk, though).

2.2 Sharp contraction following the Mexican debt moratorium of August 1982

Emerging market borrowers' debt grew from $46 bn in 1972 to over $300 bn in August 1982 (Eichengreen and Mody, 2000), when the Mexican debt moratorium[20] shocked market participants into more carefully assessing the true risks inherent in sovereign lending. According to the Bank of England's database on international capital markets, total new syndicated credit facilities – granted to emerging markets and industrialised countries – were worth almost $83 bn in 1980, and a further $101 bn were booked in the following year (Allen, 1990). As Table 2 below indicates, from August 1982 onwards, the euroloan[21] market entered a phase of sharp contraction, bottoming out in 1985, when the value of new international syndicated loans amounted to only $19 bn.

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[19] A form of syndicated credit where the facility is not sold down on the market but reserved for a limited number of insider banks.

[20] The realisation of the magnitude of former Soviet satellite states' indebtedness and a Polish debt suspension worth $8 bn in 1981 were the forerunners of the major debt rescheduling programmes of the 1980s.

[21] The term euroloan is used here in its original meaning, i.e. a loan made in a currency abroad and outside the control of the country of origin (Rhodes, 2000).

Table 2: Announcements of international syndicated credit facilities by regions

	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989
Industrialised countries	39.9	48.9	41.0	21.8	16.1	9.5	18.1	76.3	91.1	122.6
Developing countries[22]	41.9	51.2	45.8	14.6	13.5	9.3	10.4	11.5	10.5	26.2
Other[23]	1.0	0.8	1.4	1.6	0.5	0.2	1.1	0.9	0.2	0.2
Total	82.8	100.9	88.2	38.0	30.1	19.0	29.6	88.7	101.8	149.0

Source: Bank of England Quarterly Bulletin

2.3 The renaissance of the 1990s

In the 1980s, the expansion of public debt markets (in particular junk bond markets) seemed to threaten the future of syndicated bank-lending. Indeed, banks were unwilling and essentially unable to lend because they were grappling with bad loans, writing off losses and, after 1989, managing their Brady bonds[24]. But by the beginning of the 1990s, traditional lenders have learnt some of the risk-based pricing techniques of the public corporate-bond market. Previously, one or more banks would originate a loan, underwrite it and, often, hold it to maturity. There was little data on the performance of loans, so pricing often bore little relation to risk. Since the beginning of the 1990s, banks originating loans have been typically part of a syndicate (traditional single-bank lending has genuinely been dying out) and sell on a loan to other investors, such as pension funds. This has helped to make loans much more competitive. As a result, syndicated lending is now the largest financial market in America. It is also the most lucrative for the firms arranging the loans (commercial and investment banks alike). In 1998, revenues from underwriting syndicated loans were around $6 bn, compared with $4.6 bn for equities and $3.2 bn for corporate bonds (Madan, Sobhani and Horowitz, 1999).

Syndicated loans have shown significant growth in the 1990s, and have been tapped by emerging market and industrialised-country borrowers alike. According to the Dealogic Loanware database, total loan syndication volume – including domestic deals –

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[22] Including Eastern Europe and oil producing countries.

[23] Including international organisations.

[24] Developing country debt-conversion programmes have gone hand in hand with the development of the secondary market for syndicated credits. Under a debt-conversion programme, an investor can convert dollar-denominated syndicated loans purchased on the secondary market into local currency for fixed investments in the debtor countries. The so-called Brady conversion for Latin America was among the first such debt-conversion programmes.

represented $1.7 trillion in 2001, more than three times the amount of $533 bn in 1993. The proportion of merger, acquisition and buyout related loans represented 15% of the total volume in 2001, against 7% in 1993. Following a spate of privatisations in emerging markets, utilities, banks, transportation and mining companies – often with large asset bases, substantial capital needs and good debt service capacity – have started to displace sovereign borrowers in these regions (Robinson, 1996). They have turned the focus on capital investment to the private sector, from balance of payments lending to the public sector or sovereign states, previously. They have also been able to obtain longer-term loans, thus ending the dominance of self-liquidating short-term finance geared to emerging markets. As for the industrialised countries, many of their corporate borrowers have been relying on syndicated lending to finance mergers, acquisitions and leveraged buyouts since the beginning of the 1980s. Corporate institutions in developed countries have also been eager to restructure their existing lines of credit into more flexible financing arrangements, such as multiple-option facilities. Besides, second-tier corporate borrowers that did not possess a sufficiently high credit rating to obtain access to the eurobond market and use interest rate swaps at favourable rates have been tapping the syndicated credits market. More recently, European telecommunications firms have borrowed huge amounts on this market to finance the purchase of third-generation mobile phone licenses. According to figures published in the March 2001 issue of the Quarterly Review of the Bank for International Settlements, international syndicated lending to telecommunications firms amounted to $256 bn for the whole of 2000, a more than threefold increase over 1999. Facilities intended to support purchases of third-generation mobile phone licenses accounted for at least 20% of such financing.

Commercial and investment banks alike have benefited from the renaissance of syndicated lending in the 1990s. This is because bank and institutional debt markets, while not exactly merged, are now intertwined. For instance, it is very common nowadays for a medium term syndicated loan provided by a syndicate to be refinanced by a bond at, or very much before, the loan's stated maturity. Another frequent hybrid format is the US commercial paper programme backed by a syndicated letter of credit. These packages have contributed to blurring the lines between investment and commercial banking. It has become usual to see bank loan syndicates led by major investment banks include commercial banks.

Syndicated lending is increasingly undertaken these days by private financial institutions in conjunction with multilateral agencies such as the International Finance Corporation (IFC) or the Interamerican Development Bank (IDB). This takes the form of syndicated IFC or IDB loans with tranches reserved for private sector bank lenders.

Finally, syndicated credits are increasingly traded on secondary markets. However, compared to the total volume of syndicated credits arranged secondary trading volumes remain relatively small. The biggest market for secondary loan market trading of loans is the United States where the volume of such trading represented $118 bn in 2001, according to the Loan Pricing Corporation. Loan trading in Europe amounted only to $29 bn (according to the Loan Market Association, a European professional body).

3. Borrower and lender behaviour in the 1990s

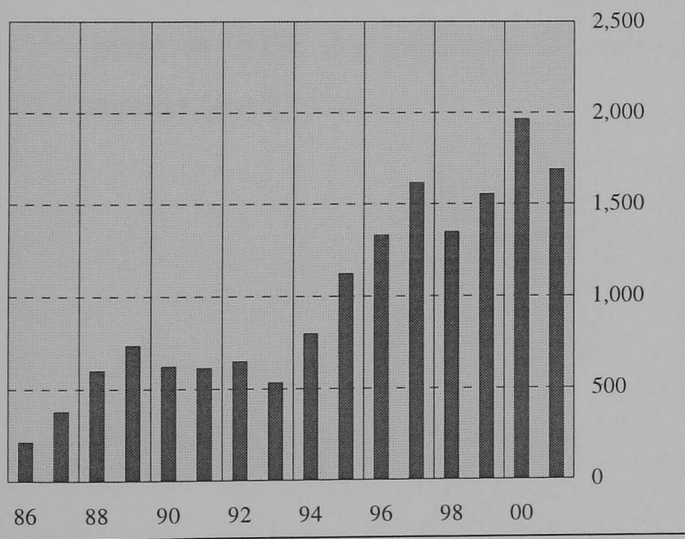
In this section, we analyse the overall evolution of the syndicated credits market since 1986 and compare it to that of securities markets. We then study in detail the borrowers and the lenders present on the market since 1993 and finally discuss the characteristics of facilities for the same period.

3.1 Size of the market, comparison to other markets

Over the past 15 years, the market for syndicated credits has grown substantially. Announced (new) facilities represented $88 bn in 1980, growing to hit a temporary peak of $736 bn in 1989. Activity then stayed lower by $100 bn in the two subsequent years, partly because of the reduction in syndicated credit financing to corporate borrowers, in particular for mergers and acquisitions. Lending has constantly grown since then, driven by banks' confidence that they were adequately capitalised. This translated into a "size for size's sake" perception that they should gain market share by building up their balance sheets (Rhodes, 2000). In the mid-1990s, a new spate of mergers and acquisitions and refinancing-related transactions also fuelled the market. For the whole of 2001, syndications volume had reached $1.7 trillion. Annual volumes for the period 1986 – 2001 are displayed in Figure 1 below. As noted in Onsrud and Pinto (1991), the

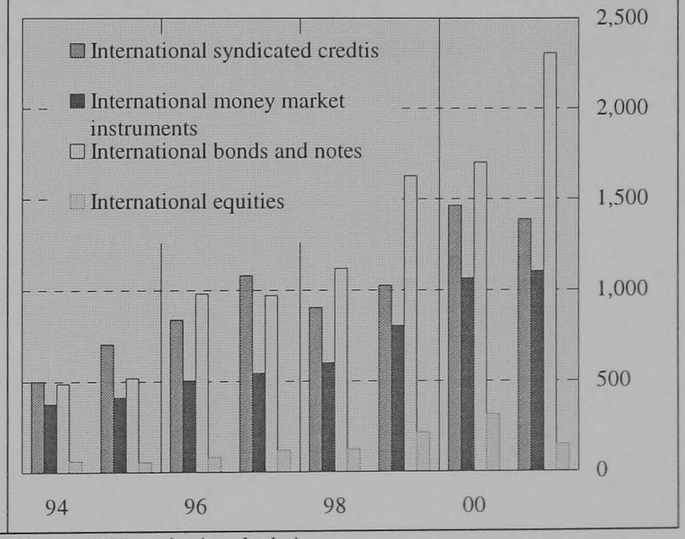
rate of adoption of an innovation for a class of potential users typically plots an S-shape, reflecting a slow beginning as only a few innovators adopt, followed by a rapid spread throughout the class, and finally by a levelling off as full diffusion is reached. To the extent that syndicated lending came into existence in the 1970s, was soon widely used by emerging country borrowers, subsequently levelled off in the 1980s and then started a new life in the 1990s, the shape of Figure 1 could be thought of in this context of innovation. Financial innovation that competed with syndicated lending from the 1980s onwards would notably include securitisation and the widespread use of disintermediated financing. However, this interpretation should be nuanced by the fact that syndicated loans are nowadays largely complementary to financing through securities (see Paper 3 for more on this). Figure 2 compares announcements of international syndicated loans for the 1994 – 2001 period with other sources of financing on international capital markets: bonds and notes, money market instruments and equity issuance. It shows that for the years under consideration, international syndicated credits announcements have represented amounts comparable to international bonds and notes issuance, with international equities and money market instruments representing on average another 25% of funds raised internationally.

Figure 1: Signings of international and domestic syndicated credit facilities, US$ bn equivalent



Source: Euromoney, Dealogic Loanware, author's calculations.

Figure 2: Comparison of international syndicated credits and securities markets, gross announcements, US$ bn equivalent



Source: BIS, author's calculations.

3.2 Borrower characteristics

3.2.1 Borrower type and residence

Figure 3 below displays a breakdown of the syndicated credits market since 1993 by borrower type. For the sake of simplification, we classified borrowers into three main groups:

- sovereigns, quasi-sovereigns (comprising central government, local government, international institutions);
- financial institutions (including banks and other financial institutions such as insurance companies, stockbroker firms and the like);
- the corporate (i.e. non-financial) sector.

As can be seen from the chart, the lion's share of syndicated lending has been directed at the non-financial corporate sector for the period under study, representing, in 2001, 76% of all loans. Financial institutions accounted for 22% of the total, leaving only 2% to sovereign borrowers. As already mentioned, the financing needs of the corporate sector have mainly corresponded to mergers and acquisitions, refinancing (rolling over of previous debt or temporary source of short-term finance before tapping longer-term securities markets). With auctions of third-generation mobile phone licenses taking place in 2000, the telecommunications companies have been extensively using the market (see § 2.3).

Figure 3: Syndicated loan volumes by borrower type, US$ bn equivalent

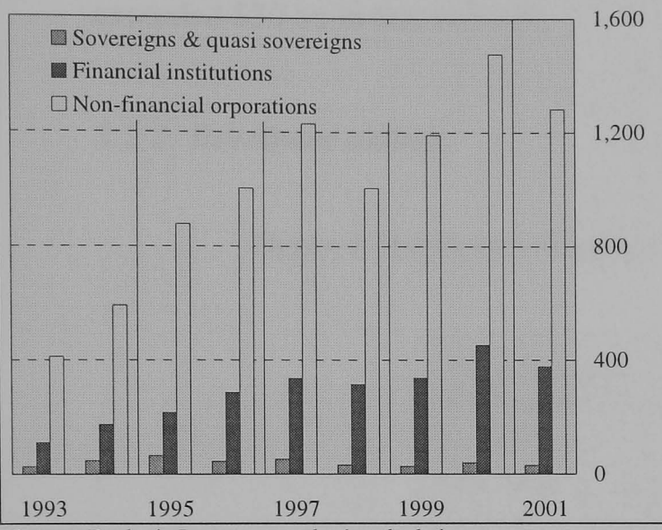
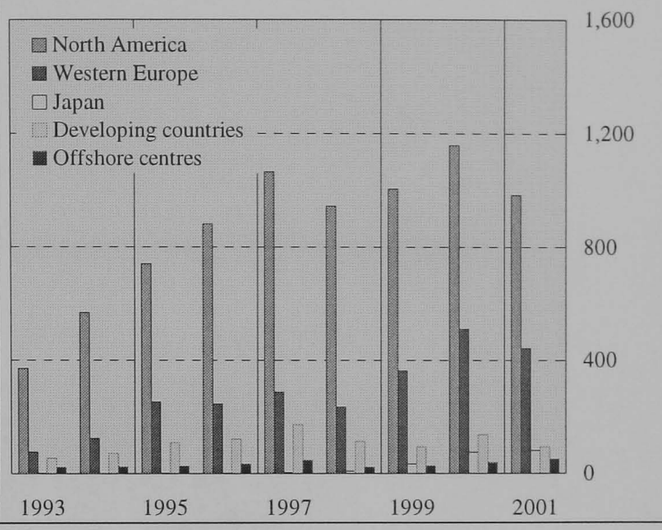


Figure 4: Syndicated loan volumes by residence of the borrower, US$ bn equivalent



Source: Dealogic Loanware, author's calculations.

Figure 4 above breaks down syndicated lending since 1993 by residence of the borrower. During this period, borrowers resident in North America have been the largest recipients of funds (with the US accounting for $939 bn in 2001, or 56% of the total). It must be said, however, that US borrowers' share of the market has been eroded over the past few years, as it had been as high as 68% in 1994. The weight of European borrowers has almost doubled between 1993 and 2001, from 14 to 26%. Within the region, the largest amounts in 2001 were directed to the UK ($156 bn), France ($56 bn), Germany ($46 bn) and Italy ($32 bn).

The share of borrowers from emerging markets was 10% of the total (or $56 bn) in 1993, and has not grown since. The region that obtained the highest amount in 2001 was Latin America, ($38 bn), followed by the Asia and Pacific region[25] ($20 bn), the Middle East and Africa ($20 bn) and Eastern Europe ($16 bn). Rankings were comparable for the previous years, with the highest amounts going either to Latin America or Asia. Offshore centres[26] have represented 2-4% of global syndications during the 1993-2001 period; activity in these centres is driven by foreign-owned special purpose vehicles through which funds are channelled for tax efficiency purposes. The syndicated credits

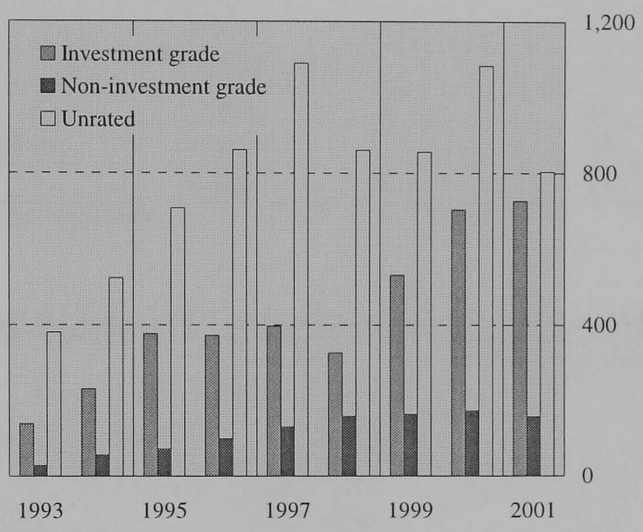
[25] This excludes Australia and New Zealand, accounting for $24 bn in 2001.

[26] We have used the BIS definition for the list of offshore centres: Aruba, Bahamas, Bahrain, Barbados, Bermuda, Cayman Islands, Hong Kong, Lebanon, Liberia, Netherlands Antilles, Panama, Singapore, Vanuatu, UK West Indies, Virgin Islands.

market in Japan has been traditionally weak, with borrower-lender relationships being bilateral to a large extent. Only in the past three years has the volume of syndications exceeded $30 bn in that country.

3.2.2. Borrower rating

Figure 5: Syndicated lending by borrower rating, US$ bn equivalent



Source: Dealogic Loanware, author's calculations.

Figure 5 shows that more syndicated credits have been extended to investment grade borrowers than to non-investment grade ones during the 1993-2001 period, but it also highlights the fact that the majority of borrowers (60%) have been *unrated.* As already suggested in Table 1, being rated is less of a requirement for a borrower wanting to tap the syndicated credits market than for a counterpart wishing to issue a bond[27].

3.2.3. Borrower league tables

Tables 3 and 4 below display the ten most active borrowers on the market in terms of number of facilities and total amounts. It is interesting to note that the first ranking is dominated by emerging market borrowers who appear to have arranged a large number

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[27] It should be noted that in the past couple of years, ratings agencies have started attributing ratings to syndicated loans (in a similar way to bonds), not the borrowers themselves. The number of rated loans however is small at the moment (less than 5% of the total). The recent drivers behind this type of rating are the strong global growth in global syndicated loan markets, unparalleled M&A activity, the increased role played by institutional investors, increased secondary trading of syndicated loans, as well as banks' increased appetite for asset selection, pricing and portfolio management.

of facilities with a lower total US dollar amount, while the largest participants in dollar terms are from industrialised countries.

Table 3: Borrowers with the largest number of facilities, 1993-2001

Name	Country	Number of facilities	Total amount, $m
Korean Airlines Co Ltd (KAL)	South Korea	71	4,105
Hyundai Merchant Marine Co Ltd	South Korea	57	3,828
Petroleo Brasileiro SA (PETROBRAS)	Brazil	57	6,977
Republic of Turkey	Turkey	53	7,324
Indian Oil Corp Ltd (IOC)	India	51	7,150
Air China	China	47	3,279
ENRON CORP	United States	46	21,755
Bank of China	China	42	4,169
Petroleos Mexicanos (PEMEX)	Mexico	41	10,116
China Southern Airlines	China	34	2,031

Source: Dealogic Loanware, author's calculations.

Table 4: Borrowers with the largest US dollar amounts of facilities, 1993-2001

Name	Country	Number of facilities	Total amount, $m
AT&T Corp (AT&T)	United States	20	102,125
General Motors Acceptance Corp (GMAC)	United States	11	60,056
Student Loan Corporation	United States	12	56,161
Philip Morris Companies INC	United States	10	47,000
IBM	United States	12	43,540
KPN (Koninklijke KPN)	Netherlands	7	34,929
American Express Co	United States	10	33,400
British Telecommunications PLC (BT)	United Kingdom	4	32,796
Wal-Mart Stores INC	United States	14	32,273
France Telecom	France	5	29,516

Source: Dealogic Loanware, author's calculations.

3.3 Lender characteristics: nationality of arrangers and fund providers

Figures 6 and 7 below show syndicated lending by nationality of the arrangers and the junior fund providers.

Figure 6: Syndicated lending by group nationality of the arranger banks US$ bn equivalent

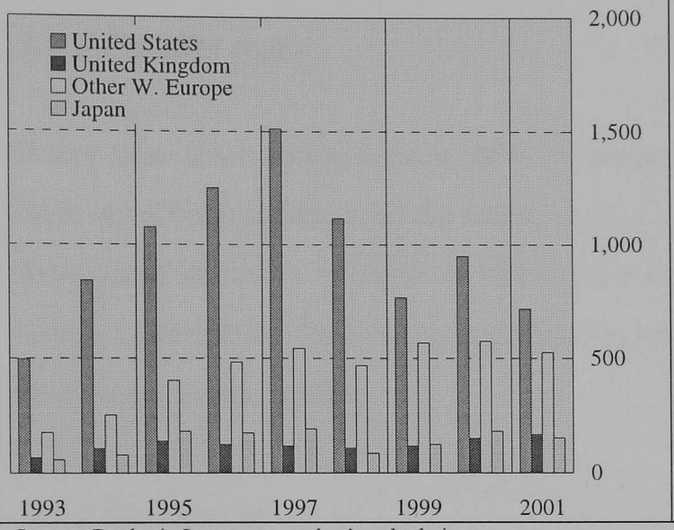
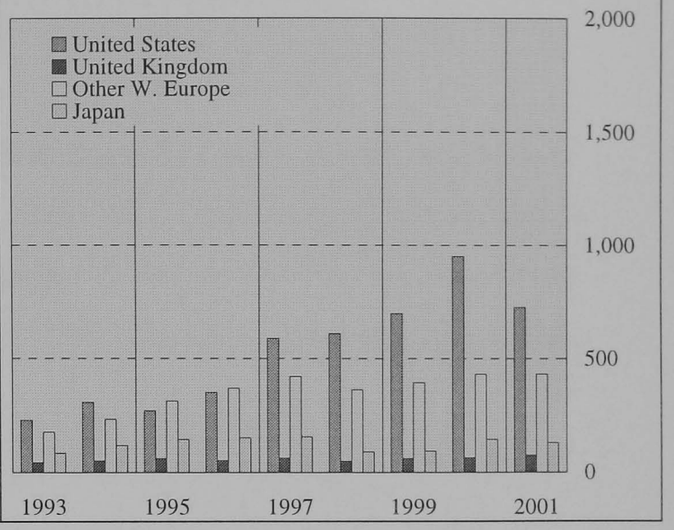


Figure 7: Syndicated lending by group nationality of the junior fund providers US$ bn equivalent



Source: Dealogic Loanware, author's calculations.

US banks have been on top of the league as arrangers during the 1993 – 2001 period, arranging 52% of syndicated facilities, followed by their counterparts from Continental Europe (24%), the UK and Japan (7% each). Although the relative scores of Continental European and Japanese banks have edged up over the past couple of years, these results still suggest a dominant role of US bulge bracket investment banks. Indeed, as pointed out in § 2.3, despite the blurring of lines between investment and commercial banking, the arranger position within a syndicate still corresponds to an investment bank-type activity, while that of junior fund provider is more akin to commercial banking type behaviour.

The picture is slightly different when looking at the breakdown of deals by nationality of the junior participants, a role that is more akin to commercial banking within a syndicate. While the ranking is still the same, European and Japanese banks' share of the total market is somewhat higher here, averaging, respectively, 29% and 10%, against 44% for US institutions.

3.4 Loan characteristics: instrument types, currencies, purpose and maturities

3.4.1 Facility types

Every year since 1993, at least 60% of syndicated credit facilities issued globally have been revolving credits – as described in § 1.4, these offer a great deal of flexibility to their users in terms of total or partial drawdowns, repayments and redrawings. Term loans, representing 33% of all facilities between 1993 and 2001, have been the second most popular instrument.

3.4.2 Currencies

The split of syndicated lending by currencies (see Figure 8 below) shows that the US dollar has been the currency of choice for arranging syndications during the past few years, used for 71% of facilities in 2001.

Figure 8: Syndicated lending by currency
US$ bn equivalent

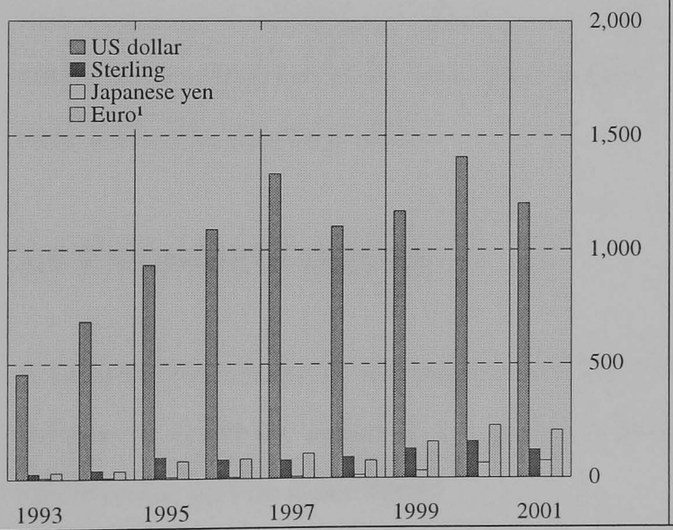
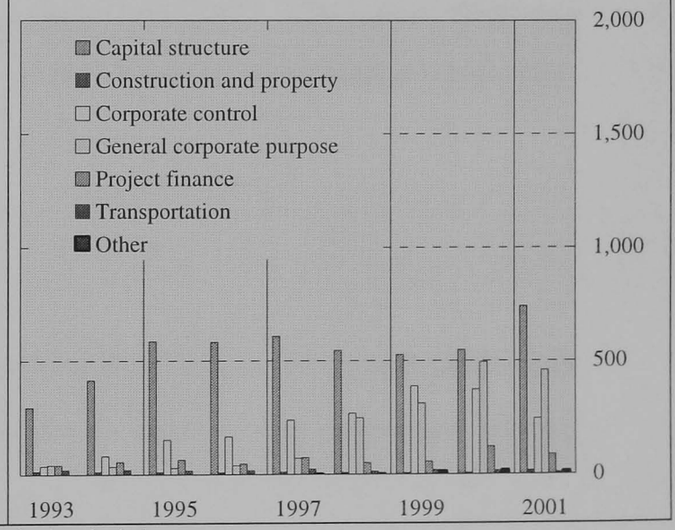


Figure 9: Syndicated lending by purpose
US$ bn equivalent



[1] prior to 1999, predecessor currencies. Source: Dealogic Loanware, author's calculations

However, this share has been dropping since 1993 (when it was 86%), to the benefit of Sterling (whose share has risen slightly, from 5 to 7% since 1993) and even more importantly, the euro and its legacy currencies, used for 5% of deals in 1993 and 12% in 2001. Not more than 2% of facilities have been denominated in Japanese yen between 1993 and 2001, in line with the lack of well-established presence of Japanese borrowers

in the market, as pointed out in § 3.2.1. The preceding analysis confirms the status of the US dollar and, to a lesser extent, of the euro, as international currencies, bearing in mind that they are commonly used both for domestic and international transactions.

3.4.3 Facility purposes

Facilities signed for capital structure purposes (recapitalisation, share repurchases, standby commercial paper support or refinancing) have been most widely used between 1993 and 2001, followed by corporate control (mergers and acquisitions, leveraged buyouts, management buyouts, employee stock option plans) and general corporate purpose facilities.

3.4.4 Maturities

In 2001, 65% of syndicated loans had a maturity of not more than 5 years, slightly higher than, but comparable to previous years. The most popular maturity within the 1-5 year bucket has been the one below one year. The 5-10 year bracket contributed to another 28% of total amounts in 2001, down from 25% in 1993. Between 1993 and 2001, less than 5% of commitments had maturities longer than 10 years. This suggests that syndicated lending is geared to cover mostly borrowers' short-term financing needs, as a complement to securities markets, which cater for more medium and long-term financing requirements.

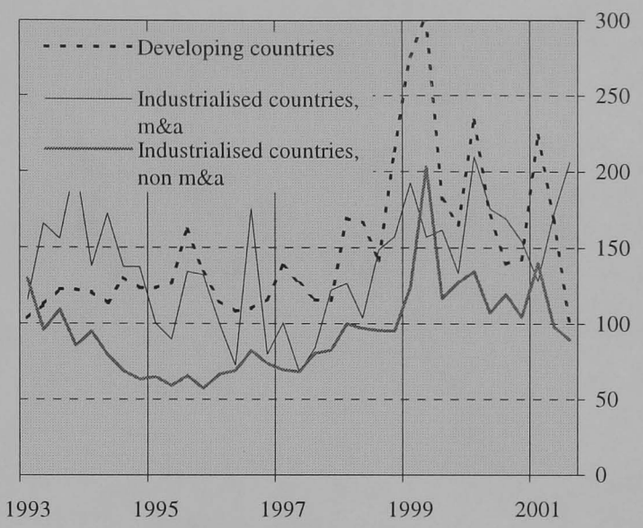
3.5 Evolution of pricing

A detailed discussion of the margin and fees to be paid by the user of a syndicated credit facility is featured under § 1.3 and summarised in Table 1. The following pricing information can be calculated:

- Average pricing: this is the weighted average margin plus the facility fee.
- Average drawn cost: the average pricing, but adding the annualised front-end (participation) fees.
- Average undrawn cost: weighted average facility fee plus commitment fee plus annualised front-end participation fee.

- Fees: total fees, participation upfront fees, facility fee, commitment fee, utilisation fee, underwriting fee.

Figure 10: Weighted average drawn cost for syndicated credits



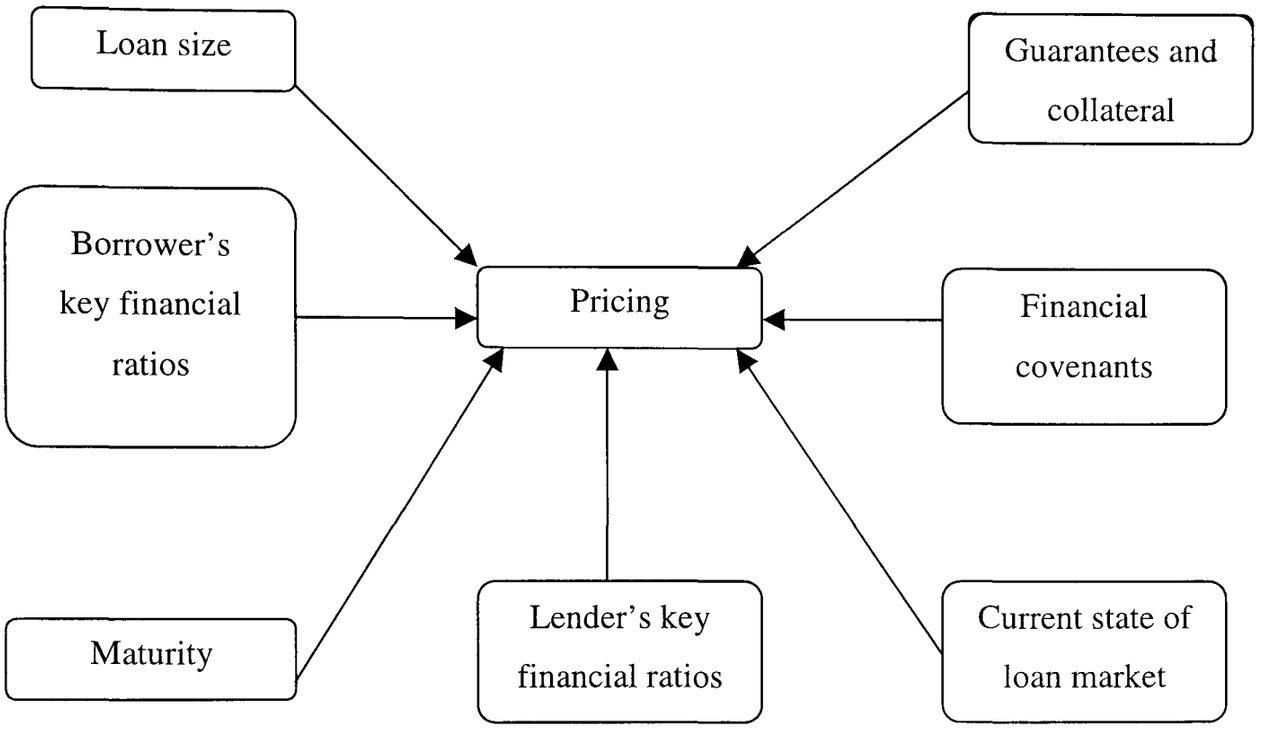
Weighted by facility amounts. Source: Dealogic Loanware, author's calculations

Figure 10 above shows that the cost of syndicated credits granted to borrowers from industrialised countries to finance mergers and acquisitions (M&A) has been higher than that of non M&A or buyout related deals in industrialised countries. The average cost of all deals to borrowers residing in emerging markets has itself been generally higher than that of deals arranged for industrialised country borrowers.

The cost of all types of credits decreased between 1993 and 1996-97, then shot up, in the second quarter of 1999, in the aftermath of the Russian and Latin American financial crises. Loan costs stabilised at lower levels at the beginning of 2001.

If one were to consider that the loan price (the margin over LIBOR plus fees) charged to a borrower on a syndicated loan ought to reflect the borrower's riskiness, then the logical pricing equation for a syndicated loan would look like as follows, as shown on Diagram B below.

Diagram B: The logical pricing model for syndicated credits.



Source: Diagram by author

However, reality is very different, and the pricing of syndicated credits is also influenced by the following factors:

- The lender's relationship with the borrower.
- Any existing or expected ancillary business with the borrower (these first two points can entice lenders to underprice credits in return for the borrower rewarding them with lucrative investment banking or advisory business, although such subsequent or parallel business does not always materialise).
- The borrower's industry. Risk will be different in lending to a supermarket chain to, say, a coal mine.
- The loan's purpose (e.g. loans arranged to finance mergers and acquisitions obey a different logic from general corporate purpose ones).
- The loan's transferability (the possibility to transfer the loan to different lender on the secondary market can be of value and hence influence the price).

- The syndication strategy (different pricing strategies can arise according to the number of banks invited to lend).

These effects are analysed extensively in a risk-return framework in the remainder of this thesis.

Literature cited

Allen, T., 1990: Developments in the international syndicated loan market in the 1980s, Bank of England Quarterly Bulletin, February.

BIS, 2001: Quarterly Review, March, Bank for International Settlements, Basel, Switzerland

Boehmer, E. and W. L. Megginson, 1990: Determinants of Secondary Market Prices for Developing Country Syndicated Loans, Journal of Finance, Volume 45, Issue 5 (December), pp. 1517-1540.

Dennis, S. and D. Mullineaux, 2000: Syndicated loans, Journal of Financial Intermediation 9, 404-426

Eichengreen, B. and A. Mody, 2000: Lending booms, reserves and the sustainability of short-term debt: inferences from the pricing of syndicated bank loans, Journal of Development Economics, Vol. 63, pp. 5-44.

Madan, R., R. Sobhani and K. Horowitz, 1999: The Biggest Secret of Wall Street, Paine Webber Equity Research

Onsrud, H.J. and J.K. Pinto, 1991: Diffusion of Geographic Information Innovations, International Journal of Geographic Information Systems, Volume 5, 447-467

Robinson, M., 1996: Syndicated Lending: A Stabilizing Element in the Latin Markets, Corporate Finance Guide to Latin American Treasury & Finance.

Rhodes, T., 2000, Syndicated Lending, Practice and Documentation, Euromoney Books, ISBN 1 85564 799 0

PAPER 2

Developing country economic structure and the pricing of syndicated credits

Developing Country Economic Structure and the Pricing of Syndicated Credits

ABSTRACT

WE USE A HEDONIC pricing model to analyse in an extensive risk-return framework the determinants of the pricing of a sample of 5,000-plus syndicated credits granted to developing country borrowers between 1993 and 2001. We come to the conclusion that syndicated loans with riskier characteristics or granted to riskier borrowers are more expensive than others, although the effect of purely micro-economic price determinants is in several instances weaker when variables reflecting macro-economic conditions in borrowers' countries are also introduced into the model. In addition to individual loan or borrower considerations, lenders seem to focus more on macro-economic country risk factors to determine the pricing of their loans, such as the level of exports relative to debt service in the developing countries where the borrowers are located. For some, this means restricted access to external financing. Indeed, we detect possible evidence of lenders exploiting their market power when lending to developing country borrowers. Certain banks appear to charge a premium to change initially agreed loan terms. Furthermore, discounts are granted on developing country loans provided by small groups or clubs of relationship banks rather than on facilities with participation by a large number of institutions.

JEL classification: F20, F34

Keywords: syndicated loans, developing countries, debt

1. Introduction

GRINOLS AND BHAGWATI (1976) REPORT that some developing countries are excessively dependent on foreign funds or aid, which leaves them unable to escape the poverty trap by their own means. Balassa (1986) notes differences in the response of inward- and outward-oriented countries (i.e. countries relying or not on international trade for their economic growth) to external economic shocks, partly because the former depend excessively on foreign funds and do not have the right policies to make use of these funds, which eventually results in lower economic growth rates and reduces their creditworthiness. Economic problems in developing countries – such as the Mexican crisis of 1982, and more recently, the financial crises of South-East Asia (1997) and Russia (1998) – have often triggered major international financial crises over the past three decades. Several recent papers discuss bank lending to emerging markets (Van Rijckeghem and Weder, 2001; Goldberg, Dages and Kinney, 2000; Goldberg, 2001) and crises (Kaminsky and Reinhart, 1999). The sustained availability of foreign credit to developing countries is viewed as one means for deepening capital markets in these countries and potentially reducing the severity of crises, when they occur (Goldberg, 2001).

For all these reasons, international financing flows to developing countries and their determinants are worthy of our study. The determinants of bank lending to developing countries have been analysed in the existing academic literature within a risk-return framework, but the conclusions of earlier articles have often been only partial or contradictory. The availability of a comprehensive database of individual syndicated credit facilities allows us to apply the risk-return framework to study the determinants of syndicated lending to developing countries in a more systematic manner. This is the analysis we undertake in this paper.

One stream of academic literature, which started to appear in the late 1970s/early 1980s with the Latin American financial crisis, examines the effects of sovereign borrowers' macro-economic characteristics on the financing conditions obtained by them. More recent papers on secondary bond spreads study the determinants of spreads including local and global factors, (Mauro, Sussman and Yafeh, 2002; Forbes and Rigobon,

2002). Other papers on market discipline analyse the interest rates charged to different banks according to bank characteristics and macro-economic variables (Martinez Peria and Schmukler, 2001).

Hanson (1974), Harberger (1980), Sachs (1981, 1984), Eaton and Gersovitz (1981a, b) and Edwards (1983) report that sovereign borrowers' declining *solvency* – the restriction of their ability to fulfil their obligations in the long run – results in higher sovereign loan spreads. Sovereign borrowers' deteriorating *liquidity* – a proxy for their worsening short-to-immediate-term debt service capacity – is expected to reduce the borrower's degree of creditworthiness and to result in higher spreads (Feder and Just, 1977; Edwards, 1983; Eichengreen and Mody, 2000). However, Gersovitz (1985) argues that in a willingness-to-pay framework[28], higher international liquidity reserves may reduce creditworthiness and lead to an increase in the country risk premium. Several authors (Boehmer and Megginson, 1990; Gooptu and Brun, 1992) have examined the effects a *sovereign debt rescheduling history* or *debt repudiation* and come to the conclusion that these factors result in higher prices for sovereign debt. High *investment* relative to economic output enhances a sovereign borrower's perspectives for future growth. As shown in Sachs (1984) and Edwards (1983), it is negatively related to sovereign spreads. However, again in keeping with the willingness-to-pay framework, Gersovitz (1985) argues that if borrowers use foreign funds to undertake risk-reducing investment, they will reduce the cost of the penalty in case of default. Therefore, higher investment to output ratios will reduce creditworthiness and increase spreads. As far as actual economic growth is concerned, Eichengreen and Mody (2000) find that high country *growth rates* enhance the ability to repay debt and reduce spreads, provided they do not spill over into unsustainable credit booms.

Do riskier loan facilities or borrowers incur more expensive or restrictive funding than safer ones? The main theoretical issues pertaining to this question can be found in the information asymmetry literature of the late 1970s and early 1980s. The risk-price relationship has also been analysed in more recent empirical articles. Eichengreen and Mody (2000) present an extensive theoretical summary on these issues. Information asymmetry theory (Leland and Pyle, 1977; Stiglitz and Weiss, 1981; Fama, 1985;

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[28] The willingness-to-pay theory can be summarised as a sovereign borrower's use of national funds as a war-chest to survive international economic sanctions instead of paying down external debt.

Diamond, 1991) suggests that financial contracts should be formulated in such a way as to address the problems of adverse selection (supply of credit such that the less risky projects drop out of the market) and moral hazard (risk of non-repayment by the borrower, who has been prompted by a higher interest rate to choose a riskier project). Comparing a loan contract to a sale-leaseback with an option to repurchase the assets, Smith (1980) suggests that firms with higher asset values enjoy cheaper pricing on their credits, although the volatility of these assets raises the pricing. He also argues that banks should charge more for larger loans as they represent more risk – and possibly more risk concentration – on their books. However, he does not demonstrate the maturity of the loans to influence their pricing in an unambiguous way, although the effect might be expected to be positive purely from a risk perspective (the bank uses its balance sheet for a longer period of time). Smith (1980), Bester (1985) and Besanko and Thakor (1987) demonstrate that borrowers can signal better creditworthiness through their willingness to offer collateral, and so need not be charged high spreads. Yet Smith and Warner (1979) argue that collateralisation is costly and that benefits to securing the loan must exceed the cost for a particular loan to be secured. In a cross-section of loans this means that riskier loans will be collateralised. Berger and Udell (1990) also document that collateral typically is associated with riskier loans. If collateral's main purpose is to solve moral hazard problems, then riskier borrowers or those who need more monitoring will post more collateral.

Two recent articles (Kleimeier and Megginson, 2000; Eichengreen and Mody, 2000) investigate the micro-economic determinants of loan spreads. Regarding the *borrower's business sector*, Eichengreen and Mody find that when *financial institutions* from developing countries borrow on the syndicated loan market, they seem to be able to obtain lower spreads than non-financial borrowers. This is consistent with the emphasis some observers have placed on tacit or explicit guarantees provided to financial institutions by monetary authorities (lenders of last resort). Concerning the *purpose of the loans*, a borrower needing large sums of money quickly (for example, to finance a takeover) may have to pay a premium for liquidity. Kleimeier and Megginson present empirical evidence of this by showing that syndicated credits arranged for merger and acquisition purposes are relatively more expensive than others. Eichengreen and Mody find that spreads on loans to finance *infrastructure projects* are usually higher than on other types of loans. Kleimeier and Megginson document the fact that spread and

maturity and *loan size* are significantly and negatively related for most types of syndicated credits. As far as *risk mitigants* are concerned, Kleimeier and Megginson find the presence of a *third-party guarantee* to reduce the spread on most syndicated credits. The effects of the presence of *collateralisable assets* are found to vary according to the purpose of the loans.

The approach presented in this paper follows Kleiemeier and Megginson (2000) and Eichengreen and Mody (2000) and contributes to the literature in the following respects:

- Two different measures for whether the loans are guaranteed or not are used: the notion of implicit and explicit guarantees. Our loan pricing measure systematically incorporates the full economic cost of loans, including fees (in addition to spreads, which are used by most previous studies).
- Our study seeks to answer the following question: how is the pricing of syndicated credits granted to sovereign, but also non-sovereign borrowers in developing countries influenced by macro-economic conditions prevailing in their countries of location? We combine this analysis with that of the effects of a large number of individual, essentially qualitative, risk characteristics of every loan and borrower, such as loan purpose and borrower business sector. To our knowledge, the effects of these factors have not been measured in a combined and extensive manner. Our contribution also consists in evaluating the relative importance of macro- and micro-economic determinants of loan pricing.
- The implications on syndicated loan pricing of a variety of market structure indicators for this loan market are also evaluated to answer the following questions: are loans granted by smaller syndicates to developing country borrowers cheaper than those granted by larger ones, and are borrowers who have used the market more extensively able to obtain cheaper rates than others? Does a transferable loan (this characteristic is a proxy for the liquidity of the secondary loan market) command a price discount?

Our data sample on developing country loans is more comprehensive in terms of information content and the number of facilities than in most previous studies and also covers the years corresponding to the Asian and Russian financial crises. Our analysis of micro-economic variables shows that most individual characteristics of borrowers

and loans influence the pricing of credits in the expected way (i.e. riskier loans or borrowers correspond to higher pricing). However, this effect is in several instances weaker when macro-economic conditions prevailing in the countries of the borrowers are also controlled for. Lenders seem to attach at least as much importance to macro-economic conditions prevailing in borrowers' countries (e.g. ratio of debt service to exports, debt rescheduling, IMF adjustment programme) as to the characteristics of the borrowers or loans themselves. Our findings concerning the structure of the market for syndicated loans granted to developing countries point to lending institutions potentially exploiting their market power.

The rest of this paper is structured as follows. Section 2 provides a brief historical perspective on syndicated lending to developing countries. We present our dataset and methodology in Section 3. Section 4 describes and discusses our regression results. We conclude in Section 5.

2. Historical perspective

Syndicated loans have always been an important source of international financing for developing countries and indeed were in the limelight during the Mexican debt moratorium of August 1982, since most Latin American debt then consisted of syndicated credits. In fact the international market for syndicated credits saw its first large wave of development in the 1970s with lending to developing country borrowers, followed by a dominance of bond markets over loans in the 1980s, until syndicated credits again became an indispensable source of finance in the 1990s and largely complementary to securities. Syndicated lending has been as significant as bond financing since the first half of the 1990s (Table 1). While international developing country bond issues rose from negligible levels at the beginning of the 1990s to more than $120 bn in 1997, before falling back to $82 bn in 2000 after the Asian crisis, loan commitments have followed pace, reaching levels comparable to bond issues. Signings of international developing country loan facilities actually exceeded bond issuance just about every other year, totalling $96 bn in 2000. Robinson (1996) notes that "the

rapidity with which [the Latin American syndicated loans] market has recovered from the problems [of the Mexican crisis], its growing size and increasing breadth of participation indicate that this market has staying power". As Table 2 below shows, in times of financial crises in developing countries, syndicated lending generally tended to fall quite rapidly (refer to the statistics for 1985 and 1998) and took some time to pick up again. This form of lending thus seems very much market-oriented and determined by lenders' short-term considerations, based on macro-economic conditions in the borrowers' countries. This provides an important justification for the inclusion of macro-economic variables into our analysis of the determinants of syndicated lending to emerging markets.

Table 1: Various sources of international financing for developing countries, $bn

Gross announcements	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
International syndicated credit facilities	26.5	26.2	46.6	76.6	89.3	140.1	75.8	56.7	95.7	71.1
International bonds	20.6	47.1	38.1	36.9	103.3	120.9	77.3	76.6	81.6	105.6
International equities	6.7	7.7	17.3	8.9	15.1	26.0	10.1	22.7	44.0	11.6

Source: Dealogic Loanware; Bank for International Settlements, various years.

Table 2: Announcements of international syndicated credit facilities by regions, $bn

	1980	1982	1984	1985	1986	1988	1989	1992	1994	1996	1998	2000	2001
Industrialised countries	39.9	41.0	16.1	9.5	18.1	91.1	122.6	159.9	441.6	729.6	821.0	1,332.2	1,280.1
Developing countries	41.9	45.8	13.5	9.3	10.4	10.5	26.2	26.5	46.6	89.3	75.8	95.7	71.1
Other[29]	1.0	1.4	0.5	0.2	1.1	0.2	0.2	7.8	13.7	20.3	8.5	37.8	37.7
Total	82.8	88.2	30.1	19.0	29.6	101.8	149.0	194.0	501.9	839.3	905.3	1,465.4	1,388.8

Source: Bank of England (Allen, 1990), Bank for International Settlements, various years; Dealogic Loanware

[29] Including offshore centres and international organisations.

3. Data and methodology

We work with a sample of 10,304 syndicated credit facilities granted to developing country borrowers from 1993 to 2001. These data were extracted from the Dealogic Loanware database, a primary market information provider on individual syndicated credit facilities, in particular the characteristics of the loans (amount, maturity, currency, pricing) and the borrowers (name, nationality, business sector). A large part (80%) of the facilities were contracted in US dollars.

We also use macro-economic data for our study, corresponding to characteristics of the borrowers' countries. Our data sources for these variables were the BIS-IMF-OECD-World Bank Joint Statistics on external debt, the IMF's International Financial Statistics, the IMF's World Economic Outlook database and the International Institute of Finance's developing country database. We linked the macro-economic variables and the micro-economic information contained in the loans database to the country over time. For instance, for a loan granted to an Argentine borrower in 1995[30], our real GDP growth variable represents Argentina's real economic growth for 1995.

3.1 Loan pricing

In our sample of 10,304 syndicated loan contracts, the spread charged to the borrower (over Libor, Euribor or another pricing reference) is available for 6,831 deals. Several research articles (Cantor and Packer, 1996; Kamin and von Kleist, 1999; Kleimeier and Megginson, 2000) have analysed this indicator. However, spreads are only one component of the true economic cost of a syndicated credit facility that the borrower has to pay, with the rest corresponding mostly to a variety of fees. The pricing structure of a syndicated credit is described in detail in Appendix 2. In our loan pricing analysis we look at the so-called *drawn return,* a proxy for the full economic cost of loans priced

[30] In case of loan facilities that have already been funded by the lenders but not yet signed, we took the funding date as a reference.

over Libor. The drawn return, which can be calculated for 5,010[31] observations in our sample, is the annual return expressed in basis points (spread plus utilisation fee, participation fee, facility fee, underwriting fee) that will accrue to a senior fund provider if the facility is drawn throughout its life.

3.2 Explanatory variables

3.2.1 Macro-economic explanatory variables

Our macro-economic variables can be classified into six subgroups: indicators of (1) solvency, (2) liquidity, (3) economic growth and its sustainability, and (4) economic openness for the country of the borrower; (5) outside economic factors and (6) sovereign ratings.

- *1. Solvency of the borrower's country:*

  The ratios of *external debt to GDP*[32] and of *debt service to exports of goods and services* are solvency measures that gauge the burden of a country's debt relative to its earnings. The higher this ratio, the more likely the country is to be distressed and therefore to default. Hanson (1974), Harberger (1980), Sachs (1984), Eaton and Gersovitz (1981a, b) and Edwards (1983) discuss how higher debt to export or debt to output ratios result in higher sovereign loan spreads. Boehmer and Megginson (1990) further find that developing countries' deteriorating solvency can reduce the secondary market price of their debt. We expect the ratio of external debt to GDP to raise the pricing of syndicated credits, therefore. We also employ an indicator of whether the borrower's country has received *assistance from the IMF* – defined as *use of Fund credit by operating the General Resources Account (GRA)* during the year when the syndicated credit was granted – as a proxy for potential problems in the economy of the country concerned. We expect this indicator to be positively

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[31] This sample size is considerably larger than in several other studies analysing the determinants of developing country credit spreads: Edwards (1986) and Kamin and von Kleist (1999) use 113 and 358 loan spread observations, respectively.

[32] This includes both private and public debt.

related to the pricing of loans. The use of this variable is equivalent to testing the effects on pricing of a *sovereign debt rescheduling history* or *debt repudiation*, which several authors have done. Gooptu and Brun (1992) find that the declaration of a moratorium on commercial bank debt service payments has a negative impact on the availability of short-term trade credit lines. Besides, the existence of a current World Bank or IMF adjustment programme is a significant determinant of the amounts of short-term trade credit lines that are available during a given year from commercial banks. Boehmer and Megginson (1990) find that the level of incurred payment arrears, the unilateral debt moratoria by Brazil and Peru and the loan-loss provisions by US banks have a significantly negative impact on secondary loan prices on these borrowers' debt. The adoption of legislation for debt-conversion programmes is associated with a decline in secondary market loan prices for the sovereign debt of the countries concerned.

- *2. Liquidity of the borrower's country:*

  Relatively high values of the ratio of *short term external debt to total external debt* indicate that a country can be the victim of a liquidity crisis if it cannot roll over existing credits – especially if its short-term debt exceeds its foreign currency reserves – we expect this ratio to be positively associated with the pricing of syndicated loans. The ratio of *reserves to debt or reserves to short-term debt* is also used as an indicator of such vulnerability. The *ratio of international reserves to GDP* measures the relative level of international liquidity held by a sovereign borrower and is determined to have a negative effect on spreads (Edwards, 1983). However, Gersovitz (1985) argues that in a willingness-to-pay framework, a country can choose not to use reserves for debt service, if it can protect them from seizure. The very liquidity of resources in the form of reserves may make them ideal for surviving sanctions after default. The first period after repudiation may find the country most vulnerable since it will take time to set up alternatives to the banks for facilitating international trade. A foreign exchange war chest can be especially important in this transition period. In the early 1980s, rumours that developing countries were choosing to rebuild reserves rather than service debts were viewed as particularly ominous in this context. Argentina, for instance, appeared prepared to threaten its creditors with

having to classify its loans as non-performing rather than use its increased reserves for debt service (Gersovitz, 1985). Therefore under a willingness-to-pay approach to foreign borrowing, higher international reserves may reduce creditworthiness and will result in an increase in the country risk premium.

High values of the ratios of *investment to GDP* and *credit to GDP* can forecast a future improvement in the country's general economic situation and are also signs of confidence on behalf of banks and investors, provided they do not spill over to an unsustainable credit boom (see below). The *investment to GDP* ratio captures the country's perspectives for future growth. As shown in Sachs (1984) and Edwards (1983), it is negatively related to spreads. However, in the willingness-to-pay framework, Gersovitz (1985) argues that borrowers may use foreign funds to make investments that reduce the cost of the penalty in case of default. Thus, higher investment ratios will reduce creditworthiness and increase spreads. As for the ratio of credit to GDP, it can be best thought of, in a cross-section, as an indicator of financial depth or development.

- *3. Economic growth and its sustainability:*

  Real GDP growth is an indicator of the evolution of the country's wealth and relatively high values can point to the debt burden becoming easier to bear in the future. Eichengreen and Mody (2000) find that high country *growth rates* enhance the ability to repay and reduce spreads; highly variable export growth, on the other hand, raises the risk of non-payment and increases the spread. At low levels of financial development and low growth rates, policy measures to improve financial intermediation bring value and reduce the costs of external borrowing. Even so, when they spill over to unsustainable credit booms, they are regarded by the markets with alarm and worsen the terms of access to external funds. To all intents and purposes, high values of the real GDP growth variable are supposedly associated with relatively cheaper syndicated credits, then, unless they reach unsustainable levels. In order to control for the sustainability of growth, we also included *inflation* as an explanatory variable into our model. As Cantor and Packer (1996) explain, "a high rate of inflation points to structural problems in the government's finances. When a government appears unable or unwilling to pay for current budgetary expenses through taxes or debt issuance,

it must resort to inflationary money finance [i.e., to printing money]. Public dissatisfaction with inflation may in turn lead to political instability." According to Barro (1997), business and households perform poorly when inflation is high and unpredictable, both because the average rate of inflation and its variability and uncertainty. We expect the inflation rate to be positively associated with the pricing of syndicated credits.

- *4. Economic openness:*

  Relatively high values of the ratio of *imports to exports* and *import to GDP* can point to excessive foreign dependence of the country in the sense that it has to import a relatively high amount of goods and services in order to export a given amount of goods and services or to generate a unit of domestic economic wealth. As suggested by Frenkel (1983) and Balassa (1986), to the extent that more open economies are more vulnerable to foreign shocks, we expect that higher values of the ratio of imports to GDP will raise spreads. Balassa (1986) notes that between 1973 and 1983, outward-oriented countries suffered considerably larger external shocks than inward-oriented ones in the first instance[33].

- *5. Outside economic factors:*

  We included as explanatory variables the *country's purchasing power parity share of world GDP:* this is an indicator of the country's economic weight in the world. We also controlled for *growth in world trade:* if world trade is booming, one could expect that there is more competition for funds as these are more difficult and therefore more expensive to come by. Finally, we included the *yield on the three-year US Treasury bill* in our regression models in order to control for the price of the alternative, risk-free investment available to the lenders. The extent to which lenders are willing to extend funds to potentially riskier borrowers from developing countries instead of investing in US Treasuries is an indicator of their appetite for risk. In a study of the evolution and determinants of US bank's claims on developing countries, Goldberg (2001) suggests that foreign claims of US banks are correlated with real US interest rates, but

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[33] Nevertheless, Balassa also demonstrates that while outward-oriented countries accepted a temporary decline in economic growth in the immediate aftermath of external economic shocks in order to limit reliance on foreign borrowing, their economic growth accelerated subsequently, owing to the output-increasing policies applied.

generally uncorrelated with foreign real interest rates. Tighter real lending conditions in the United States are associated with lower real claims on industrialised countries and higher claims on Latin American countries.

- *6. Sovereign ratings:*

  Cantor and Packer (1996) find that a number of rated countries' macro-economic characteristics are reflected in their sovereign ratings, especially per capita income, GDP growth, inflation, external debt, level of economic development, and default history. Because of the correlation of sovereign ratings with most macro-economic indicators, we analysed separately the effects of these two sets of variables on the pricing of syndicated credits. For the purposes of econometric analysis, we converted the Standard and Poor's sovereign ratings into five rating classes, from best to default, using the conversion table shown in Appendix 3. We associated these rating classes with the credits based on the nationality of the borrower and the date of the loan facility. The resulting distribution is shown in Table 3 below. We expect the good ratings classes to be negatively associated with the pricing of syndicated credits and vice versa.

Table 3: number of syndicated loan facilities corresponding to each sovereign rating class

Rating class	Ratings included[34]	Number of observations
missing	-	281
default or not rated or not disclosed	SD, NR, R	1,257
poor	CC to BB-	1,823
speculative	BB to BBB-	2,832
investment grade	BBB to A	2,856
best	A+ to AAA	1,255
Total	SD to AAA	10,304

Source: Standard and Poors, Dealogic Loanware, author's calculations.

3.2.2 Micro-economic explanatory variables

Our micro-economic explanatory variables pertain to loan maturity and size, the existence of risk mitigants, business sector and loan purpose, as well as the structure of the market for syndicated loans granted to developing countries.

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[34] See Appendix 3 for more detail.

- *Maturity* indicates the lifetime of the loan, expressed in years, and hence the period for which the lender is exposed to credit risk. Kleimeier and Megginson (2000) report that loan maturity and spread are significantly and positively related, except for project finance loans. The effect of maturity on the pricing of loans is generally not found to be uniform in the academic literature (see, for instance, Smith, 1980).
- We also included the natural logarithm of *loan size* (and the resulting bank exposure) expressed in millions of US dollars. Kleimeier and Megginson confirm a negative and significant relationship between loan prices and size for most syndicated credits in their sample, except for project finance loans. This could point to the ability of more creditworthy borrowers being able to arrange larger loans or to the presence of economies of scale when banks arrange syndicated credit facilities.
- We computed dummies to indicate the presence of *risk mitigants*, such as the loan being *secured* (notably on an asset or receivables the borrower might have), *sponsored* or *explicitly guaranteed* by a third party. Eichengreen and Mody do not control for the presence of risk mitigants. Kleimeier and Megginson do include dummies for the existence of a third-party repayment guarantee or of collateralisable assets; these are explicit guarantees, though. While the authors find the presence of a *third-party guarantee* to reduce the spread on most syndicated credits, the effect of collateralisable assets depends on the type of credit. As an innovation on this previous article, we distinguish between *explicit guarantees* (written pledges from a third party to guarantee the loan) and *implicit guarantees* (e.g. when the borrower is a developing country subsidiary of a multinational firm from an industrialised country) and examine their effects separately. In the rest of the existing empirical literature, the findings about the effects of risk mitigants on the pricing of loans are mixed (Smith, 1980; Bester, 1985; Besanko and Thakor, 1987; Smith and Warner, 1979; Berger and Udell, 1990).
- Dummy variables are also included to identify subsamples within our dataset that correspond to particular *borrower business sector* and *loan purpose* groups that we might expect to have different risk characteristics and therefore incur different pricing of their loans. Our control for the borrower business sectors and

the industrial structure of borrowing countries is more refined than in Kleimeier and Megginson who determine a dummy variable for the existence of collateralisable assets based on the borrower's industry, and Eichengreen and Mody, who control for only four industrial sectors: manufacturing, financial services, other services, government. The authors report that when *financial institutions* borrow on the syndicated loan market, they seem to be able to obtain lower spreads than non-financial borrowers. This is consistent with the emphasis some observers have placed on tacit or explicit guarantees provided to financial institutions by monetary authorities (lenders of last resort). We created ten *business sector* subcategories: construction and property, financial services (banks), financial services (non banks), high-tech industries, infrastructure related industries, services provided to the population, services provided by the state, traditional industry, transportation and utilities firms, based on the 188 groups described in Appendix 4. Our *loan purpose* classifications are partially based on Kleimeier and Megginson (2000), who notably report that merger and acquisition-purpose loans are relatively more expensive than others. Eichengreen and Mody further find that spreads on loans to finance infrastructure projects are usually higher than on other types of loans. We distinguished between the following loan purposes: corporate control, capital structure, general corporate purpose, project finance, property, transport, other or not available, multi-purpose. For a full list of purpose codes included in the various groupings, please refer to Appendix 5.

- We finally included variables to control for the *structure of the loan market*, an approach which has not been adopted so far in the literature on the pricing of developing country syndicated credits. Firstly, we included a dummy variable showing whether the credit facility is *transferable* or not. This is an indicator of the market's liquidity, i.e. the extent to which the loan can be traded on the secondary market. It may be easier for a bank to offload loans from its balance sheet and manage its exposure to certain developing country borrowers if the loans concerned are transferable[35]. This may have an impact on the pricing of the loans. Secondly, we used a dummy to indicate if the amount of the loan has been *increased* from the original amount. When this dummy is equal to 1, it can

[35] Although this may not be an indispensable condition if credit derivatives are used.

indicate that the market had a positive reaction to the deal during syndication or that the banks have shown flexibility in adapting their financing package to a change in the borrower's needs. Thirdly, we controlled for the *size of the syndicate* of lending banks for each facility. We defined a first dummy to indicate the case when the number of fund providers was greater than two, and a second one to indicate that the deal is a *club deal* or a *bilateral deal*[36]. The conditions of bilateral or club deals are expected to reflect the relationship of the borrower with its core banks and may therefore be more favourable than on other deals. Fourthly, we included among our control variables the *share of the borrower's country in total lending to all countries* during the year concerned: this ratio indicates the relative presence of the country on the market for syndicated credits relative to others. A high country share may indicate relatively high financing needs for a nation, possibly leading to more expensive credits, but also, on the contrary, to an established presence on the market, resulting in more favourable financing conditions.

3.3 Descriptive statistics

As an exploratory analysis, we now present some descriptive statistics to understand the characteristics of our sample[37], which covers the 1993-2001 period. Table 4 shows that with the exception of 1996, the mean and the median of the drawn return in our sample has been following a generally upward trend, peaking in 1999 – the mean was then 252 basis points, possibly reflecting higher risk premia demanded from developing country borrowers in the aftermath of the Asian and Russian financial crises of 1997 and 1998. Spreads subsequently levelled off. The mean and the median are quite close to each other, suggesting a symmetrical statistical distribution of the data. Higher drawn returns have generally been associated with higher dispersion. Table 5 further suggests that loan size has been increasing over time; even so, the relatively high standard deviation indicates dispersion in loan sizes, although the coefficient of variation is relatively stable.

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[36] A club deal is reserved for a limited number of insider banks instead of being widely sold down on the market; in a bilateral deal, there is only one participant bank.

[37] Our comprehensive sample is approximately equal to the population.

Table 4: Evolution of drawn return (bp) over time

Year	N	Mean	Median	Standard deviation	Coefficient of variation
1993	317	120.4	100.0	74.7	0.62
1994	400	125.3	111.2	74.7	0.60
1995	615	124.0	95.0	105.7	0.85
1996	945	111.9	79.5	95.0	0.85
1997	1,132	132.5	92.8	116.5	0.88
1998	558	180.4	145.0	137.6	0.76
1999	412	252.2	225.0	181.0	0.72
2000	552	190.6	150.0	133.1	0.70
2001*	79	204.8	187.5	139.1	0.68
Total	5,010	149.0	106.7	125.3	0.84

Source: Dealogic Loanware, author's calculations. * first quarter data only

Table 5: Evolution of loan size ($m equivalent) over time

Year	N	Mean	Median	Standard deviation	Coefficient of variation
1993	317	62.2	35.0	104.2	1.68
1994	400	84.1	42.6	166.2	1.98
1995	615	83.7	50.0	167.0	2.00
1996	945	77.8	44.3	123.1	1.58
1997	1,132	107.4	50.0	244.4	2.28
1998	558	126.7	66.3	209.9	1.66
1999	412	129.2	77.6	217.1	1.68
2000	552	140.8	99.3	172.7	1.23
2001*	79	162.7	75.0	390.2	2.40
Total	5,010	102.6	50.0	194.1	1.89

Source: Dealogic Loanware, author's calculations. * first quarter data only

Loan size and drawn return seem to differ significantly according to the borrower's industry (Table 6), with the highest median loan size associated to the utilities sector ($91m) and the lowest one to the construction, property and the non-bank financial services sectors ($30m). We observe the highest median drawn returns for infrastructure and population related services[38], more than twice as high as the median return observed for the transport industry (the sector with the lowest median drawn return). Table 17 of Appendix 6 shows the correlation matrix of the variables. The analysis of this matrix provides an opportunity to detect relationships between the dependent and the independent variables as well as among the independent variables (Gujarati, 1995). The table suggests significant relationships in particular between the dependent and independent variables.

[38] E.g. hotels, healthcare. See Appendix 4 for full list of sectors included.

Table 6: Distribution of loan size and drawn return by industry, 1993-2001

		Loan size ($m)		
Industry	N	Mean	Median	Standard deviation
Construction and property	170	46.2	30.0	42.1
Financial services – banks	897	83.5	50.0	109.4
Financial services – nonbanks	501	63.0	30.0	110.7
High-tech industries	825	104.9	56.8	156.4
Infrastructure	17	89.1	70.0	70.0
Population related services	149	86.9	50.0	123.0
State-provided services	249	191.4	90.0	354.3
Traditional industry	866	94.2	50.0	170.7
Transport	521	75.7	39.7	207.6
Utilities	794	163.1	91.2	282.3
		Drawn return (bp)		
Industry	N	Mean	Median	Standard deviation
Construction and property	170	131.1	100.0	94.5
Financial services – banks	898	140.6	96.2	134.3
Financial services – nonbanks	501	124.0	100.0	96.2
High-tech industries	826	150.3	105.0	132.1
Infrastructure	17	233.0	188.0	163.1
Population related services	149	258.6	203.6	180.0
State-provided services	249	139.0	100.0	113.5
Traditional industry	866	171.9	130.8	126.6
Transport	522	98.3	75.0	79.6
Utilities	794	164.3	137.5	120.6

Source: Dealogic Loanware, author's calculations.

In Table 7 we notice that better borrower country sovereign ratings correspond to lower drawn returns. Besides, except for the worst Standard & Poor's ratings class, the median maturity of poor ratings classes (e.g. class 1 – "poor") is typically short (never above 2 years between 1993 and 1999), potentially indicating that lenders are reluctant to extend funds to poorly rated borrowers for longer periods of time. This may leave these countries in a maturity trap, if the maturity of fresh loans is always only sufficient to refinance maturing credits.

We now present the methodology used to further analyse these data.

Table 7: Summary statistics by borrower country sovereign rating and year

Median drawn return (bp) by borrower country sovereign rating and year									
Rating class	1993	1994	1995	1996	1997	1998	1999	2000	2001*
default or not rated or not disclosed	150.0	160.0	172.3	150.0	138.3	82.0	105.0	117.7	
poor	136.3	150.0	170.0	155.0	182.5	220.8	250.0	200.0	249.6
speculative	142.8	138.6	120.6	90.0	76.4	158.0	255.6	190.0	236.0
investment grade	97.5	100.0	100.0	82.5	80.0	85.0	132.5	106.6	74.0
best	70.8	66.0	55.0	61.1	53.2	63.0	85.0	73.7	77.2
Median loan size ($m equivalent) by borrower country sovereign rating and year									
Rating class	1993	1994	1995	1996	1997	1998	1999	2000	2001*
default or not rated or not disclosed	32.0	40.0	36.0	40.3	50.0	120.0	100.0	100.0	
poor	43.5	50.3	80.8	60.0	50.0	61.8	60.0	95.0	72.5
speculative	50.0	42.8	67.5	75.0	50.0	75.0	83.0	100.0	70.0
investment grade	29.0	31.0	40.0	40.0	48.4	52.7	86.5	91.9	95.0
best	40.0	50.0	33.4	30.0	56.3	60.0	52.5	77.0	60.0
Median maturity (years) by borrower country sovereign rating and year									
Code Rating class	1993	1994	1995	1996	1997	1998	1999	2000	2001*
default or not rated or not disclosed	5.0	5.0	4.0	5.0	5.0	7.0	8.4	7.0	
poor	1.5	2.0	1.1	1.5	1.0	1.0	2.0	3.3	3.0
speculative	5.0	2.5	4.2	5.0	5.0	3.0	4.5	3.3	4.0
investment grade	5.0	5.0	5.0	5.0	5.0	5.0	3.0	3.0	3.0
best	3.0	5.0	5.0	3.0	5.0	5.5	3.0	3.0	3.0

Source: Dealogic Loanware, author's calculations. * first quarter data only

3.4 Methodology

As many of our independent variables are qualitative dummies, a hedonic (i.e. quality-adjusted) model seems particularly useful for the task at hand. Hedonic prices are the implicit prices of attributes of a differentiated product. Following the approach of Linneman (1980)[39], our equations are of the form:

$$\ln DRAWN_i = \alpha + \Sigma_k \beta_k X_{ik} + \Sigma_m \gamma_m Y_{im} + \Sigma_n \phi_n Z_{in} + U_i$$

where:

$\ln DRAWN_i$ represents the natural logarithm of the drawn return on loan i,

α is a constant,

[39] Linneman estimates property values and rental payments for the urban housing market that are hedonic functions of neighbourhood (nonstructural) and structural traits associated with each site. The partial derivative of these hedonic functions with respect to any trait describes the marginal change in the total site valuation associated with a change in that trait when all other trait levels are held constant. These partial derivatives reveal the same marginal information as do prices in standard market analyses; for this reason partial derivatives are often referred to as the shadow prices of the underlying locational traits.

$(x_1, \ldots, x_k)$ is a vector of *k* continuously measurable micro-economic characteristics of the loan or the borrower (e.g. maturity, natural logarithm of loan size),

$(y_1, \ldots, y_m)$ is a vector of *m* continuously measurable macro-economic measures for the performance of the borrower's country (e.g. ratio of debt to GDP, of debt service to export of goods and services),

$(z_1, \ldots, z_n)$ is a vector of *n* qualitative characteristics (e.g. loan purpose dummies, borrower business sector dummies).

U_i = is a random disturbance.

$(\beta_1, \ldots, \beta_k)$, $(\gamma_1, \ldots, \gamma_m)$ and $(\phi_1, \ldots, \phi_n)$ are parameters to be estimated.

ϕ_j (j = 1, ..., n) can then be interpreted as the hedonic price attached to qualitative characteristic *j*.

To perform our modelling, we first considered variables that were likely to influence loan pricing in theory. We then looked at the literature to corroborate our selection of variables, and we examined the relation of each of them to loan pricing by means of bivariate analysis. Finally, progressing from the specific to the general, we ran stepwise regressions of the drawn return using various combinations of the independent variables described above. This technique has, among other things, the advantage of reducing the effects of multicolinearity. We used the so-called *forward stepwise* method, which starts with an empty model, adds variables one by one provided they are significant below a certain level (10% in our case), re-estimates the model and subsequently removes any variables that are then only significant at or above a certain level (11% in our case).

The results of our regressions are presented and interpreted in section 4.

4. Results and discussion

Insofar as sovereign ratings are expected to be correlated with the other indicators of countries' macro-economic performance, we analysed the effects of these two sets of independent variables separately. We first discuss our models containing only macro-

economic independent variables, then the one containing only micro-economic independent variables. We conclude with combinations of the two.

4.1 The effect of sovereign ratings

Table 8 shows that the drawn return is statistically different for each ratings class from 'poor' to 'best' (the 95% confidence intervals for the mean do not overlap). In accordance with Kamin and von Kleist (1999) we find that spreads on loan issues increase as sovereign ratings deteriorate, suggesting that lenders price sovereign ratings properly into their loan offerings. This is the straightforward result one would expect. Borrowers from countries with a 'poor' sovereign rating are having to pay a drawn return of 238.3 bp on their loans on average, almost four times the average drawn return of the borrowers from countries with the 'best' sovereign ratings (65.7 bp).

Table 8: Drawn return (bp) by broad rating category

					95% conf.	
Rating class	N	Mean	Median	Standard deviation	interval	
default or not rated or not disclosed	324	169.4	147.3	116.7	156.6	182.1
poor	860	238.3	182.5	159.4	227.7	249.0
speculative	1,617	166.0	125.0	134.7	159.4	172.6
investment grade	1,509	106.1	93.3	67.0	102.8	109.5
best	614	65.7	60.0	27.7	63.5	67.9

Source: Dealogic Loanware, author's calculations.

4.2 The effect of maturity combined with indicators of countries' macro-economic performance

We then investigate the relationship between the pricing of syndicated credits and their maturity plus measures of economic performance for the borrowers' countries. The results are displayed in Table 9.

Table 9: The effect of maturity combined with indicators of countries' macro-economic performance

We estimated the following equation using the forward stepwise technique, with an entry criterion of 10% and a removal criterion of 11%:

ln drawn = β_0 **Intercept** + β_1 **maturity** + β_2 **debtgdp** + β_3 **growth** + β_4 **st_tdebt** + β_5 **cpi** + β_6 **pppsh** + β_7 **restogdp** + β_8 **tdstoxgs** + β_9 **c_share_w** + β_{10} **gra** + β_{11} **impexp** + β_{12} **invgdp** + β_{13} **credgdp** + β_{14} **trade** + β_{15} **trsyld** + ε

where:

- ln drawn = natural logarithm of drawn return, in bp
- maturity = maturity of loans, in years
- debtgdp = ratio of debt to GDP for country of the borrower, for year concerned (end-year)
- growth = real GDP growth in borrower's country, for year concerned
- st_tdebt = ratio of short-term external debt to total external debt for borrower's country, for year concerned (end-year)
- cpi = inflation in borrower's country, for year concerned
- pppsh = purchasing power parity share of world GDP of the borrower's country for year concerned (end-year)
- restogdp = ratio of reserves to GDP for country of the borrower, for year concerned (end-year)
- tdstoxgs = ratio of debt service to exports of goods and services for country of the borrower, for year concerned
- c_share_w = share of the borrower's country in world syndicated lending, for year concerned
- gra = dummy for assistance received by the country of the borrower from the IMF – use of Fund credit by operating the General Resources Account (GRA) – during the year concerned
- impexp = ratio of imports to exports for country of the borrower, for year concerned
- invgdp = ratio of investment to GDP for country of the borrower, for year concerned
- credgdp = ratio of bank credit to GDP for country of the borrower, for year concerned
- trade = growth in world trade for year concerned
- trsyld = yield on the three-year US Treasury Bill, for month concerned

variable	Coefficient	*t*-statistic	P-value
tdstoxgs	0.0076	11.42	0.000
growth	-0.0353	-9.85	0.000
pppsh	0.0604	11.60	0.000
gra	0.2119	6.81	0.000
credgdp	-0.0052	-7.44	0.000
debtgdp	0.0036	4.43	0.000
trsyld	-0.0493	-2.72	0.007
restogdp	0.0125	5.63	0.000
c_share_w	0.2342	4.91	0.000
cpi	0.0005	2.46	0.014
trade	-0.0117	-2.32	0.020
intercept	4.7856	45.57	0.000

N = 4,198; Adj R^2 =0.2000; F(11; 4,186) = 96.39

The significant and positive coefficients on the ratio of the debt service to exports and the ratio of debt to GDP are in accordance with the results of the academic literature (Feder and Just, 1977; Sachs, 1984; Eichengreen and Mody, 2000): lenders seem to be concerned about the weight of countries' debt service as a proportion of their income and therefore charge higher spreads to borrowers from countries whose ratios of debt or

debt service to income are higher. The dummy controlling for assistance from the IMF is also positive and significant: likewise, Eichengreen and Mody (2000) find that loans granted to countries with a history of debt rescheduling are more expensive than those to countries with no such history. Lenders seem to regard with suspicion the necessity of the borrower's country to rely on assistance from the IMF. They impose a penalty for this[40]. The significant and negative coefficients on real GDP growth and the ratio of domestic credit to GDP are also in accordance with Eichengreen and Mody (2000): investors seem to grant a discount on loans to borrowers from countries whose fortunes may be expected to improve, presumably at least as long as the situation does not spill over into an unsustainable inflationary credit boom (the coefficient on the inflation variable is significant and positive). The ratio of reserves to GDP is significantly and positively related to drawn returns: although sovereign borrowers normally default only in extreme circumstances, the willingness-to-pay argument developed by Gersovitz (1985) seems to prevail in creditors' eyes over any possible good impression conveyed by relatively high reserves about borrower countries' finances or prospects (Edwards, 1983).

Countries' share in syndicated lending to the whole world is significantly and positively related to the spreads in this regression: investors seem to interpret high country shares as relatively high and/or more urgent financing needs for a nation and therefore demand a higher price for extending credit. This could point to the market power of lenders being exploited or higher perceived concentration of risk being charged for extra. The yield on the three-year US Treasury bill, the alternative, risk-free investment to extending credit to potentially riskier borrowers from developing countries, is significantly and negatively related to the pricing of syndicated credits. We interpret this as survival bias in the sense that only the best developing country borrowers are able to obtain credits in a time of higher industrialised country interest rates.

Countries' purchasing parity power share of world GDP is significantly and positively related to the pricing of syndicated loans: lenders seem to extract a premium from relatively 'wealthier' borrowers.

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[40] Surely the effects of this variable are not limited to the year of signature of the loan. The results reported in this paper use a GRA dummy equal to 1 if Fund assistance was received during the year of signature of the loan. An alternative model specification (not shown) with a dummy for Fund assistance *preceding* the year of signature of the loan gives very similar results.

Finally, although growth in world trade does show up as a significantly negative determinant of loan pricing, the ratio of imports to exports of the country of the borrower does not. This may point to the fact that (1) only a limited portion of syndicated loans granted to developing countries does in fact accompany their participation in world trade and that (2) the participation of developing countries in world trade is significantly lower than that of industrialised countries. Likewise, loan maturity, the ratio of short-term to total external debt, and the ratio of investment to GDP drop out of the regression. Other macro-economic factors seem to dominate these variables as determinants of loan pricing in lenders' eyes.

4.3 The effect of micro-economic variables

Next we examine the effects of micro-economic variables considered on their own on the pricing of syndicated credits. In particular, we include dummies for the borrower's business sector and the loan purpose. We leave out the sectoral dummy for utilities and the multiple-purpose loan purpose dummies as base cases, because including them would result in overspecifying the model. The results are shown in Table 10.

The coefficient on loan size is negative as in Kleimeier and Megginson (2000), suggesting either that banks extending syndicated credits to developing country borrowers are enjoying economies of scale, or that safer borrowers are able to arrange larger loans, or both. Longer loan tenors result in lower pricing; this is unusual, but in accordance with Fons (1994). In reference to the junk bond market, Fons argues that for good quality borrowers, the passage of time only offers an opportunity for a deterioration of creditworthiness, while very poor credit risks that survive during the tenor of the bond are likely to experience an improvement in their creditworthiness[41].

In the same way as Eichengreen and Mody (2000), we find that banks enjoy cheaper pricing on their loans.

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[41] This interpretation is also known as survival bias.

Corporate control loans are pricier than other loans, meaning that the borrower is prepared to pay a premium if a facility is urgently needed for an acquisition – this is in accordance with the rest of the academic literature. Further, we find that loans arranged for transport finance, general corporate, project finance and capital structure purposes are cheaper than others (cf. definition of these purposes in Appendix 5), with transport finance loans carrying the steepest discount. In accordance with Kleimeier and Megginson, our results also indicate that loans sponsored or explicitly guaranteed by a third party cost less, although the ones that are secured actually carry a premium, potentially because they are very risky[42]. This latter finding is in accordance with Smith and Warner (1979) and Berger and Udell (1990) on collateral. The presence of implicit guarantees attached to syndicated credits does not seem to lower spreads, possibly because lenders regard them as insufficient (non-binding).

Bilateral loans and club deals are relatively cheaper than others, possibly reflecting more favourable conditions stemming from borrowers' relationship with their core banks. Large syndicate sizes do not appear to reduce loan pricing (the NBPROV3 variable does not show up as being significant), indicating that competition among banks bidding for the loans does not lower the pricing of loans[43]. Loans whose amount has been increased from the original amount are relatively more expensive, possibly because banks have found their pricing attractive. The causality may also play in the opposite direction, with the interpretation then being that if the borrower needs to increase the original amount of the loan because of increased financing needs, the lenders may raise the price.

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[42] Collateral has a cost (Bester, 1985) so it may also be the case that the cost of arranging or warehousing the collateral is charged for in the loan price (Freixas and Rochet, 1997). Otherwise, financing constraints facing the borrower may be such that he accepts both collateral and a higher spread. Inspection of our data sample indicates that borrowers from countries with poorer sovereign ratings require collateralisation more often.

[43] Furthermore, the dummy for large syndicate sizes is significant and positive when macro-economic conditions are also controlled for – see Table 11.

Table 10: The effect of micro-economic variables

We estimated the following equation using the forward stepwise technique, with an entry criterion of 10% and a removal criterion of 11%:

ln drawn = β_0 **Intercept** + β_1 **lnsize_l** + β_2 **maturity** + β_3 **nbrov3** + β_4 **clubilat** + β_5 **secured** + β_6 **transferable** + β_7 **spgtr** + β_8 **g_implicit** + β_9 **increased** + β_{10} **constrpty** + β_{11} **finservbk** + β_{12} **finservnb** + β_{13} **high-tech** + β_{14} **infrastruct** + β_{15} **popserv** + β_{16} **state** + β_{17} **tradind** + β_{18} **transport** + β_{19} **cc** + β_{20} **cs** + β_{21} **gen** + β_{22} **oth** +β_{23} **prj** + β_{24} **pty** + β_{25} **tr** + ε

where:

- ln drawn = natural logarithm of drawn return, in bp
- lnsize_l = natural logarithm of loan size, in millions of US dollars
- maturity = maturity of loans, in years
- nbprov3; clubilat = dummies for deals with more than two provider banks; for club or bilateral deals
- secured, transferable = dummies for secured and transferable deals
- spgtr, g_implicit = dummy for deals explicitly guaranteed or sponsored by a third party; dummy for implicitly guaranteed deal (e.g. borrower is a developing country subsidiary of a major US concern)
- increased = dummy to indicate that the original amount of the deal has been increased
- constrpty, finservbk, finservnb, high-tech, infrastruct, popserv, state, tradind, transport = sectoral dummies for construction and property, financial services (banks), financial services (non-banks), high-tech industry, infrastructure, population-related services, state, traditional industry, transport. Note that the dummy for the utilities sector was excluded from the equation as the case by default as its inclusion would have overspecified the model.
- cc, cs, gen, oth, prj, pty, tr = purpose dummies for corporate control, capital structure, general corporate purpose, other, project finance, property, transport finance. Note that the multi-purpose dummy has been excluded from the equation as the case by default as its inclusion would have overspecified the model.

Variable	Coefficient	*t*-statistic	P-value
tr	-0.7420	-13.50	0.000
oth	-0.4643	-10.82	0.000
secured	0.2764	10.00	0.000
popserv	0.5277	8.65	0.000
maturity	-0.0127	-3.70	0.000
cs	-0.3153	-6.65	0.000
tradind	0.1223	4.34	0.000
clubilat	-0.1722	-6.25	0.000
lnsize_l	-0.0649	-6.54	0.000
increased	0.2129	5.78	0.000
cc	0.1423	2.00	0.046
finservbk	-0.1272	-4.25	0.000
spgtr	-0.0759	-3.00	0.003
gen	-0.1663	-3.71	0.000
prj	-0.1384	-2.94	0.003
infrastruct	0.4304	2.42	0.016
intercept	5.2748	87.58	0.000

N = 4,921; Adj R^2 =0.1463; F(16; 4,904) = 53.69

In keeping with Eichengreen and Mody, we find that loans granted to borrowers involved in infrastructure projects carry a premium[44], although this is also case for the traditional industry and population-related services sectors. The sectoral dummy for the high-tech industry did not turn up as a significant variable. This seems to indicate that the presence of high-tech industries in developing countries' economies is not sufficient enough to make a difference on the pricing of their loans. The insignificance of the sectoral dummies for state[45] and transport may be related to the insufficiency of state, public and transport services provided in these countries and the unwillingness of international lenders to grant relatively better conditions on loans geared to fund such services.

4.4 The effect of micro-economic variables combined with indicators of countries' macro-economic performance[46]

As can be seen from Table 11, when we combine micro-economic variables with indicators of countries' macro-economic performance, the signs of the coefficients are the same as when these two sets of independent variables are not combined (cf. Tables 9 and 10). As already noted, the dummy for large syndicate sizes of three banks or more now shows up as being significant and positive, indicating that large syndicate sizes do not lower loan pricing. We must note that a number of purpose and sectoral dummies (construction and property, high-tech industry, state, traditional industry, project finance, property development finance) are insignificant in this model, possibly because indicators of macro-economic performance for the borrowers' countries take away some of their information content, at least in the eyes of the lenders.

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[44] In the past, some developing countries have increased their external debt to finance infrastructure projects: some of the dams, roads, towns, just to name a few examples, eventually turned out to be "white elephants" which did not directly or indirectly result in additional economic growth. Barro (1997) also argues that non-productive government expenditure is bad for growth.

[45] See Appendix 4 for full list of sectors included.

[46] We did not include indicators of countries' macro-economic performance together with the sovereign ratings as independent variables into our regressions because they were highly correlated with one another.

Table 11: The effect of micro-economic variables combined with indicators of countries' macro-economic performance

We estimated the following equation using the forward stepwise technique, with an entry criterion of 10% and a removal criterion of 11%. Variable names as in Tables 9 and 10.

ln drawn = β_0 **Intercept** + β_1 **lnsize_l** + β_2 **maturity** + β_3 **nbrov3** + β_4 **clubilat** + β_5 **secured** + β_6 **transferable** + β_7 **spgtr** + β_8 **g_implicit** + β_9 **increased** + β_{10} **constrpty** + β_{11} **finservbk** + β_{12} **finservnb** + β_{13} **high-tech** + β_{14} **infrastruct** + β_{15} **popserv** + β_{16} **state** + β_{17} **tradind** + β_{18} **transport** + β_{19} **cc** + β_{20} **cs** + β_{21} **gen** + β_{22} **oth** + β_{23} **prj** + β_{24} **pty** + β_{25} **tr** + β_{26} **debtgdp** + β_{27} **growth** + β_{28} **st_tdebt** + β_{29} **cpi** + β_{30} **pppsh** + β_{31} **restogdp** + β_{32} **tdstoxgs** + β_{33} **c_share_w** + β_{34} **gra** + β_{35} **impexp** + β_{36} **invgdp** + β_{37} **credgdp** + β_{38} **trade** + β_{39} **trsyld**+ ε

variable	Coefficient	*t*-statistic	P-value
tdstoxgs	0.0064	9.62	0.000
growth	-0.0344	-9.97	0.000
secured	0.1978	7.16	0.000
tr	-0.3997	-9.57	0.000
pppsh	0.0463	9.12	0.000
gra	0.2210	7.38	0.000
popserv	0.3746	6.37	0.000
oth	-0.2866	-9.39	0.000
c_share_w	0.2577	5.53	0.000
cs	-0.2659	-7.29	0.000
lnsize_l	-0.0887	-8.63	0.000
clubilat	-0.1844	-6.97	0.000
cc	0.2184	3.43	0.001
increased	0.1662	4.46	0.000
gen	-0.1463	-4.21	0.000
trade	-0.0140	-2.89	0.004
credgdp	-0.0047	-7.01	0.000
restogdp	0.0094	4.35	0.000
finservnb	0.0929	2.70	0.007
finservbk	-0.1106	-3.78	0.000
transferable	0.1201	3.36	0.001
spgtr	-0.0810	-3.29	0.001
nprov3	0.0772	2.80	0.005
debtgdp	0.0023	2.94	0.003
trsyld	-0.0294	-1.70	0.089
intercept	5.2356	46.49	0.000

N = 4,195; Adj R^2 = 0.2807; F(25; 4,169) = 66.48

The dummy for non-bank financial sector borrowers as well as the dummy for loan transferability appear significant and positive in this model. We surmise that loan transferability seems unattractive in lenders' eyes once macro-economic conditions prevailing in the borrower's country are taken into consideration. Moreover, macro-economic indicators may deteriorate lenders' perception of the riskiness of non-bank financial institutions. Monetary authorities of developing countries experiencing economic difficulties may be expected only to a limited extent to perform their lender of

last resort functions and bail out insolvent financial institutions that are critical to the country's financial system.

5. Conclusion

In this paper we estimated hedonic models to analyse the macro- and micro-economic determinants of the pricing of syndicated credits granted to a sample of developing country borrowers. The following conclusions can be drawn from our findings.

We report that indicators of countries' economic weakness (high ratios of debt to GDP, of debt service to exports, assistance from the IMF) raise the cost of borrowing, while indicators of economic strength (high real GDP growth, high ratio of domestic credit to GDP) lower financing costs. This is in accordance with the existing academic literature. We further find that higher reserves to GDP ratios raise the pricing of loans granted to developing country borrowers, in keeping with the willingness-to-pay approach developed by Gersovitz (1985).

Corporate control loans granted to developing country borrowers are found to be more expensive than other loans. In accordance with Kleimeier and Megginson, our results also indicate that loans sponsored or explicitly guaranteed by a third party cost less, although those that are secured actually carry a premium, potentially because they are very risky. This latter finding is in accordance with Smith and Warner (1979) and Berger and Udell (1990) on collateral. The presence of an implicit guarantee attached to syndicated credits does not lower spreads, possibly because lenders regard these as insufficient (non-binding).

We come to the conclusion that certain micro-economic characteristics of developing country syndicated loans generally affect their pricing in the expected way (i.e. more risk raises pricing), albeit more weakly when macro-economic conditions are also controlled for. In particular:

- Firstly, like Eichengreen and Mody (2000), we find that banks enjoy cheaper pricing on their loans than borrowers from other sectors. However when we explicitly control for macro-economic conditions prevailing in the borrowers' countries, we find that loans to non-bank financial institutions cost more than other loans. Macro-economic indicators may deteriorate lenders' perception of the riskiness of non-bank financial institutions. Furthermore, monetary authorities of developing countries experiencing economic difficulties may be limited from performing their lender of last resort functions. This result can be related to the findings of Martinez Peria and Schmukler (2001) who note that market discipline is present among insured depositors in selected Latin American countries, demonstrating that deposit insurance schemes are not always fully credible.
- Secondly, the absolute values of the coefficients on the micro-economic variables are often lower when macro-economic variables are present in the model. This suggests that loan purpose and the borrower's business sector seem to have a weaker effect on the pricing of syndicated credits granted to developing country borrowers once indicators of macro-economic performance are controlled for.
- Thirdly, loan transferability appears to raise loan pricing once macro-economic conditions prevailing in the borrower's country are taken into consideration.

Regarding the structure of the market for developing country loans, we can make the following conclusions based on the research described in this paper:

- Borrowers from 'wealthier' developing countries (countries with relatively higher purchasing power parity shares of world GDP), or countries that use the world market for syndicated loans more intensely, are having to pay more for their credits. This could be a result of lender market power being exploited, lender brand name recognition, or (in the case of the share of the borrower in world syndicated lending) penalties being charged for higher perceived concentration of risk.
- Discounts are granted to developing country borrowers on bilateral or club deals rather than on deals where a large number of lending institutions bid (compete) for the loan.

- Syndicated credits whose initial amount has been increased may not be priced competitively.

Lastly, our results reflect the relatively low participation of developing countries in world trade, or at least the low contribution of syndicated credits to support such participation. The weak or nonexistent discounts on the pricing of loans intended to fund state-provided or transport services may not help improve the quality of such services, let alone enhance the relatively limited role of the state in some developing countries. Some of the most poorly rated developing countries further face a maturity trap because they are only able to obtain short-term loans which they can then only use to refinance existing lines of credits instead of genuinely improving state services.

Literature cited

Allen, T., 1990: Developments in the international syndicated loan market in the 1980s, Bank of England Quarterly Bulletin, February.

Angbazo, L. A., J. Mei and A. Saunders, 1998: Credit spreads in the market for highly leveraged transaction loans, Journal of Banking and Finance, 22(10-11), pp. 1249-1282.

Balassa, B., 1986: Policy Responses to Exogenous Shocks in Developing Countries, The American Economic Review, Volume 76, Issue 2, Papers and Proceedings of the Ninety-Eighth Annual Meeting of the American Economic Association, May

BIS, 2001: Quarterly Review, March, Bank for International Settlements, Basel, Switzerland

Barro, R.J., 1997: Determinants of Economic Growth: A Cross-Country Empirical Study, Development Discussion Paper No. 579 (April), Harvard Institute for International Development

Berger, A.N. and G.F. Udell, 1990: Collateral, loan quality and bank risk, Journal of Monetary Economics 25, 21-42.

Berger, A.N. and G.F. Udell, 1995: Relationship Lending and Lines of Credit in Small Firm Finance, The Journal of Business, Vol. 68, No. 3. (July), pp. 351-381.

Besanko, D. and A. Thakor, 1987: Collateral and Rationing: Sorting equilibrium in monopolistic and competitive credit markets, International Economic Review, 671-689.

Bester, H., 1985: Screening vs. rationing in credit markets with imperfect information, American Economic Review 75, 850-855.

Boehmer, E. and W. L. Megginson, 1990: Determinants of Secondary Market Prices for Developing Country Syndicated Loans, Journal of Finance, Volume 45, Issue 5 (December), pp. 1517-1540.

Cantor, R. and F. Packer, 1996, Determinants and Impact of Sovereign Credit Ratings, Federal Reserve Bank of New York Economic Policy Review (September).

Diamond, D., 1991: Monitoring and reputation: The choice between bank loans and directly placed debt, Journal of Political Economy 99:688-721.

Eaton, J. and M. Gersovitz, 1981a: Debt with potential repudiation: Theoretical and empirical analysis, Review of Economic Studies 48, April, 208-309.

Eaton, J. and M. Gersovitz, 1981b: Poor country borrowing in private financial markets and the repudiation issue, Princeton Studies in International Finance, no. 47. International Finance Section, Princeton University, Princeton, NJ, June.

Edwards, S., 1983: LDC foreign borrowing and default risk: an empirical investigation, NBER working paper no. 1172, July.

Edwards, S., 1986: The pricing of bonds and bank loans in international markets, European Economic Review 30, 565-589.

Eichengreen, B. and A. Mody, 2000: Lending booms, reserves and the sustainability of short-term debt: inferences from the pricing of syndicated bank loans, Journal of Development Economics, Vol. 63, pp. 5-44.

Fama, E., 1985: What's different about banks?, Journal of Monetary Economics 15, 29-36.

Feder, G. and R.E. Just, 1977: An analysis of credit terms in the Eurodollar market, European Economic Review 9, May, 221-243.

Fons, J. S., 1994: Using Default Rates to Model the Term Structure of Credit Risk, Financial Analysts Journal, Vol 50, pp 25-32.

Forbes, K.J. and R. Rigobon, 2002: No Contagion, Only Interdependence: Measuring Stock Market Comovements, Journal of Finance Vol LVII, No. 5, October

Freixas, X. and J.C. Rochet, 1997: The Microeconomics of Banking, MIT Press

Frenkel, J., 1983: International liquidity and monetary control in: G. von Furstenberg, ed., International money and credit: The policy roles (IMF, Washington, DC).

Gersovitz, M., 1985: Banks' international lending decisions: What we know and implications for future research, in: G.W. Smith and J.T. Cuddington, eds., International debt and the developing countries (World Bank, Washington, DC).

Goldberg, L.S., B.G. Dages and D. Kinney, 2000: Foreign and Domestic Bank Participation in Emerging Markets: Lessons from Mexico and Argentina, National Bureau of Economic Research Working Paper 7714

Goldberg, L.S., 2001: When Is U.S. Bank Lending to Emerging Markets Volatile?, National Bureau of Economic Research Working Paper 8209

Gooptu, S. and R. Brun, 1992: The Role and Cost of Short-Term Trade Credit in Beyond Syndicated Credits, World Bank Technical Paper # 163, pp. 1-42.

Grinols, E. and J. Bhagwati, 1976: Foreign Capital, Savings and Dependence, The Review of Economics and Statistics, Volume 58, Issue 4 (November), 416-425

Gujarati, D.N., 1995: Basic Econometrics, Third Edition, McGraw Hill, Inc.

Hanson, J.A., 1974: Optimal international borrowing and lending, American Economic Review 64, Sept. 616-630.

Harberger, A.C., 1980: Vignettes on the world capital market, American Economic Review Papers and Proceedings 70, 616-630.

Kamin, S.B. and K. von Kleist, 1999: The evolution and determinants of emerging market credit spreads in the 1990s, BIS Working Papers, No. 68, May.

Kaminsky, G.L. and C.M. Reinhart, 1999: The Twin Crises: The Causes of Banking and Balance-Of-Payments Problems, American Economic Review, Volume 89, Issue 3 (June), 473-500

Kleimeier, S. and W. Megginson, 2000: Are project finance loans different from other syndicated credits?, Journal of Applied Corporate Finance, Vol. 13, Part 1, pp. 75-87.

Leland, H. and D. Pyle, 1977: Information asymmetries, financial structure and financial intermediaries, Journal of Finance 32, 371-87.

Linneman, P., 1980: Some Empirical Results on the Nature of the Hedonic Price Function for the Urban Housing Market, Journal of Urban Economics 8, 47-68.

Martinez Peria, M.S. and S.L. Schmukler, 2001: Do Depositors Punish Banks for Bad Behaviour? Market Discipline, Deposit Insurance and Banking Crises, Journal of Finance Vol LVI, No. 3, June

Mauro, P., N. Sussman and Y. Yafeh, 2002: Emerging market spreads: then versus now, The Quarterly Journal of Economics, May

Rhodes, T., 1996: Syndicated Lending Practice and Documentation, second edition, Euromoney books.

Rhodes, T., 2000: Syndicated Lending Practice and Documentation, third edition, Euromoney books.

Robinson, M., 1996: Syndicated Lending: A Stabilizing Element in the Latin Markets, Corporate Finance Guide to Latin American Treasury & Finance.

Sachs, J.D., 1981: The current account and macroeconomic adjustment in the 1970s, Brookings Papers on Economic Activity 1, 201-268.

Sachs, J.D., 1984: Theoretical issues in international borrowing, Princeton Studies in International Finance no. 54, July.

Smith, C. and J. Warner, 1979: On financial contracting: An analysis of bond covenants, Journal of Financial Economics 7, 111-161.

Smith, C.W., 1980: On the theory of financial contracting: The personal loan market, Journal of Monetary Economics 6, 333-357.

Stiglitz, J. and A. Weiss, 1981: Credit rationing in markets with imperfect information, American Economic Review 7(31): 393-410.

Van Rijckeghem, C. and B. Weder, 2001: Sources of contagion: is it finance or trade?, Journal of International Economics 54, 293-308

Appendix 1: The literature about the pricing and availability of bank credits

by variable

Variable	Effect on spread	Literature references
macro-economic characteristics		
Debt to output ratio Debt to export ratio (solvency)	+	Hanson (1974), Harberger (1980), Sachs (1984), Eaton and Gersovitz (1981a) and Edwards (1983)
Current account to GNP ratio (solvency)	–	Sachs (1981)
Debt service to exports (liquidity)	+	Feder and Just, (1977), Eichengreen and Mody (2000)
Ratio of international reserves to GNP (liquidity)	–	Edwards (1983)
Ratio of international reserves to GNP (liquidity)	+	Gersovitz (1985) [willingness-to-pay]
History of rescheduling	+	Eichengreen and Mody (2000)
Investment to GNP ratio	–	Sachs (1984), Edwards (1983)
Investment to GNP ratio	+	Gersovitz (1985) [willingness-to-pay]
Imports to GNP ratio	+	Frenkel (1983)
Rate of growth per capita	–	Feder and Just (1977)
Economic growth	–	Eichengreen and Mody (2000)
Variance of export growth	+	Eichengreen and Mody (2000)
Bank credit/GNP	–	Eichengreen and Mody (2000)
(Bank credit/GDP)*(Economic growth rate), [(Bank credit/GDP)*(Economic growth rate)]^2	+	Eichengreen and Mody (2000)
micro-economic characteristics		
Financial institutions	–	Financial institutions seem able to obtain syndicated credit facilities at lower spreads than borrower from other sectors, Eichengreen and Mody (2000)
Firm riskiness	+	Measured by variance of firm assets, Smith (1980)
Firm value	–	Smith (1980)
Infrastructure projects	+	Loans to fund infrastructure projects tend to have higher spreads than loans with other purposes, Eichengreen and Mody (2000)
Acquisition facility	+	Borrower is prepared to pay a premium if facility is urgently needed for an acquisition.
Facility's maturity	+/–	Negative effect for project finance loans, positive for other loans, Kleimeier and Megginson (2000). Ambiguous effect on spread, Smith (1980).
Revolving facility	+	Because of higher take-down risk, Angbazo, Mei and Saunders (1998).
Loan size	+/–	Negative effect on spreads according to Kleimeier and Megginson (2000) – except for project finance loans – positive effect according to Smith (1980), because of higher resulting bank exposure.
Third party guarantee	–	Kleimeier and Megginson (2000)
Collateralisable assets	+/–	Depending on type of loan, Kleimeier and Megginson (2000)
Collateral	–	Smith (1980), Bester (1985), Besanko and Thakor (1987)
Collateral	+	Smith and Warner (1979), Berger and Udell (1990)

Appendix 1 (continued): The literature about the pricing and availability of bank credits

by main empirical studies

Authors	Methodology and data	Main results
Edwards (1986)	OLS pricing regression on 113 developing country bank loans and 167 bonds (1976-80)	Both on loan and bond markets, the country risk premium is a positive function of the debt to output ratio and a negative function of the investment to GNP ratio. Some of the coefficients are significantly different across bond and loan markets.
Boehmer and Megginson (1990)	Fuller-Battese generalised least squares method for testing the determinants of the secondary market values of 10 developing countries over 32 months	Secondary market values of developing countries' debt are significantly related to variables which are proxies for nations' economic solvency but not to the variables that are proxies for their liquidity.
Gooptu and Brun (1992)	Cross-section study of thirty-two highly indebted and low income countries, for which trade finance and macro-economic data is available as of December 1987.	The declaration of a moratorium on commercial bank debt service payments has a negative impact on the availability of short-term credit lines.
Berger and Udell (1995)	OLS pricing regression on 863 credits issued to small businesses in the US, Logit regression for the probability of collateral being required on the loans	Small firms with longer banking relationships borrow at lower rates and are less likely to pledge collateral than are other small firms.
Kamin and von Kleist (1999)	OLS pricing regression on 662 developing country bank loans and bonds issues (1991-97)	While the responses of bond and loan prices to price determinants are different, the list of determinants themselves is quite similar for these two types of financing. Investors have charged Latin American and Eastern European borrowers more over time than borrowers from Asia and the Middle East, all other factors constant. There is no statistically significant relationship between various measures of industrial country interest rates and emerging market new-issue bond spreads.
Kleimeier and Megginson (2000)	OLS pricing regression on a Loanware sample comprising slightly over 5% of project finance loans	Project finance loans are fundamentally different by their characteristics from other loans
Eichengreen and Mody (2000)	OLS pricing regression on a Loanware sample comprising of 4,000-plus loans granted to developing country borrowers (with sample correction)	At low levels of financial development and low growth rates, policy measures to improve financial intermediation bring value and reduce the costs of borrowing, but when they spill over into unsustainable credit booms, thy are regarded by the markets with alarm and worsen the terms of access to external funds.

Appendix 2: Pricing structure of syndicated credits: spreads and fees

As well as earning a margin over Libor (or any other benchmark) when the loan is drawn, banks in the syndicate receive various fees (described in Allen, 1990; Rhodes, 1996). The arranger and other members of the lead management team, who may be responsible for various aspects of the preparation of the deal and its documentation, generally earn some form of upfront fee. This is often called *praecipium* or *arrangement fee*. The underwriters similarly earn an *underwriting* fee for guaranteeing the availability of funds. Other participants (those at least on the 'manager' and 'co-manager'[47] level) may expect to receive a *participation fee* for agreeing to join the facility – the actual size of the fee generally varies with the size of the commitment. Once the credit is established and as long as it is not drawn, the syndicate members often receive an annual *commitment* or *facility fee* (to compensate for the cost of tying up regulatory capital that needs to be set aside against the commitment) again proportional to their commitments. As soon as the facility is drawn, the borrower may have to pay a *utilisation fee*, as often as not a means of concealing from the market part of the spread that he is paying. There is also an *agency fee*, usually payable annually, to cover the costs incurred by the agent to run the loan and the responsibility for supervising the conditions. Loan documents sometimes incorporate a penalty clause, whereby the borrower agrees to pay a *prepayment fee* or otherwise compensate the lenders in the event that it pre-pays its debt prior to the specified term. Finally, the *conduit fee* is the remuneration of the so-called conduit bank[48] and the *legal fee*, that of the legal adviser to the deal. The commitment, utilisation and agency fees are payable per annum; all other fees are one-off fees.

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[47] These two titles correspond to senior participants, to establish the fact that they commit to larger amounts and hence receive bigger fees, but they do not actually manage anything.

[48] Institution through which payments are channelled with a view to avoiding payment of withholding tax.

Appendix 3: Conversion of the Standard and Poor's sovereign ratings into rating classes

NB we gave preference to the Standard and Poor's sovereign ratings over Moody's because Dealogic Loanware has a live feed from S&P that is better linked to its borrower database than Moody's.

Sub-investment grade		Investment grade	
Rating	Rating class code	Rating	Rating class code
SD	default	BBB	
NR	or not rated	BBB+	investment
R	or not disclosed	A-	grade
CC		A	
CCC-		A+	
CCC		AA-	
CCC+		AA	best
B-	poor	AA+	
B		AAA	
B+			
BB-			
BB			
BB+	speculative		
BBB-			

Note: SD = selective default, NR = not rated, R = rated.

Appendix 4: Full list of borrower business sectors contained in each broad grouping

Our groupings are based on the 188 business sectors provided by Loanware.

Construction and property: Construction/Building, Products-Commercial Building, Construction/Building Products-Maintenance, Construction/Building Products-Miscellaneous, Construction/Building Products-Residential Building, Construction/Building Products-Retail/Wholesale, Property/Real Estate, Property/Real Estate-Development, Property/Real Estate-Diversified, Property/Real Estate-Operations, Property/Real Estate-REIT, Construction/Building.

Financial services (bank): Finance-Commercial & Savings Banks, Finance-Student Loan, Finance-Mortgages/Building Societies, Finance-Investment Bank, Finance-Credit Cards, Finance-Development Bank.

Financial services (non-bank): Insurance, Finance-Investment Management, Insurance-Property & Casualty, Insurance-Multi-Line, Insurance-Life, Insurance-Brokers, Insurance-Accident & Health, Holding Companies-Conglomerates, Finance-Leasing Companies, Finance-Brokers & Underwriters, Finance, Holding Companies-Special Purpose Financial Vehicles, Holding Companies.

High-tech: Aerospace & Defence-Aircraft, Chemicals-Fibers, Chemicals-Diversified, Chemicals, Agribusiness-Agriculture, Aerospace & Defence-Products & Services, Aerospace & Defence, Healthcare-Genetics/Research, Chemicals-Plastic, Agribusiness, Services-Management Consulting, Telecommunications-Wireless/ Mobile, Telecommunications-Telephone, Telecommunications-Services, Telecommunications-Satellite, Electronics, Telecommunications, Computers, Services-IT, Healthcare-Products, Computers-Internet, Telecommunications-Equipment, Computers-Hardware, Healthcare-Medical/Analytical Systems, Computers-Software, Electronics-Electrical equipment, Healthcare-Drugs/Pharmaceuticals, Healthcare-Instruments/Surgical supplies.

Infrastructure: Transportation-Airport, Transportation-Logistics/Distribution, Construction/Building Products-Infrastructure

Population services: Dining & Lodging-Hotels & Motels, Healthcare-Nursing Homes, Automobile-Repair, Automobile-Sales, Dining & Lodging, Services-Funeral & Related, Retail-Home Furnishings, Retail-Jewellery Stores, Retail-Mail Order & Direct, Dining & Lodging-Restaurants, Retail-Pharmacy, Healthcare-Professional Services/Practices, Retail-Supermarkets, Services, Retail-Department Stores, Services-Advertising/Marketing, Retail-Miscellaneous/Diversified, Services-Legal, Services-Personnel, Services-Printing, Services-Schools/Universities, Services-Security/Protection, Services-Travel, Telecommunications-Cable Television, Telecommunications-Radio/TV Broadcasting, Services-Accounting, Healthcare-Miscellaneous Services, Healthcare, Healthcare-Hospitals/Clinics, Retail-Specialty, Healthcare-Management Systems, Retail-Convenience Stores, Healthcare-Outpatient care/Home care, Leisure & Recreation, Leisure & Recreation-Film, Leisure & Recreation-Gaming, Leisure & Recreation-Services, Publishing, Publishing-Books,

Publishing-Diversified, Publishing-Newspapers, Publishing-Periodicals, Retail, Retail-Apparel/Shoe, Retail-Computers & Related, Leisure & Recreation-Products

State: Finance-Export Credit Agencies, Government-Provincial Authority, Government-Local Authority, Government-Central Bank, Government-Central Authority, Finance-Multilateral Agencies, Government.

Traditional Industry: Air Conditioning and Heating, Forestry & Paper, Automobile, Automobile-Manufacturers, Automobile-Mobile Homes, Automobile-Parts, Chemicals-Fertilizers, Metal & Steel-Products, Forestry & Paper-Packaging, Forestry & Paper-Pulp & Paper, Forestry & Paper-Raw materials, Machinery, Machinery-Electrical, Construction/Bldg Prods-Cement/Concrete, Machinery-General Industrial, Food & Beverage-Wholesale Items, Machinery-Material Handling, Machinery-Printing Trade, Food & Beverage-Miscellaneous, Metal & Steel-Distributors, Machinery-Farm Equipment, Mining, Mining-Excavation, Oil & Gas-Equipment & Services, Oil & Gas-Exploration & Development Onshore, Oil & Gas-Exploration & Development Offshore, Textile, Textile-Apparel Manufacturing, Textile-Home Furnishings, Textile-Mill Products, Textile-Miscellaneous, Metal & Steel, Consumer Products-Footwear, Construction/Bldg Prods-Engineering, Construction/Building Prods-Wood Products, Machinery-Machine Tools, Consumer Products-Cosmetics & Toiletries, Food & Beverage-Sugar & Refining, Consumer Products-Furniture, Consumer Products-Glass, Consumer Products-Home Improvement, Consumer Products-Miscellaneous, Consumer Products-Office Supplies, Consumer Products-Precious Metals/Jewellery, Consumer Products-Rubber, Consumer Products-Tobacco, Consumer Products-Tools, Food & Beverage, Food & Beverage-Alcoholic Beverages, Food & Beverage-Canned Foods, Food & Beverage-Confectionery, Food & Beverage-Dairy Products, Food & Beverage-Flour & Grain, Food & Beverage-Meat Products, Food & Beverage-Non-Alcoholic Beverages, Consumer Products-Soap & Cleaning Preps, Consumer Products.

Transport: Transportation, Transportation-Ship, Transportation-Road, Transportation-Airline/Aircraft, Transportation-Equipment & Leasing, Transportation-Rail.

Utilities: Utility-Water Supply, Oil & Gas, Oil & Gas-Diversified, Oil & Gas-Pipeline/Distribution, Oil & Gas-Refinery/Marketing, Utility & Power, Utility-Diversified, Utility-Electric Power, Utility-Hydroelectric Power, Utility-Nuclear Power, Utility-Waste Management.

Appendix 5: Full list of loan purposes contained in each broad grouping

Corporate control: LBO / MBO, employee stock option plan, Acquisition, Acquisition line

Capital structure: Refinancing, Debtor in Possession Financing, Recapitalisation, Receivable backed financing, Debt repayment, Securitisation, Standby/CP support

General: General corporate, Private placement, Public finance, Trade financing, Working capital

Project: Project financing

Property: Mortgage lending, Property

Transport: Shipping, Aircraft

Other: Spin-off, Empty purpose code

Multiple purpose code: more than one purpose for the same loan.

Appendix 6: Additional summary statistics

Table 12: Evolution of drawn return, loan size and maturity by purpose and year

	Median drawn return (bp) by loan purpose and year								
Purpose	1993	1994	1995	1996	1997	1998	1999	2000	2001*
Corporate control	120.0	100.0	102.5	67.0	90.0	125.6	387.5	212.7	70.5
Capital structure	91.3	133.1	85.0	80.0	102.5	125.0	228.8	150.0	175.0
General	100.0	115.0	100.0	85.8	125.0	133.9	183.5	135.0	213.3
Other (spin-off, empty code)	100.0	94.8	80.0	77.5	86.2	145.0	225.0	181.3	250.0
Project finance	102.2	128.5	120.1	92.5	91.6	145.0	225.0	182.5	206.3
Property	50.0	350.0	87.9	80.1	95.0	200.0	78.3		315.0
Transport	104.2	86.0	79.3	73.7	79.9	180.9	132.5	125.0	200.0
Multiple purpose	95.0	150.8	200.0	80.1	96.5	150.8	247.5	170.3	200.0
	Median loan size ($m equivalent) by loan purpose and year								
Purpose	1993	1994	1995	1996	1997	1998	1999	2000	2001*
Corporate control	45.0	60.0	25.0	46.0	58.8	100.0	65.0	75.0	170.0
Capital structure	31.3	48.0	50.0	50.0	60.0	72.0	85.0	111.0	100.0
General	35.0	40.0	50.0	60.0	50.0	60.8	70.0	100.0	81.5
Other (spin-off, empty code)	30.0	40.0	48.3	41.1	50.0	67.5	84.3	87.5	48.0
Project finance	40.0	45.0	50.0	50.0	48.4	55.0	60.0	77.6	40.0
Property	10.0	25.0	28.1	24.5	26.5	45.0	250.0		32.2
Transport	40.0	41.5	42.0	30.0	50.0	50.0	73.1	106.1	15.0
Multiple purpose	31.2	50.0	30.0	33.5	70.5	75.0	100.0	96.3	50.0
	Median maturity (years) by loan purpose and year								
Purpose	1993	1994	1995	1996	1997	1998	1999	2000	2001*
Corporate control	3.0	7.0	3.0	5.0	3.8	3.0	3.0	5.0	3.0
Capital structure	3.2	3.5	4.8	4.5	5.0	3.0	3.0	3.2	3.0
General	3.0	2.1	3.0	4.0	3.0	3.0	3.0	3.0	3.0
Other (spin-off, empty code)	4.5	3.0	4.0	3.5	4.0	3.0	3.0	3.0	4.8
Project finance	5.0	5.0	5.0	5.0	5.0	5.0	5.0	6.4	3.0
Property	5.0	10.0	5.0	4.4	3.0	5.0	3.0		15.0
Transport	4.0	5.0	3.0	5.0	5.0	3.0	3.0	5.0	4.0
Multiple purpose	3.0	5.0	3.0	3.5	4.0	3.0	3.9	3.0	4.0

Source: Dealogic Loanware, author's calculations. * first quarter data only

Table 13: Drawn return, loan size and maturity by borrower country sovereign rating and loan purpose

Median drawn return (bp) by borrower country sovereign rating and loan purpose								
Loan purpose / Broad rating category	Corporate control	Capital structure	General	Other	Project finance	Property	Transport	Multiple purpose
0 (borrower default or not rated or not disclosed)	88.2	158.4	135.0	139.2	175.0	150.0	145.0	150.6
1 (poor)	305.0	200.0	177.5	173.3	175.0		172.5	225.0
2 (speculative)	145.0	108.3	150.0	90.0	141.6	124.7	100.0	173.5
3 (investment grade)	70.0	91.4	90.0	86.2	109.2	125.0	93.0	104.1
4 (best)	63.0	57.5	70.0	57.0	56.7	54.6	68.5	60.0
Median loan size ($m equivalent) by borrower country sovereign rating and loan purpose								
Loan purpose / Broad rating category	Corporate control	Capital structure	General	Other	Project finance	Property	Transport	Multiple purpose
0 (borrower default or not rated or not disclosed)	20.0	75.0	80.0	37.3	75.0	23.0	35.5	112.5
1 (poor)	70.0	75.0	55.0	65.0	52.0		50.0	70.0
2 (speculative)	80.0	86.8	80.0	50.0	58.0	32.5	55.0	80.0
3 (investment grade)	70.0	50.0	60.0	39.9	44.7	26.0	33.0	50.0
4 (best)	40.0	38.0	41.0	34.4	40.0	21.8	38.9	32.0
Median maturity (years) by borrower country sovereign rating and loan purpose								
Loan purpose / Broad rating category	Corporate control	Capital structure	General	Other	Project finance	Property	Transport	Multiple purpose
0 (borrower default or not rated or not disclosed)	5.0	5.0	5.0	5.0	7.5	2.0	5.0	5.0
1 (poor)	2.5	2.0	1.0	1.0	4.5		1.0	1.0
2 (speculative)	3.8	4.0	3.0	4.5	5.0	4.4	4.0	4.0
3 (investment grade)	5.0	4.8	4.0	5.0	5.0	5.0	5.0	5.0
4 (best)	5.0	4.5	3.0	3.3	5.0	5.0	7.0	3.0

Source: Dealogic Loanware, author's calculations.

Table 14: Evolution of mean maturity (years) and drawn return (bp) by loan size and years

Evolution of mean maturity (years)									
Loan size ($m)	1993	1994	1995	1996	1997	1998	1999	2000	2001*
[0; 25[	4.2	3.3	4.3	4.2	4.1	4.4	5.0	5.0	2.5
[25; 50[	5.1	4.4	5.6	4.3	4.4	4.0	4.9	4.8	4.4
[50; 100[	4.5	4.5	4.9	4.6	4.5	4.1	4.4	4.8	4.1
[100; ∞[	5.8	7.1	5.8	4.9	5.5	4.4	4.6	4.7	2.9
Evolution of mean drawn return (bp)									
Loan size ($m)	1993	1994	1995	1996	1997	1998	1999	2000	2001*
[0; 25[	121.2	122.1	128.0	107.7	115.7	201.1	259.7	264.6	216.2
[25; 50[	119.9	126.7	113.3	110.2	149.2	200.8	273.3	203.5	217.0
[50; 100[	123.8	118.0	117.5	118.9	143.7	177.3	263.7	188.0	209.8
[100; ∞[	116.0	134.8	135.6	111.6	126.1	162.3	236.0	168.6	191.0

Source: Dealogic Loanware, author's calculations. * first quarter data only.

Table 15: Mean drawn return by loan size and purpose

	Mean drawn return (bp) loan size and purpose							
Loan purpose	Corporate control	Capital structure	General	Other	Project finance	Property	Transport	Multiple purpose
Loan size ($m)								
[0; 25[	187.3	138.7	187.6	111.3	158.9	119.1	114.3	197.6
[25; 50[	155.6	149.7	183.8	120.0	161.3	194.7	109.4	209.6
[50; 100[	159.8	154.7	182.9	123.9	165.0	115.0	122.2	180.1
[100; ∞[	185.4	158.9	156.7	130.0	161.4	117.0	121.3	176.7

Source: Dealogic Loanware, author's calculations.

Table 16: Distribution of mean drawn return (bp) by loan size and industry

	Loan size ($m)			
Industry	[0; 25[	[25; 50[	[50; 100[	[100; ∞[
Construction and property	107.9	126.2	165.5	152.0
Financial services – banks	187.1	170.9	124.4	104.1
Financial services – nonbanks	116.5	111.8	118.6	170.8
High-tech industries	130.9	139.1	177.5	152.6
Infrastructure	181.3	177.5	217.7	293.9
Population related services	242.3	231.2	254.8	292.8
State-provided services	173.2	136.5	150.0	127.7
Traditional industry	143.5	179.8	183.7	185.5
Transport	101.6	92.4	95.4	103.0
Utilities	178.7	177.4	159.9	157.8

Source: Dealogic Loanware, author's calculations.

Table 17: Correlation matrix between variables

	lndrawn	lnsize_l	maturity	debtgdp	pppsh	trsyld	growth	st_tdebt	cpi	trade	cshare_w	restogdp	tdstoxgs	impexp	invgdp	credgdp
lndrawn	1															
lnsize_l	-0.0015	1														
maturity	-0.0474*	0.1329*	1													
debtgdp	0.1882*	0.0207*	-0.0597*	1												
pppsh	-0.0540*	-0.0739*	0.0547*	-0.3256*	1											
trsyld	-0.0721*	-0.0106	-0.0438*	0.0322*	0.0240*	1										
growth	-0.2862*	-0.0873*	0.0460*	-0.3012*	0.3601*	0.1070*	1									
st_tdebt	-0.1634*	-0.0429*	-0.0749*	-0.0752*	-0.2566*	0.0493*	0.1738*	1								
cpi	0.0590*	-0.0024	-0.0096	-0.0482*	-0.0159	-0.0546*	-0.1738*	-0.0660*	1							
trade	-0.0331*	0.0564*	0.0036	-0.0399*	-0.0125	0.5635*	0.1456*	0.0014	-0.0428*	1						
cshare_w	-0.0599*	-0.0394*	-0.0586*	-0.1140*	0.3311*	0.0454*	0.3708*	0.2734*	-0.1131*	0.0253*	1					
restogdp	-0.1435*	0.0373*	0.0968*	0.0875*	-0.1193*	-0.0457*	0.1282*	-0.0863*	-0.0807*	-0.0123	-0.1307*	1				
tdstoxgs	0.3321*	0.1390*	-0.1054*	0.2780*	-0.1652*	-0.0378*	-0.2369*	0.0258*	-0.0299*	0.0126	0.1025*	-0.2792*	1			
impexp	-0.0108	0.0034	-0.0006	0.0460*	-0.2779*	-0.0776*	-0.0224*	0.0772*	-0.0217*	-0.0511*	-0.3059*	0.0448*	0.0048	1		
invgdp	-0.3057*	-0.1265*	0.0593*	-0.2708*	0.3499*	0.0169	0.5540*	0.2118*	-0.1425*	-0.0917*	0.3929*	0.4012*	-0.3956*	-0.1154*	1	
credgdp	-0.2633*	-0.0486*	0.0943*	-0.0775*	0.4605*	-0.0021	0.3711*	0.0085	-0.1113*	-0.0431*	0.1651*	0.5694*	-0.3450*	-0.1272*	0.7010*	1

*: significant at the 10% level

PAPER 3

Comparison of developing and industrialised countries' access to bond and loan markets in the 1990s

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Comparison of developing and industrialised countries' access to bond and loan markets in the 1990s

ABSTRACT

THIS PAPER ANALYSES the determinants of the pricing of loans and bonds during the 1990s, extending previous work in this area by focusing simultaneously on two types of borrowers (from industrialised and developing countries) and two types of instruments (bonds and loans). On average, we find that developing country bonds have been riskier than developing country loans and industrialised country loans riskier than industrialised country bonds. We analyse how contagion may have taken place from one market segment to the other in the wake of the Asian financial crisis. We also compare the influence of market structure on the respective market segments and find that market access appears to have been more difficult for developing country borrowers in loan markets. This is the market segment where banks and investors may have exercised their market power to the greatest extent and where the penalising effect of higher perceived risk concentration may have been most pronounced.

JEL classification: D40, F34, G20

Keywords: Loan and bond pricing, debt

1. Introduction

"EXCESSIVE BORROWING BY COMPANIES, households or governments lies at the root of almost every economic crisis of the past two decades, from Mexico to Japan and from East Asia to Russia. The past two months [leading up to January 2002] alone have witnessed the largest-ever foreign debt default, in Argentina, and the biggest-ever corporate bankruptcy, of Enron." (*The Economist*, 26 January 2002, page 23). Following the financial crises in Mexico (1995) and South-East Asia (1997 and 1998) the determinants of bond and loan financing to developing countries and the pricing of these instruments have been analysed widely in the academic literature (see, for instance, Hernandez and Rudolph; 1995, Eichengreen and Mody, 1997 and 1998; Kamin and von Kleist; 1999, Chowdhry and Goyal, 2000). As stressed by Hale (2001), bonds and loans compete in the market for emerging market finance and it is important to gauge the relative importance of each instrument for planning purposes by lenders and borrowers alike. Indeed, while banks can cancel loans relatively easily – posing more potential liquidity threats to emerging market borrowers – bonds are harder to restructure, not least because of the dispersion of the bondholders. The comparison of the prices of the two instruments can also provide an indication of the degree to which the relevant markets have matured and become liquid. However, in today's globalised financial environment, emerging and industrialised country borrowers compete for funds. Cline and Barnes (1997) make the argument in the context of developing country loans and bonds competing with US junk bonds to attract investors' funds. Vine (2001) stresses that emerging market bonds lend themselves particularly well to the analysis applied to US domestic high-yield investors to domestic high-yield borrowers. Finally, the comparison of the determinants of developing and industrialised country loan and bond characteristics is important in order to gauge the phenomena of flight to quality or contagion from one market to another during times of crises or financial stress: financial crises in emerging markets may have made investors more wary or selective about lending to industrialised country borrowers as well. As summarised in *the Economist* (6 July 2002, page 69), "After Thailand devalued the bath on July 2nd 1997, capital rushed out of the region's economies, and in rapid succession most of them collapsed. The resulting panic soon spread beyond East Asia to other emerging markets and for a while it posed a serious threat to the world economy". While most of the earlier loan and bond

pricing literature has focused on developing countries or on industrialised countries separately, this paper makes a first attempt (as far as we know) to combine the two.

On average, we find that developing country bonds have been riskier than developing country loans and industrialised country loans riskier than industrialised country bonds. We analyse how contagion may have taken place from one market segment to the other in the wake of the Asian financial crisis. We also compare the influence of market structure in the respective market segments (i.e. bonds, loans, industrialised and developed countries) and find that market access appears to have been more difficult for developing country borrowers in loan markets. This is the market segment where banks and investors may have exercised their market power to the greatest extent and where the penalising effect of higher perceived risk concentration may have been most pronounced.

2. Some historical and theoretical background

In the case of *emerging market borrowers*, syndicated lending has been as significant as bond financing since the first half of the 1990s (see Table 1 on page 55). While international developing country bond issues rose from negligible levels at the beginning of the 1990s to more than $120 bn in 1997 (before falling back to $82 bn in 2000 after the Asian crisis) loan commitments have grown at a similar pace, reaching levels comparable to bond issuance. In fact developing country loan facilities actually exceeded bond issuance just about every other year, totalling $96 bn in 2000.

Figures published by the Bank for International Settlements (see Table 1 below) indicate that in 2001, international syndicated credit facilities granted to borrowers from *industrialised countries* were worth $1.3 trillion, while gross international bond issuance by industrialised country issuers represented $1.9 trillion and equity issuance $133 bn.

Table 1: Various sources of international financing for industrialised countries, $bn

Gross announcements	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
International syndicated credit facilities	159.9	254.1	441.9	609.9	730.0	908.7	822.0	961.0	1,333.1	1,280.1
International bonds	n.a.	374.3	345.4	353.4	625.6	673.1	863.7	1,415.7	1,499.2	1,948.1
International equities	17.6	32.7	44.3	43.1	59.1	87.6	111.8	177.8	257.0	132.5

Source: Dealogic Loanware; Bank for International Settlements, various years.

In order to understand how the choice between intermediated and disintermediated finance in developing and industrialised countries has been determined over the past decade, one first needs to consider a series of differences between the two types of financing (see Table 2 below for a summary):

- The costs of arranging a syndicated loan are lower than those of issuing a bond (Allen, 1990).
- The syndicated loan market generally allows borrowers to raise larger sums than they would be able to obtain through either the bond or the equity markets under a time constraint[49].
- Syndicated credit facilities can be arranged quickly and discreetly, which may be of value with certain transactions such as takeovers.
- Commitments to lend can be cancelled relatively easily, while it would be difficult to cancel borrowing in the securities markets without reducing investor confidence.

[49] Indeed, in order to bid for third generation mobile phone licenses in 2000 auctioned off by various European countries' governments, many European telecommunications firms tapped the syndicated credits market for large amounts in the first instance, subsequently aiming to refinance the initial short-term debt by later issuing medium or long term securities.

Table 2: Characteristics of syndicated credits compared to bonds

Characteristic	Syndicated loans	Bonds
Maturity	Short to medium term (typically less than 3 years)	3-10 years for Eurobonds 5-10 years for US bonds
Minimal amount	As low as $1 m	$30 m for Eurobonds, higher for US bonds[50]
Targeted investor population	Banks Development banks Export credit agencies Multilateral organisations (e.g. IFC)	Banks Insurance companies Pension funds Fund managers (unit trusts, mutual funds) Individuals Corporates
Average completion time of programme	5-12 weeks	Eurobonds: 6-15 weeks US bonds: 6-20 weeks
Rate type	Floating (rarely fixed)	Eurobonds: fixed or floating US bonds: mostly fixed
Flexibility (i.e., diversity of financing options, possibility to change them if needs of borrower change)	High (e.g. multiple currency options)	Low
Information disclosure and issuance costs	Low (no US GAAP, no rating, no compulsory disclosure to the market)	Eurobonds: medium (rating & disclosure to market) US bonds: high (US GAAP, rating, disclosure to market)
Liquidity of secondary market	Low, but improving in the US	Eurobond market reasonably liquid, US market highly liquid

Source: Compiled by author

There are a number of theoretical and empirical justifications for comparing the characteristics of loan and bond instruments:

To begin with, the characteristics of bonds and loans are extensively compared in the information asymmetry literature from a monitoring/incentives perspective (Sachs and Cohen, 1982; Berlin and Loeys, 1988; Berlin and Mester, 1992; Bolton and Freixas, 2000). Eichengreen and Mody (1998) note that the determinants of risk and pricing behaviour differ between bank loans and bonds, principally because of the differences

[50] Minimal amounts also tend to be higher for bonds than for loans because of the higher costs involved, which would make it uneconomical to issue bonds for low amounts.

in seniority between the two instruments and the different extent to which they lend themselves to restructuring;

Secondly, a homogenous pool of loans can lend itself well to securitisation (i.e., removal of the claims from the bank's balance sheet and purchase by a special purpose vehicle (SPV) which issues securities that are subsequently serviced by the cash-flow from the loans), allowing some tranching of the risk in the process. The characteristics of the underlying pool of loans are derived (in terms of maturity, pricing, currency, quality) from those of the securities issued, with the SPV often engaging in some kind of transformation (by means of a currency swap or risk enhancement[51]) to make the securities more marketable to the targeted investor population. Therefore securitisation is an example where financiers directly relate the characteristics of loans and bonds to one another for financial engineering purposes. As an ultimate solution to the Mexican sovereign default of 1982, some developing countries' non-performing loans were transformed into 'Brady bonds' – instruments secured on US Treasuries and purchased by creditors. This was accompanied by partial debt forgiveness.

Thirdly, the issuance of certain securities is often subordinated to the arrangement of a liquidity backstop/backup loan facility – in fact, some rating agencies require this in order to rate the bond issue. Besides, the repayment of many syndicated loans is predicted on a bond takeout within 6-12 months (or sooner) of signing the loan. Many of the largest acquisition loans arranged in 1999 – such as the ones for Olivetti (€22.5 bn), Mannesmann (€9 bn and £8 bn), Vodafone ($10.5 bn) and Repsol ($9 bn) – were subsequently refinanced in the bond markets (Rhodes, 2000). In such financing decisions, borrowers directly compare the cost of intermediated and disintermediated financing to determine their interest expense.

Fourthly, the emergence of a relatively liquid secondary market for loans in the United States (which had a turnover of $8 bn in 1991, $40 bn in 1996 and $118 bn in 2001 according to the Loan Pricing Corporation, a US-incorporated loan data vendor) has allowed some institutional investors – such as high-yield bond/leveraged loan mutual

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[51] This can for instance be a guarantee written by an insurance company.

funds – to arbitrage between loans and bonds, picking the asset that presents the best risk/return profile (Coffey, 2000). This practice has been dominant particularly in the area of *leveraged loans*[52]. In contrast to banks which have typically been using loans to build customer relationships, these cross-over institutional investors have effectively been treating loans as an asset class. They weigh the attributes of bonds and loans against their yield, and will purchase the asset with the better fit. If there is a significant relative value mismatch between the two assets, investors will buy the more attractive investment and avoid the less attractive one (often forcing a repricing of the unattractive asset). In order to attract investors, many loans have been repriced – worth about $11 bn in 1998 and $23 bn in 1999 according to Coffey (2000) – in order to bring them back into relative value alignment. Again, this constitutes an example of investors directly comparing the characteristics of loans and bonds in order to make investment decisions. The growing trend of institutional investors to compare relative value in the loan and bond markets is mirrored within banks' own pricing models.

Finally, Kamin and von Kleist (1999) note that bonds and loans are very different types of financial instruments. Bond issues tend to have fixed interest rates, while most loans are floating rate instruments (i.e., have interest rates which are at a fixed initial spread over LIBOR). Additionally, many facets of the credit contract differ substantially between bonds and loans. Finally, borrower-lender relations are very different for bonds and loans. These considerations, taken together, would suggest that bond and loan spreads behave so differently that it would be inappropriate to analyse them together. Yet, one of the most surprising results of the authors' research is that emerging market bonds and loans appear to differ only in the level of their spreads, not in the response of their spreads to changes in other factors such as credit rating or maturity.

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[52] Angbazo, Mei and Saunders (1998) define as Highly Leveraged Transaction (HLT) loans all loan financings:

- which are used for buyouts, acquisitions, recapitalisations,
- which (i) double the borrower's liabilities and result in a leverage ratio (total liabilities/total assets) higher than 50% or (ii) increase the leverage ratio higher than 75%,
- that are designated as HLT by the syndication agent,
- granted to subsidiaries of HLT companies, even when the subsidiary does not meet the HLT definitions above.

Dealogic Loanware applies the term leveraged in case of lending to non-investment grade companies where the ratio of debt to net worth is often high. Typically in the US and Canadian markets, HLT corresponds to a LIBOR pricing of 250bp or above. For European borrowers, the notion of leveraged loans applies to a LIBOR pricing of 150bp or above.

We now present some comparative visual analysis of bond and loan issuance over the past decade by industrialised countries and some selected developing countries that have been affected by serious financial crises. The analysis allows us to make inferences about linkages between financing for developing and industrialised country borrowers.

To begin with, analysis of volumes shows that syndicated lending was sharply curtailed in 1998 to South-East Asia in the aftermath of the financial crises that hit the region. The crises were accompanied by a reduction of lending to borrowers in the United States and in Western Europe (Figure 1). The collapse of bond issuance by Asian crisis countries in 1998 and 1999 was followed by a reduction in Western European bond issuance from 1999 onwards (Figure 6).

Furthermore, looking at the evolution of pricing, we note that LIBOR spreads on syndicated credit facilities granted to Asian developing countries hit by financial crises[53] peaked in 1998-99. So did launch spreads (i.e. spreads at issuance) on their bonds – for those still able to tap bond markets. These peaks were accompanied by a peaking of LIBOR loan spreads for US and Japanese borrowers (Figure 2) and to a lesser extent of bond spreads in 1999 for Japanese issuers (Figure 7). One could interpret this as a possible sign of contagion in financial markets, which we will test statistically later in the paper. Latin American loan and bond spreads peaked in 1999, while spreads demanded on Russian and Turkish bonds and loans started edging up sharply in 2000.

Lastly, the evolution of loan maturities may also provide possible evidence of contagion (Figure 3). The abrupt reduction of new average facility maturities that occurred for Turkish, Russian, South Korean and Indonesian borrowers in particular, as lenders shunned further long-term exposure to crisis-hit countries, was accompanied by a less abrupt but generally protracted reduction of weighted average maturities on industrialised country syndicated loan facilities. Interestingly, as average maturities on facilities to South Korean borrowers fell in 1998 to about one third of their average of 1997, average maturities on facilities granted to Japanese borrowers shrank by 50%

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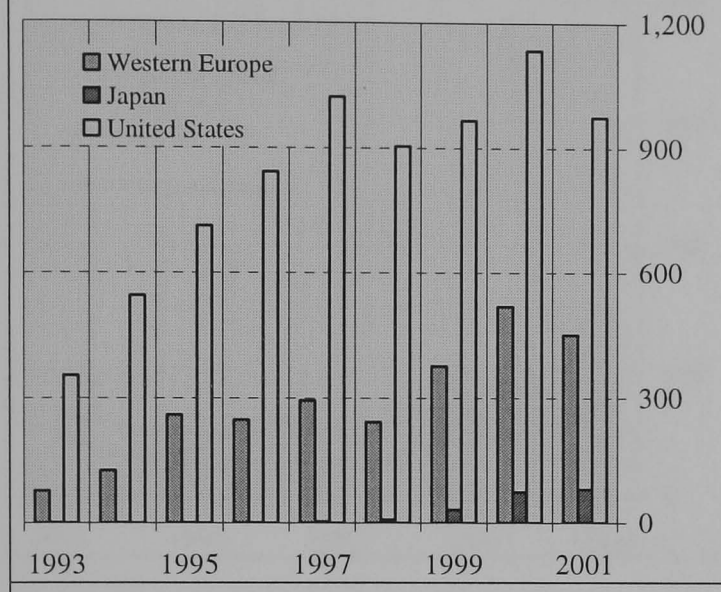
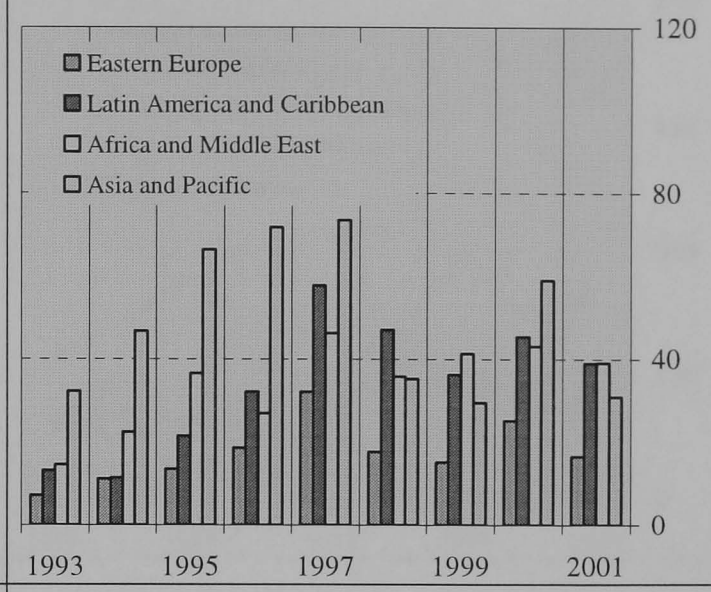
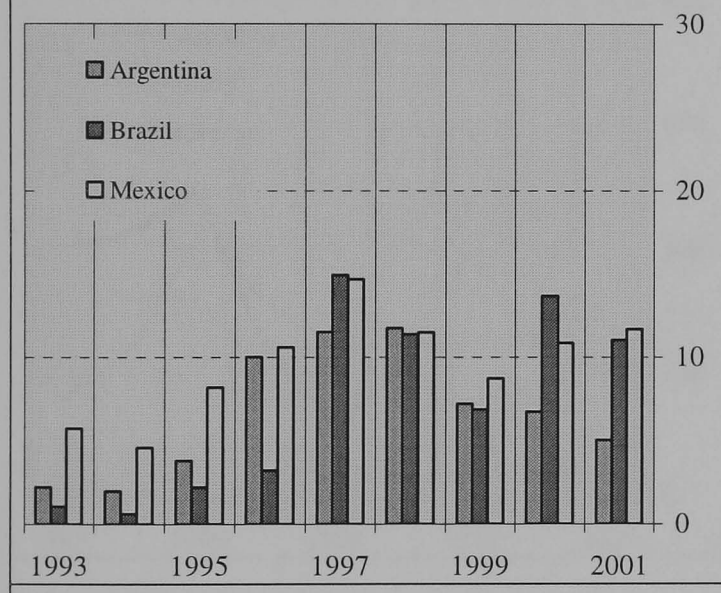
[53] Indonesia, Malaysia, South Korea, Thailand.

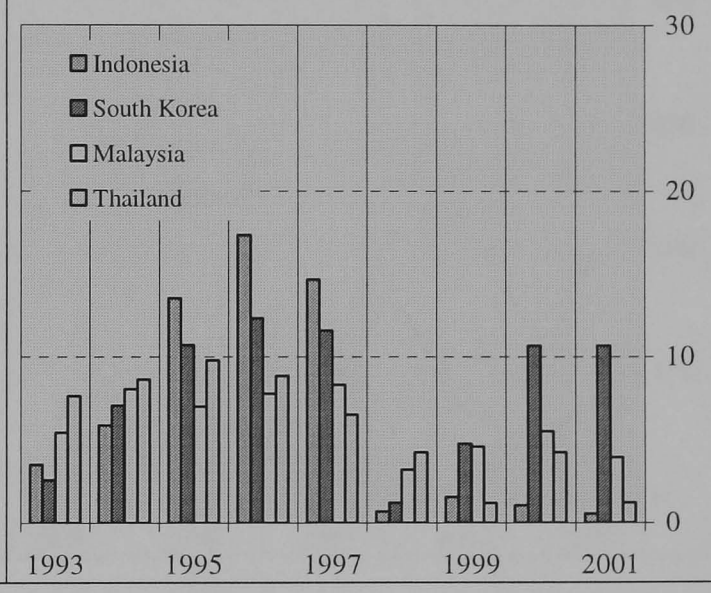
between 1997 and 1998. To a lesser extent, the sharp reduction in maturity for emerging country bonds issued from 1997 onwards, first in Asia and subsequently in Latin America, was accompanied by a trough in US bond maturities in 1998 (Figure 8).

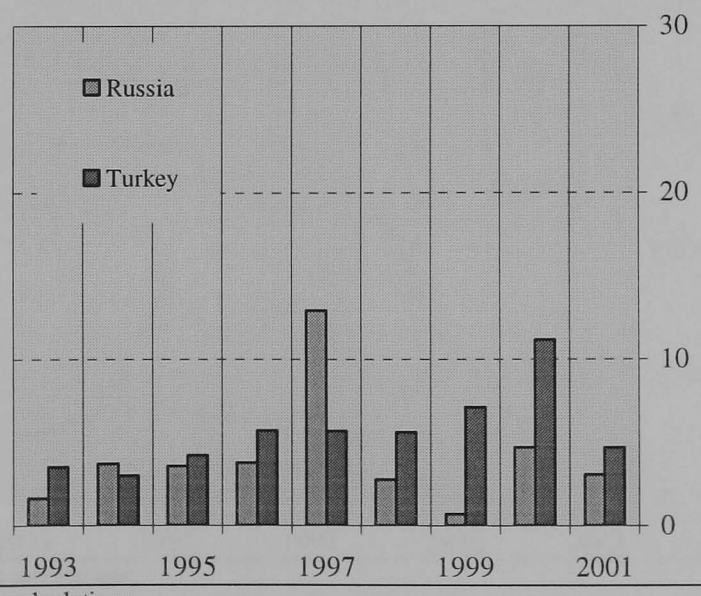
Figure 1: Evolution of syndicated lending to industrialised countries and selected developing countries affected by financial crises, in billions of US dollars





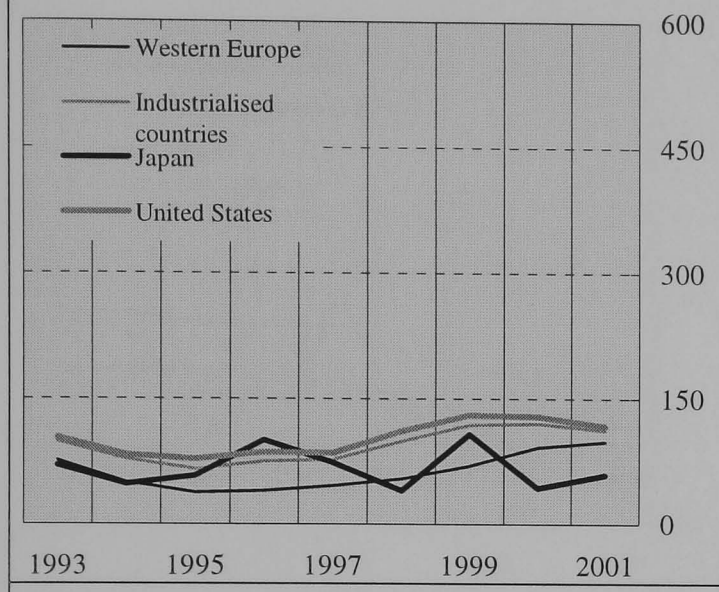


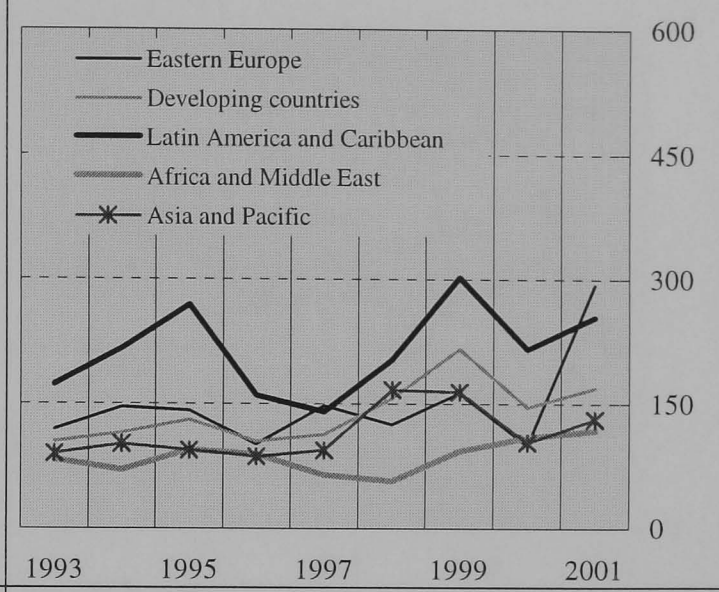


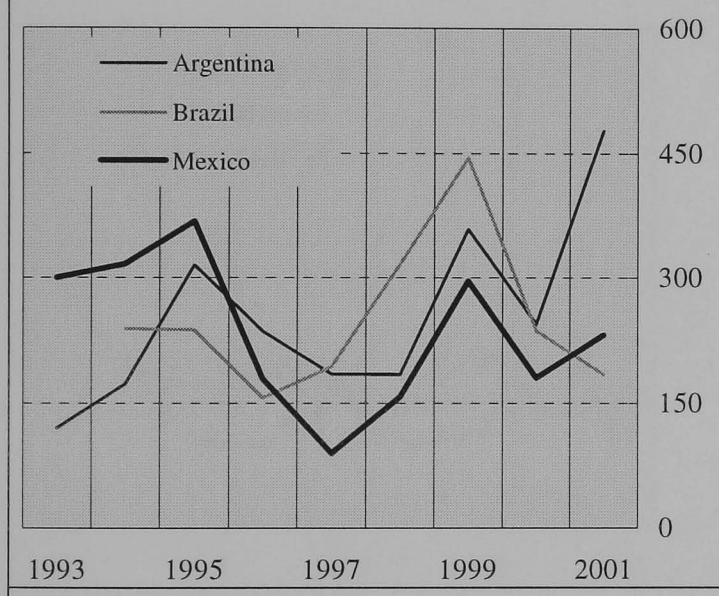


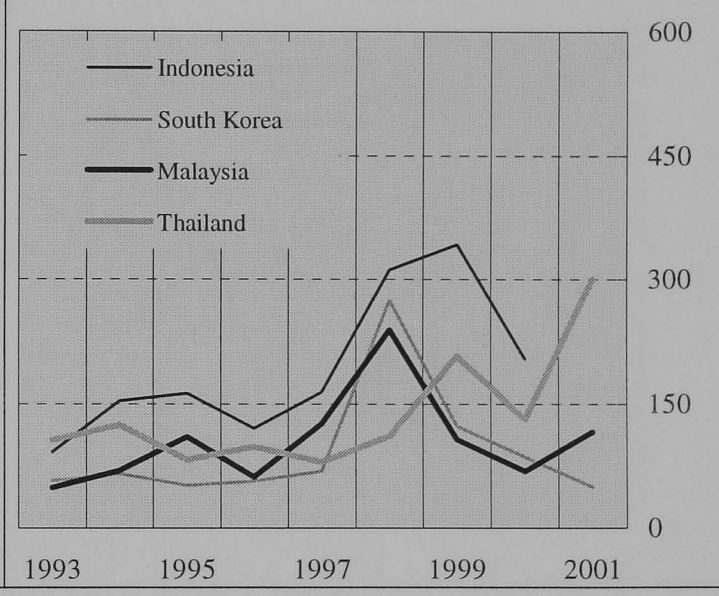
Sources: Dealogic Loanware, author's calculations.

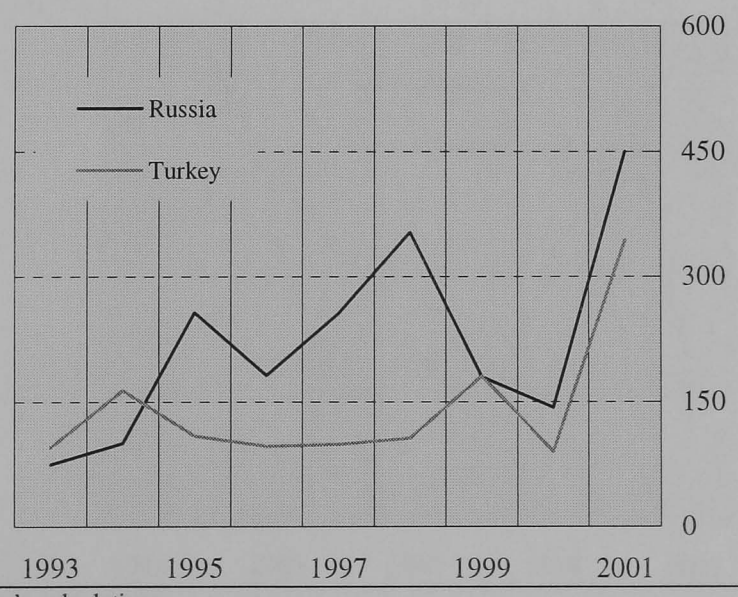
Figure 2: Evolution of average LIBOR spreads weighted by facility amounts on syndicated credits granted to industrialised countries and selected developing countries affected by financial crises, in basis points





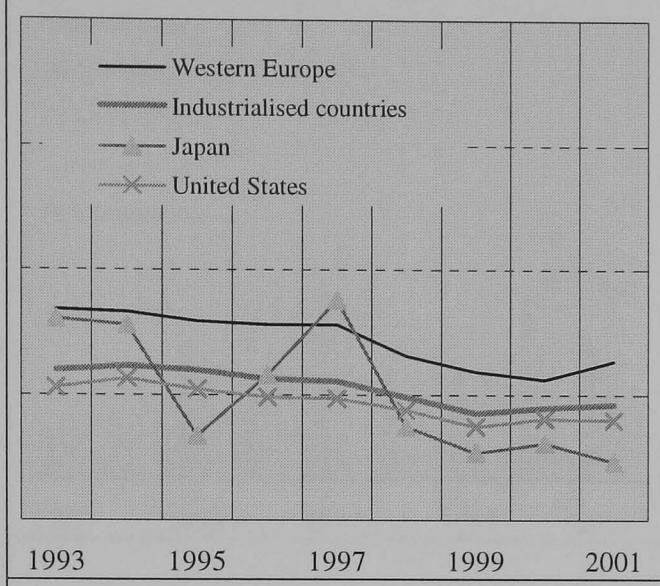


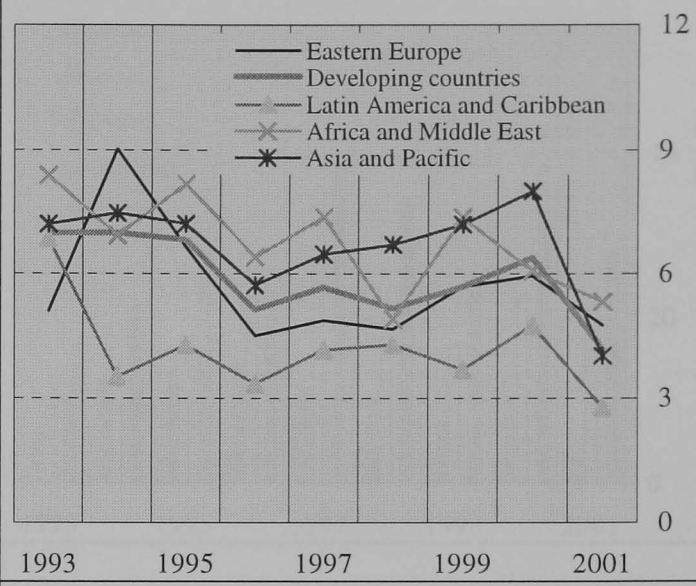


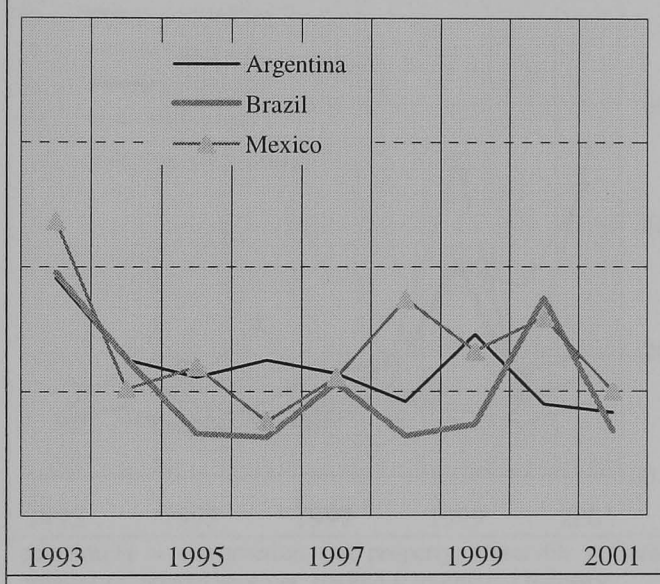


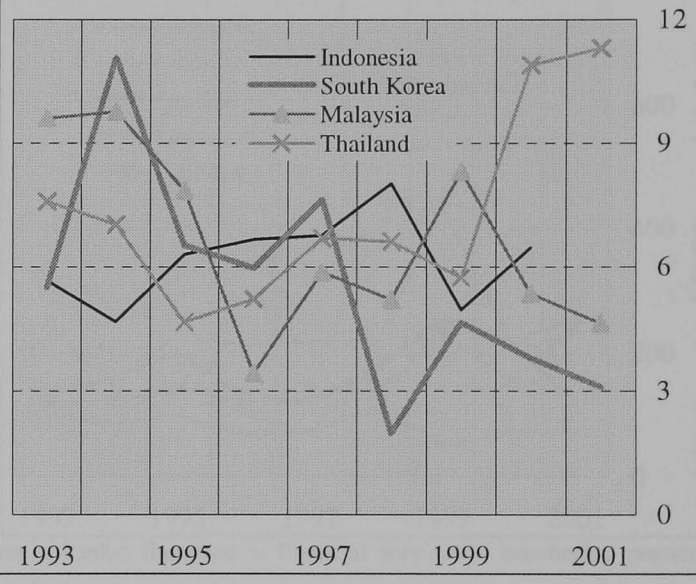
Sources: Dealogic Loanware, author's calculations.

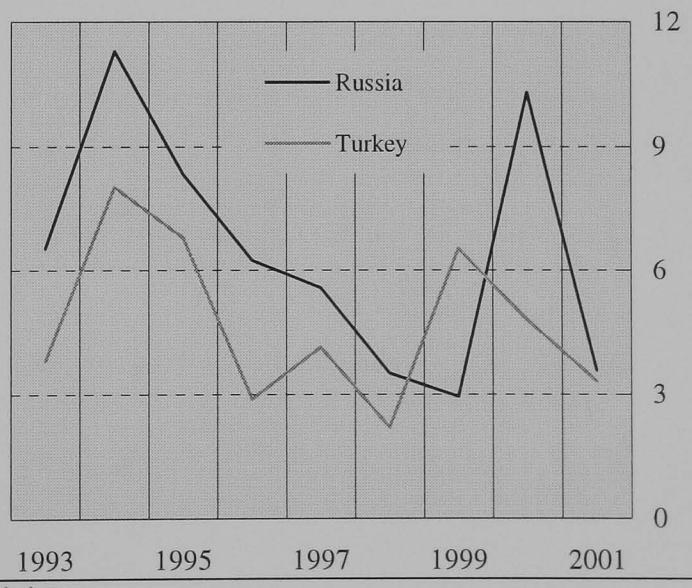
Figure 3: Evolution of average maturities weighted by facility amounts on syndicated credits granted to industrialised countries and selected developing countries affected by financial crises, in years





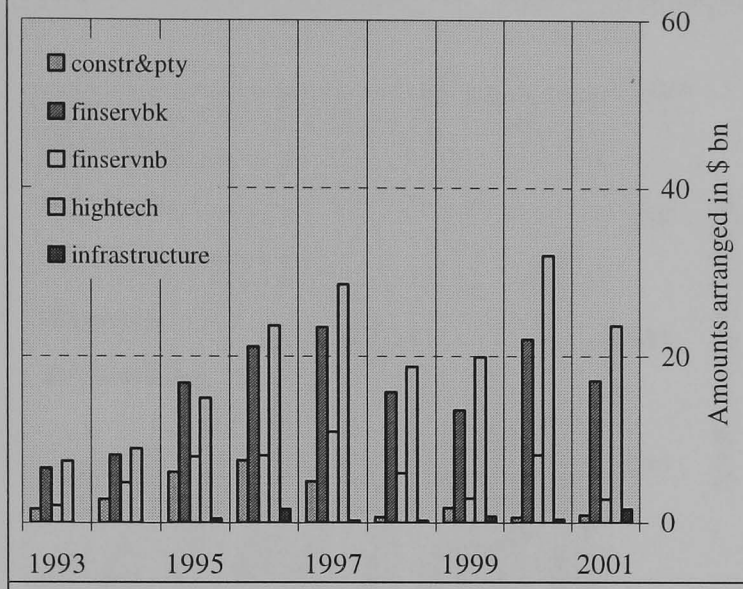


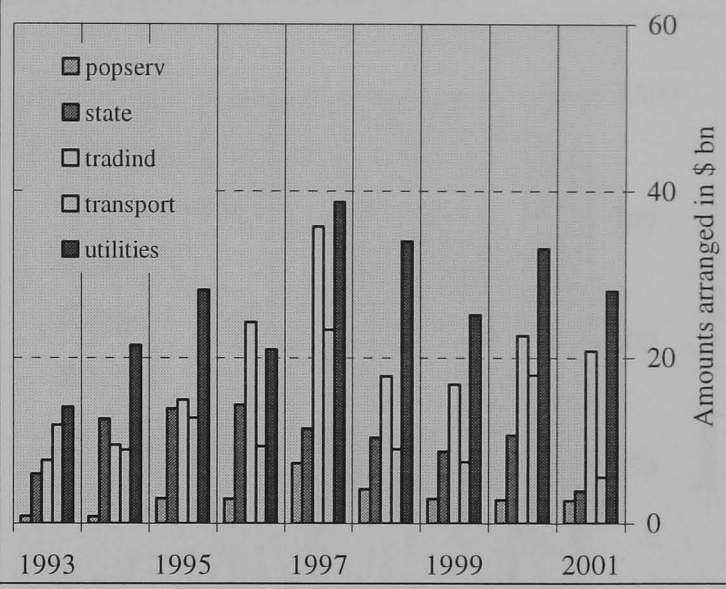


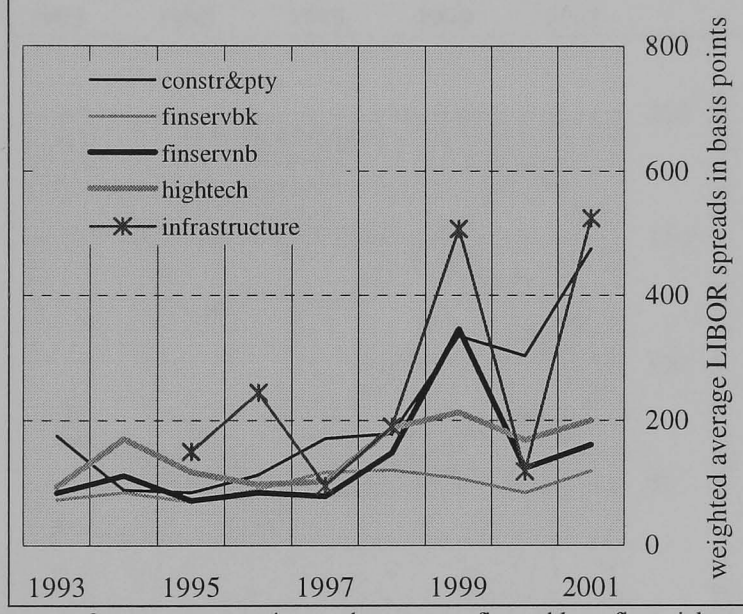


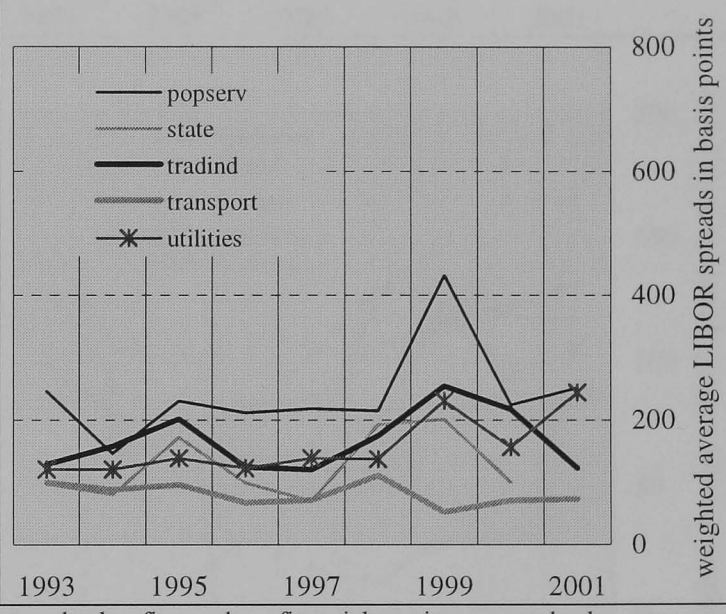
Sources: Dealogic Loanware, author's calculations.

Figure 4: Evolution of lending and average LIBOR spreads weighted by facility amounts on syndicated loans arranged for various business sectors in developing countries





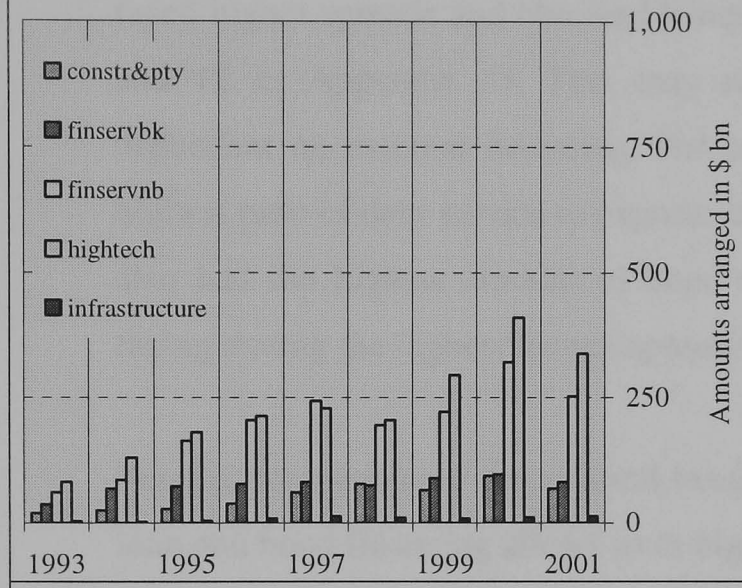


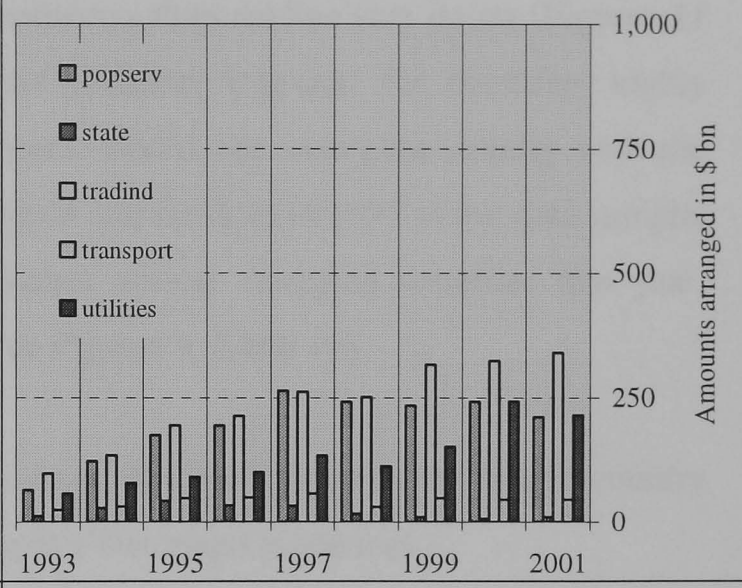


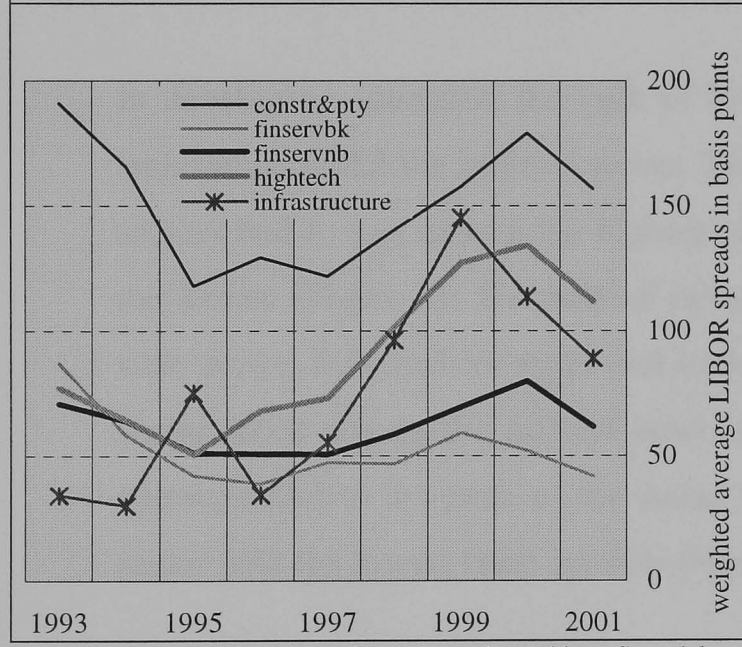
constr&pty = construction and property; finservbk = financial services – banks; finservnb = financial services – non-banks; popserv = population-related services; tradind = traditional industry

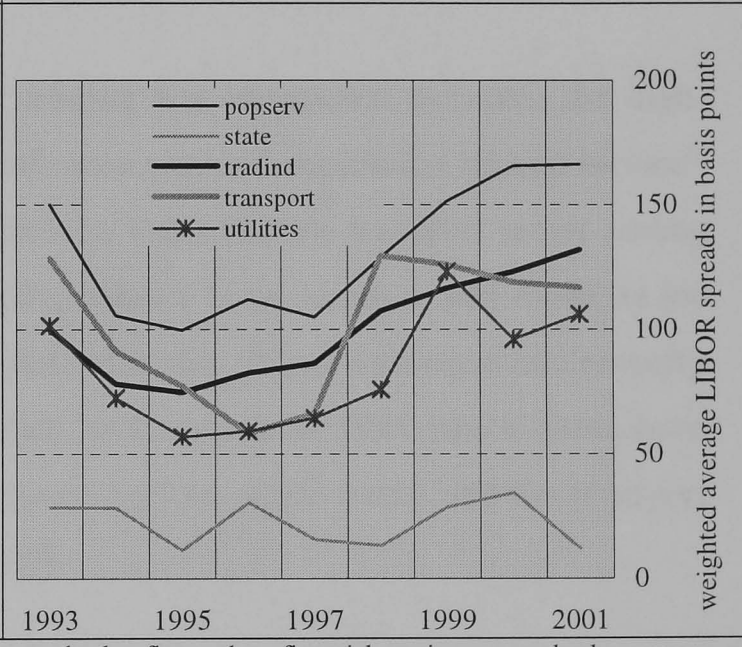
Sources: Dealogic Loanware, author's calculations.

Figure 5: Evolution of lending and average LIBOR spreads weighted by facility amounts on syndicated loans arranged for various business sectors in industrialised countries









constr&pty = construction and property; finservbk = financial services – banks; finservnb = financial services – non-banks; popserv = population-related services; tradind = traditional industry
Sources: Dealogic Loanware, author's calculations.

We detect similar relationships in developing and industrialised countries between the concentration of the locus of financing on the one hand and the pricing of funds on the other. Borrowers that arranged the largest loan or bond issues for a particular year often faced higher spreads and obtained lower maturities than median size issues (Figures 11 and 12 in Appendix 4). This may reflect penalties imposed for countries highly dependent on external financing. For instance, Brazil, the emerging country with the highest ratio of debt service to exports of goods and services in 1997 in our data sample, also had the highest amount of bond issuance among emerging countries that year, facing among the highest launch spreads (see Figures 6, 7 and 12).

Finally, comparison of the sectoral breakdown of developing and industrialised country loan and bond financing allows us to highlight a few major tendencies.

In developing countries, the bulk of bank lending was channelled to banks, the high-tech industry and the utilities sector. The infrastructure and population-related service[54] sectors had to pay among the highest spreads on loans and the transport sector among the lowest (Figure 4). The bulk of developing country bond issuance was made by the state sector, followed by banks and traditional industries. The construction and property sector faced among the highest bond spreads, with a peak in 1998 which could have corresponded to the peak of the Asian property bubble, while banks and the transport sector paid the lowest bond spreads (Figure 9).

In industrialised countries, non-bank financial intermediaries and the high-tech industry were the most active arrangers of syndicated loans. In 1999 and 2000, borrowing by the high-tech sector peaked, boosted by large loan facilities arranged for mainly European telecoms firms to support the purchase of third-generation mobile phone licenses. The state and banking sectors obtained among the lowest bond and loan spreads while the construction and property and population-related sectors faced the highest. Banks and the state sector were the most active bond issuers. Spreads on loans written to and on bonds issued by the high-tech industry were the highest in 2000 when telecoms borrowing peaked (Figures 5 and 10).

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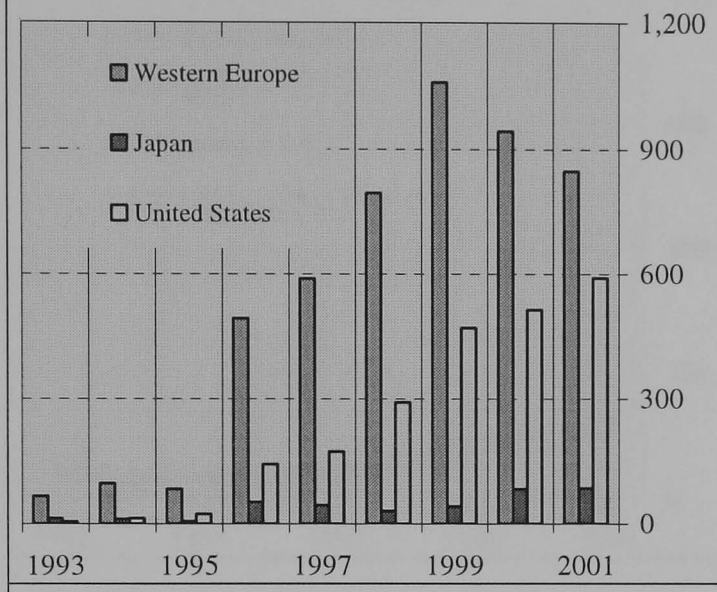
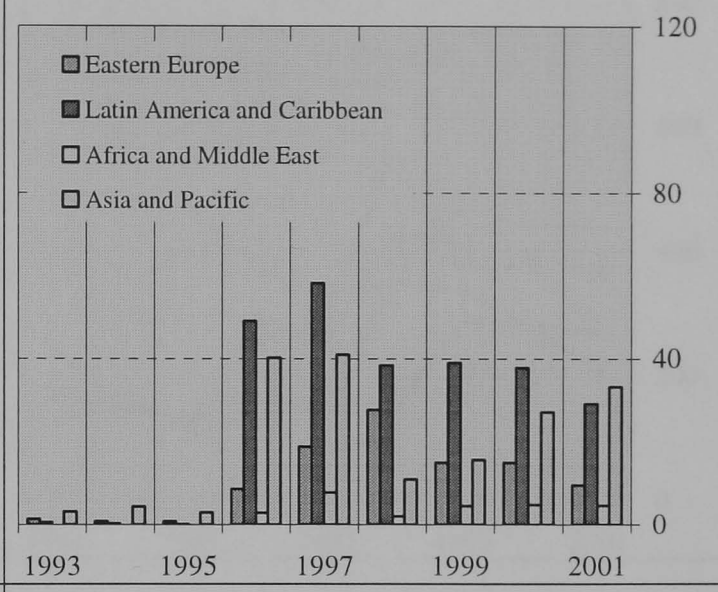
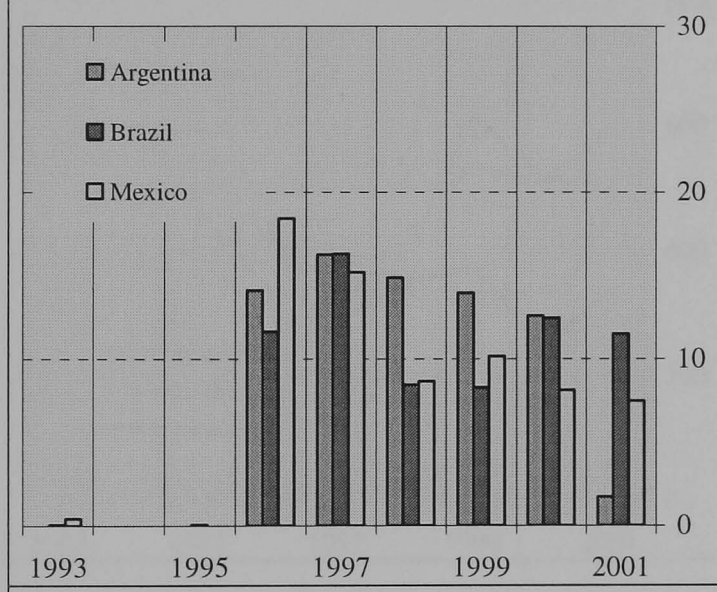
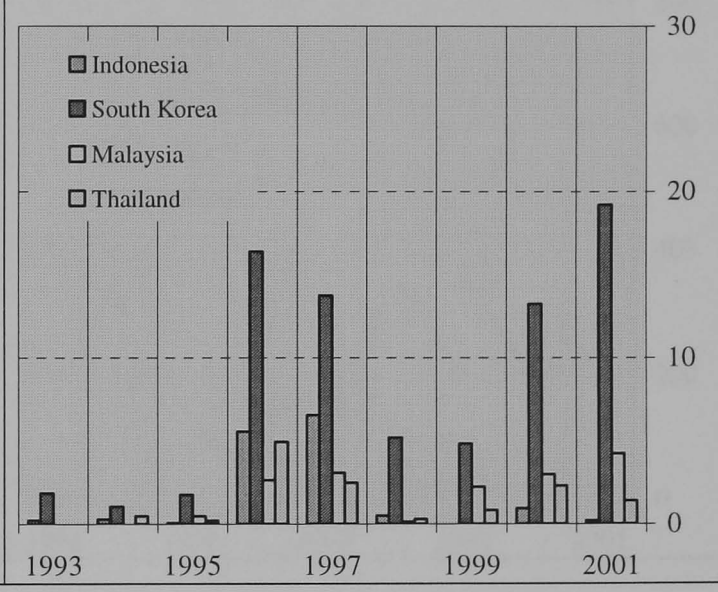
[54] E.g. Media & Publishing, Hotels & Leisure, Retailing.

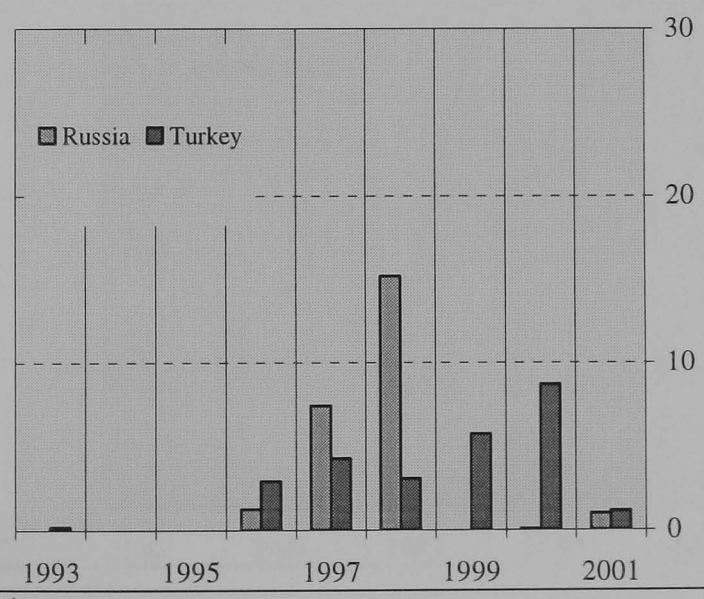
Figure 6: Evolution of bond issuance by industrialised countries and selected developing countries affected by financial crises, in billions of US dollars





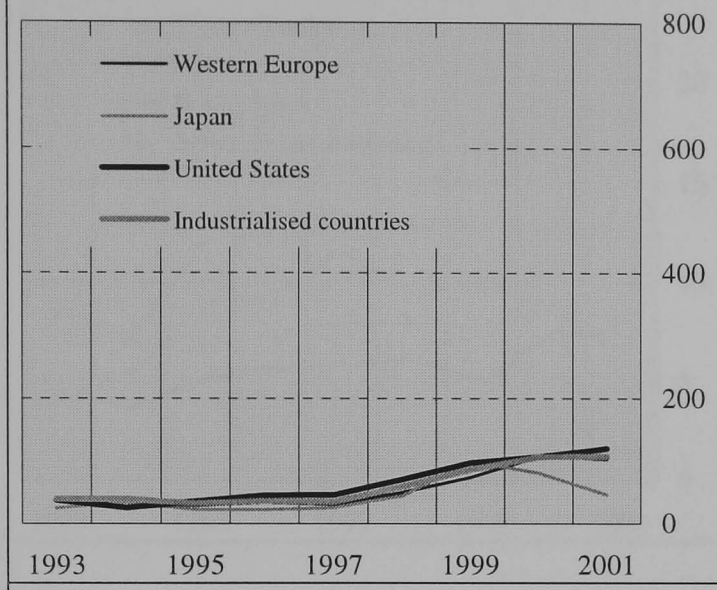


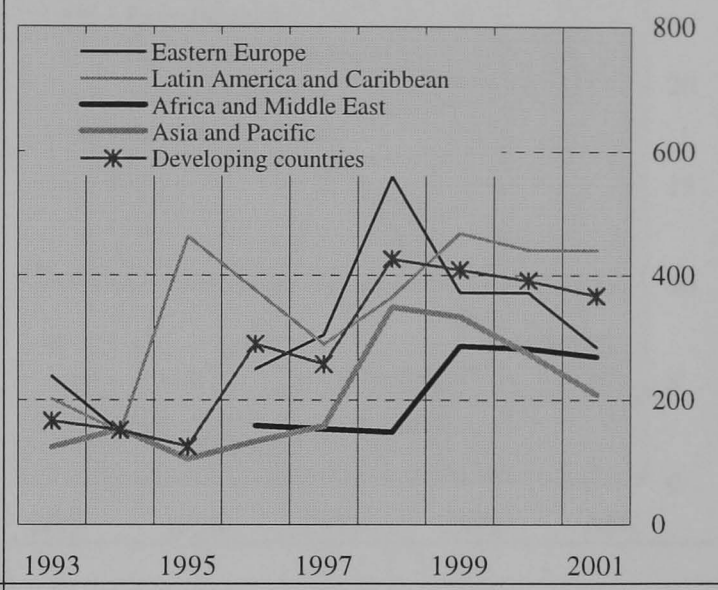


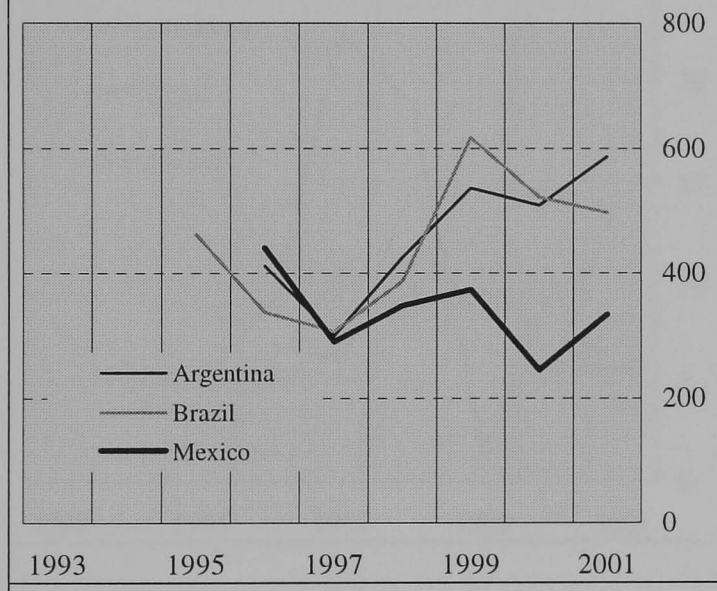


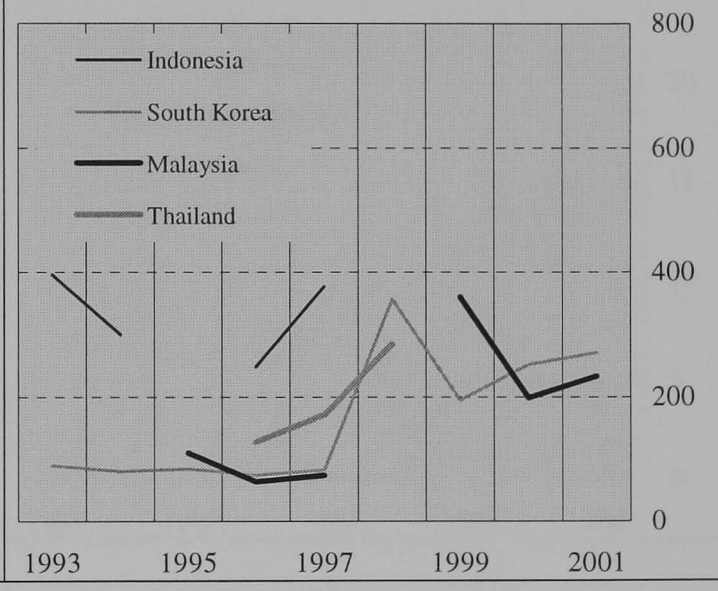
Sources: Dealogic, author's calculations.

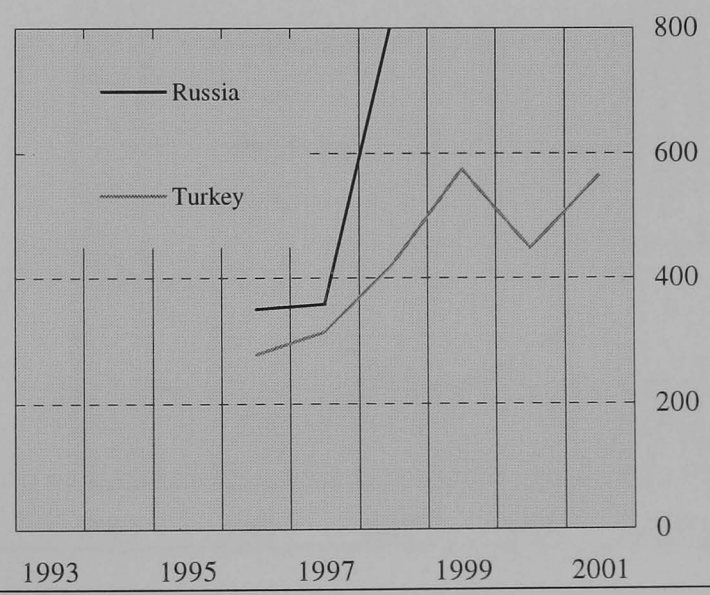
Figure 7: Evolution of average launch spreads* weighted by facility amounts on bond issues for industrialised countries and selected developing countries affected by financial crises, in basis points







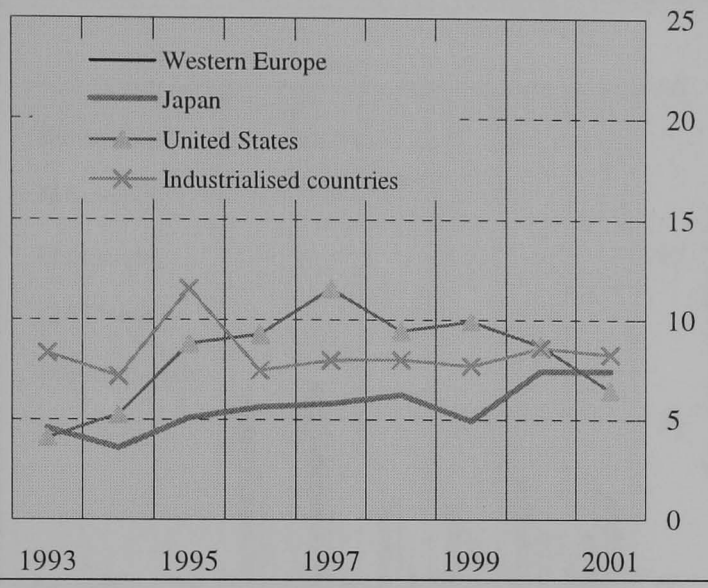


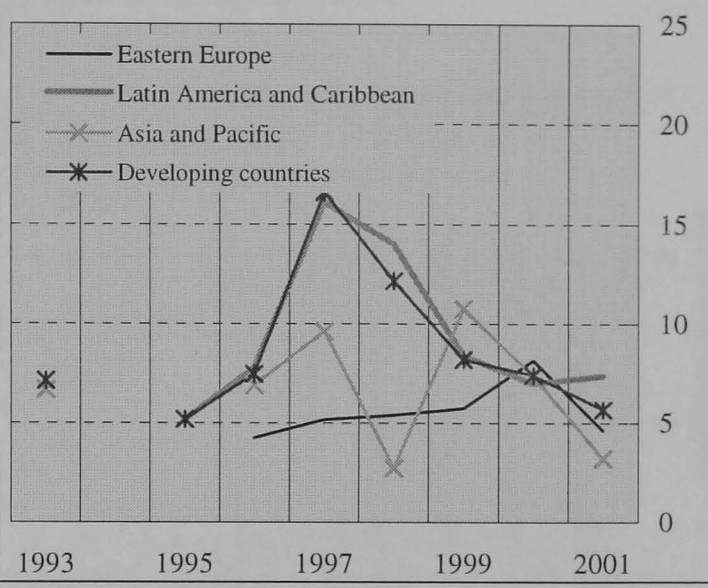


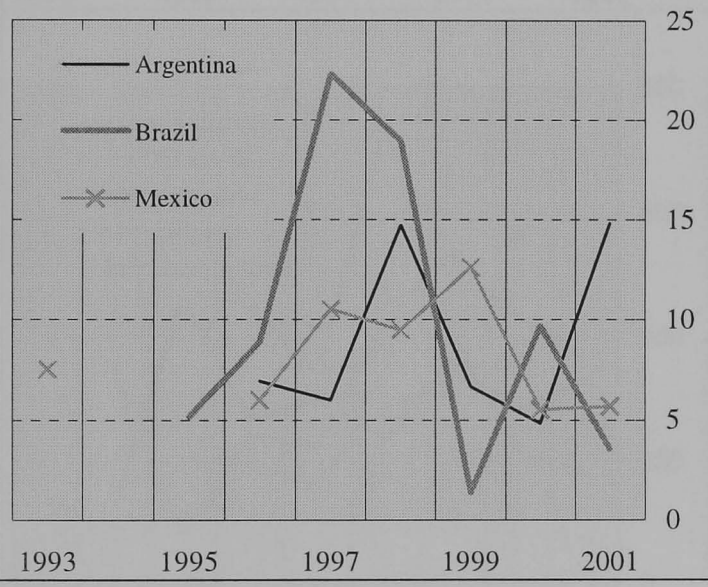
* Spreads at issuance

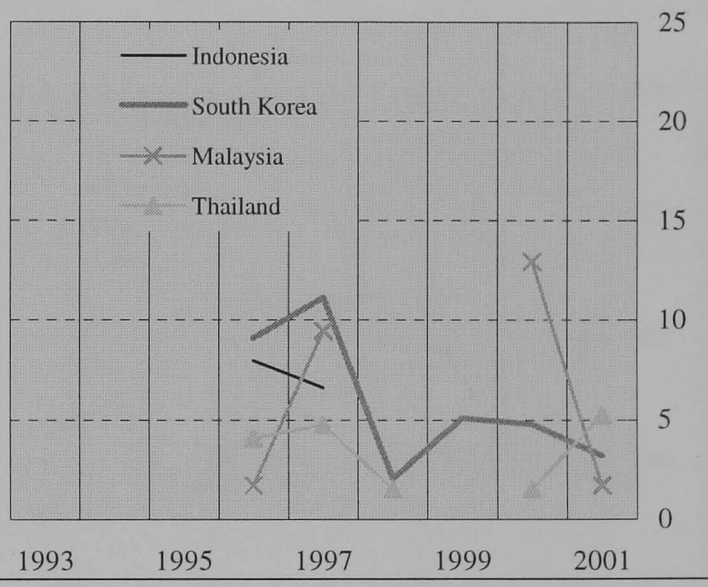
Sources: Dealogic, author's calculations.

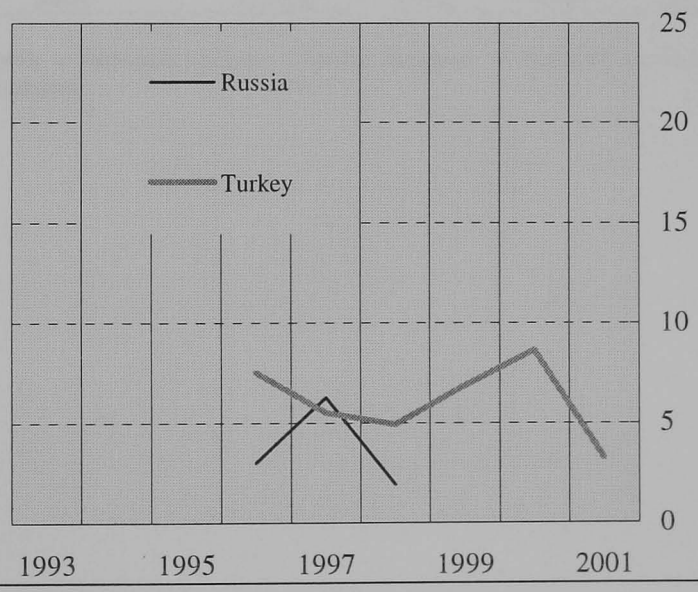
Figure 8: Evolution of average maturities weighted by facility amounts on bond issues for industrialised countries and selected developing countries affected by financial crises, in years





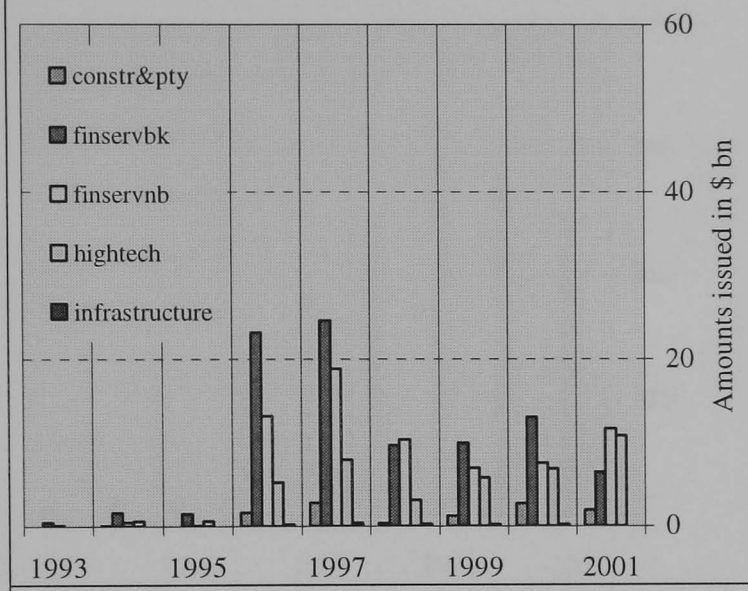


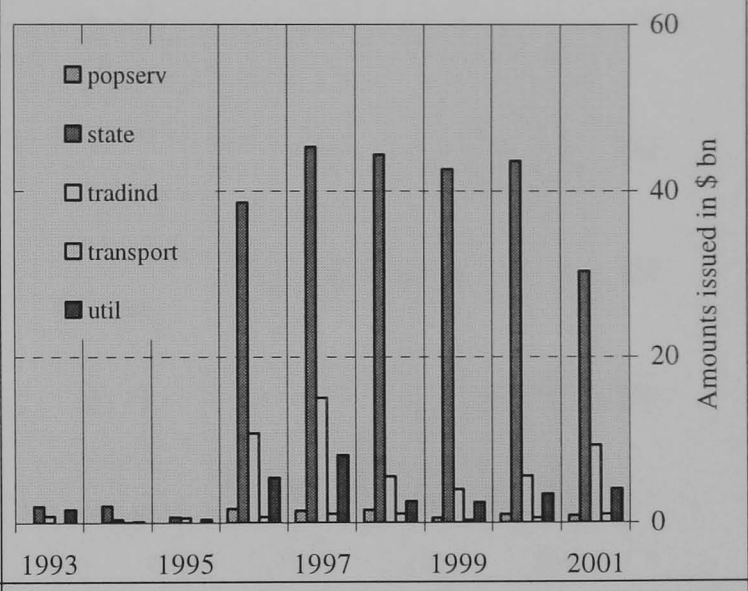


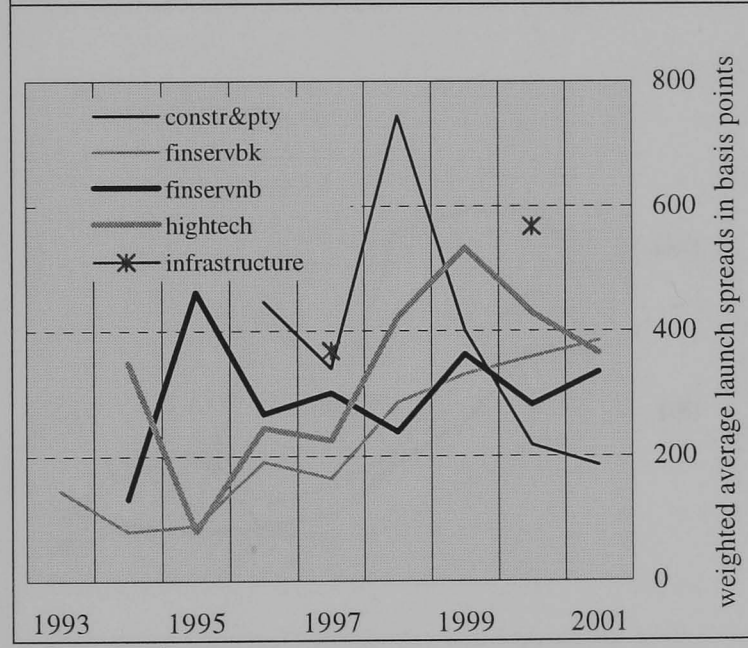


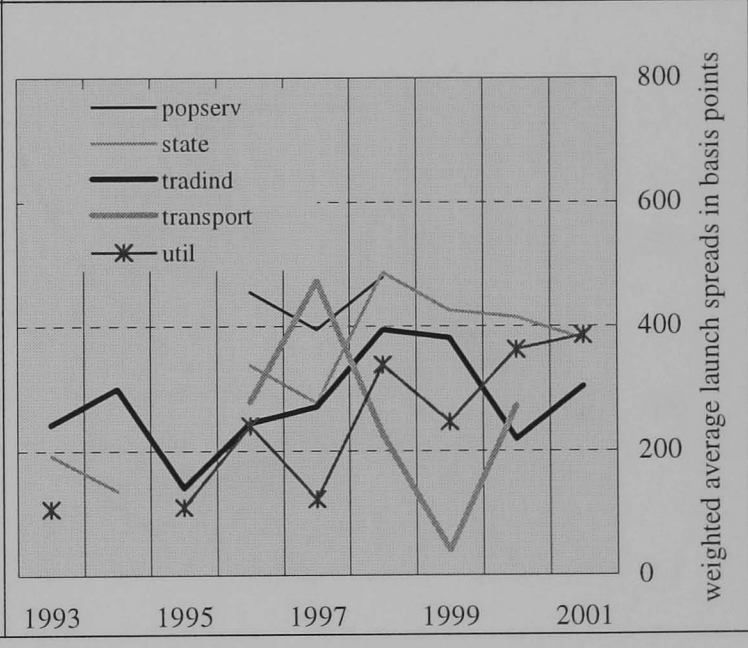
Sources: Dealogic, author's calculations.

Figure 9: Evolution of issuance amounts and average launch spreads* weighted by facility amounts on bonds issued by various business sectors in developing countries







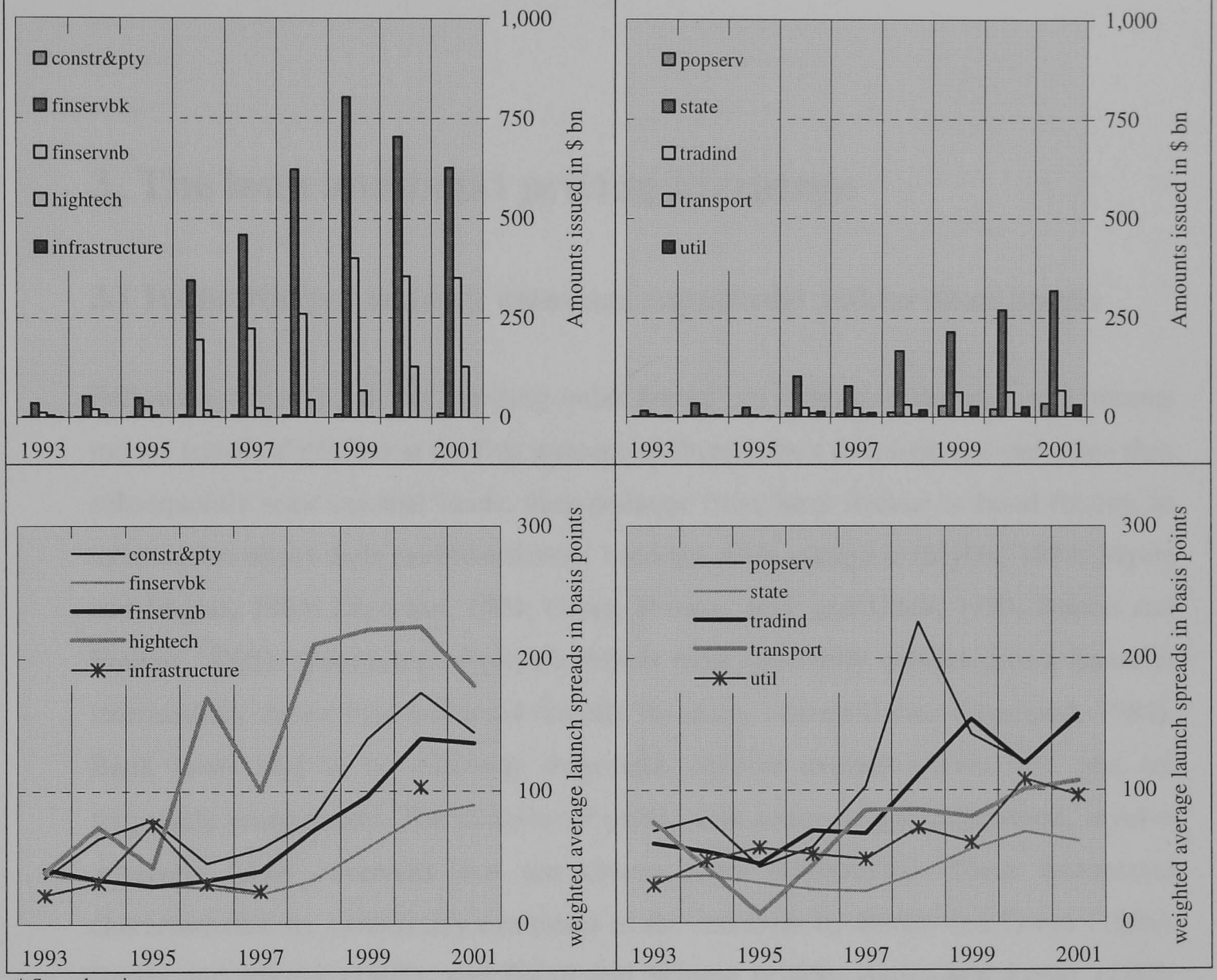


* Spreads at issuance

constr&pty = construction and property; finservbk = financial services – banks; finservnb = financial services – non-banks; popserv = population-related services; tradind = traditional industry

Sources: Dealogic, author's calculations.

Figure 10: Evolution of issuance amounts and average launch spreads* weighted by facility amounts on bonds issued by various business sectors in industrialised countries



* Spreads at issuance

constr&pty = construction and property; finservbk = financial services – banks; finservnb = financial services – non-banks; popserv = population-related services; tradind = traditional industry

Sources: Dealogic, author's calculations.

In order to prepare our statistical analysis of the abovementioned issues arising from visual inspection of the figures, we now review some of the academic literature dealing with loan and bond pricing issues.

3. The loan and bond pricing literature

3.1 Industrialised country loans are supposedly riskier than bonds

Following the logic of the "pecking order theory" of finance, companies use internal money (retained profits) in the first instance to finance their development and when they subsequently seek external funds, they graduate from bank finance to bond finance as information about their creditworthiness becomes more complete (Myers, 1984; Myers and Majluf, 1984; Diamond, 1991; Carey, Prowse, Rea, and Udell, 1993; Bolton and Freixas, 2000). Monitoring of private debt is most efficiently delegated to a financial intermediary rather than collected directly by many intermediaries (Diamond, 1984). Bank loans tend to be relatively short-term, involve extensive covenants, and are frequently renegotiated. The majority of public-debt contracts are longer-term, involve relatively loose covenants and are almost never renegotiated. These contractual characteristics are extensively examined in the literature by Berlin and Loeys (1988), Berlin and Mester (1992), and Rajan and Winton (1995). Berlin and Loeys (1992) develop a model in which bond contracts – enforced by indicators observable to anyone – tend to be either too harsh (too many good projects are liquidated) or too lenient (too many bad projects are allowed to mature). Hiring the services of a delegated monitor ensures a more efficient liquidation policy (loan contract), providing the monitor with proper incentives is costly. The choice of contract depends on the trade-off between the inefficiencies of rigid bond covenants and the costs of hiring a delegated monitor. This trade-off depends on the firm's production technology and the information technology. Bolton and Freixas (2000) derive an equilibrium where (i) the riskiest firms (which are often start-ups) are either unable to obtain funding or are constrained to issue equity, (ii) somewhat safer firms are able to take out bank loans, which provide the cheapest form of flexible financing required and (iii) the safest firms prefer to tap securities markets

and thus avoid paying the intermediation cost. This theoretical segmentation is consistent with practice, especially with European reality where only the safest firms are able to issue bonds on securities markets and no highly developed junk-bond market exists, as in the US.

Research conducted by Melnik and Plaut (1991) underpins the pecking order theory. Their investigation of lending to industrialised country borrowers on the short-term Eurocredit market provides evidence that the market seems to be segmented in such a way that the highest-quality borrowers issue securities in their own names (in other words do not require monitoring) while others have recourse to finance in the form of bank loans (i.e. are monitored). On a sample of credit contracts consisting of Note Issuance Facilities (NIFs, instruments closer to securities than to loans) and loans – that were executed for financial and non-financial borrowers in 1986, loans have a riskier average credit rating and a higher average spread over LIBOR than NIFs combined with a higher average facility amount (possibly indicating higher leverage and greater risk). Logit regression analysis shows that riskier credit ratings increase the likelihood that borrowers obtain financing through a conventional loan rather than a NIF. The inclusion of a third-party guarantee also significantly increases the likelihood that the financing is in the form of a NIF.

3.2 Developing country bonds could be riskier than loans

The above considerations apply to lending to industrialised countries, but a different analysis is warranted for developing countries. Edwards (1986) argues that the levels of risk involved in international bank loans and bonds are different. There is somewhat greater risk involved in bonds. As a result of implicit or explicit central bank guarantees on bank deposits and loans, spreads on loans would not reflect the real risk of default. Bonds, on the other hand, supposedly reflect the risk more accurately. Sachs and Cohen (1982) have argued that while bank lending is implicitly lending with an option to renegotiate, bond lending excludes the possibility of rescheduling. Consequently, in their model, bond lending is more risky – that is, for the same amount of debt, spreads are higher on bonds than on bank loans.

Monetary authorities have traditionally guaranteed bank deposits and loans. Nowadays, bank loans and deposits are, in most countries, implicitly or explicitly insured: in a way, central banks have agreed to become lenders of last resort. McKinnon (1984), Folkerts-Landau (1985) and Eichengreen and Mody (2000) have argued, among others, that the moral hazard factor has become increasingly important in bank lending. According to this view, spreads charged on bank loans do not reflect the real risk of the borrower. The bond market, on the other hand, has not been affected by the broadening of this implicit insurance scheme. Indeed, Folkerts-Landau (1985) argues that while bank loan spreads reflect the probability of *rescheduling*, bond spreads mirror the probability of *default*.

The empirical investigations of these issues in the existing academic literature confirm that spreads on developing country bonds are higher than on developing country loans (Kamin and von Kleist, 1999; Eichengreen and Mody, 1997, 1998, 2000), although the determinants of loan and bond spreads are similar.

We now analyse the determinants of the availability of intermediated and disintermediated finance for developing and industrialised country borrowers for the 1993-2001 period.

4. Analysis of lending to developing countries

We now explore in a more systematic fashion which factors determine the pricing of developing and industrialised country bonds and loans during 1993-2001, our period under study. We focus on primary market spreads, i.e. launch spreads for bonds and LIBOR spreads for loans issued on the primary market. It is important to note that the behaviour of spreads on secondary markets, which can be quite different from that of primary spreads, is not analysed here. In particular, as underscored by Eichengreen and Mody (1997 and 1998), in poor market conditions when secondary spreads rise, launch spreads generally fall. One justification of our approach is that we are comparing loan and bond pricing and the secondary market for loans is much less developed than the secondary market for bonds.

We regress the pricing of 2,772 developing country loans and 530 developing country bonds issued or granted between 1993 and 2001, on a series of macro- and micro-economic variables with a view to comparing the determinants of the pricing of these two instruments. Descriptive statistics of our sample can be found in Appendix 5.

Our macro-economic[55] variables include the following measures of the economic performance of the country of the borrower:

- *solvency*, such as the ratios of external debt to GDP, debt service to exports, assistance from the IMF, a history of debt rescheduling (see Hanson, 1974; Harberger, 1980; Eaton and Gersovitz, 1981; Edwards, 1983; Sachs, 1984; Cantor and Packer, 1996, Cline and Barnes, 1997);
- *liquidity*, such as the total or short-term external debt positions and their relation to foreign currency reserves (Edwards, 1983; Gersovitz, 1985; Cline and Barnes, 1997; Eichengreen and Mody, 2000);
- *economic growth and its sustainability:* economic growth rate and its variance, ratios of investment to GDP and domestic credit to GDP (Feder and Just, 1977; Edwards, 1983; Sachs, 1984; Gersovitz, 1985; Cline and Barnes, 1997; Eichengreen and Mody, 1998, 2000);
- *economic openness:* ratio of exports to import (Frenkel, 1983; Balassa, 1986);

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[55] Our data sources for the macro-economic variables were the BIS-IMF-OECD-World Bank Joint Statistics on external debt, the IMF's International Financial Statistics, the IMF's World Economic Outlook database, the International Institute of Finance's developing country database, the OECD's World Economic Outlook, and national statistical offices. We linked the macro-economic variables and the micro-economic information contained in the loans and bonds databases on the country and the date, considering both the year the loan was signed or the bond was issued, and the previous year. We thus distinguish between long-term and short-term effects. In fact we expect investors and banks to have incorporated some kind of macro-economic forecasting into their pricing models. For instance, for a loan granted to an Argentine borrower in 1995, our real GDP growth variables represent Argentina's real economic growth for 1995 (noted as growth) and for 1994 (noted as $growth._1$).

- *business climate,* for which we use as a proxy the corruption index compiled by Transparency International[56]. The corruption index is standardised on a scale of 0 to 10 with a score of 0 corresponding to the highest degree of corruption, and a score of 10 to the lowest. To the extent that lenders may be expected to charge a premium on funding to countries where a corrupt business climate prevails, we expect to find a negative coefficient on the corruption index variable in our loan and bond pricing regressions.

We also control for general economic factors like the country's purchasing power parity share of world GDP, growth in world trade and the yield on the risk-free investment alternative to the loan or bond in question (the three-month US Treasury bill). We generally expect that the market will penalise borrowers from countries with weak macro-economic fundamentals by charging them higher spreads and vice-versa.

Our micro-economic variables include issue size, maturity, borrower business sector, the existence of guarantees, the currency of issue and market structure.

- Issue size and maturity can lower or increase pricing (Smith, 1980; Fons, 1994; Eichengreen and Mody, 1997 and 1998; Kamin and von Kleist, 1999; Kleimeier and Megginson, 2000).
- Likewise, the effect of the presence of collateral and third-party guarantees are uncertain (Smith and Warner 1979; Smith 1980; Bester, 1985; Besanko and Thakor, 1987; Berger and Udell, 1990, Kleimeier and Megginson, 2000).
- Eichengreen and Mody (2000) report that when *financial institutions* borrow on the syndicated loan market, they seem to be able to obtain lower spreads than non-financial borrowers. This is consistent with the emphasis some observers have placed on tacit or explicit guarantees provided to financial institutions by monetary authorities (lenders of last resort).
- We included dummies for facilities or bonds denominated in US dollars, Japanese Yen and euro (or any of its twelve predecessor currencies). We expect

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[56] Transparency International assigns a score of 0 to 10 to most countries of the world, standardising a number of corruption surveys conducted by public and private institutions and consisting of questions about issues such as bribing of public officials, kickbacks in public procurement, or embezzlement of public funds. For a description of the methodology, and the full dataset, please refer to www.transparency.org.

instruments denominated in Yen and euro to have relatively lower pricing than others, due to the low funding costs for yen-based investors and declining margins in European banking (Eichengreen and Mody, 2000) and lower benchmark yields in non-dollar currencies than comparable US Treasuries (Kamin and von Kleist, 1999).

- Our indicators of market structure include a dummy to indicate if the original amount of the loan has been *increased*. When this dummy is equal to 1, it can hint that the market had a positive reaction to the deal during syndication or that the banks have shown flexibility in adapting their financing package to a change in the borrower's needs. We also controlled for the *number of fund providers (for loans) or arranger banks (for bonds).* The conditions on issues with a lower number of participants or issue arrangers are expected to reflect the relationship of the borrower with its core banks and may therefore be more favourable than on other deals. Finally, we included among our control variables the *shares of the borrower's country and business sector in total lending or bond issuance to all countries and all sectors* during the year concerned: these ratios indicate the relative presence of the country or the industry in the market for syndicated credits and bonds relative to others. A high country or industry share may indicate relatively high financing needs for a nation or an industry, possibly leading to more expensive funding, but also, on the contrary, to an established presence on the market, resulting in more favourable financing conditions.

For a summary of the academic literature about the micro- and macro-economic determinants of the pricing and availability of foreign funds, see Appendix 1.

Since the macro-economic characteristics of the various countries in our sample are different, a fixed-effect panel regression model is appropriate to control for these effects. Baltagi, Griffin and Xiong (2000) argue that in case of panel data, if inter-group heterogeneity is strong, then one can just run a timeseries regression for each group. If on the other hand it is believed that the long-run model corresponds to cross-sectional variation then a between-group approach can be employed. While pure cross-section studies cannot control for group-specific effects, pure time-series studies cannot control for unobservable changes occurring over time. The authors suggest that even when used

on relatively long time-series of panel data, heterogeneous models for individual groups tend to produce implausible estimates with inferior forecasting properties. The explanation for why pooled models outperform heterogeneous ones is based on the relative variability of data between time-series and individual panels. Efficiency gains measured by root mean square errors (particularly when we are faced with a relatively short time-series) from pooling appear to more than offset the biases due to inter-group heterogeneities.

The estimation results of the model are displayed in Table 3. Next, we discuss the results.

Most of our results regarding the effects of micro-economic factors on loan and bond pricing are in line with the existing academic literature. Maturity is significantly and positively related to the pricing of developing country loans and bonds, with the coefficient about twice as high in the case of loans than in the case of bonds. The premium for a risk of change in the borrower's creditworthiness for longer-term instruments is thus integrated into the pricing of developing country loans than bonds. The result is in accordance with the findings of Kamin and von Kleist (1999). Pricing is negatively and significantly related to size in the case of developing loans (this is the same result as found by Kleimeier and Megginson (2000) for a sample containing both developed and industrialised country loans), although this is not found for bonds. Overall, these results suggest that there are economies of scale for banks issuing loans or that better risks are created with larger loans, or both. No such effect seems to exist in the case of bonds where banks do not monitor borrowers and do not appear to derive economies of scale from carrying out that activity. We fail to detect the negative effect of issue size on developing country bond spreads found by Eichengreen and Mody (1997 and 1998) arising from economies of scale in the distribution of large issues and liquidity of the secondary market. Explicit guarantees appear to significantly lower the pricing of loans while the pricing of secured developing country loans carries a premium, possibly because they are deemed too risky[57]; conversely, guarantees or collateral seem to have no effect on bond pricing. These differences may be related to

[57] Examination of our data sample confirms that borrowers with poorer ratings are more likely to require collateralisation.

the greater seniority of loans over bonds. Other authors (see above) who have analysed the effects of collateral and guarantees on the pricing of bonds and loans have also failed to identify a systematic relationship.

The sensitivity of bond and loan pricing to borrower sectors appears to be quite different: while several sectoral dummies seem to influence loan spreads, no sectoral dummy is significantly related to the pricing of bonds. Investors may consider developing country bonds as an asset class in themselves and therefore show less sensitivity than in the case of loans to the borrower's industry for determining the pricing (while banks seem to pay more attention to borrower industry when granting loans). The significant and positive coefficients on the construction and property as well as the high-tech sectors in the loan pricing regression may reflect the high risk-return or speculative profile of these industries. Like Eichengreen and Mody (2000), we find that loans granted to banks are relatively cheaper than others, possibly because of the implicit or explicit lender of last resort guarantees enjoyed by these institutions.

Turning to the macro-economic determinants of loan and bond pricing, we detect no relationship between the yield on the risk-free alternative investment and the primary market pricing of developing country bonds and loans: this is in accordance with Kamin and von Kleist (1999)[58]. As noted by these two authors, the implication for policymakers is that an upturn in industrialised country interest rates may lead to a smaller than expected upturn in developing country spreads. The negative and significant coefficient on the dummy for loans denominated in Japanese yen indicates that Japanese banks' low funding costs could have resulted in lower spreads on developing country loans (Eichengreen and Mody, 2000) – this underpricing could reflect a search-for yield attitude on Japanese banks' behalf.

We find a positive and significant coefficient for growth in world trade for our developing country loan pricing regression (indicating that when world trade is booming, more economic agents are competing for foreign funds which are then harder to come by) and a negative one on growth in world GDP. The absence of a significant

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[58] For the purposes of comparability with bond pricing, we only looked at the LIBOR spread in the case of loans, not fees. When including fees, Eichengreen and Mody (2000) do find a significant relationship.

coefficient on either of these two variables in our bond pricing regressions underscores the important role that banks still play in supporting developing countries' participation in world trade. For policymakers, who have put forth world trade as a means of improving developing countries' economic condition, the availability of disintermediated foreign funds to these countries' participation in world trade therefore seems of particular relevance. Besides, the negative effect on bond pricing of a high penetration of trade into the economy of the borrower (measured by the ratio of imports plus exports divided by GDP) and its positive effect on loan pricing suggests that the financing of the participation of developing countries in world trade can be more optimal through bonds than loans, provided the former channel is available.

The effect of market structure on pricing appears to be different depending on whether loans or bonds are considered. On the one hand, the positive coefficient on country share in world syndicated lending seems to lead to higher developing country loan spreads in our regressions, suggesting banks charge higher than normal spreads to borrowers from countries which are excessively dependent on bank lending for their economic development. This could reflect that either the banks are exercising market power or loans are becoming pricier as greater concentration of risk is perceived by investors. On the other hand, the opposite effect seems to prevail for bonds (higher country shares are associated with lower bond spreads) where banks, as underwriters and distributors of securities rather than ultimate bearers of risk, have less scope to exercise market power. Instead, a country's established presence as an issuer, be it of junk bonds, seems to result in lower bond spreads (reputation effect). Meanwhile the negative and significant coefficient on sector share in world syndicated lending indicates that particular industries' established presence on the market can lower loan spreads. In the loan regression, we obtain a positive coefficient on the contemporaneous value of the purchasing parity share of world GDP of the borrower's country and a negative sign on the lagged value of the same variable. We interpret this as a time-effect phenomenon. Investors may regard high values of the contemporaneous share of world wealth indicator as a licence to charge sub-optimal spreads while they are more enticed to regard its value from the previous year as a warranty of reputation, allowing cheaper loans.

We could not analyse the effects of the corruption index in the panel regression because the index itself uniquely identifies each developing country. But in the non-panel version of this regression with robust standard errors shown in Table 9 of Appendix 8, this variable is negatively associated with developing country bond and loan pricing – the lower the level of corruption, reflected by higher values of the corruption index, the lower the price – confirming that for the purposes of determining the pricing of foreign funds, investors are sensitive to the quality of the business climate and the presence of corruption in developing countries and penalise those countries' borrowers where there is a relatively high level of perceived corruption by charging them relatively higher spreads.

A greater number of macro-economic variables influence developing country loan pricing than bond pricing, again confirming that developing country bonds may be considered by investors as an asset class in themselves, with less sensitivity to the macro-economic conditions prevailing in the borrowers' country. Other coefficients have the expected signs, favourable macro-economic indicators (favourable current account position, high ratio of investment to GNP, of domestic credit to GDP) are generally associated with lower spreads and unfavourable indicators (high ratio of debt service to exports, of government debt or deficit to GDP; assistance from the IMF) with higher spreads.

The significant and positive bond dummy in the regression where bonds and loans are pooled together (see Appendix 7) shows that spreads tend to be higher on emerging market bonds than on loans, confirming, on average, the riskier nature of the former as compared to the latter. This finding is in accordance with Sachs and Cohen (1982), Eichengreen and Mody (1997, 1998, 2000) and Kamin and von Kleist (1999) and of course also with our figures shown in section 2.

The tests of the panel regression also indicate that loan spreads differ among countries: country effects are significant in determining the pricing of developing country bonds and loans (The F-test makes us strongly reject the hypothesis that there are no country effects).

Table 3: Loan and bond pricing regressions for developing countries

We estimated the following fixed effects panel regression, considering each borrower country as a group:

$$\ln(\text{spread}) = \beta_0\,\text{Intercept} + \beta_1\,\text{maturity} + \beta_2\,\text{ln\_size} + \beta_3\,\text{nbrov} + \beta_4\,\text{g\_explic} + \beta_5\,\text{g\_implic} + \beta_6\,\text{secured} + \beta_7\,\text{increase} + \beta_8\,\text{constrpt} + \beta_9\,\text{tradind} + \beta_{10}\,\text{finservb} + \beta_{11}\,\text{finservn} + \beta_{12}\,\text{high-tech} + \beta_{13}\,\text{infrastr} + \beta_{14}\,\text{popserv} + \beta_{15}\,\text{state} + \beta_{16}\,\text{transpor} + \beta_{17}\,\text{debtgdp} + \beta_{18}\,\text{debtgdp}_{-1} + \beta_{19}\,\text{brent} + \beta_{20}\,\text{brent}_{-1} + \beta_{21}\,\text{treas} + \beta_{22}\,\text{treas}_{-1} + \beta_{23}\,\text{pppsh} + \beta_{24}\,\text{pppsh}_{-1} + \beta_{25}\,\text{growth} + \beta_{26}\,\text{growth}_{-1} + \beta_{27}\,\text{wrgdp} + \beta_{28}\,\text{wrgdp}_{-1} + \beta_{29}\,\text{trade} + \beta_{30}\,\text{trade}_{-1} + \beta_{31}\,\text{cty\_shar} + \beta_{32}\,\text{cty\_shar}_{-1} + \beta_{33}\,\text{bus\_shar} + \beta_{34}\,\text{bus\_shar}_{-1} + \beta_{35}\,\text{restodeb} + \beta_{36}\,\text{restodeb}_{-1} + \beta_{37}\,\text{gra} + \beta_{38}\,\text{defiGDP} + \beta_{39}\,\text{defiGDP}_{-1} + \beta_{40}\,\text{curacGDP} + \beta_{41}\,\text{curacGDP}_{-1} + \beta_{42}\,\text{invGNP} + \beta_{43}\,\text{invGNP}_{-1} + \beta_{44}\,\text{tdstoxgs} + \beta_{45}\,\text{tdstoxgs}_{-1} + \beta_{46}\,\text{iegdp} + \beta_{47}\,\text{iegdp}_{-1} + \beta_{48}\,\text{credgdp} + \beta_{49}\,\text{credgdp}_{-1} + \beta_{50}\,\text{corrupt} + \beta_{51}\,\text{usd} + \beta_{52}\,\text{jpy} + \beta_{53}\,\text{eur} + \varepsilon$$

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where:

- ln(spread) = natural logarithm of spread (over LIBOR for loans, over benchmark security for bonds)
- maturity = maturity of loan or bond, in years
- ln_size = natural logarithm of loan or bond issue size, in millions of US dollars
- nbprov = number of provider banks (for loans), or arranger banks (for bonds)
- g_explic, g_implic = dummies for explicitly, resp. implicitly guaranteed instrument (implicit guarantee in the sense for instance that borrower or issuer is the subsidiary of another concern)
- secured = dummy for secured instrument
- increase = dummy to indicate that the original amount of the bond or the loan has been increased
- constrpt, tradind, finservb, finservn, high-tech, infrastr, popserv, state, transpor = sectoral dummies for construction and property, traditional industry, financial services (banks), financial services (non-banks), high-tech industry, infrastructure, population-related services, state, transport. Note that the dummy for the utilities sectors was excluded from the equation as the case by default as its inclusion would have overspecified the model. For the full list of base sectors included in each category, see Appendix 3.
- debtgdp = ratio of debt to GDP for country of the borrower/issuer, for year concerned (end-year), $_{-1}$ for previous year
- brent = price of one barrel of Brent crude oil at time of signing (in US$), $_{-1}$ one year before
- treas = yield on the three-month US Treasury Bill, for month concerned, $_{-1}$ one year before
- pppsh = purchasing power parity share of world GDP of the borrower's/issuer's country for year concerned (end-year), $_{-1}$ for previous year
- growth = real GDP growth in borrower's/issuer's country, for year concerned, $_{-1}$ for previous year
- wrgdp = growth in world GDP for year concerned, $_{-1}$ for previous year
- trade = growth in world trade for year concerned, $_{-1}$ for previous year
- cty_shar = share of the borrower's (issuer's) country in world syndicated lending (bond issuance) for year concerned, $_{-1}$ for previous year
- bus_shar = share of the borrower's (issuer's) business sector in world syndicated lending (bond issuance), for year concerned, $_{-1}$ for previous year
- restodeb = ratio of external reserves to debt in borrower's/issuer's country for year concerned (end-year), $_{-1}$ for previous year
- gra = dummy for assistance received by the country of the borrower/issuer from the IMF – use of Fund credit by operating the General Resources Account (GRA) – during the year concerned
- defiGDP = ratio of government deficit to GDP in borrower's/issuer's country for year concerned (end-year), $_{-1}$ for previous year
- curacGDP = ratio of current account to GDP in borrower's/issuer's country for year concerned (end-year), $_{-1}$ for previous year
- invGNP = ratio of investment to GNP in borrower's/issuer's country for year concerned, $_{-1}$ for previous year
- tdstoxgs = ratio of debt service to exports of goods and services for country of the borrower/issuer, for year concerned, $_{-1}$ for previous year
- iegdp = ratio of imports plus exports over GDP for country of the borrower/issuer, for year concerned, $_{-1}$ for previous year
- credgdp = ratio of bank credit to GDP for country of the borrower or issuer, for year concerned, $_{-1}$ for previous year
- corrupt = corruption index of the country of the borrower/issuer (assigned by World Transparency)
- usd, jpy, eur = dummies for instrument denominated, respectively, in US dollars, Japanese yen and euro (or any of its 12 predecessor currencies)
- ε is a random disturbance

Table 3 (continued): Loan and bond pricing regression for developing country borrowers

Fixed effects panel regression, considering each borrower country as a group.

variable	Loan spreads		Bond spreads	
maturity	0.0253‡	(0.003)	0.0099‡	(0.002)
ln_size	-0.1029‡	(0.012)	-0.0001	(0.033)
nbprov	0.0025	(0.001)	-0.0088†	(0.004)
g_explic	-0.2824‡	(0.030)	-0.0165	(0.068)
g_implic	0.0086	(0.045)	-0.0648	(0.069)
secured	0.1958‡	(0.028)	-0.2536	(0.320)
increase	0.0227	(0.040)	-0.1126	(0.073)
constrpt	0.2036‡	(0.067)	0.0847	(0.173)
tradind	0.1355‡	(0.042)	-0.0242	(0.091)
finservb	-0.1382‡	(0.043)	0.0360	(0.530)
finservn	0.1888‡	(0.049)	-0.0581	(0.151)
high-tech	0.1665‡	(0.039)	0.1388	(0.107)
infrastr	0.4906†	(0.213)	0.2346	(0.463)
popserv	0.3492‡	(0.071)	0.0671	(0.131)
state	-0.0586	(0.063)	-0.1809	(0.125)
transpor	0.1190†	(0.053)	0.1349	(0.206)
debtgdp	0.0052†	(0.002)	0.0097	(0.012)
debtgdp$_{-1}$	-0.0035	(0.003)	-0.0152*	(0.008)
brent	-0.0086*	(0.004)	-0.0532‡	(0.014)
brent$_{-1}$	-0.0227‡	(0.004)	0.0179	(0.013)
treas	-0.0582	(0.037)	-0.1680	(0.127)
treas$_{-1}$	0.0052	(0.029)	-0.0030	(0.124)
pppsh	2.4651‡	(0.694)	-2.3399	(2.599)
pppsh$_{-1}$	-1.6127†	(0.672)	2.5049	(2.302)
growth	-0.0137	(0.011)	0.0434	(0.050)
growth$_{-1}$	0.0039	(0.004)	-0.0036	(0.036)
wrgdp	-0.2297‡	(0.081)	-0.1319	(0.346)
wrgdp$_{-1}$	-0.4112‡	(0.083)	0.3025	(0.338)
trade	0.0976‡	(0.018)	0.0371	(0.109)
trade$_{-1}$	0.0838‡	(0.019)	0.0119	(0.100)
cty_shar	0.2303*	(0.135)	0.0823	(0.230)
ctyshar$_{-1}$	0.2285*	(0.123)	-0.2702†	(0.112)
bus_shar	-0.0346*	(0.018)	-0.0215	(0.014)
busshar$_{-1}$	0.0049	(0.019)	0.0167	(0.014)
restodeb	0.0001	(0.000)	0.0036	(0.002)
resdeb$_{-1}$	0.0003	(0.000)	-0.0005	(0.000)
gra	0.0946*	(0.051)	0.5579‡	(0.177)
defiGDP	0.0155‡	(0.005)	-0.0078	(0.027)
defigdp$_{-1}$	0.0246‡	(0.009)	0.0377	(0.040)
curacGDP	-0.0144*	(0.007)	0.0453	(0.029)
curgdp$_{-1}$	-0.0237‡	(0.009)	0.0048	(0.030)
invGNP	-0.0612‡	(0.009)	-0.0248	(0.031)
invgnp$_{-1}$	-0.0315‡	(0.009)	0.0705	(0.046)

Table 3 (continued): Loan and bond pricing regression for developing country borrowers
Dependent variable: ln(spread)
Fixed effects panel regression, considering each borrower country as a group.

variable	Loan spreads		Bond spreads	
tdstoxgs	0.0039*	(0.002)	0.0105	(0.009)
$tdsxgs_{-1}$	-0.0010	(0.002)	-0.0064	(0.016)
iegdp	0.0001	(0.000)	-0.0001	(0.000)
$iegdp_{-1}$	0.0090‡	(0.002)	-0.0266†	(0.010)
credgdp	0.0000	(0.000)	-0.0000	(0.000)
$credgdp_{-1}$	-0.0000*	(0.000)	-0.0000†	(0.000)
usd	-0.2550‡	(0.095)	0.1727	(0.141)
jpy	-0.3141†	(0.126)	0.0081	(0.273)
eur	-0.1320	(0.107)	0.1942	(0.145)
intercept	7.0714‡	(0.443)	5.4644†	(2.709)

Note: standard errors in parentheses. Number of observations in loan spreads regression = 2,772, in bond spreads regression = 530. F-tests are significant at the 1% level.
*: significant at the 10% level; †: significant at the 5% level; ‡: significant at the 1% level.

5. Analysis of lending to industrialised countries

We now compare the above results with a similar regression analysis of a sample of 20,365 industrialised country syndicated loans and 5,086 bond issues. Our model and results are presented in Table 4 below. The descriptive statistics appear in Appendix 6. Again, the panel regression confirms that country effects are significant in the determination of the pricing of industrialised country loans and bonds.

5.1 Comparison of industrialised and developing country loans

We note several similarities in the pricing of industrialised and developing country loans. As for developing country loans, the coefficient on the maturity is significant and positive on industrialised country loans, meaning a premium is demanded by lenders for being exposed to a risk for a longer period of time. This is a verification, for industrialised country loans, of the results found in Kamin and von Kleist (1999). Moreover, in accordance with Kleimeier and Megginson (2000), we find a significantly negative relationship between loan size and spreads, although the coefficient is higher in absolute terms for industrialised loans than for developing country loans, suggesting

that banks in our sample could have more experience in monitoring industrialised country borrowers than developing country ones, deriving more economies of scale from that activity. Lastly, most sectoral dummies on industrialised country loans are significant and have the same signs as in the case of developing countries, with the absolute values of the coefficients on the construction and property, traditional industry, high-tech, population-related services and transport sectors higher in the case of industrialised countries.

Still, despite the above similarities, the pricing of industrialised and developing country loans appears to differ in several respects. First, the number of fund provider banks had no effect on the pricing of developing country loans; here we detect a significantly positive relationship, possibly because industrialised country loans requiring the presence of a high number of providers could represent more complex deals, on average, than comparable emerging market deals. Melnik and Plaut (1991) also detect a link between deal complexity and the number of managers. Second, for industrialised country loans, implicit and explicit guarantees can lower spreads; only explicit guarantees had this effect for developing countries, possibly because only they were considered binding enough. As in the case of developing countries, secured loans are more expensive than others, potentially because they are very risky[59]. Third, the dummy for increased deals – in the sense that the amount of a facility has been increased from its original amount – has a negative effect on industrialised country loan spreads, not on emerging ones, suggesting banks wield less market power and show more flexibility to adapt to changes in industrials borrowers' financing needs.

Regarding market structure, we find that contrary to developing countries, industrialised country borrowers with a high share of world syndicated borrowing are having to pay less for their loans relative to others. This could reflect pricing gains from the established presence of their countries on the loan market.

Contrary to developing countries, the corruption index did not turn up as a significant variable for loan pricing (see also the OLS version of the regression with robust

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[59] Berger and Udell (1990) also document that collateral typically is associated with riskier loans.

standard errors in Appendix 8, Table 10): lenders do not seem concerned about this issue in industrialised countries or consider at least that a legal framework exists for enforcing loan contracts.

The negative coefficient on the ratio of government deficit to GDP is worth noting in the industrialised country loan pricing regression. Investors seem to trust that when the government of an industrialised country stimulates demand and economic activity through higher budget deficits, then this is beneficial for the fortunes of the borrowers that operate to meet the extra demand. This translates into cheaper loans for such borrowers. We find an opposite effect for developing countries: borrowers of countries with higher government deficits face higher loan prices, possibly because investors do not trust the ability of the governments concerned to stimulate economic activity through higher deficits. For instance, in undemocratic or corrupt regimes, members of the government can be seen to embezzle the extra government expense for their own personal benefit, or to spend the money on "white elephants".

We find a negative relationship between the primary market pricing of industrialised country loans (and bonds) and the risk-free interest rate: like Kamin and von Kleist (1999) we failed to detect such a relationship in the case of developing countries.

5.2 Comparison of industrialised and developing country bonds

We note a number of differences between pricing mechanisms for industrialised and developing country bonds.

To begin with, the negative and significant effect of the number of arranger banks on bond pricing is more than twice as high for industrialized country issues as for developing ones, suggesting there may be more competition between banks arranging the former, while a smaller number of banks may specialising in arranging issues for the latter.

Regarding the micro-economic factors that influence bond prices, secured industrialised issues are relatively cheaper than others; securing developing country bonds or loans

had either no effect or a positive effect on pricing. The significant and positive coefficient on the presence of implicit guarantees is surprising in the case of industrialised country bonds, but again not incompatible with Smith and Warner (1979). Issuer sectors seem to be taken into account more for industrial country bonds than for developing country ones, suggesting that investors consider the former as an asset class in itself to the a lesser extent than developing country bonds.

As far as macro-economic factors are concerned, world economic growth, world trade and the share of trade in the GDP of the country of the issuer significantly affect the pricing of industrialised country bonds, which was not the case for developing country bonds, suggesting that the financing of trade in industrialised countries tends to rely both on loans and bonds while it tends to rely more exclusively on loans in the case of developing countries.

Regarding currency effects, we note that contrary to developing country bond issues denominated in euro, industrialised country issues denominated in euro are relatively cheaper than others, suggesting the liquidity of euro-denominated bond markets catering for industrialised country issues may be higher than for developing country issues[60]. The significant coefficients for issues denominated in yen and US dollar (respectively negative and positive) can be accounted for by benchmark or cheap funding effects in the case of bonds.

Finally, as in the case of industrialised country loans and contrary to developing country bonds and loans, the corruption index did not turn up as a significant explanatory variable of spreads in the case of industrialised country bonds[61]. It is interesting to relate this result to Bilson, Brailsford and Hooper (2002) who present evidence that political risk is important in explaining stock return variation in individual emerging markets, but not in developed markets.

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[60] According to the Dealogic database, developing country bond issuance in euro represented less than half of developing country bond issuance in US dollars during the 1993-2001 period.

[61] This can be seen in the OLS version of the industrialised country bond regression with robust standard errors presented in Table 10 of Appendix 8. Again, the corruption index was dropped from the panel regression for industrialised country bonds because it uniquely identified every country.

5.3 Analysis of the pooled loans and bonds sample

The significant and negative bond dummy in the regression where industrialised country bonds and loans are pooled (see Appendix 7) shows that spreads tend to be lower for industrialised country bonds than on loans, confirming, on average, the riskier nature of the latter as compared to the former. This result is in contrast with our findings about developing countries, but consistent with the view (Diamond, 1991; Bolton and Freixas, 2000) that riskier or "start-up" borrowers require monitoring and will use bank lending as a source of finance until they establish a credible repayment history and are able to issue securities in their name. Furthermore, this finding is also in accordance with the empirical results of Melnik and Plaut (1991). The comparison with developing countries confirms that, on average during the 1990s, developing country borrowers have been issuing "junk"-quality bonds, i.e. bonds where risk premia are higher than developing country loans, while industrialised country borrowers have predominantly been occupying the higher-quality end of the bond market, where spreads are lower than on loans.

Table 4: Loan and bond pricing regressions for industrialised countries

We estimated the following fixed effects panel regression, considering each borrower country as a group:

ln(spread) = β_0 **Intercept** + β_1 **maturity** + β_2 **ln_size** + β_3 **nbrov** + β_4 **g_explic** + β_5 **g_implic** + β_6 **secured** + β_7 **increase** + β_8 **constrpt** + β_9 **tradind** + β_{10} **finservb** + β_{11} **finservn** + β_{12} **high-tech** + β_{13} **infrastr** + β_{14} **popserv** + β_{15} **state** + β_{16} **transpor** + β_{17} **debtgdp** + β_{18} **debtgdp$_{-1}$** + β_{19} **brent** + β_{20} **brent$_{-1}$** + β_{21} **treas** + β_{22} **treas$_{-1}$** + β_{23} **pppsh** + β_{24} **pppsh$_{-1}$** + β_{25} **growth** + β_{26} **growth$_{-1}$** + β_{27} **wrgdp** + β_{28} **wrgdp$_{-1}$** + β_{29} **trade** + β_{30} **trade$_{-1}$** + β_{31} **cty_shar**+ β_{32} **cty_shar$_{-1}$** + β_{33} **bus_shar** + β_{34} **bus_shar$_{-1}$** + β_{35} **restodeb** + β_{36} **restodeb$_{-1}$** + β_{37} **defiGDP** + β_{38} **defiGDP$_{-1}$** + β_{39} **curacGDP** + β_{40} **curacGDP$_{-1}$** + β_{41} **invGNP** + β_{42} **invGNP$_{-1}$** + β_{43} **iegdp** + β_{44} **iegdp$_{-1}$** + β_{45} **credgdp** + β_{46} **credgdp$_{-1}$** + β_{47} **corrupt** + β_{48} **usd** + β_{49} **jpy** + β_{50} **eur** + ε

where:

- ln(spread) = natural logarithm of spread (over LIBOR for loans, over benchmark security for bonds)
- maturity = maturity of loan or bond, in years
- ln_size = natural logarithm of loan or bond issue size, in millions of US dollars
- nbprov = number of provider banks (for loans), or arranger banks (for bonds)
- g_explic, g_implic = dummies for explicitly, resp. implicitly guaranteed instrument (implicit guarantee in the sense for instance that borrower or issuer is the subsidiary of another concern)
- secured = dummy for secured instrument
- increase = dummy to indicate that the original amount of the bond or the loan has been increased
- constrpt, tradind, finservb, finservn, high-tech, infrastr, popserv, state, transpor = sectoral dummies for construction and property, traditional industry, financial services (banks), financial services (non-banks), high-tech industry, infrastructure, population-related services, state, transport. Note that the dummy for the utilities sectors was excluded from the equation as its inclusion would have overspecified the model. For the full list of base sectors included in each category, see Appendix 3.
- debtgdp = ratio of debt to GDP for country of the borrower/issuer, for year concerned (end-year), $_{-1}$ for previous year
- brent = price of one barrel of Brent crude oil at time of signing (in US$), $_{-1}$ one year before
- treas = yield on the three-month US Treasury Bill, for month concerned, $_{-1}$ one year before
- pppsh = purchasing power parity share of world GDP of the borrower's/issuer's country for year concerned (end-year), $_{-1}$ for previous year
- growth = real GDP growth in borrower's/issuer's country, for year concerned, $_{-1}$ for previous year
- wrgdp = growth in world GDP (for year concerned), $_{-1}$ for previous year
- trade = growth in world trade (for year concerned), $_{-1}$ for previous year
- cty_shar = share of the borrower's (issuer's) country in world syndicated lending (bond issuance) for year concerned, $_{-1}$ for previous year
- bus_shar = share of the borrower's (issuer's) business sector in world syndicated lending (bond issuance), for year concerned, $_{-1}$ for previous year
- restodeb = ratio of external reserves to debt in borrower's/issuer's country for year concerned (end-year), $_{-1}$ for previous year
- defiGDP, defiGDP = ratio of government deficit to GDP in borrower's/issuer's country for year concerned (end-year), $_{-1}$ for previous year
- curacGDP = ratio of current account to GDP in borrower's/issuer's country for year concerned (end-year), $_{-1}$ for previous year
- invGNP = ratio of investment to GNP in borrower's/issuer's country for year concerned, $_{-1}$ for previous year
- iegdp = ratio of imports plus exports over GDP for country of the borrower/issuer, for year concerned, $_{-1}$ for previous year
- credgdp = ratio of bank credit to GDP for country of the borrower or issuer, for year concerned, $_{-1}$ for previous year
- corrupt = corruption index of the country of the borrower/issuer (assigned by World Transparency)
- usd, jpy, eur = dummies for instrument denominated, respectively, in US dollars, Japanese yen and euro (or any of its 12 predecessor currencies)
- ε is a random disturbance

Table 4 (continued): Loan and bond pricing regression for industrialised country borrowers

Fixed effects panel regression, considering each borrower country as a group.

variable	Loan spreads		Bond spreads	
maturity	0.0696‡	(0.001)	0.0274‡	(0.001)
ln_size	-0.2461‡	(0.004)	-0.1019‡	(0.012)
nbprov	0.0013†	(0.000)	-0.0209‡	(0.001)
g_explic	-0.0578†	(0.025)	-0.0213	(0.031)
g_implic	-0.0931‡	(0.028)	0.2246‡	(0.028)
secured	0.4116‡	(0.011)	-0.2026‡	(0.063)
increase	-0.1390‡	(0.040)	0.1708‡	(0.056)
constrpt	0.4681‡	(0.027)	0.2776†	(0.115)
tradind	0.3197‡	(0.022)	0.2481‡	(0.077)
finservb	-0.1322‡	(0.033)	-0.0050	(0.133)
finservn	0.0593†	(0.025)	-0.1838†	(0.072)
high-tech	0.2857‡	(0.022)	0.5504‡	(0.078)
infrastr	0.2860‡	(0.058)	-0.0502	(0.233)
popserv	0.4432‡	(0.023)	0.4473‡	(0.096)
state	-0.6109‡	(0.090)	-0.3101‡	(0.075)
transpor	0.2345‡	(0.033)	0.0423	(0.104)
debtgdp	-0.0068	(0.007)	0.0058	(0.006)
$debtgdp_{-1}$	0.0174†	(0.006)	-0.0001	(0.006)
brent	0.0009	(0.001)	-0.0199‡	(0.005)
$brent_{-1}$	-0.0042†	(0.002)	0.0117†	(0.005)
treas	-0.0368‡	(0.014)	-0.1112‡	(0.029)
$treas_{-1}$	-0.0268	(0.018)	-0.1654‡	(0.043)
pppsh	0.2381	(0.161)	0.1419	(0.183)
$pppsh_{-1}$	-0.2890	(0.219)	-0.0413	(0.205)
growth	0.0062	(0.017)	-0.0093	(0.022)
$growth_{-1}$	-0.0097	(0.016)	-0.1255‡	(0.023)
wrgdp	-0.1670‡	(0.047)	-0.2139†	(0.088)
$wrgdp_{-1}$	-0.2175‡	(0.051)	-0.1576	(0.097)
trade	0.0380‡	(0.010)	0.0542†	(0.026)
$trade_{-1}$	0.0315‡	(0.010)	0.1604‡	(0.020)
cty_shar	-0.0282†	(0.011)	0.0024	(0.005)
cty_shar_{-1}	-0.0164‡	(0.005)	0.0110†	(0.005)
bus_shar	0.0136	(0.008)	0.0025	(0.004)
bus_shar_{-1}	-0.0114	(0.009)	-0.0080	(0.005)
restodeb	-0.0126	(0.008)	-0.0000	(0.011)
$restodeb_{-1}$	0.0093	(0.007)	0.0177*	(0.010)
defiGDP	-0.0423‡	(0.014)	0.0007	(0.022)
$defiGDP_{-1}$	-0.0251*	(0.012)	-0.0307*	(0.016)
curacGDP	-0.0035	(0.012)	-0.0254	(0.019)
$curacGDP_{-1}$	0.0034	(0.013)	-0.0331	(0.023)
invGNP	-0.0677‡	(0.022)	-0.0593*	(0.031)
$invGNP_{-1}$	0.1154‡	(0.024)	0.1122‡	(0.033)

Table 4 (continued): Loan and bond pricing regression for industrialised country borrowers
Dependent variable: ln(spread)
Fixed effects panel regression, considering each borrower country as a group.

variable	Loan spreads		Bond spreads	
iegdp	0.0207‡	(0.004)	0.0057	(0.006)
$iegdp_{-1}$	-0.0111†	(0.004)	0.0126†	(0.006)
credgdp	0.0105‡	(0.002)	-0.0179‡	(0.003)
$credgdp_{-1}$	-0.0011	(0.000)	0.0063*	(0.003)
corrupt	-0.0107	(0.010)		
usd	0.0740†	(0.030)	0.1935‡	(0.035)
jpy	0.0061	(0.141)	-0.9792‡	(0.101)
eur	-0.0229	(0.045)	-0.1743‡	(0.036)
intercept	6.7548†	(2.644)	3.2922†	(1.666)

Note: standard errors in parentheses. Number of observations in loan spreads regression = 20,365, in bond spreads regression = 5,086. F-tests are significant at the 1% level.
*: significant at the 10% level; †: significant at the 5% level; ‡: significant at the 1% level.

6. Analysis of contagion effects

In order to determine statistically if contagion could have affected industrialised country borrowers in the aftermath of financial crises in developing countries, that is to say whether industrialised borrowers' terms of access to the primary market worsened following the crisis, we created a dummy variable in our industrialised country bond and loan sample taking the value of 1 in the possible instances of contagion identified during the visual inspection in Section 2. In other words we assigned the value of 1 to the dummy during years when industrialised country bond and/or loan spreads had peaked or maturities had bottomed out simultaneously with developing country bonds or loans. The facilities concerned were:

- Japanese and US loans signed in 1999; (peaking of spreads during the Russian, Turkish and Latin American crises, see Figure 2);
- Japanese bonds issued in 1999 (peaking of spreads and maturity trough, see Figures 7 and 8);

- Japanese loans signed in 1998 (sharp reduction of maturities during the Asian crisis[62], see Figure 3);
- US bonds issued in 1998 (maturity trough, see Figure 8).

We then re-ran the industrialised country loan and bond pricing panel regressions incorporating this extra dummy variable on the right-hand side. We found the contagion dummy to be strongly significant and positive in case of loans and insignificant in case of bonds (see Appendix 9). This confirms the results of our visual analysis in Section 2 where we had highlighted that the contagion phenomenon from developing to industrialised countries had appeared to have occurred to a lesser extent in the case of bonds than of loans. Another explanation is that contagion on the bond markets (especially affecting the low-quality end of the market for industrialised country bonds) is more likely to have taken place in the secondary markets. The secondary market for loans is still much less developed than the one for bonds.

7. Conclusion

While the academic literature suggests that it may be appropriate to apply the same model to analyse the pricing of bonds and loans, we have found differences in the way the two instruments react to price determinants. Furthermore, there are differences in the pricing of developing and industrialised country instruments. Based on the research described in this paper, we can draw the following conclusions.

Firstly, in the 1990s, investors may have considered developing country bonds as an asset class in themselves, with less sensitivity of the pricing of such bonds to macro-economic conditions and borrower business sector than developing country loans or industrialised country bonds issued during the same period. We verify that on average, developing country bonds have been riskier than developing country loans and industrialised country loans riskier than industrialised country bonds. This could be

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[62] Korea, Malaysia, Thailand.

evidence of the fact that for the period under study, some industrialised country borrowers have been able to access the good quality compartment of the bond market where no financial intermediation or monitoring by banks is needed, while, on average, developing country borrowers have been able to issue junk bonds (i.e., bonds that are riskier than loans).

Secondly, the corruption index in the borrower's country is significantly related to bond and loan pricing in developing countries, but not in industrialised countries, possibly mirroring the fact that in the latter, investors consider that the legal and regulatory infrastructure is sufficient to enforce financial contracts. This result can be related to Bilson, Brailsford and Hooper (2002) who present proof that political risk is important in explaining stock return variation in individual emerging markets, particularly in the Pacific Basin, but not in developed markets. Our paper helps partially answer the research issue raised by the aforementioned authors by presenting evidence that there is some political risk exposure in emerging markets that is different to any exposure in developed markets, and this has implications for asset pricing and portfolio decisions in these markets.

Thirdly, like Kamin and von Kleist (1999) we fail to detect a significant relationship for the period under study between the primary market pricing of developing country bonds and loans and industrialised country interest rates. As noted by Kamin and von Kleist, the implication for policymakers is that an upturn in industrialised country interest rates may lead to a smaller than expected upturn in developing country spreads. However, we find a negative relationship between industrialised country interest rates and spreads on loans and bonds granted to industrialised country borrowers, which could reflect poorer credits dropping out of the market during a period of high interest rates.

We also studied the structure of industrialised and developing country loan and bond markets during the 1990s. As far as the currency composition of these markets is concerned, we found that industrialised country bonds and developing country loans denominated in Japanese yen are relatively cheaper than others, possibly because of low interest rates in the Japanese economy (constituting low funding costs for investors based in Japanese yen). We also found industrialised country bonds denominated in

euro or its predecessor currencies relatively cheaper than others, which could reflect the higher liquidity of that market segment. We failed to detect a similar effect for developing country bonds denominated in euro, possibly suggesting relatively lower liquidity in that market segment.

Five years after the Asian crisis, bond issuance by developing countries, particularly large corporations, is starting to pick up. As *the Economist* notes (6 July 2002, page 71): "The future will probably involve a continued shift away from bank borrowing by big companies [from emerging markets]. Having been burned once, the healthy ones have been raising capital in the equity and, even more eagerly, in the bond markets." The liquidity of markets for developing country bonds deserves policymakers' attention all the more because this research also provides evidence of the still relatively low reliance of developing countries on bonds – at the expense of loans – to finance their participation in world trade. Furthermore we detect potentially less than optimal pricing behaviour on banks' behalf when lending to developing country borrowers. This is shown by the positive coefficient in our loan pricing regressions on the share of the country concerned in world syndicated lending and by the absence of a positive reaction from the market in case of loan deals whose amount has been increased from the original facility amount. Finally, this research highlights the lower occurrence of contagion in financial markets from developing to industrialised country borrowers in the case of bonds than in the case of loans.

Literature cited

Allen, T., 1990: Developments in the international syndicated loan market in the 1980s, Bank of England Quarterly Bulletin, February.

Angbazo, L. A., J. Mei and A. Saunders, 1998: Credit spreads in the market for highly leveraged transaction loans, Journal of Banking and Finance, 22(10-11), pp. 1249-1282.

Balassa, B., 1986: Policy Responses to Exogenous Shocks in Developing Countries, The American Economic Review, Volume 76, Issue 2, Papers and Proceedings of the Ninety-Eighth Annual Meeting of the American Economic Association, May

Baltagi, B.H., J.M. Griffin and W. Xiong, 2000: To pool or not to pool: homogeneous versus heterogeneous estimators applied to cigarette demand, The Review of Economics and Statisitics, February, 82(1), 117-126

Berger, A. and G. Udell, 1990: Collateral, loan quality and bank risk, Journal of Monetary Economics 25, 21-42.

Berlin, M. and J. Loeys, 1988: Bond covenants and delegated monitoring, Journal of Finance 43, 397-412

Berlin, M. and L. Mester, 1992: Debt covenants and renegotiation, Journal of Financial Intermediation 2, 19-133

Besanko, D. and A. Thakor, 1987: Collateral and Rationing: Sorting equilibrium in monopolistic and competitive credit markets, International Economic Review, 671-689

Bester, H., 1985: Screening vs. rationing in credit markets with imperfect information, American Economic Review 75, 850-855

Bilson, C.M., J. Brailsford and V.C. Hooper, 2002: The explanatory power of political risk in emerging markets, International Review of Financial Analysis 11, 1-27

Bolton, P. and X. Freixas, 2000, Equity, Bonds and Bank Debt: Capital Structure and Financial Market Equilibrium Under Asymmetric Information, The Journal of Political Economy, Volume 108, Issue 2, April, 324-351

Cantor, R. and F. Packer, 1996, Determinants and Impact of Sovereign Credit Ratings, Federal Reserve Bank of New York Economic Policy Review (September)

Carey, M., S. Prowse, J. Rea, G. Udell, 1993: The economics of private placements: A new look, Financial Markets Institutions Instruments 2, 1-67

Chowdhry, B. and A. Goyal, 2000: Understanding the financial crisis in Asia, Pacific-Basin Finance Journal 8, 135-152

Cline, W. R. and K. J. S. Barnes, 1997, Spreads and Risk in Emerging Markets Lending, Institute of International Finance, IIF Research Papers No. 97-1.

Coffey, M., 2000: The US leveraged loan market: from relationship to return, in Syndicated Lending, Practice and Documentation, edited by Tony Rhodes, Euromoney books

Diamond, D., 1984: Financial intermediation and delegated monitoring. Review of Economic Studies 51, 393-414

Diamond, D., 1991: Monitoring and reputation: The choice between bank loans and directly placed debt, Journal of Political Economy 99:688-721

Eaton, J. and M. Gersovitz, 1981: Debt with potential repudiation: Theoretical and empirical analysis, Review of Economic Studies 48, April, 208-309.

Edwards, S., 1983: LDC foreign borrowing and default risk: an empirical investigation, NBER working paper no. 1172, July.

Edwards, S., 1986: The pricing of bonds and bank loans in international markets, European Economic Review 30, 565-589.

Eichengreen, B. and A. Mody, 1997: What Explains Changing Spreads on Emerging-Market Debt: Fundamentals or Market Sentiment? *Mimeo*, International Monetary Fund.

Eichengreen, B. and A. Mody, 1998: Interest Rates in the North and Capital Flows to the South: Is there a missing link? Journal of International Finance, Volume 1 Issue 1 Page 35, October

Eichengreen, B. and A. Mody, 2000: Lending booms, reserves and the sustainability of short-term debt: inferences from the pricing of syndicated bank loans, Journal of Development Economics, Vol. 63, pp. 5-44.

Feder, G. and R.E. Just, 1977: An analysis of credit terms in the Eurodollar market, European Economic Review 9, May, 221-243.

Folkerts-Landau, D.F.I., 1985: The changing role of international bank lending in development finance, IMF Staff Papers, June

Fons, J. S., 1994: Using Default Rates to Model the Term Structure of Credit Risk, Financial Analysts Journal, Vol 50, pp 25-32.

Freixas, X. and J.C. Rochet, 1997: The Microeconomics of Banking, MIT Press

Frenkel, J., 1983: International liquidity and monetary control in: G. von Furstenberg, ed., International money and credit: The policy roles (IMF, Washington, DC).

Gersovitz, M., 1985: Banks' international lending decisions: What we know and implications for future research, in: G.W. Smith and J.T. Cuddington, eds., International debt and the developing countries (World Bank, Washington, DC).

Hale, G. 2001: Bonds or Loans? On the Choice of International Debt Instrument by Emerging Market Borrowers, UC Berkeley, unpublished manuscript.

Hanson, J.A., 1974: Optimal international borrowing and lending, American Economic Review 64, Sept. 616-630.

Harberger, A.C., 1980: Vignettes on the world capital market, American Economic Review Papers and Proceedings 70, 616-630.

Hernandez, L. and H. Rudolph, 1995: Sustainability of private capital flows to developing countries – is a generalised reversal likely?, World Bank Policy Research Working Paper, no 1518.

Kamin, S.B. and K. von Kleist, 1999: The evolution and determinants of emerging market credit spreads in the 1990s, BIS Working Papers, No. 68, May.

Kleimeier, S. and W. Megginson, 2000: Are project finance loans different from other syndicated credits?, Journal of Applied Corporate Finance, Vol. 13, Part 1, pp. 75-87

McKinnon, R. I., 1984: The international capital market and economic liberalisation in LDCs, the Developing Economies 22, December, 476-481

Melnik, A.L. and S.E. Plaut, 1991: The Short-Term Eurocredit Market, Monograph Series in Finance and Economics, Monograph 1991-1, Stern School of Business, New York University

Myers, S.C., 1984: The capital structure puzzle. Journal of Finance 39, 575–592.

Myers, S.C. and N. Majluf, 1984: Corporate financing and investment decisions when firms have information investors do not have. Journal of Financial Economics 13, 187–221.

Rajan, R. and A. Winton, 1995: Covenants and collateral as incentives to monitor, Journal of Finance 50, 1113-1146

Rhodes, T., 2000, Syndicated Lending, Practice and Documentation, Euromoney Books, ISBN 1 85564 799 0

Sachs, J.D., 1981: The current account and macroeconomic adjustment in the 1970s, Brookings Papers on Economic Activity 1, 201-268.

Sachs, J.D., 1984: Theoretical issues in international borrowing, Princeton Studies in International Finance no. 54, July.

Sachs, J.D. and D. Cohen, 1982: LDC borrowing with default risk, National Bureau of Economic Research working paper no. 925, July.

Smith, C.W. and J. Warner, 1979: On financial contracting: An analysis of bond covenants, Journal of Financial Economics 7, 111-161.

Smith, C.W., 1980: On the theory of financial contracting: The personal loan market, Journal of Monetary Economics 6, 333-357.

Vine, A., 2001: High-Yield Analysis of Emerging Markets Debt, *in* The Handbook of Fixed Income Securities, edited by F. Fabozzi, Sixth Edition, McGraw-Hill

Appendix 1: The literature about the pricing and availability of external funds

Summary of findings on the effects of borrowers' macro-economic characteristics on the pricing of developing country loans and bonds – by variable

Variable	Effect on spread	Literature references
External debt Debt to output ratio Debt to export ratio (solvency)	+	Hanson (1974), Harberger (1980), Sachs (1984), Eaton and Gersovitz (1981), Edwards (1983), Cantor and Packer (1996), Cline and Barnes (1997)
Current account to GNP ratio (solvency)	–	Sachs (1981)
Current account deficit to exports	+	Cline and Barnes (1997)
Debt service to exports (liquidity)	+	Feder and Just, (1977), Eichengreen and Mody (2000)
Ratio of international reserves to GNP (liquidity)	–	Edwards (1983)
Ratio of international reserves to GNP (liquidity)	+	Gersovitz (1985) [willingness-to-pay]
Reserves to imports	–	Cline and Barnes (1997)
History of rescheduling or default	+	Cantor and Packer (1996), Eichengreen and Mody (1997, 1998, 2000)
Absence of Brady debt forgiveness	–	Cline and Barnes (1997)
Dummy for industrialised country borrower (vs. developing country)	–	Cline and Barnes (1997)
Investment to GNP ratio	–	Sachs (1984), Edwards (1983)
Investment to GNP ratio	+	Gersovitz (1985) [willingness-to-pay]
Imports to GNP ratio	+	Frenkel (1983)
Rate of growth per capita Per capita income	– –	Feder and Just (1977) Cantor and Packer (1996)
Economic growth	–	Eichengreen and Mody (1997, 1998, 2000)
Variance of export growth	+	Eichengreen and Mody (1997, 1998, 2000)
Bank credit/GNP	–	Eichengreen and Mody (2000)
(Bank credit/GDP)*(Economic growth rate), [(Bank credit/GDP)*(Economic growth rate)]^2	+	Eichengreen and Mody (2000)
High inflation	+	Cline and Barnes (1997)
Good sovereign rating	–	Cantor and Packer – for sovereign spreads (1996), Kamin and von Kleist – for sovereign and non-sovereign spreads (1999)

Appendix 1 (continued): The literature about the pricing and availability of external funds

Summary of findings on the effects of borrowers' micro-economic characteristics on the pricing of loans and bonds – by variable

Variable	Effect on spread	Remarks/reference
Financial institutions	–	Financial institutions seem able to obtain syndicated credit facilities at lower spreads than borrower from other sectors, Eichengreen and Mody (2000)
Firm riskiness	+	Measured by variance of firm assets, Smith (1980)
Firm value	–	Smith (1980)
Infrastructure projects	+	Loans to fund infrastructure projects tend to have higher spreads than loans with other purposes, Eichengreen and Mody (2000)
Acquisition facility	+	Borrower is prepared to pay a premium if facility is urgently needed for an acquisition.
Facility's maturity	+/–	Negative effect for project finance loans, positive for other loans, Kleimeier and Megginson (2000). Positive effect on bond spreads, Kamin and von Kleist (1999). Ambiguous effect on spread, Smith (1980). Negative effect on bond spreads (Fons, 1994) – survival bias?
Revolving facility	+	Because of higher take-down risk, Angbazo, Mei and Saunders (1998).
Loan size	+/–	Negative effect on spreads according to Kleimeier and Megginson (2000) – except for project finance loans – positive effect according to Smith (1980), because of higher resulting bank exposure. Negative effect on bond spreads according to Eichengreen and Mody (1997 and 1998): economies of scale in the distribution of large issues and liquidity of the secondary market
Third party guarantee	–	Kleimeier and Megginson (2000)
Collateralisable assets	+/–	Depending on type of loan, Kleimeier and Megginson (2000)
Collateral	–	Smith (1980), Bester (1985), Besanko and Thakor (1987)
Collateral	+	Smith and Warner (1979), Berger and Udell (1990)
Dummy for private placement	+	Eichengreen and Mody (1997 and 1998): investors demand higher spreads to purchase a bond issued by a borrower about whom less is known.
Bond dummy (= 1 when borrowing instrument is a bond rather than a loan)	+	Kamin and von Kleist (1999)
Dummy for non-dollar issue (as opposed to issue in dollars)	–	Kamin and von Kleist (1999), due to the fact that non-dollar currency benchmark yields have been lower than US Treasury yields. In Eichengreen and Mody (2000), loan facilities denominated in yen and deutsche marks are found to be relatively cheaper than others.

Appendix 2: The literature comparing the pricing and availability of loans and bonds

Authors	Definition of pricing	Methodology and data	Main results
Edwards (1986)	Depending on the currency of denomination of each bond, the spread is defined as the difference between their yields and the yield on the long-term US, German, Swiss or Japanese government bonds. The spread over LIBOR is taken for loans.	OLS pricing regression on 113 developing country bank loans and 167 bonds (1976-80)	Both on loan and bond markets, the country risk premium is a positive function of the debt to output ratio and a negative function of the investment to GNP ratio. Some of the coefficients are significantly different across bond and loan markets.
Melnik and Plaut (1991)	Mark-up over LIBOR	201 syndicated Euroloans and 129 Note Issuance Facilities (NIFs) originated in 1986 and 1987 • Logit regression to examine the various explanatory factors affecting the choice of a particular form of contract (NIFs vs. loans) by borrowers • OLS regression of Log[1 + Number of Regular Managers / Number of Lead Managers] on loan characteristics	• Riskier credit ratings increase the likelihood that borrowers obtain financing through a conventional loan rather than a NIF. The inclusion of a third-party guarantee significantly increases the likelihood that the financing is in the form of a NIF. • The spread increases the number of lead managers for NIFs, not necessarily for loans, suggesting that lead managers do indeed play a risk-bearing role in the syndicate, but that role seems confined to NIFs and the underwriting risks they involve, rather than the risks of lending. A riskier credit rating seems to reduce the number of regular managers for NIFs. Third party guarantees reduce the number of lead managers for NIFs. Longer contract maturity seems to primarily affect the number of regular managers, whereas additional options in the contract, such as a multi-currency option appear to be met by altering the number of lead managers.
Cantor and Packer (1996)	Spread over US Treasuries for most actively traded Eurodollar bond of each as reported by Bloomberg LP on September 29, 1995. This is a snapshot of secondary market spreads.	Log of 35 countries' bond spreads is regressed against their average ratings	• Ratings have considerable explanatory power for spreads. Sovereign spreads tend to rise as ratings become poorer. In addition, ratings appear to provide additional information beyond that contained in the standard macro-economic country statistics incorporated in market spreads. • Rating announcements appear to have a highly significant impact on speculative grade sovereigns but a statistically insignificant effect on investment grade sovereigns. Rating announcements that are more fully anticipated, at least by the authors' proxy measures, have a larger impact than those that are less anticipated.

Appendix 2 (continued): The literature about the pricing and availability of loans and bonds

Authors	Definition of pricing	Methodology and data	Main results
Cline and Barnes (1997)	Spreads are defined as the excess of the interest rate above that current on the US Treasury obligation of the same maturity. Brady bond spreads tend to be volatile because of their long maturities, their complex asset structure as restructured assets, and because their previous relative liquidity had made some of them designated assets in options and derivatives, making their prices and yields particularly sensitive to derivatives trading. The pricing of Eurobonds tends to be less influenced by such special factors and therefore the authors use Eurobonds rather than Brady bonds for their analysis.	Quarterly secondary market spreads for 11 emerging market and 6 European industrial countries over the 1992-96 period are regressed on a series of macro- and micro-economic variables.	Comparison of actual and predicted spreads shows that between 1995 and 1997, the average spreads for emerging market economies with BB ratings fell by more than could be alone explained by macro-economic fundamentals, with the rest attributable to rising global capital supply. The market's expectation about defaults can be inferred from spreads. The effects of various macro-economic variables on spreads are also analysed in detail. Loss-equivalent probabilities are also calculated.
Eichengreen and Mody (1997, 1998)	Primary market (launch) spread for all developing country bonds – public and private – issued in the 1991-96 period, drawn from Dealogic, are considered. That these are launch spreads is important, since spreads at the time of issue behave differently than spreads on the secondary market. In particular, in poor market conditions when secondary spreads rise, launch spreads generally fall.	A model to explain simultaneously both the probability of emerging market bond issuance and the spread is estimated based on about 2,000 emerging market country bonds issued between 1991 and 1996.	Poor credits drop out of the market when interest rates rise. In addition, some, especially East Asian, fixed rate, bond issuers have been able to time their debt issuance to take advantage of favourable market conditions. However, the magnitude of the change in spreads following the movement of US interest rates is small. US interest rates do have a large impact in determining the volume of bond issuance.
Kamin and von Kleist (1999)	Annualised yield on the emerging market debt instrument less the benchmark yield (i.e. the annualised yield on an industrial country government bond of the same currency denomination and maturity as the emerging market instrument). For loans, the spread over LIBOR is considered. The authors also briefly examine spreads on Brady bonds and simulate a yield curve based on their regression estimates of the determinants of credit spreads.	OLS pricing regression on 662 developing country bank loans and bonds issues (1991-97)	While the responses of bond and loan prices to price determinants are different, the list of determinants themselves is quite similar for these two types of financing. Investors have charged Latin American and Eastern European borrowers more over time than borrowers from Asia and the Middle East, all other factors constant. There is no statistically significant relationship between various measures of industrial country interest rates and emerging market new-issue bond spreads.
Eichengreen and Mody (2000)	Spread over LIBOR plus fees.	OLS pricing regression on a Loanware sample comprising of 4,000-plus loans granted to developing country borrowers (with sample correction).	At low levels of financial development and low growth rates, policy measures to improve financial intermediation bring value and reduce the costs of borrowing, but when they spill over into unsustainable credit booms, thy are regarded by the markets with alarm and worsen the terms of access to external funds.

Appendix 3: Full list of borrower business sectors contained in each broad grouping

Our groupings are based on the 188 business sectors provided by Dealogic Loanware (for loans) and the 49 sectors provided by Dealogic (for bonds).

For loans:

See Appendix 4 in Paper 2.

For bonds:

Construction and property: Real Estate, Construction

Financial services (bank): Banking & Financial services, Building Society

Financial services (non-bank): Financial corporate, Insurance, Investment trust/company, Leasing company, Financial re-packaged

High-tech: Electronics/Electrical, Rubber & Plastics, Healthcare & Pharmaceuticals, Computers/Software, Chemicals, Consultancies/Agencies/Services, Telecoms/Communications, Biotechnology, Agribusiness, Aerospace

Infrastructure: Public works/Public services

Population services: Luxury goods, Media & Publishing, Hotels & Leisure, Retailing & Consumer goods, Education

State: Central Bank, State Authority/Government, US Agency, Local authority

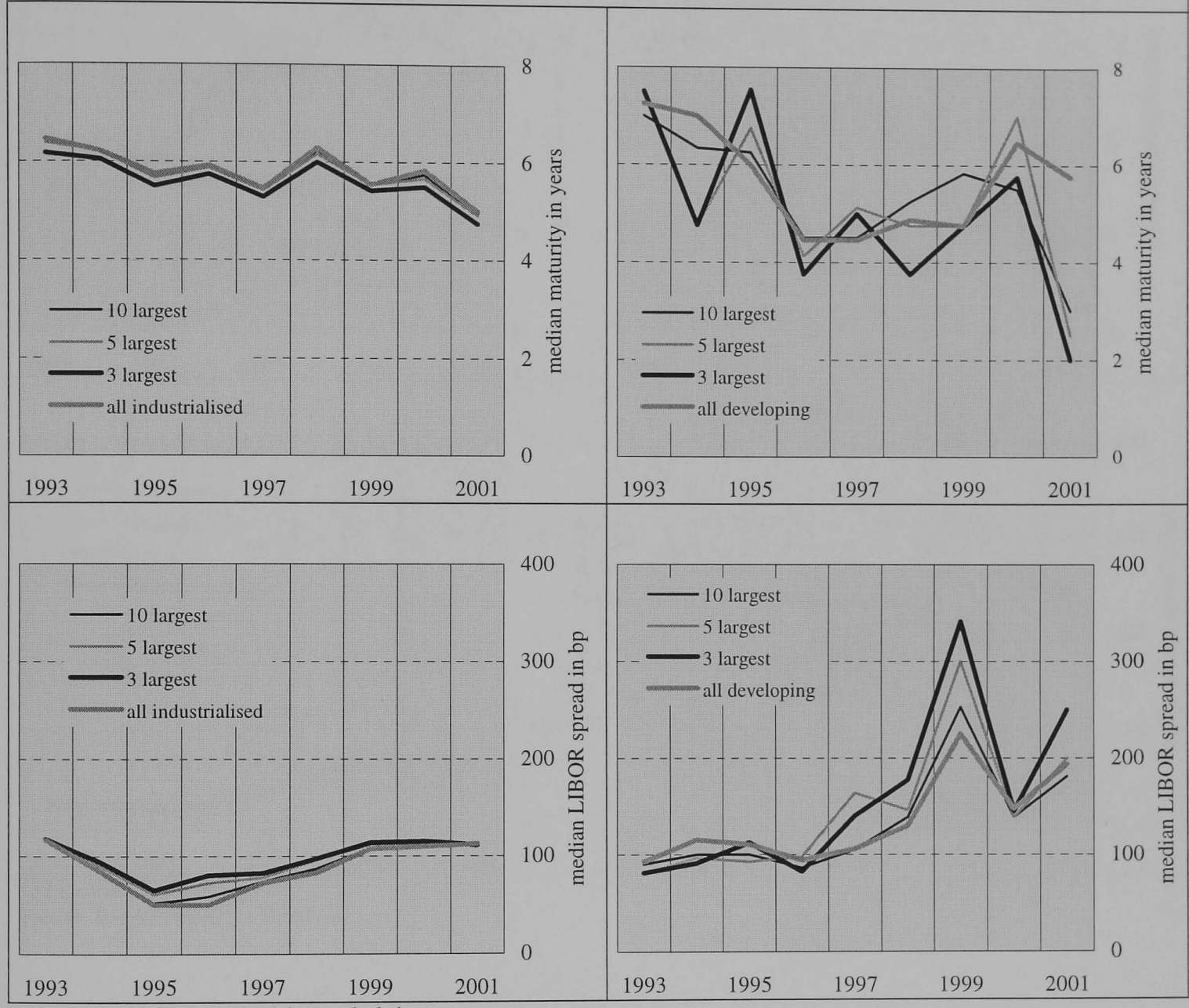
Traditional Industry: Food & Drink, Textiles & Clothing, Trading & Dealing, Tobacco, Mining, Iron & Steel, Engineering, Oil, Coal & Gas, Metals & Ores, Manufacturing, Glass & Ceramics, Forest products/Packaging, Automotive, Industrials & Conglomerates

Transport: Railways, Transport & Shipping, Airline

Utilities: Energy/Utility

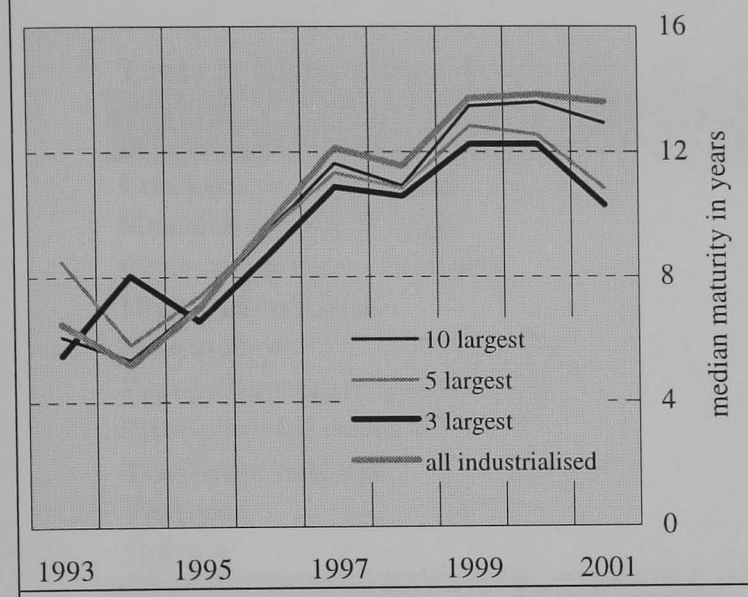
Appendix 4: Concentration, spreads and maturities

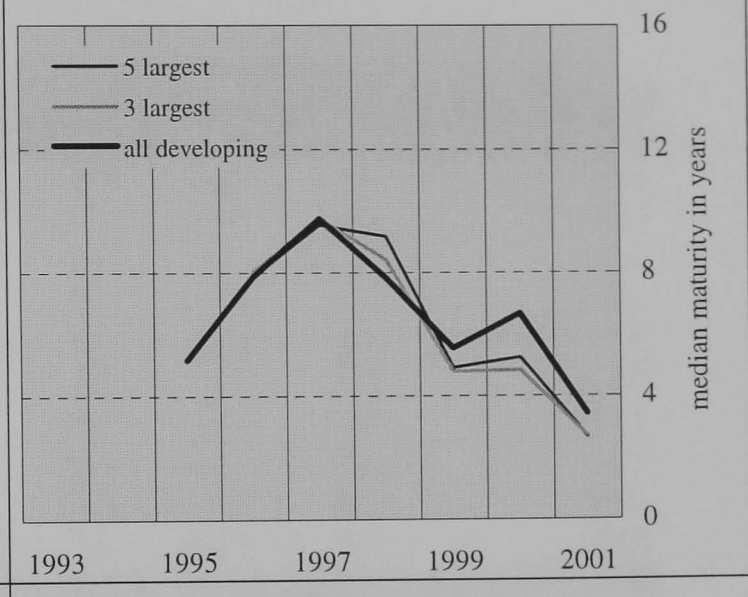
Figure 11: Evolution of median maturity and pricing on syndicated loans granted to all industrialised and developing countries and countries with largest amounts of borrowings for year concerned

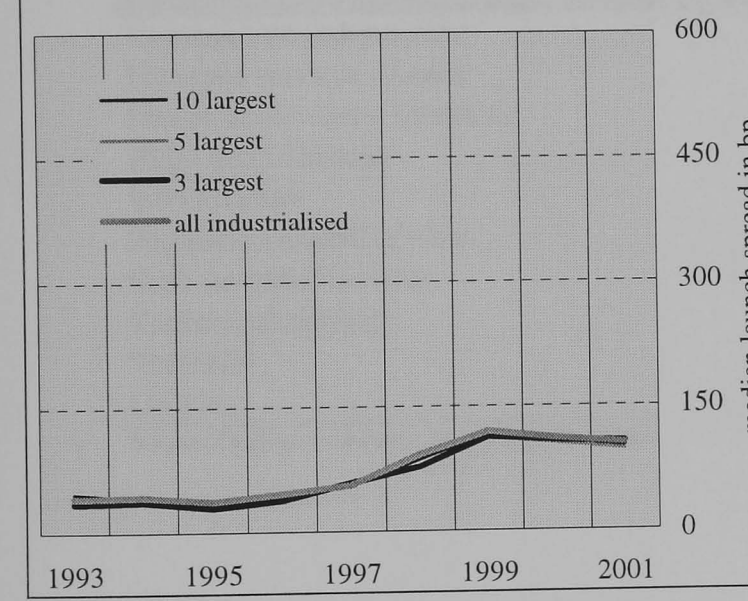


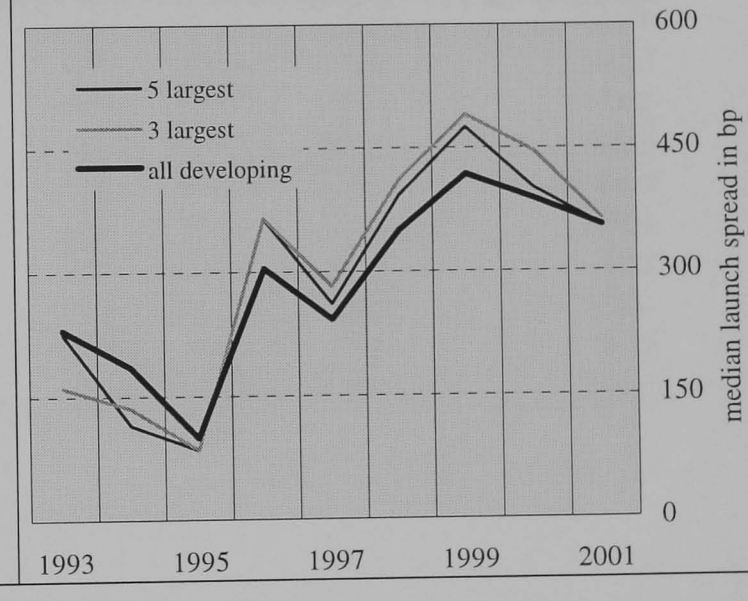
Sources: Dealogic Loanware, author's calculations.

Figure 12: Evolution of median maturity and launch spreads* on bond issues for all industrialised and developing countries and countries with largest amounts of issuance for year concerned









* Spreads at issuance
Sources: Dealogic, author's calculations.

Appendix 5: Descriptive statistics for the developing country bond and loan sample

Table 5: Distribution of loan sizes and spreads by industry (developing countries)

	Loan size ($m)			
Industry	N	Mean	Median	Standard deviation
Construction and property	167	44.6	30.0	40.5
Financial services – banks	877	84.8	50.0	110.3
Financial services – nonbanks	493	61.9	30.0	110.1
High-tech industries	802	104.6	55.0	157.4
Infrastructure	15	71.0	55.0	51.0
Population related services	132	89.4	50.0	128.7
State-provided services	245	188.0	90.0	352.6
Traditional industry	846	94.5	50.0	172.5
Transport	518	75.9	39.8	208.1
Utilities	777	162.5	91.0	284.2
	Spread (bp)			
Industry	N	Mean	Median	Standard deviation
Construction and property	167	121.4	87.5	93.4
Financial services – banks	878	107.6	75.0	102.0
Financial services – nonbanks	493	95.8	75.0	68.2
High-tech industries	803	130.8	100.0	99.4
Infrastructure	15	179.8	150.0	94.0
Population related services	132	203.8	163.8	130.3
State-provided services	245	119.2	87.5	94.2
Traditional industry	846	152.9	120.0	108.2
Transport	519	89.1	70.0	68.5
Utilities	777	150.0	128.0	104.2

Source: Dealogic Loanware, author's calculations.

Table 6: Distribution of bond sizes and spreads by industry (developing countries)

	Bond size ($m)			
Industry	N	Mean	Median	Standard deviation
Construction and property	25	205.4	150.0	137.9
Financial services – banks	213	177.2	115.0	163.7
Financial services – nonbanks	150	234.3	200.0	193.0
High-tech industries	77	207.8	200.0	139.2
Infrastructure	3	200.0	200.0	75.0
Population related services	24	161.0	138.4	77.1
State-provided services	391	486.9	351.8	475.7
Traditional industry	136	200.2	150.0	141.6
Transport	11	171.4	150.0	108.2
Utilities	71	228.1	170.0	195.3
	Spread (bp)			
Industry	N	Mean	Median	Standard deviation
Construction and property	25	363.0	375.0	150.8
Financial services – banks	213	271.8	270.0	167.4
Financial services – nonbanks	150	323.9	319.0	192.4
High-tech industries	77	346.8	340.0	248.9
Infrastructure	3	426.5	387.5	125.6
Population related services	24	421.1	425.0	85.1
State-provided services	391	349.4	337.5	182.8
Traditional industry	136	308.6	293.8	168.7
Transport	11	291.9	275.0	150.0
Utilities	71	257.7	248.0	167.6

Source: Dealogic, author's calculations.

Appendix 6: Descriptive statistics for the industrialised country bond and loan sample

Table 7: Distribution of loan sizes and spreads by industry (industrialised countries)

	Loan size ($m)			
Industry	N	Mean	Median	Standard deviation
Construction and property	1,850	140.4	78.1	181.7
Financial services – banks	941	397.2	128.7	824.9
Financial services – nonbanks	2,274	387.4	150.0	842.8
High-tech industries	5,076	248.2	64.8	754.0
Infrastructure	210	186.5	50.0	545.9
Population related services	5,746	191.7	70.1	418.0
State-provided services	89	710.6	200.0	1,471.8
Traditional industry	6,031	205.8	73.2	483.2
Transport	961	202.0	80.0	366.5
Utilities	2,024	310.1	150.0	508.8
	Spread (bp)			
Industry	N	Mean	Median	Standard deviation
Construction and property	1,853	182.9	175.0	92.3
Financial services – banks	944	94.5	55.0	98.1
Financial services – nonbanks	2,275	126.2	87.5	108.2
High-tech industries	5,087	196.0	200.0	119.3
Infrastructure	211	188.8	200.0	105.2
Population related services	5,758	205.1	213.8	108.1
State-provided services	89	45.5	25.0	52.4
Traditional industry	6,038	184.9	200.0	109.8
Transport	966	153.1	127.9	103.0
Utilities	2,025	119.6	100.0	94.1

Source: Dealogic Loanware, author's calculations.

Table 8: Distribution of bond sizes and spreads by industry (industrialised countries)

	Bond size ($m)			
Industry	N	Mean	Median	Standard deviation
Construction and property	109	183.9	160.0	143.5
Financial services – banks	3,470	396.4	252.0	462.3
Financial services – nonbanks	2,311	308.1	200.0	391.4
High-tech industries	525	557.4	320.4	628.0
Infrastructure	13	236.2	191.9	158.9
Population related services	201	353.3	250.0	355.6
State-provided services	803	1,076.0	500.0	1,341.6
Traditional industry	577	326.5	243.2	334.6
Transport	144	270.6	200.9	198.9
Utilities	239	363.7	300.0	259.1
	Spread (bp)			
Industry	N	Mean	Median	Standard deviation
Construction and property	109	119.5	90.0	121.1
Financial services – banks	3,470	49.6	30.0	56.0
Financial services – nonbanks	2,312	88.7	68.0	89.5
High-tech industries	525	230.3	115.0	245.5
Infrastructure	13	37.7	28.0	30.1
Population related services	201	175.5	106.0	184.1
State-provided services	803	44.0	38.5	29.1
Traditional industry	577	120.4	85.0	128.5
Transport	144	99.6	52.3	140.2
Utilities	239	82.1	60.0	77.3

Source: Dealogic, author's calculations.

Appendix 7: Pooled bond and loan pricing regressions (effect of the bond dummy)

Dependent variable: ln(spread). Independent variables as in Table 3 (developing countries) and Table 4 (industrialised countries). bond = dummy that takes the value of 1 if instrument is a bond, 0 otherwise. Fixed effects panel regression with each borrower country considered as a group.

variable	Developing countries		variable	Industrialised countries	
maturity	0.0144‡	(0.001)	maturity	0.0433‡	(0.001)
ln_size	-0.0900‡	(0.011)	ln_size	-0.2096‡	(0.003)
nbprov	0.0009	(0.001)	nbprov	-0.0041‡	(0.000)
g_explic	-0.2231‡	(0.027)	g_explic	-0.0414†	(0.019)
g_implic	-0.0063	(0.036)	g_implic	0.0867‡	(0.019)
secured	0.1962‡	(0.027)	secured	0.4227‡	(0.011)
increase	0.0159	(0.036)	increase	0.0117	(0.033)
constrpt	0.2584‡	(0.061)	constrpt	0.4480‡	(0.026)
tradind	0.1786‡	(0.035)	tradind	0.3395‡	(0.021)
finservb	-0.1536‡	(0.040)	finservb	-0.1399‡	(0.032)
finservn	0.1734‡	(0.044)	finservn	-0.0702‡	(0.023)
high-tech	0.1814‡	(0.036)	high-tech	0.3416‡	(0.021)
infrastr	0.5433‡	(0.197)	infrastr	0.2924‡	(0.058)
popserv	0.3648‡	(0.062)	popserv	0.4727‡	(0.021)
state	-0.0488	(0.049)	state	-0.1711‡	(0.040)
transpor	0.1858‡	(0.048)	transpor	0.2156‡	(0.032)
debtgdp	0.0037*	(0.001)	debtgdp	-0.0072†	(0.003)
debtgdp$_{-1}$	-0.0028	(0.002)	debtgdp$_{-1}$	0.0050	(0.003)
brent	-0.0114‡	(0.004)	brent	0.0026	(0.001)
brent$_{-1}$	-0.0199‡	(0.004)	brent$_{-1}$	-0.0008	(0.001)
treas	-0.0437	(0.035)	treas	-0.0370‡	(0.012)
treas$_{-1}$	0.0121	(0.028)	treas$_{-1}$	-0.0370†	(0.017)
pppsh	1.9781‡	(0.619)	pppsh	-0.1774†	(0.089)
pppsh$_{-1}$	-1.0844*	(0.592)	pppsh$_{-1}$	-0.0049	(0.096)
growth	-0.0047	(0.010)	growth	0.0392‡	(0.011)
growth$_{-1}$	0.0036	(0.004)	growth$_{-1}$	0.0009	(0.011)
wrgdp	-0.2125‡	(0.072)	wrgdp	-0.1928‡	(0.038)
wrgdp$_{-1}$	-0.3345‡	(0.072)	wrgdp$_{-1}$	-0.2764‡	(0.032)
trade	0.0768‡	(0.016)	trade	0.0401‡	(0.008)
trade$_{-1}$	0.0684‡	(0.017)	trade$_{-1}$	0.0535‡	(0.007)
cty_shar	0.0502	(0.053)	cty_shar	-0.0030	(0.002)
ctyshar$_{-1}$	0.0467	(0.042)	ctyshar$_{-1}$	0.0079‡	(0.002)
bus_shar	-0.0235†	(0.010)	bus_shar	-0.0142‡	(0.003)
busshar$_{-1}$	0.0225†	(0.010)	busshar$_{-1}$	0.0116‡	(0.004)
restodeb	0.0000	(0.000)	resdebt	-0.0170‡	(0.006)
resdeb$_{-1}$	0.0002	(0.000)	resdebt$_{-1}$	0.0184‡	(0.006)
gra	0.0972†	(0.047)	defgdp	-0.0650‡	(0.010)
defiGDP	0.0133‡	(0.005)	defgdp$_{-1}$	-0.0286‡	(0.008)

Appendix 7 (continued): pooled bond and loan pricing regressions

Dependent variable: ln(spread)

Fixed effects panel regression, considering each borrower country as a group.

variable	Developing countries		variable	Industrialised countries	
curacGDP	-0.0002	(0.006)	$curgdp_{-1}$	-0.0303‡	(0.011)
$curgdp_{-1}$	-0.0245‡	(0.008)	invgdp	-0.1019‡	(0.014)
invGNP	-0.0508‡	(0.008)	$invgdp_{-1}$	0.0753‡	(0.016)
$invgnp_{-1}$	-0.0244‡	(0.008)	iegdp	0.0064†	(0.003)
tdstoxgs	0.0051†	(0.002)	$iegdp_{-1}$	0.0089‡	(0.003)
$tdsxgs_{-1}$	0.0001	(0.001)	credgdp	0.0072‡	(0.001)
iegdp	0.0001	(0.000)	$credgdp_{-1}$	-0.0031‡	(0.000)
$iegdp_{-1}$	0.0061†	(0.002)	corrupt	-0.0131	(0.010)
credgdp	-0.0000	(0.000)	usd	0.1993‡	(0.022)
$credgdp_{-1}$	-0.0000	(0.000)	jpy	-0.2381‡	(0.074)
corrupt			eur	-0.0291	(0.026)
usd	-0.1232	(0.081)	bond	-0.1071‡	(0.027)
jpy	-0.2141*	(0.113)	intercept	8.0924‡	(1.179)
eur	-0.0544	(0.089)			
bond	0.7697‡	(0.045)			
intercept	6.4446‡	(0.409)			

Note: standard errors in parentheses. Number of observations in loan spreads regression = 3,302; in bond spreads regression = 25,451. F-tests are significant at the 1% level.

*: significant at the 10% level; †: significant at the 5% level; ‡: significant at the 1% level.

Appendix 8: Corruption index regressions

Table 9: Corruption index regression for developing country borrowers
Regression with robust standard errors, all variables as in panel regression. pcpi = inflation; st_tdebt = ratio of short-term to total external debt. Dependent variable = ln(spread)

variable	Loan spreads		Bond spreads	
maturity	0.0197‡	(0.003)	0.0083‡	(0.001)
ln_size	-0.0757‡	(0.014)	-0.0014	(0.041)
nbprov	-0.0003	(0.001)	-0.0095†	(0.004)
g_explic	-0.2873‡	(0.035)	0.0719	(0.071)
g_implic	0.0050	(0.054)	-0.0905	(0.074)
secured	0.2031‡	(0.032)	-0.5443†	(0.215)
increase	0.0495	(0.047)	-0.1166	(0.073)
constrpt	0.1499†	(0.067)	0.0986	(0.113)
tradind	0.1453‡	(0.048)	-0.0270	(0.095)
finservb	-0.1748‡	(0.047)	-0.4567	(0.404)
finservn	0.1629‡	(0.048)	-0.1290	(0.165)
high-tech	0.1160†	(0.048)	0.1297	(0.097)
infrastr	0.4176‡	(0.122)	0.3037†	(0.122)
popserv	0.3503‡	(0.076)	0.0675	(0.104)
state	-0.1396*	(0.073)	-0.2184†	(0.107)
transpor	0.0416	(0.059)	0.1736	(0.136)
debtgdp	0.0080‡	(0.002)	0.0183‡	(0.005)
debtgdp$_{-1}$	-0.0054†	(0.002)	-0.0042	(0.006)
brent	-0.0016	(0.005)	-0.0540‡	(0.015)
brent$_{-1}$	-0.0192‡	(0.005)	0.0242*	(0.014)
treas	0.0134	(0.034)	-0.1986*	(0.104)
treas$_{-1}$	0.0256	(0.030)	0.0273	(0.158)
pcpi	-0.0004	(0.000)	-0.0015	(0.000)
pcpi$_{-1}$	0.0003	(0.000)	0.0018	(0.001)
pppsh	-3.7932‡	(0.638)	-4.6333‡	(1.321)
pppsh$_{-1}$	3.6706‡	(0.650)	4.5535‡	(1.304)
growth	0.0533‡	(0.010)	0.0947‡	(0.032)
growth$_{-1}$	-0.0144‡	(0.005)	-0.0173	(0.018)
st_tdebt	-0.0057	(0.003)	0.0098	(0.008)
st_tdebt$_{-1}$	0.0045	(0.003)	-0.0148	(0.009)
wrgdp	-0.3923‡	(0.083)	-0.2455	(0.246)
wrgdp$_{-1}$	-0.3202‡	(0.065)	0.1067	(0.211)
trade	0.0838‡	(0.016)	0.0603	(0.080)
trade$_{-1}$	0.0376†	(0.016)	0.0464	(0.069)
cty_shar	0.6312‡	(0.126)	0.1864†	(0.086)
ctyshar$_{-1}$	-0.0715	(0.128)	-0.2940‡	(0.097)
bus_shar	-0.0247	(0.028)	-0.0011	(0.014)
busshar$_{-1}$	-0.0050	(0.027)	0.0055	(0.015)
restodeb	0.0000	(0.000)	0.0042‡	(0.001)
resdeb$_{-1}$	-0.0001	(0.000)	0.0012†	(0.000)

Table 9 (continued): Loan and bond pricing regression for developing country borrowers

Dependent variable: ln(spread)

OLS estimation with robust standard errors.

variable	Loan spreads		Bond spreads	
gra	0.0186	(0.041)	0.3792‡	(0.130)
defiGDP	0.0211‡	(0.006)	0.0439	(0.034)
defigdp$_{-1}$	-0.0027	(0.008)	0.0499*	(0.027)
curacGDP	-0.0146	(0.009)	0.0324*	(0.018)
curgdp$_{-1}$	0.0085	(0.008)	-0.0597‡	(0.016)
invGNP	-0.0685‡	(0.009)	0.0014	(0.028)
invgnp$_{-1}$	0.0112	(0.008)	0.0011	(0.026)
tdstoxgs	0.0030	(0.002)	0.0163†	(0.006)
tdsxgs$_{-1}$	-0.0018	(0.002)	-0.0086	(0.007)
iegdp	0.0002	(0.000)	0.0001	(0.000)
iegdp$_{-1}$	-0.0010	(0.001)	-0.0107‡	(0.002)
credgdp	0.0000	(0.000)	0.0000‡	(0.000)
credgdp$_{-1}$	-0.0000	(0.000)	-0.0000*	(0.000)
corrupt	-0.1360‡	(0.014)	-0.1570‡	(0.035)
usd	-0.1643	(0.119)	0.1764	(0.125)
jpy	-0.1707	(0.134)	-0.0092	(0.237)
eur	-0.2382*	(0.132)	0.2157*	(0.120)
intercept	8.6935‡	(0.291)	5.9998‡	(0.713)
R^2	0.4404		0.6405	

Note: robust standard errors in parentheses. Number of observations in loan spreads regression = 2,772; in bond spreads regression = 530.

*: significant at the 10% level; †: significant at the 5% level; ‡: significant at the 1% level.

Table 10: Corruption index regression for industrialised country borrowers
Regression with robust standard errors. All variables as in panel regression. pcpi = inflation.
Dependent variable: ln(spread)

variable	Loan spreads		Bond spreads	
maturity	0.0672‡	(0.002)	0.0283‡	(0.001)
ln_size	-0.2429‡	(0.004)	-0.0805‡	(0.012)
nbprov	0.0009	(0.000)	-0.0229‡	(0.001)
g_explic	-0.0616†	(0.024)	-0.0294	(0.031)
g_implic	-0.0968‡	(0.031)	0.2297‡	(0.029)
secured	0.4146‡	(0.010)	-0.1790‡	(0.060)
increase	-0.1513‡	(0.036)	0.1453†	(0.062)
constrpt	0.4757‡	(0.026)	0.2319†	(0.101)
tradind	0.3293‡	(0.023)	0.1759†	(0.069)
finservb	-0.1576‡	(0.034)	0.0559	(0.104)
finservn	0.0643†	(0.026)	-0.2429‡	(0.061)
high-tech	0.2955‡	(0.023)	0.5054‡	(0.078)
infrastr	0.2932‡	(0.055)	-0.1644	(0.219)
popserv	0.4505‡	(0.024)	0.4065‡	(0.095)
state	-0.6374‡	(0.100)	-0.3730‡	(0.063)
transpor	0.2379‡	(0.033)	-0.0283	(0.116)
debtgdp	-0.0149‡	(0.005)	0.0177‡	(0.004)
debtgdp$_{-1}$	0.0154‡	(0.005)	-0.0143‡	(0.004)
brent	0.0033*	(0.001)	-0.0059	(0.005)
brent$_{-1}$	-0.0036*	(0.002)	0.0161‡	(0.005)
treas	-0.0394‡	(0.014)	-0.1561‡	(0.026)
treas$_{-1}$	-0.0286	(0.018)	-0.1571‡	(0.044)
pcpi	-0.0370*	(0.020)	0.0938‡	(0.023)
pcpi$_{-1}$	-0.0295*	(0.017)	0.0622‡	(0.019)
pppsh	-0.1781	(0.111)	0.0518	(0.165)
pppsh$_{-1}$	0.2090*	(0.109)	-0.0541	(0.166)
growth	0.0309†	(0.014)	0.0590‡	(0.015)
growth$_{-1}$	0.0145	(0.014)	-0.0398†	(0.018)
wrgdp	-0.0966†	(0.045)	-0.2494‡	(0.091)
wrgdp$_{-1}$	-0.1441‡	(0.042)	0.1332*	(0.074)
trade	0.0276‡	(0.009)	0.0249	(0.024)
trade$_{-1}$	0.0247†	(0.010)	0.1116‡	(0.017)
cty_shar	0.0061	(0.005)	-0.0041	(0.004)
cty_shar$_{-1}$	-0.0067	(0.004)	0.0036	(0.005)
bus_shar	0.0113	(0.009)	0.0021	(0.004)
bus_shar$_{-1}$	-0.0092	(0.009)	-0.0113†	(0.005)
restodeb	-0.0253‡	(0.006)	-0.0115	(0.009)
restodeb$_{-1}$	0.0143†	(0.005)	0.0138	(0.009)

Table 10 (continued): Corruption index regression for industrialised country borrowers

Dependent variable: ln(spread)
OLS estimation with robust standard errors.

variable	Loan spreads		Bond spreads	
defiGDP	-0.0556‡	(0.011)	-0.0146	(0.015)
defiGDP$_{-1}$	-0.0164	(0.010)	0.0027	(0.014)
curacGDP	0.0200*	(0.010)	0.0168	(0.017)
curacGDP$_{-1}$	-0.0263†	(0.011)	-0.0548‡	(0.018)
invGNP	-0.0871‡	(0.020)	-0.0129	(0.020)
invGNP$_{-1}$	0.1064‡	(0.021)	0.0136	(0.019)
iegdp	0.0070*	(0.003)	-0.0056	(0.005)
iegdp$_{-1}$	-0.0068*	(0.004)	0.0062	(0.005)
credgdp	0.0074‡	(0.001)	-0.0134‡	(0.002)
credgdp$_{-1}$	-0.0021†	(0.000)	0.0106‡	(0.002)
corrupt	-0.0003	(0.010)	0.0131	(0.023)
usd	0.0143	(0.030)	0.1591‡	(0.031)
jpy	0.1811	(0.129)	-0.9432‡	(0.109)
eur	-0.2647‡	(0.039)	-0.2455‡	(0.032)
intercept	4.4085‡	(0.213)	4.3367‡	(0.356)
R^2	0.4414		0.4966	

Note: standard errors in parentheses. Number of observations in loan spreads regression = 20,365; in bond spreads regression = 5,086.
*: significant at the 10% level; †: significant at the 5% level; ‡: significant at the 1% level.

Appendix 9: Contagion effects regression

Fixed effects panel regression; group variable = country. Dependent variable: ln(spread). All independent variables as in Table 4, except contag variable as defined in Section 6.

variable	Loan spreads		Bond spreads	
maturity	0.0696‡	(0.001)	0.0274‡	(0.001)
ln_size	-0.2460‡	(0.004)	-0.1017‡	(0.012)
nbprov	0.0012†	(0.000)	-0.0209‡	(0.001)
g_explic	-0.0593†	(0.025)	-0.0210	(0.031)
g_implic	-0.0913‡	(0.028)	0.2247‡	(0.028)
secured	0.4113‡	(0.011)	-0.2028‡	(0.063)
increase	-0.1361‡	(0.040)	0.1713‡	(0.056)
constrpt	0.4690‡	(0.027)	0.2774†	(0.115)
tradind	0.3201‡	(0.022)	0.2481‡	(0.077)
finservb	-0.1306‡	(0.033)	-0.0037	(0.133)
finservn	0.0605†	(0.025)	-0.1837†	(0.072)
high-tech	0.2860‡	(0.022)	0.5501‡	(0.079)
infrastr	0.2863‡	(0.058)	-0.0513	(0.233)
popserv	0.4436‡	(0.023)	0.4481‡	(0.096)
state	-0.6008‡	(0.090)	-0.3095‡	(0.075)
transpor	0.2358‡	(0.033)	0.0416	(0.104)
debtgdp	-0.0148*	(0.007)	0.0058	(0.006)
debtgdp$_{-1}$	0.0260‡	(0.007)	0.0000	(0.006)
brent	0.0001	(0.001)	-0.0203‡	(0.005)
brent$_{-1}$	-0.0042†	(0.002)	0.0115†	(0.005)
treas	-0.0312†	(0.014)	-0.1104‡	(0.029)
treas$_{-1}$	-0.0308*	(0.018)	-0.1668‡	(0.044)
pppsh	0.3162*	(0.163)	0.2779	(0.354)
pppsh$_{-1}$	-0.5458†	(0.233)	-0.1663	(0.346)
growth	-0.0060	(0.017)	-0.0129	(0.023)
growth$_{-1}$	-0.0211	(0.016)	-0.1264‡	(0.023)
wrgdp	-0.2161‡	(0.049)	-0.2162†	(0.088)
wrgdp$_{-1}$	-0.2957‡	(0.056)	-0.1474	(0.099)
trade	0.0658‡	(0.013)	0.0543†	(0.026)
trade$_{-1}$	0.0582‡	(0.013)	0.1591‡	(0.020)
cty_shar	-0.0374‡	(0.011)	0.0032	(0.006)
cty_shar$_{-1}$	-0.0272‡	(0.006)	0.0096	(0.006)
bus_shar	0.0141	(0.008)	0.0026	(0.004)
bus_shar$_{-1}$	-0.0119	(0.009)	-0.0081	(0.005)
restodeb	-0.0126	(0.008)	-0.0002	(0.011)
restodeb$_{-1}$	0.0092	(0.007)	0.0174	(0.010)
defiGDP	-0.0530‡	(0.014)	0.0014	(0.022)
defiGDP$_{-1}$	-0.0208	(0.013)	-0.0307*	(0.016)
curacGDP	-0.0097	(0.012)	-0.0241	(0.019)
curacGDP$_{-1}$	-0.0015	(0.014)	-0.0342	(0.023)
invGNP	-0.0483†	(0.022)	-0.0593*	(0.031)

Appendix 9 (continued): contagion effects regression for industrialised country borrowers

Dependent variable: ln(spread)

Fixed effects panel regression, considering each borrower country as a group.

variable	Loan spreads		Bond spreads	
iegdp	0.0188‡	(0.004)	0.0057	(0.006)
$iegdp_{-1}$	-0.0063	(0.004)	0.0128†	(0.006)
credgdp	0.0092‡	(0.002)	-0.0180‡	(0.003)
$credgdp_{-1}$	-0.0016*	(0.000)	0.0063*	(0.003)
contag	0.1816‡	(0.057)	-0.0602	(0.134)
usd	0.0738†	(0.030)	0.1933‡	(0.035)
jpy	0.0103	(0.141)	-0.9860‡	(0.102)
eur	-0.0158	(0.045)	-0.1745‡	(0.036)
intercept	11.090‡	(2.985)	3.2080*	(1.677)

Note: standard errors in parentheses. Number of observations in loan spreads regression = 20,365; in bond spreads regression = 5,086. F-tests are significant at the 1% level.

*: significant at the 10% level; †: significant at the 5% level; ‡: significant at the 1% level.

Appendix 10: Corrleation matrices

Table 11: Correlation matrix between variables – developing country loans

	lnspread	maturity	ln_size	nbprov	debtgdp	brent	treas	pppsh	growth	wrgdp	trade	cty_shar	bus_shar	restodeb	defiGDP	curacGDP	invGNP	tdstoxgs	iegdp	credgdp
lnspread	1																			
maturity	0.0520*	1																		
ln_size	-0.007	0.1204*	1																	
nbprov	-0.0459*	0.0015	0.5129*	1																
debtgdp	0.1756*	-0.0142	0.1260*	0.0412*	1															
brent	0.0294*	-0.0107	0.0797*	0.0602*	0.1112*	1														
treas	0.0029	-0.012	0.0812*	0.0613*	0.1826*	0.4507*	1													
pppsh	-0.0805*	0.0258*	-0.1976*	-0.1326*	-0.3788*	-0.0789*	-0.0648*	1												
growth	-0.2610*	0.0676*	-0.1825*	-0.0569*	-0.3977*	0.0014	-0.0742*	0.4621*	1											
wrgdp	-0.0355*	0.0116	0.0541*	0.0602*	0.1697*	0.6491*	0.7096*	-0.0460*	0.0530*	1										
trade	-0.0159	0.0296*	0.0475*	0.0611*	0.0043	0.5137*	0.6096*	-0.0115	0.1388*	0.8538*	1									
cty_shar	-0.0601*	-0.0013	-0.1415*	-0.0890*	-0.2138*	-0.0935*	-0.1561*	0.4194*	0.4179*	-0.0814*	-0.0321*	1								
bus_shar	-0.0585*	-0.0598*	0.022	0.0664*	-0.0454*	0.0403*	-0.0085	0.1291*	0.0255*	-0.0143	-0.0116	0.0096	1							
restodeb	-0.1593*	0.0646*	-0.0478*	-0.0009	-0.4413*	-0.1054*	-0.1265*	0.1396*	0.2476*	-0.1713*	-0.0049	0.01	0.0346*	1						
defiGDP	0.1791*	-0.0939*	0.0233	-0.0358*	-0.0370*	-0.1219*	-0.1154*	0.2315*	-0.4466*	-0.1933*	-0.2178*	-0.3337*	0.0362*	-0.2132*	1					
curacGDP	0.0192	0.0305*	0.0381*	0.0204	-0.0364*	0.1373*	0.1005*	0.3405*	-0.0059	0.0982*	0.1237*	-0.0777*	0.0784*	0.0545*	0.2529*	1				
invGNP	-0.3533*	0.0861*	-0.3081*	-0.1272*	-0.3540*	-0.1642*	-0.1939*	0.4794*	0.6387*	-0.1263*	-0.0704*	0.5589*	0.0055	0.3557*	-0.4657*	-0.1036*	1			
tdstoxgs	0.3688*	-0.0897*	0.1924*	0.0399*	0.3191*	0.1417*	0.0932*	-0.2137*	-0.3956*	0.0443*	0.005	-0.0815*	0.0199	-0.3173*	0.2839*	-0.1543*	-0.5907*	1		
iegdp	-0.0440*	0.0272*	-0.0075	0.0025	0.0156	0.0522*	0.0425*	-0.0174	0.0269*	0.0456*	0.0610*	-0.0145	0.0105	0.0540*	-0.0522*	0.0583*	0.0696*	-0.1250*	1	
credgdp	-0.01	0.0520*	0.1342*	-0.003	0.0759*	0.0291*	-0.0027	-0.1286*	0.0225	-0.0089	0.0009	-0.007	-0.0211	0.0995*	-0.0335*	0.0989*	0.0757*	-0.1148*	0.0755*	1

*: significant at the 10% level

Table 12: Correlation matrix between variables – developing country bonds

	lnspread	maturity	ln_size	nbprov	debtgdp	brent	treas	pppsh	growth	wrgdp	trade	cty_shar	bus_shar	restodeb	defiGDP	curacGDP	invGNP	tdstoxgs	iegdp	credgdp
lnspread	1																			
maturity	-0.0198	1																		
ln_size	0.017	0.2251*	1																	
nbprov	-0.1149*	0.0226	0.3929*	1																
debtgdp	0.1505*	0.1203*	0.3771*	0.1221*	1															
brent	0.0398	-0.1348*	-0.3426*	-0.2443*	-0.2846*	1														
treas	0.008	0.0252	0.0697*	0.0336*	0.2809*	0.1787*	1													
pppsh	-0.0448	-0.0063	0.0770*	0.1281*	-0.1530*	-0.0607*	0.0118	1												
growth	-0.3305*	0.0533*	0.0417*	0.1316*	0.0686*	0.1015*	0.3929*	0.2522*	1											
wrgdp	-0.0998*	0.0216	-0.0450*	-0.0183	0.1782*	0.4293*	0.7428*	0.0448*	0.4946*	1										
trade	-0.1081*	-0.0078	-0.1435*	-0.0921*	-0.0141	0.5394*	0.6114*	0.0161	0.3980*	0.8789*	1									
cty_shar	0.1195*	-0.0682*	0.1263*	0.0776*	0.0910*	-0.0761*	-0.0454*	0.1454*	0.1322*	-0.002	-0.1285*	1								
bus_shar	-0.1684*	-0.1433*	0.0959*	0.0693*	0.1099*	-0.1644*	0.0392*	0.0958*	0.0785*	0.0409*	-0.0395*	0.1413*	1							
restodeb	-0.2078*	-0.0689*	-0.2319*	-0.1539*	-0.4734*	0.2129*	-0.2703*	0.0227	-0.0076	-0.2187*	-0.0411*	-0.0607*	-0.1477*	1						
defiGDP	0.2054*	-0.0202	0.1136*	0.0262	-0.0897*	-0.2233*	-0.2092*	0.1606*	-0.4923*	-0.3128*	-0.2778*	-0.1557*	0.0179	-0.0512*	1					
curacGDP	0.0111	-0.0621*	-0.2230*	-0.1854*	-0.0406*	0.2786*	-0.0524*	0.1055*	-0.0075	-0.0107	0.1025*	-0.0661*	-0.1596*	0.1821*	0.0774*	1				
invGNP	-0.5360*	0.0056	-0.1878*	0.0909*	-0.1434*	-0.0014	-0.0313	0.2508*	0.4974*	0.0899*	0.0494*	0.0229	0.0770*	0.1844*	-0.4306*	-0.1507*	1			
tdstoxgs	0.4544*	-0.0544*	0.1909*	0.0226	0.1874*	-0.0817*	0.0499*	0.0470*	-0.3345*	-0.0204	-0.0724*	0.0801*	0.1383*	-0.2886*	0.3572*	-0.3138*	-0.6082*	1		
iegdp	-0.0167	-0.0214	-0.2498*	-0.1787*	-0.1220*	0.2224*	-0.0054	-0.0986*	-0.0036	0.0207	0.1145*	-0.1295*	-0.1243*	0.2240*	-0.0443*	0.2914*	0.0787*	-0.1944*	1	
credgdp	-0.1183*	0.0707*	-0.0322	-0.0630*	0.0918*	0.0939*	0.0629*	-0.1194*	0.1726*	0.0873*	0.1027*	-0.1197*	-0.1131*	0.0576*	-0.0491*	0.1649*	0.2206*	-0.1787*	0.2593*	1

*: significant at the 10% level

Table 13: Correlation matrix between variables – industrialised country loans

	lnspread	maturity	ln_size	nbprov	debtgdp	brent	treas	pppsh	growth	wrgdp	trade	cty_shar	bus_shar	resdebt	defgdp	curgdp	invgdp	iegdp	credgdp
lnspread	1																		
maturity	0.1918*	1																	
ln_size	-0.4648*	-0.0530*	1																
nbprov	-0.2467*	0.0881*	0.4961*	1															
debtgdp	-0.0545*	0.0089	-0.0622*	-0.0057	1														
brent	0.0427*	-0.0568*	0.0994*	0.0172*	-0.3289*	1													
treas	-0.0155*	0.0259*	0.0394*	-0.0042	-0.0529*	0.3446*	1												
pppsh	0.2509*	-0.2405*	-0.1006*	-0.1870*	-0.0610*	-0.0311*	-0.0204*	1											
growth	0.1026*	-0.0619*	-0.0440*	-0.0775*	-0.0301*	-0.0362*	0.4736*	0.3004*	1										
wrgdp	-0.0002	-0.0096	0.0539*	0.006	-0.1235*	0.6284*	0.6981*	-0.0282*	0.3815*	1									
trade	-0.0108*	-0.0108	0.0481*	-0.0025	-0.1214*	0.6071*	0.6197*	-0.0331*	0.2824*	0.9121*	1								
cty_shar	0.2447*	-0.2248*	-0.1135*	-0.1876*	-0.0386*	-0.1157*	-0.0423*	0.9889*	0.3290*	-0.0797*	-0.0838*	1							
bus_shar	-0.1880*	-0.0519*	0.1849*	0.0843*	-0.0116*	0.0318*	0.0195*	-0.0540*	-0.0061	0.0264*	0.0129*	-0.0628*	1						
resdebt	-0.1692*	0.1094*	0.0612*	0.1002*	-0.3095*	0.0203*	0.0221*	-0.5648*	-0.1533*	0.0110*	0.0220*	-0.5474*	0.0379*	1					
defgdp	-0.1021*	0.0811*	-0.0640*	-0.0098	0.2817*	-0.3548*	-0.2730*	-0.0947*	-0.2457*	-0.2258*	-0.1174*	-0.0517*	-0.0352*	-0.0706*	1				
curgdp	-0.2049*	0.1524*	0.0271*	0.1358*	0.1404*	-0.2286*	-0.0802*	-0.6201*	-0.2575*	-0.1141*	-0.0815*	-0.5732*	0.0158*	0.6044*	0.2561*	1			
invgdp	-0.1075*	0.0789*	0.1029*	0.0999*	-0.1185*	0.1791*	0.2093*	-0.5743*	0.0122*	0.1358*	0.0463*	-0.6269*	0.0664*	0.4644*	-0.3971*	0.1627*	1		
iegdp	-0.1852*	0.1883*	0.1112*	0.1643*	-0.0692*	0.1220*	0.0652*	-0.8753*	-0.1383*	0.0831*	0.0790*	-0.8608*	0.0473*	0.5172*	-0.0872*	0.5870*	0.5357*	1	
credgdp	-0.1065*	0.1801*	0.0935*	0.1422*	-0.3082*	0.1659*	0.0778*	-0.6891*	-0.2496*	0.0862*	0.0586*	-0.7016*	0.0291*	0.4140*	-0.0719*	0.3991*	0.5316*	0.7268*	1

*: significant at the 10% level

Table 14: Correlation matrix between variables – industrialised country bonds

	lnspread	maturity	ln_size	nbprov	debtgdp	brent	treas	pppsh	growth	wrgdp	trade	cty_shar	bus_shar	resdebt	defgdp	curgdp	invgdp	iegdp	credgdp
lnspread	1																		
maturity	0.3228*	1																	
ln_size	-0.0085	-0.1822*	1																
nbprov	-0.4051*	-0.2575*	0.0143	1															
debtgdp	-0.0799*	-0.0352*	-0.0623*	0.0183*	1														
brent	0.1700*	-0.0601*	0.0920*	-0.1569*	-0.0564*	1													
treas	-0.0328*	-0.0047	-0.016	-0.0307*	-0.0417*	0.2662*	1												
pppsh	0.1816*	0.0297*	0.0838*	-0.1274*	-0.0015	0.0532*	0.0257*	1											
growth	0.2417*	0.1363*	-0.0504*	-0.1392*	-0.1110*	0.0005	0.3015*	0.3556*	1										
wrgdp	-0.0234*	-0.0101	-0.0285*	-0.0099	-0.0639*	0.5676*	0.6513*	0.0314*	0.2612*	1									
trade	-0.008	-0.0196*	-0.0046	-0.0069	-0.0497*	0.6120*	0.5653*	0.0178	0.2246*	0.8961*	1								
cty_shar	-0.0166	-0.1123*	0.2434*	-0.0717*	-0.2290*	0.0938*	0.1157*	0.5477*	-0.0461*	0.0176	0.0029	1							
bus_shar	-0.3506*	-0.2239*	0.0201*	0.2135*	-0.1152*	-0.0718*	0.0783*	-0.2310*	-0.1945*	0.0195*	-0.0027	0.1980*	1						
resdebt	-0.0824*	-0.0430*	-0.0773*	0.0455*	-0.3014*	-0.0362*	-0.0214*	-0.4398*	-0.1453*	-0.0089	-0.0046	-0.3396*	0.0709*	1					
defgdp	-0.3156*	-0.0921*	-0.1202*	0.1679*	0.2290*	-0.1575*	-0.2242*	-0.1844*	-0.4569*	-0.1533*	-0.1127*	-0.1833*	0.0526*	-0.0652*	1				
curgdp	-0.2238*	-0.0359*	-0.1256*	0.0947*	0.1350*	-0.0530*	-0.0181	-0.5774*	-0.2207*	-0.0045	0.0041	-0.4909*	0.1561*	0.4395*	0.0730*	1			
invgdp	-0.2573*	-0.1629*	-0.0274*	0.1447*	0.1478*	0.0280*	0.0640*	-0.4967*	-0.3371*	0.0458*	0.0386*	-0.1100*	0.2453*	0.3101*	0.3544*	0.2505*	1		
iegdp	-0.0289*	0.0224*	-0.0650*	0.0492*	-0.0306*	0.0274*	0.0249*	-0.6950*	0.0199*	0.0277*	0.0394*	-0.4223*	0.2117*	0.2993*	-0.2795*	0.6237*	0.1488*	1	
credgdp	-0.1773*	-0.0792*	0.0344*	-0.0042	-0.1084*	0.0637*	0.0873*	-0.5819*	-0.4296*	0.0242*	0.0314*	0.1148*	0.4020*	0.2327*	0.1424*	0.3950*	0.5519*	0.4850*	1

*: significant at the 10% level

PAPER 4

Lender characteristics and the structure and pricing of syndicated loans

Lender characteristics and the structure and pricing of syndicated loans

ABSTRACT

THIS PAPER analyses the relationship between bank characteristics and the structure and pricing of syndicated loans. Such credit facilities amounted to more than one third of total international financing in 2001 and therefore constitute an important feature of the global financial system. We show that the pricing of loans is likely to be lower as banks participating in those loans become less liquidity-constrained or better capitalised. The relationship between bank characteristics and loan pricing generally appears to be stronger in the case of senior banks than for junior banks. This confirms the stronger pricing power of senior banks when arranging loans, while junior participants tend to act more as price takers. Contrary to the existing literature we find evidence of senior banks offloading riskier loans in a potentially opportunistic way to outsider junior banks (who may have little knowledge of the borrower), and they tend to hold higher proportions of loans they arrange when they are better capitalised. In addition, as information about the borrower becomes less transparent, junior banks rely more on the reputation of the senior bank, to determine their level of commitment, than when borrower information is widely available to the public.

JEL classification: G21, D40, F30

Keywords: syndicated loans, banks, liquidity, capital

1. Introduction

IN 2001, INTERNATIONAL SYNDICATED LENDING represented $1.4 trillion or more than one third of new international capital market financing, and is deemed to have generated more underwriting revenue in recent years than either the equity or the bond market (Madan, Sobhani and Horowitz, 1999). In particular, leveraged lending has been growing rapidly, as commercial borrowers have increasingly displayed a preference for leveraged borrowing over junk bond financing (Jones, Lang, Nigro, 2000)[63]. Specific tranches of such syndicated loans are purchased by non-bank investors. These non-bank tranches are in most cases equivalent to public bonds and subject to an "arms-length" relationship in case of problems (Altman and Suggitt, 2000). This means that banks arranging syndicated credits, especially on the leveraged end of the credit quality spectrum, have *de facto* been acting as investment banks, collecting fees for putting together syndicates, but not always warehousing the loans themselves, leaving that activity to commercial banks or even non-banks[64]. Indeed, in the aftermath of banks' reduced lending following the Russian crisis, the BIS locational banking statistics show a marked decline since 1995 of banks' international loan portfolios relative to their total foreign claims including holdings of securities (Figure 1). In other words banks have increasingly been investing in publicly marketable securities in relative terms over the past few years at the expense of traditional intermediation and monitoring activities. The question therefore arises as to which market participants ultimately act as the main risk-takers in the syndicated lending market. Their level of knowledge about risk raises important concerns for financial stability and one aspect this paper aims to answer is to examine the extent to which international syndicated lending over the last decade contributed to risk transfer from banks with insider knowledge of borrowers to less well informed outsiders.

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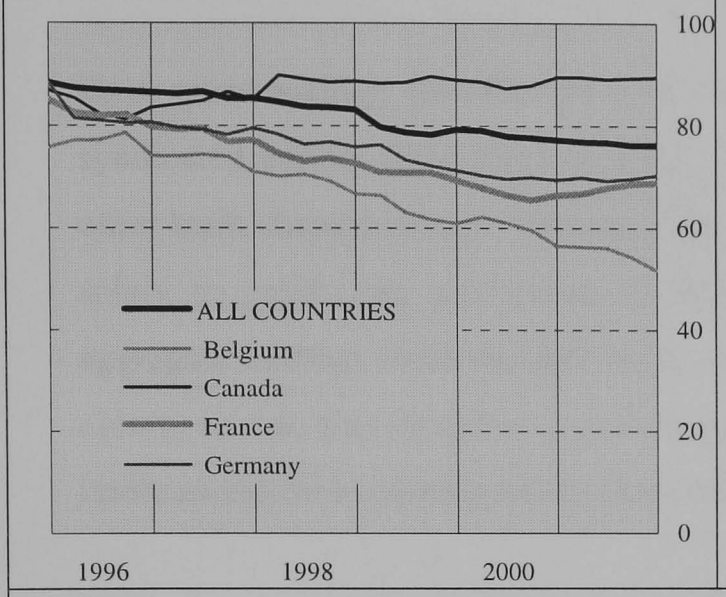
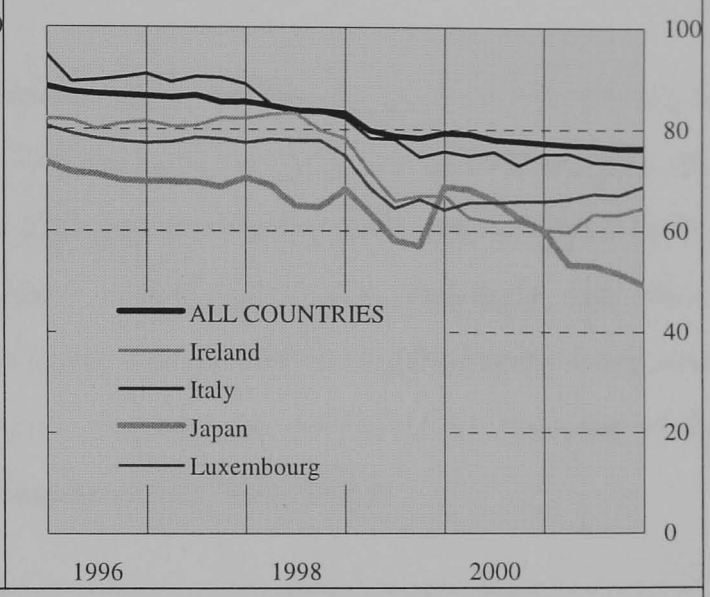
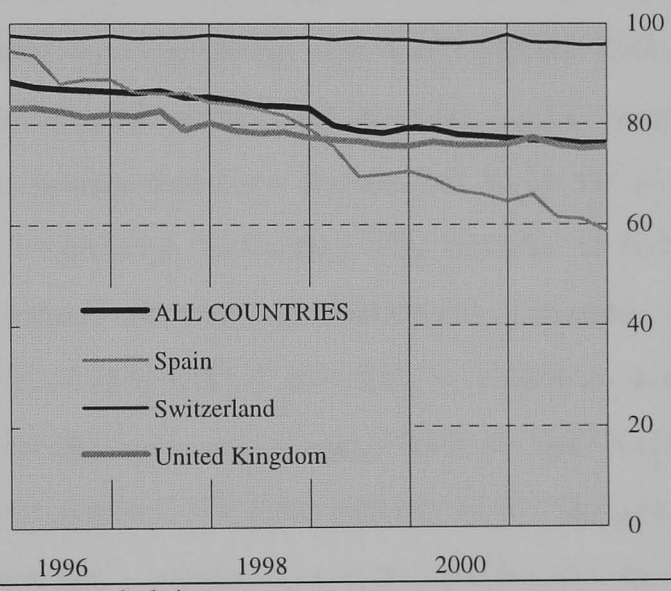
[63] See footnote 52 for a definition of leveraged lending.

[64] Insurance companies, pension funds and collateralised debt obligation (CDO) arbitrage funds have become buyers of syndicated loans, especially on the leveraged and highly leveraged segments.

Figure 1: Evolution of banks' international loan portfolios relative to their total foreign claims including holdings of securities, by country of residence of the banks, percentages







Source: BIS locational banking statistics, author's calculations.

The first pillar of the new Basel Capital Accord[65] refines the current capital weights existing under the 1988 version determining how much capital banks have to hold as a cushion against losses on loans. The refinement is undertaken by means of an explicit reference to external ratings issued by rating agencies or banks' internal ratings qualifying the borrowers. The new Accord will apply to all internationally active banks at every tier within a banking group. As far as we are aware, there have been no studies to date that explore the relationship between bank capital and individual loan and borrower characteristics at an international level. This paper aims to take a first step in

[65] Basel Committee on Banking Supervision Consultative Document: The New Basel Capital Accord, January 2001, issued for comment by May 2001.

addressing this issue. More specifically, based on the evolution of the international market for syndicated lending from 1993 to 2001, the paper examines the following:

First, we investigate the effect of banks' capital and liquidity situation on the pricing of syndicated credits from 1993 to 2001, controlling for a series of borrower, loan and other bank characteristics.[66] Thakor (1996) has reported that capital requirements linked solely to credit risk are shown to increase equilibrium credit rationing and lower aggregate lending. With the new Basle Accord linking capital requirements even more closely to risk, this issue has important policy implications and involves the issue of the international level playing field (Chen, Mazudmar and Yan, 2000).

Second, we examine the extent to which capital- or liquidity-constrained banks engage in opportunistic behaviour by originating and subsequently selling low-quality loans about which they hold privileged information as senior banks. From this type of activity the senior banks gather syndication fees but do not hold the loans on their balance sheets (i.e. they do not warehouse the loans). The transfer of risk in the economy, in such a way or by other means, via credit derivatives for instance, to market participants who may have limited knowledge about the risk, is a serious issue for policymakers. Most empirical studies in this area (e.g. Jones, William and Nigro, 2000; Dennis and Mullineaux 2000) have drawn on US data, mainly from regulatory returns. However, data from Dealogic Loanware, a commercial data provider, shows that 51% of the funds for syndicated loans arranged for US borrowers in 2001 were provided by non-US banks who do not necessarily complete US regulatory returns; 54% of those loans were arranged by non-US banks. We compile a unique international dataset combining the specifications of individual loan contracts such as size, maturity and pricing with lenders' balance sheet and income statement information[67]. This allows us to undertake the first analysis of this kind at an international level.

Third, we examine the effects of local knowledge on loan characteristics. As underlined by Boot and Thakor (2000), interbank and capital market competition can either leave banks to act like capital market underwriters and originators of transaction loans or

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[66] E.g. loan size and maturity; borrower rating; bank size and business mix.
[67] See Section 3 for more on how this is done.

make them return to their roots as relationship lending experts. The greater, and more timely availability of borrower credit records, as well as the greater ease of processing these, makes it easier for banks to originate transaction loans even when they are at a great distance from the borrower (Petersen and Rajan, 2000). As an extension of the first two research questions outlined above, we also seek to determine in this paper whether there is still an advantage – reflected in loan terms – for a bank to operate in the same country as the borrower or to be domiciled or headquartered in the country in whose currency the loan is made.

In keeping with the credit rationing hypothesis developed by Thakor (1996), we show that the pricing of loans is likely to be lower as banks participating in those loans become less liquidity-constrained or better capitalised, or enjoy a regulatory advantage. The relationship between bank characteristics and loan pricing generally appears to be stronger in the case of senior banks than of junior banks. This confirms the stronger pricing power of senior banks when arranging loans, while junior participants tend to act more as price takers. Contrary to the existing literature we find evidence of senior banks offloading riskier loans to outsider junior banks with little knowledge of the borrower. They also tend to hold higher portions of loans they arrange when they are better capitalised. In addition, we document the fact that as information about the borrower becomes less transparent, junior banks rely more on the reputation of the senior bank, to determine their level of participation in the syndicate, than when borrower information is widely available to the public. Finally, this paper highlights the importance of local knowledge by senior syndicate banks about the most informationally opaque borrowers if those borrowers are to access international syndicated credit markets.

The rest of the paper is structured as follows. The next section reviews the theoretical and empirical literature. Sections 3 and 4 discuss the data and methodology, present analyse the results. A closing section concludes.

2. Literature review

This section reviews the literature dealing with (i) how banks' capital constraints are reflected in loan terms, (ii) the possible occurrence of opportunistic behaviour by senior banks who arrange syndicates of banks and sell low quality loans to junior syndicate participants and (iii) whether some borrowers can still benefit from lending by syndicates of banks where senior banks have local or insider knowledge about borrowers.

2.1 Capital constraints and loan syndications

In an article exploring the effects capital regulations have on aggregate bank lending and monetary policy, Thakor (1996) demonstrates how binding capital constraints can result in credit rationing. According to Thakor, the most heavily regulated banks have the highest incentive to ration credit. Several authors investigate how loan syndications or loan sales can alleviate banks' financing costs under such constraints. Pennachi (1988) argues that loan sales allow some banks to finance loans less expensively than by traditional deposit or equity issue because bank funds received via loan sales can avoid costs associated with required reserves and capital. Other banks with substantial market power in deposit financing, but with limited loan-origination opportunities, may choose to hold marketable assets. These assets can take the form of loan shares purchased from those banks facing competitive financing.

Banks that have capital-asset ratios below or close to regulatory minima or that are liquidity constrained may not want to increase assets by adding large loans to their balance sheets and may choose, instead, to share them with other banks by selling them (Pavel and Phillis, 1987) or by syndicating them (Simons, 1993). Furthermore, Simons points out that banks are limited in the size of the loan they can make to any one borrower (exposure to a single borrower cannot exceed 15% of a bank's capital under US regulation). Participating in a syndicate thus allows small banks to acquire exposure to large borrowers which they would otherwise not be permitted to have. While loan sales or syndications from banks with higher capital requirements to banks with lower

requirements may take place in some instances, one main function of loan sales and syndications is to reduce the concentration of risk.

Finally, Chen, Mazumdar and Yan (2000) explore how regulatory differences faced by banks can affect loan pricing. Following Thakor (1996), less heavily regulated banks may charge a premium on loans to borrowers which might otherwise fall victim of a credit crunch (i.e. would be denied credit by the more heavily regulated banks). In accordance with these hypotheses, Chen, Mazumdar and Yan (2000) show that Japanese banks operating in the US seem to have been extracting such premiums from US borrowers who might otherwise not been lent to by US banks.

2.2 The interaction between senior and junior banks

Some lead banks originating syndicated credits, especially when they are capital- or liquidity-constrained, may exploit the procedure during their behaviour vis-à-vis junior participants in the syndicate. Flannery (1989) shows how certain bank examination procedures may induce banks to hold only certain risk classes of loans while profitably selling the rest (i.e. that portion which cannot be efficiently funded by the bank itself). Pennachi (1988) demonstrates that the extent of banks' loan selling is limited by a moral-hazard problem that arises from the diminished incentive by banks to efficiently monitor and service loans after they have been sold. But this problem can be alleviated by optimally designing the loan sales contract.

In Pennachi's model, if the bank sells a proportion b_i of loan i, then it only gets $(1 - b_i)$ of the return on the loan. In other words the marginal benefit of its monitoring effort will be discounted by factor $(1 - b_i)$. Rational loan buyers will infer the diminished level of monitoring this entails and hence expect a smaller state-contingent loan cash-flow. However the structure of the contract can be made incentive-compatible by giving the selling bank a disproportionate share of the loan, assuming certain loan distributions (notably that the bank's monitoring effort increases the "fatness" of the lower tail of the distribution of the borrowing firm's value). The contract is characterised by penalising the bank if low loan outcomes occur and rewarding the bank if high loan outcomes occur. Giving the bank a disproportionate share of the risk allows the bank to reap a

disproportionate share of the gains from monitoring, enabling a greater amount of the loan to be sold while maintaining monitoring-incentive efficiency. Practical illustration of this type of contracting can be found in banks' loan sales from a pool of credit card receivables where the seller retains an equity position in the pool equal to twice the historical default level of the receivables. To summarise, a bank's ability to sell loans depends on the loan buyer's perception of the bank's incentive to monitor those loans. Besides, by designing the loan sales contract in a way that gives the bank a disproportionate share of the gains to monitoring, Pennacchi shows that a greater share of the loan can be sold and, hence, a greater level of bank profits can be attained.

The model of Banerjee and Cadot (1996) offers another example of how lead banks may have exploited insider knowledge when arranging syndicated credits. The authors relate that large syndicates lending to Latin American debtors were organised and managed by a couple of large banks who negotiated loan contracts and sold participations to smaller banks worldwide. The same group of banks could be found organising most of the large syndications in the late 1970s and early 80s, and could be considered real insiders of the country-risk business. Those large banks, being in close contact with officials in the borrowing-country governments, had private – albeit imperfect – information on the true level of credit risks in any particular country, and might even have got advance warning of coming repayment difficulties. Whether they had any incentive to pass that information on to other market participants is another matter. Such a situation makes junior participants vulnerable to a certain degree of opportunistic behaviour by the agent bank, which could withhold information about borrower or loan quality or possibly cherry-pick the high-quality syndicated loans for its own portfolio. It could do so by either not syndicating them at all or retaining a larger share of them on its books in case of a syndication. The agent may even be tempted to deliberately sell bad loans. Banerjee and Cadot develop a game theory model to show that prior to the 1982 international debt crisis, it was possible for banks with heavy exposure to troubled debtors to attract rational newcomers into syndicated loans which were, with positive probability, bailout loans. They use a model in which lenders enter the market sequentially in two rounds of lending. Between the two rounds, a shock separates borrowers into good ones and bad ones, and early entrants acquire information about individual borrower type, while late entrants only know the distribution of borrower types. The asymmetric information

structure gives rise to both signalling and screening issues. The authors note that there is always a pooling perfect Bayesian equilibrium in which late entrants lend to both good and bad types, without the borrower type being exposed before final clearing at the terminal phase, at which borrower types are revealed.

Several researchers have produced empirical work in this area.

Working with a 1991 sample of US loans, Simons (1993) finds that agent banks who are more capital-constrained are also more likely to retain a smaller share of syndicated loans. She demonstrates that the agent bank's capital-to-asset ratio is positively and significantly related to the share of syndicated loans retained on the agent's books. However, agent banks typically hold greater shares of real estate loans, which in 1991 were typically more risky than other types of loans. Therefore, there is no indication of opportunistic behaviour on agent banks' behalf in 1991 as they are found to keep a smaller share of higher-quality loans on their books.

Dennis and Mullineaux (2000) show that lead banks which have established a reputation through a large volume of repeat business (or are rated better) are able to sell off larger portions of syndicated loans. Longer maturity makes a loan more saleable, presumably because longer term loans save on duplicative monitoring costs for the syndicate banks. Unsecured loans are as likely to be syndicated as secured ones. A loan is more likely to be syndicated as the managing agent is more heavily involved in repeat business, as the agent's credit rating improves and as the agent is a bank rather than a nonbanking institution. The identity of the managing agent also influences whether a particular loan will be syndicated. Moreover, according to the authors, although banks are more likely to engage in syndication when they are capital constrained, managing agents of syndicates hold larger proportions of information-problematic loans on their portfolios. This is in keeping with the standard view that the saleability of a debt contract depends on the scale and scope of information asymmetries, and that financial intermediaries engage in relationship-oriented finance that draws on their specialised monitoring skills.

Working with a sample of syndicated loans from the US Shared National Credit Programme, Jones, Wiliam and Nigro (2000) find evidence that capital constraints significantly influence the share of loans held by agent banks. The authors also show that agent share tends to be lower if the borrower is a public company and the loan is large (i.e. in cases where the agent's informational advantage is smaller). Finally, while agent banks generally hold a larger share of their low-quality loans, agent banks that have a greater portfolio concentration of lower quality credits hold a smaller share of their loans. That is, some banks specialise in originating low-quality loans and these banks are relatively successful in finding participants for such loans.

Angbazo, Mei and Saunders (1998) conduct an empirical investigation of the relationship between credit spreads and the seniority of the bank in the syndicate that retains the largest share in the loan. They find that spreads are lowered by the presence of a lead lender who retains a large share of the loan (and thus bears broad monitoring responsibilities). Other members of the syndicate then supposedly perceive that the risk is lesser and hence are prepared to earn a lower margin. Conversely, if large chunks of the loan are sold down to junior syndicate members, then this should entail an increase in spreads, insofar as the junior syndicate members have narrower oversight authorities and lower incentives to monitor the borrower.

2.3 Local presence effects

The potential importance of relationship lending for smaller borrowers who would otherwise be unable to access funds has been underscored by Simons (1993). She points out that in the US, limitations on interstate banking closely link the fortunes of small mid-sized banks to those of their local and regional economies (the McFadden Act of 1927 puts geographical restrictions on bank branching). Participating in syndicated loans can give banks a chance to lend to borrowers in regions or industries to which they might otherwise have no convenient access.

Sirmans and Bejamin (1990), Jones, William and Nigro (2000) and Sommerville (2001) make the case that conditions on local or relationship loans are really different from those on other types of loans. In a study of the Louisiana mortgage market between

1985 and 1987, Sirmans and Benjamin (1990) argue that the product cost functions of national, regional and local mortgage banks are different – because of differing economies of scale and scope and that furthermore, local banks may have comparative cost advantages in originating and servicing mortgages compared to national financial institutions, because they can process geographically specific information about the creditworthiness of borrowers and the condition of local real estate markets[68]. The authors provide empirical evidence that national lenders, on average, have higher mortgage interest rates than local lenders. Jones, William and Nigro (2000) argue that since it is more likely that the agent bank has special knowledge of local firms, the agent is expected to retain larger shares of loans made to such to firms. In a comparison of the behaviour of local and national banks that finance the housing market in British Columbia, Sommerville (2001) presents evidence that local lenders offer cheaper loans, and more importantly are more likely to extend credit to more marginal or less well capitalized borrowers (they are better at relationship banking, while with their economies of scale or scope, larger national lenders focus on lending to bigger borrowers).

An alternative view is developed in Petersen and Rajan (2000). The authors conjecture that greater, and more timely, availability of borrower credit records, as well as the greater ease of processing these, may explain why in the United States the distance between smaller lenders and firms has considerably increased between 1973 and 1997. Distant firms no longer have to be observably the highest quality credits, suggesting that a wider cross-section of firms can now obtain funding from a particular lender. These findings are interpreted as evidence that there has been substantial development of the financial sector, even in areas such as small business lending, that have not been directly influenced by the growth in public financial markets. From a policy perspective, that small firms now obtain wider access to financing suggests that the consolidation of banking services may not raise as strong anti-trust concerns as in the past.

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[68] This is so despite the existence of information sources (such as credit reports and real estate appraisals) which national and local lenders can access with equal ease. But local institutions may have – among other information – past credit repayment histories of the mortgagor, information on local default rates, as well as specific legal knowledge allowing for lower servicing and origination costs.

Degryse and Ongena (2002) summarise the various considerations involved in distance and bank lending[69]. They note that developments in technology and travel may ultimately diminish the relevance of borrower-lender distance in European banking, they find that proximity branching remains very important to ensure credit at accessible rates, particularly for small firms and entrepreneurs.

3. Data and methodology

The purpose of this paper is to analyse relationships between banks' characteristics participating in syndicated loans and conditions on those loans, as reflected by the price and share of the loan retained by the senior bank. We work with a sample of credit facilities granted by syndicates of banks between 1993 and 2001. These data were extracted from the Dealogic Loanware database, a primary market information provider on individual syndicated credit facilities, in particular the characteristics of the loans (amount, maturity, currency, pricing) and the borrowers (name, nationality, business sector). A large part (80%) of the facilities were contracted in US dollars. The database provides detailed information on the composition of the syndicate, the respective roles of senior participants such as arrangers, administrative agents or senior managers, as well as junior participants. In addition, information is provided on the amounts committed by each institution. We combined the individual loan transaction data with balance sheet and income statement information on syndicate participants available from the BankScope IBCA database. This unique dataset, linking international loan transaction data with individual bank characteristics[70], allows us to perform an analysis of supply side issues in syndicated lending for the first time.

To allow for time effects, we examine the relationship between loan characteristics and bank characteristics for the year of the transactions as well as for the year before. In order to explore the relationship between the characteristics of each participant and loan specifications, we introduce each transaction into the regression as many times as there

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[69] See their paper for a comprehensive review of the distance literature.
[70] Most previous studies have relied on regulatory and hence national databases.

were banks participating in the loan at various levels of seniority, provided balance sheet and profit/loss statement information was available about these banks. Each observation then corresponds to the same transaction but to the various characteristics of each participating bank[71].

We begin by exploring the effects of specific lender characteristics on loan pricing – the results are presented in §4.1. We analyse junior and senior banks separately through separate model specifications. Our indicators of capital, liquidity and loan quality constraints facing senior banks are similar to those used by Simons (1993), Dennis and Mullineaux (2000) and Jones, Williams and Nigro (2000):

- **Capital and liquidity constraints,** reflected, respectively, by the ratio of equity[72] capital to assets, the ratio of liquid assets to deposits and money market funding;
- **Specialisation in investment banking- vs commercial banking type activities,** gauged by the ratio of interest income to total assets. Low values of this ratio reflect investment banking type behaviour while high values would mean more traditional intermediation activity;
- **Quality of the loan portfolio,** proxied by the ratio of loan loss reserves to loans gross of reserves (discussed, for instance, in Berger, 1995);
- **Efficiency,** measured by the cost-to-income ratio (personnel costs divided by net income) and by size (natural logarithm of total assets is used as a proxy for scale efficiency, as suggested, among others, by Berger and Humphrey, 1997);
- **Profitability,** reflected by return on assets.

Then, we analyse the effects on loan pricing of the presence in syndicates – at a junior level – of Japanese banks or *Landesbanken.* We hypothesise that these two types of institutions are less likely to price-ration credit than others because of funding

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[71] Consider a syndicated credit facility granted by a syndicate consisting of Société Générale and Crédit Lyonnais. We enter two observations for that facility into the regression. One will comprise Société Générale's balance sheet and profit/loss statement indicators, the other one will feature the same characteristics for Crédit Lyonnais. Both observations will carry the same loan transaction characteristics.

[72] We do not focus separately on tier 2 capital. This also follows the approach used in seminal work on the bank lending channel by Kishan and Opiela (2000).

advantages in yen (Eichengreen and Mody, 2000), differing regulatory regimes (Chen, Mazudmar and Yan, 2000) or implicit or explicit state guarantees on their debt or deposits. The findings are discussed in §4.2.

We subsequently study the effects of reputation and business mix, plus liquidity, capital and portfolio quality constraints faced by senior banks on the share of the loan they retain on their books[73] (§4.3). Bank regulations require participants to be responsible for their own credit analysis and evaluation (Jones, William and Nigro, 2000). In principle, though, junior banks often rely on the reputation of the senior bank with a view to determining their decision to join the syndicate or their level of commitment. Hence our inclusion of a proxy for the reputation of the senior bank into the model. This was calculated as the position in the arranger league tables, i.e. the percentage of total loans arranged by the bank concerned within total loans arranged worldwide, for the year under consideration. Higher percentages correspond to a better reputation and vice versa.

Finally, we discuss location of lender vs. borrower issues in §4.4.

In most of our models, we control for the following loan characteristics:

- size,
- maturity,
- guarantees (implicit or explicit; implicit for instance in the sense that the borrower is the subsidiary of another major concern, without the parent providing a formal written guarantee),
- collateral (dummy variable for secured loans),
- loan purpose (purpose dummy for corporate control loans),
- Standard & Poor's rating of borrower at time of signing.

In order to reduce the effects of heteroskedasticity resulting from the inclusion of banks with different asset sizes into the sample, we use ordinary least squares with robust

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[73] We entered a zero share in case the senior bank had sold down all the loan to junior participants.

standard errors as our estimation methodology in all our models where loan pricing is the dependent variable. As far as the share of the loan retained by senior banks is concerned, it has a lower boundary of zero and an upper limit of 100%. As such, we estimate it using a censored Tobit model with a lower limit of zero and an upper limit of 100.

4. Results and discussion

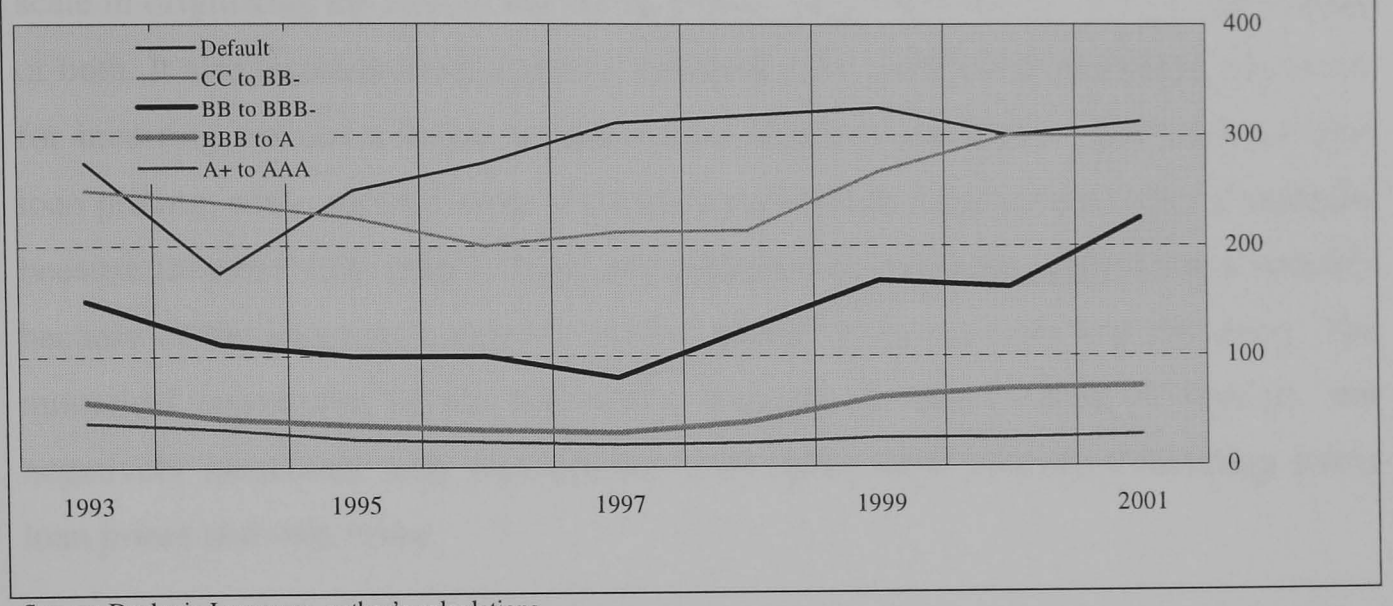
Our sample comprises 8,767 loan facilities granted to industrialised and developing country borrowers between 1993 and 2001. Table 1 shows the distribution of the observations by year and rating and Figure 2 the evolution of loan pricing by year and rating. We observe that worse ratings have systematically faced higher loan prices than better ratings – this is the straightforward result that one would expect – and loan prices have generally been edging up for all borrower ratings since 1997-98, which roughly reflects the adverse influence of the Asian crisis.

Table 1: Number of observations by borrower Standard & Poor's rating and year

	1993	1994	1995	1996	1997	1998	1999	2000	2001	Unknown	Total
Default	10	10	9	9	11	14	26	28	10	3	130
CC to BB-	228	260	223	198	285	295	450	464	222	69	2,694
BB to BBB-	90	172	156	177	212	215	253	336	195	34	1,840
BBB to A	175	273	290	242	314	318	377	451	318	57	2,815
A+ to AAA	79	164	164	180	134	127	155	172	90	23	1,288
Total	582	879	842	806	956	969	1,261	1,451	835	186	8,767

Source: Dealogic Loanware, author's calculations

Figure 2: Evolution of loan pricing, LIBOR spread + fees, medians by rating class, in bp



Source: Dealogic Loanware, author's calculations

4.1 Senior vs. junior bank characteristics and loan pricing

To investigate banks' characteristics that influence pricing, we now test the effects of quantitative variables such as capital and liquidity constraints, specialisation (investment vs. commercial banking type activities reflected by the relative weight of loans in total activities of the bank), quality of the loan portfolio, efficiency and profitability. The variables used are explained in Section 3 above and detailed in Table 2 below. We test the effect of senior and junior banks' characteristics on the pricing of loans separately to allow for the hypothesis that the former may have more power in determining loan pricing during the arrangement phase and also earn more fees for putting together the facility, while the latter may act more as pure risk holders and price takers. The lender characteristics considered mainly use changes in various ratios between the year when the loan was signed and the year before. This approach – also used by Kishan and Opiela (2000) – has the advantages of reducing (1) the effects of individual banks in the sample, (2) the autocorrelation between the residuals, and particularly between the different explanatory variables.

The results of our model estimation are shown in Table 2 below.

All coefficients on loan and borrower characteristics except the one on the dummy for the presence of an implicit guarantee coefficients are strongly significant and have the

expected signs. Loan pricing decreases with the amount loaned, reflecting economies of scale in originating the loan or the ability of less risky borrowers to arrange larger loans or both. It also increases with maturity, translating the premium demanded by the lender for incurring risk for a longer period of time. Explicit guarantees significantly reduce loan pricing, while secured loans are more expensive than non-secured ones, potentially because they are very risky[74]. There is a premium on corporate control loans possibly because of the borrower's urgent need to arrange funding quickly and discreetly. The numerical conversion of the borrower's Standard & Poor's rating is strongly and negatively associated with loan pricing, with better-rated borrowers incurring lower loan prices and vice versa.

Capital and liquidity constraints and loan pricing: we find evidence that an improvement in senior lenders' capitalisation and an improvement in junior lenders' liquidity position are significantly and negatively associated with loan pricing (the coefficient on the *deqas* variable is weakly significant and negative in the case of senior banks, the coefficient on the *dliq* variable is strongly significant and negative in the case of junior banks). We surmise that as their capital or liquidity cushions become larger, banks can accept lower prices for the same risk. Equity seems to play a more important role for senior banks, while the focus is more on the liquidity position for junior banks.

Loan loss reserves and loan pricing: A deterioration in the quality of the lenders' portfolio (reflected by an increase in the ratio of loan loss reserves to loans) is positively and significantly associated with loan pricing, reflecting a demand for more compensation to take on additional risk. This effect is weaker in the case of senior banks than in the case of junior banks, as the latter are more likely to be the ultimate risk-takers.

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[74] Collateral has a cost (Bester, 1985) so it may also be the case that the cost of arranging or warehousing the collateral is charged for in the price of the loan (Freixas and Rochet, 1997). Otherwise, financing constraints facing the borrower may be such that he accepts both collateral and a higher spread. Smith and Warner (1979) argue that collateralisation is costly and that benefits to securing the loan must exceed the cost for a particular loan to be secured. In a cross-section of loans this means that riskier loans will be collateralised. Examination of our data sample also confirms that borrowers with poorer ratings are more likely to require collateralisation. Berger and Udell (1990) also document that collateral typically is associated with riskier loans. If collateral's main purpose is to solve moral hazard problems, then riskier borrowers or those who need more monitoring will post more collateral.

Table 2: The effect of bank characteristics on loan pricing

We estimated the following equation separately for junior and senior banks, (OLS with robust standard errors):

$$\textbf{lndrawn} = \beta_0\,\textbf{Intercept} + \beta_1\,\textbf{lnsize} + \beta_2\,\textbf{maturity} + \beta_3\,\textbf{g\_implic} + \beta_4\,\textbf{g\_explic} + \beta_5\,\textbf{secured} + \beta_6\,\textbf{cc} + \beta_7\,\textbf{spn} + \beta_8\,\textbf{deqas} + \beta_9\,\textbf{dllr} + \beta_{10}\,\textbf{dci} + \beta_{11}\,\textbf{dliq} + \beta_{12}\,\textbf{lnasts} + \beta_{13}\,\textbf{dROA} + \beta_{14}\,\textbf{diita} + \varepsilon$$

- **Dependent variable: loan price**
- lndrawn = natural logarithm of drawn return (spread over LIBOR plus fees)

- **Control variables – Loan and borrower characteristics:**
- lnsize = natural logarithm of facility size converted to US dollars
- maturity = maturity of loans, in years
- g_implic, g_explic = dummies for implicitly or explicitly guaranteed loan (implicitly in the sense for instance that the borrower is the subsidiary of another major firm)
- secured = dummy for secured loan
- cc = dummy for corporate control loans (LBO, acquisition)
- spn = numerical conversion of borrower's Standard & Poor's rating (onto a scale of 0 to 28, with 0 standing for default and 28 for AAA)

- **Senior or junior bank characteristics:**
- deqas = change between year preceding the signature of the loan (t-1) and the year of signature (t0) in the ratio of equity to assets, in % [proxy for capital constraints]
- dllr = change between (t-1) and (t0) in the ratio of loan loss reserves to loans gross of reserves, in % [loan quality]
- dci = change between (t-1) and (t0) in personnel costs divided by net income, % [efficiency]
- dliq = change between (t-1) and (t0) in the ratio of liquid assets to deposits and money market funding, % [proxy for liquidity constraint]
- lnasts = natural logarithm of total assets (in USD) [measure of size, proxy for scale efficiencies] at the end of the year when the loan was signed
- dROA = change between (t-1) and (t0) in return on assets, % [measure of profitability]
- diita = change between (t-1) and (t0) in ratio of interest income to total assets, % [measures the weight of lending in bank's total activities]
- ε is a random disturbance

Table 2 (continued): The effect of bank characteristics on loan pricing

Dependent variable is *ln_drawn.* Type of estimation: OLS with robust standard errors. (natural logarithm of drawn return = LIBOR pricing + fees).
Variables are defined above.

Variable	Senior bank characteristics		Junior bank characteristics	
lnsize	-0.1198‡	(0.005)	-0.1113‡	(0.005)
maturity	0.0100‡	(0.002)	0.0119‡	(0.002)
g_implic	-0.0505†	(0.025)	-0.0080	(0.022)
g_explic	-0.0903‡	(0.030)	-0.2346‡	(0.030)
secured	0.4218‡	(0.014)	0.3853‡	(0.013)
cc	0.2461‡	(0.014)	0.2140‡	(0.016)
spn	-0.1372‡	(0.002)	-0.1500‡	(0.002)
deqas	-0.0102‡	(0.003)	-0.0012	(0.002)
dllr	0.0815‡	(0.008)	0.1168‡	(0.011)
dci	0.0002‡	(0.000)	-0.0003†	(0.000)
dliq	-0.0006	(0.001)	-0.0022‡	(0.001)
lnasts	0.0374‡	(0.005)	-0.0086†	(0.004)
dROA	0.2312‡	(0.017)	0.0393‡	(0.015)
diita	0.0032	(0.007)	-0.0166‡	(0.006)
intercept	6.8533‡	(0.104)	7.9614‡	(0.082)
N	15,934		16,391	
R^2	0.60		0.64	

NB Robust standard errors in parentheses.
*: significant at the 10% level; †: significant at the 5% level; ‡: significant at the 1% level.

Bank specialisation and loan pricing: we only find a relationship between changes in the ratio of interest income to total assets (*diita*) for junior banks, not for senior banks. Participating in syndicated loans has a greater impact on junior banks' size of traditional intermediation activities relative to their total assets. When senior banks put together syndicates of lenders, this is more of an investment banking type activity.

Bank efficiency, size, profitability and loan pricing: bank size (*lnasts*) as well as increases in the personnel costs to net income ratio (*dci*) are strongly and positively associated with more expensive loans in the case of senior banks, but not in the case of junior banks (indeed for junior banks the relationship is negative[75]). The positive relationship between senior bank size and loan pricing may reflect large senior banks' market power in setting loan prices. In the case of junior and senior banks, higher loan

[75] This negative relationship between the logarithm of total assets and loan pricing may reflect scale economies for junior banks.

prices significantly boost ROA, although this effect is stronger in the case of senior banks.

To summarise, in accordance with the credit rationing hypothesis developed by Thakor (1996) we have shown that the pricing of loans where less capital- or liquidity-constrained banks are present is likely to be lower than that of other loans. With regards to the relationship between bank characteristics and loan pricing we find that in several instances this relationship (capitalisation, size, return on assets), is stronger (in significance, magnitude, or both) in the case of senior banks than of junior banks. This confirms the stronger pricing power of senior banks when arranging loans, while junior participants tend to act more as price takers.

4.2 Capital constraints and lending: the case of Japanese banks and *Landesbanken*

Eichengreen and Mody (2000) argue that syndicated loan facilities granted to developing country borrowers and denominated in Japanese yen are relatively cheaper than others supposedly because of the low interest rates and hence the funding advantage enjoyed by Japanese financial institutions. Some authors (e.g. Wagster, 1996) have argued that the one purpose of the original Basel Capital Accord of 1988 was to reduce Japanese banks' funding advantage over other internationally active banks. German *Landesbanken's* or state co-operative banks' debt is implicitly or explicitly guaranteed by the respective German state and *Landesbanken* face little competition when attracting depositors' funds; this enables them to fund themselves at below-market costs[76]. We therefore compare the pricing of loans with and without Japanese and *Landesbanken* participation at a junior level.

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[76] In July 2002, an agreement was reached to phase out the guarantees, thus enhancing the level playing field in the German banking sector. According to the 15 July 2002 issue of the *Dresdner Bank Trends* Newsletter, "[EU] Competition Commissioner Monti and representatives of Germany [had] agreed on details for the replacement of the *Anstaltslast* (maintenance obligation) and the abolition of the *Gewahrtragerhaftung* (guarantee obligation) for *Landesbanken* and *Sparkassen* (savings banks). The *Anstaltslast* [would] be replaced by a normal owner relationship based on market principles. Accordingly, institutions cannot be shielded from insolvency. Potential financial aid of the guarantor [would] be subject to EU subsidy rules. The *Gewahrtragerhaftung* [would] be abolished on 18 July 2005. Any liability assumed up to that date [would] be subject to the old liability rules – under the condition that its maturity [did] not extend beyond 31 December 2015".

In Table 3 we calculate loan pricing confidence intervals for the subsamples with or without participation by Japanese banks or *Landesbanken*. The Table shows that the pricing of loans with participation by Japanese banks or *Landesbanken* (at a junior level) is statistically different from and lower than that of loans without such participation (the confidence intervals do not overlap).

Table 3: Loan pricing with or without participation by Japanese banks or *Landesbanken*

					95% conf.	
Loan pricing (LIBOR spread + fees)	N	Mean	Median	Standard deviation	interval	
With Japanese participation	3,827	121.3	75.0	1.7	117.9	124.6
Without Japanese participation	4,940	154.7	125.0	1.7	151.3	158.2
With participation by *Landesbanken*	1,428	81.7	51.5	2.3	77.1	86.3
Without participation by *Landesbanken*	7,339	151.5	125.0	1.4	148.8	154.2
Total	8,767	140.1	100.0	1.2	137.7	142.6

Source: Dealogic Loanware, author's calculations.

We now estimate a regression model to corroborate this hypothesis, controlling for loan and borrower characteristics, using a methodology similar to the one employed by Chen, Mazudmar and Yan (2000). The results are displayed in Table 4. The effect of the presence of Japanese banks and *Landesbanken* is tested separately[77] in two different model specifications.

The signs, magnitude and significance of most control variables (for loan size, maturity, guarantee, purpose, borrower rating) are comparable to the previous model described in Table 2.

The dummies for participation by Japanese banks and *Landesbanken* at a junior level significantly lower bank pricing, supposedly because the latter can raise funds relatively more cheaply[78]. Japanese banks and *Landesbanken* appear relatively less likely to price-ration credit than institutions without a regulatory advantage.

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[77] A third model specification (not shown) where the dummies for Japanese banks and *Landesbanken* are introduced simultaneously yields similar results.

[78] Loans with Japanese participation are more expensive in Chen Mazudmar and Yan (2000) but the latter focus on US branches of Japanese banks operating in the US where they take advantage of the stricter regulatory regime applied to US-owned competitors.

Table 4: The effect on loan pricing of the presence of Japanese banks or *Landesbanken* in the syndicate

We ran the following OLS regression with robust standard errors:

lndrawn = β_0 **Intercept** + β_1 **lnsize** + β_2 **maturity** + β_3 **g_implic**+ β_4 **g_explic** + β_5 **secured** + β_6 **cc** + β_7 **spn** + β_8 **lb_part** + β_9 **jp_part** + ε

where:

- lndrawn = natural logarithm of drawn return (spread over LIBOR plus fees)
- lnsize = natural logarithm of facility size converted to US dollars
- maturity = maturity of loans, in years
- g_implic, g_explic = dummies for implicitly or explicitly guaranteed loan (implicitly in the sense for instance that the borrower is the subsidiary of another major firm)
- secured = dummy for secured loan
- cc = dummy for corporate control loans (LBO, acquisition)
- spn = numerical conversion of borrower's Standard & Poor's rating (onto a scale of 0 to 28, with 0 standing for default and 28 for AAA)
- lb_part, jp_part: dummies for participation by one or several *Landesbanken* or Japanese banks in the syndicate (at a junior level)
- ε is a random disturbance

variable	Specification with *Landesbanken* dummy		Specification with Japanese dummy	
lnsize	-0.0976‡	(0.006)	-0.0955‡	(0.006)
maturity	0.0079‡	(0.002)	0.0092‡	(0.003)
g_implic	-0.0087	(0.037)	-0.0183	(0.037)
g_explic	-0.1729‡	(0.035)	-0.1777‡	(0.035)
secured	0.3409‡	(0.018)	0.3482‡	(0.018)
cc	0.3079‡	(0.022)	0.3062‡	(0.023)
spn	-0.1353‡	(0.002)	-0.1355‡	(0.003)
lb_part	-0.0605‡	(0.019)		
jp_part			-0.0532‡	(0.014)
intercept	7.4769‡	(0.055)	7.4792‡	(0.055)
N	8,736		8,736	
R^2	0.5861		0.6277	

NB Robust standard errors in parentheses.
*: significant at the 10% level; †: significant at the 5% level; ‡: significant at the 1% level.

4.3 The effect of capital and liquidity constraints on the share of loans retained by senior banks

Senior banks who arrange the loan may know more about the borrower and may or may not pass that information on to junior participants (Banerjee and Cadot, 1996). We now focus our attention on the proportion of loans arranged by senior banks that subsequently gets passed on to junior banks in the syndicate. If liquidity- or capital-constrained senior banks sell off relatively larger shares of loans that they arrange to junior participants than senior banks without such liquidity or capital constraints, then

this can constitute evidence of opportunistic behaviour on senior banks' behalf. Likewise, opportunistic behaviour can take place if the proportion of loans sold down by senior banks to junior participants is higher in the case of low-quality loans than in the case of high-quality loans.

We construct a model to express the share of the loan retained by senior banks as a function of loan and senior bank characteristics. In the case where there are several senior banks for the same facility we enter the same facility as many times into the model as there are senior banks, each time with the retained share and bank characteristics specific to the relevant senior arranger bank. To allow for time effects, we look at senior bank characteristics for the year of the transactions as well as the year before.

Our loan characteristics include the borrower's rating or the natural logarithm of the drawn return – LIBOR spread plus fees – maturity, guarantees and a dummy for corporate control loans (acquisitions, LBO). Our senior bank characteristics comprise liquidity- and capital constraints (equity to assets, ratio of liquid assets to deposits and money market funding), loan portfolio quality (ratio of loan loss reserves to loans), specialisation (interest income as a share of total assets) and reputation (position in the Loanware arranger league table expressed as the percentage of total worldwide loans arranged by the senior bank concerned for the year under study). We did not include loan size into the model as it is highly correlated with senior banks' league table position.

We tested four specifications of the model where we entered the various senior bank characteristics (contemporaneous with the year in which the loan was signed or lagged by one year) for rated and unrated borrowers. We used a censored Tobit estimation with an upper limit of 100 and a lower limit of zero on the share of the loan retained by senior banks. The results are displayed in Table 5 below.

The coefficient on the natural logarithm of the drawn return, a proxy for the riskiness of the loan, is negative and significant in all specifications of the model. Senior banks are more likely to keep smaller portions of riskier loans on their books, which appears to

suggest that there is evidence of possibly opportunistic behaviour on their behalf – in the sense that they would offload risky loans to outsider junior banks. These results contradict Simons (1993) and Jones, William and Nigro (2000) who find that agent banks tend to hold a larger share of their riskier or low-quality loans. Loan maturity significantly reduces the share of the facility kept by the senior bank in two specifications, as it is necessary to call in more banks when the length of the exposure increases. Senior banks tend to hold larger portions of explicitly guaranteed or secured loans, and smaller shares of corporate control loans or implicitly guaranteed facilities.

A relatively high position of the senior bank in the Loanware arranger league table, a proxy for "reputation" as an arranger of loans, tends to lower the share of the loan it retains on its books – this is reflected by the negative and significant coefficients on the *league* variable – in the case of unrated borrowers. It has no effect when the borrower has a rating. In other words, when information about the borrower is more opaque, junior banks joining the syndicate seem to rely on the reputation of the arranger bank when deciding which portion of the loan to purchase, and allow the senior bank to keep a lower share of the loan on its books when that reputation is relatively high, although the monitoring incentives for the arranger bank resulting from that lower share may then also be lower. We can relate this result to Dennis and Mullineaux (2000) who find a positive relationship between the degree of syndication and the senior bank's reputation.

Table 5: The effect of bank characteristics on the share of the loan retained by the senior bank

We estimated specifications of the following model (censored Tobit with lower limit of zero and upper limit of 100), with contemporaneous and lagged values of the senior banks' characteristics.

sen_shr = β_0 **Intercept** + β_1 **lndrawn** + β_2 **maturity**+ β_3 **g_implic**+ β_4 **g_explic** + β_5 **secured** + β_6 **cc** + β_7 **league** + β_8 **eqas** + β_9 **llr** + β_{10} **liq** + β_{11} **iita** + ε

- sen_shr = share of the loan retained by the senior bank (mandated arranger, non-mandated arranger, arranger, co-arranger, agent, co-agent, facility/syndication agent)
- lndrawn = natural logarithm of drawn return (spread over LIBOR plus fees)
- maturity = maturity of loan, in years
- g_implic, g_explic = dummies for implicitly or explicitly guaranteed loan (implicitly for instance in the sense that borrower is the subsidiary of another major concern)
- secured = dummy for secured loan
- cc = dummy for corporate control loans (LBO, acquisition)
- league = senior bank's share in syndicated loans arranged worldwide (obtained from Dealogic Loanware arranger league tables)
- eqas = ratio of equity to assets of the senior bank, in %
- llr = senior bank's ratio of loan loss reserves to loans gross of reserves, in %
- liq = ratio of liquid assets to deposits and money market funding of senior bank, in %.
- iita = ratio of interest income to total assets of senior bank, in %
- ε is a random disturbance

Dependent variable is *sen_shr* (share of loan retained by senior bank).

	Senior bank characteristics contemporaneous with year of signature of the loan				Senior bank characteristics lagged by one year			
Variable	Unrated borrowers		Rated borrowers		Unrated borrowers		Rated borrowers	
lndrawn	-0.9509†	(0.415)	-0.6762†	(0.265)	-1.9151‡	(0.435)	-0.9175‡	(0.266)
maturity	-1.5239‡	(0.092)	-0.0079	(0.092)	-1.3676‡	(0.099)	0.0046	(0.093)
g_implic	-9.2339‡	(1.315)	-2.5049†	(1.04)	-9.1766‡	(1.411)	-2.5609†	(1.045)
g_explic	10.0932‡	(0.952)	6.0661‡	(1.044)	10.4547‡	(1.029)	6.6388‡	(1.056)
secured	20.9627‡	(0.695)	5.3231‡	(0.587)	20.6555‡	(0.737)	3.7221‡	(0.597)
cc	-12.5005‡	(0.889)	-0.8085	(0.669)	-12.1934‡	(0.935)	0.2450	(0.668)
league	-1.0894‡	(0.166)	-0.0815	(0.096)	-0.7461‡	(0.166)	-0.0297	(0.095)
eqas	0.0434	(0.065)	0.0821	(0.053)	0.1571†	(0.071)	0.2278‡	(0.052)
llr	-0.0273	(0.174)	0.8559‡	(0.136)	0.1148	(0.185)	0.8763‡	(0.150)
liq	-0.1204‡	(0.013)	-0.0442‡	(0.008)	-0.1328‡	(0.015)	-0.0483‡	(0.009)
iita	0.8923‡	(0.198)	-0.2176	(0.161)	1.0447‡	(0.244)	-0.1112	(0.185)
intercept	-14.7632‡	(2.349)	-9.8872‡	(1.562)	-14.0989‡	(2.661)	-10.0220‡	(1.728)
N	41,809		20,747		36,495		18,302	

NB Robust standard errors in parentheses.
*: significant at the 10% level; †: significant at the 5% level; ‡: significant at the 1% level.

The senior bank's equity position lagged by one year is significantly related to the share of the loan retained. Senior banks with a larger capital cushion appear to retain larger portions of loans that they syndicate. A lower quality loan portfolio – reflected by a higher ratio of loan loss reserves to loans – raises the share of the loan retained only in the case of rated borrowers. As the quality of their loan portfolio deteriorates, senior banks prefer to take on more exposure to rated borrowers and less to unrated ones,

relying more on publicly available information about borrowers. Rather surprisingly, the share of the loans retained by senior banks appears to decrease with their liquidity ratio. Finally, there is evidence (reflected by the significantly positive coefficient on the *iita* ratio in two model specifications) that higher loan shares retained reflect a behaviour on senior banks' behalf that is closer to the activities of a commercial bank (whose interest income is higher when related to its total assets) rather than to the behaviour of an investment bank.

Table 6: The effect on loan pricing of the share of the loan retained by the senior bank

We ran the following OLS regression with robust standard errors:

lndrawn = β_0 **Intercept** + β_1 **sen_shr** + β_2 **maturity** + β_3 **g_implic** + β_4 **g_explic** + β_5 **secured** + β_6 **cc** + β_7 **spn** + ε

variable names as in Table 5.

variable	Coefficient	
sen_shr	-0.0006*	(0.004)
maturity	0.0068‡	(0.021)
g_implic	-0.0332	(0.023)
g_explic	-0.1112‡	(0.029)
secured	0.4073‡	(0.013)
cc	0.2346‡	(0.013)
spn	-0.1598‡	(0.002)
intercept	7.3363‡	(0.045)
N	20,910	
R^2	0.56	

NB Robust standard errors in parentheses.
*: significant at the 10% level; †: significant at the 5% level; ‡: significant at the 1% level.

To complement the analysis, in Table 6 we present the results of subsequent tests of the effect of loan shares retained by senior banks in the syndicate on loan pricing. We find this share to be negatively and significantly related to loan pricing. Our results confirm the findings of Angbazo, Mei and Saunders (1998) who present evidence that junior banks participating in highly leveraged transaction loans accept to earn a smaller margin when a lead lender is present who retains a large share of the loan (and thus bears broad monitoring responsibilities).

In §4.4, we provide evidence that senior banks' private knowledge about the borrower can also result in more favourable pricing. The advantage of these relationship lending

effects is strongest in the case of unrated borrowers located in developing countries being lent to by banks operating in these countries.

4.4 Local presence and currency effects

Above we have explored how insider knowledge of the borrower by the senior bank influences loan pricing and the syndicate structure. In this section we investigate whether closer knowledge of the borrower by the senior bank can be turned to the borrower's advantage. We partition our sample of loans into rated and unrated borrowers from industrialised and developing countries and distinguish between facilities where the senior arranger bank resides in the same country as the borrower and those where this is not the case. Calculating confidence intervals for loan pricing (shown in Table 7 below), we find that unrated borrowers located in developing countries incur significantly lower loan prices when the senior bank is operating in the country concerned. Presumably this is because operating in the country of the borrower it is easier for the senior bank to exploit the relationship with the borrower and to take advantage of local knowledge in the jurisdictional, legal and cultural domains. This pricing advantage only materialises in the case of non-rated borrowers from developing countries where the exclusive knowledge of the senior bank about the borrower might be highest. In fact, rated and non-rated borrowers from industrialised countries pay significantly higher spreads on facilities where the senior bank is located in the same country as the borrower. We surmise that exclusive knowledge about the borrower is lesser in industrialised countries and there may be more price savings to be achieved from economies of scale for lending syndicates by operating out of a big financial centre such as London, New York or Tokyo than out of the same country as the borrower.

Table 7: Loan pricing and senior bank vs. borrower country

Borrower country and borrower rating	Senior bank vs. borrower nationality	N	Mean	Median	95% conf. interval	
Emerging, rated	borrower nationality ≠ senior bank nationality	456	146.4	106.3	134.8	158.0
	borrower nationality = senior bank nationality	137	158.2	115.0	135.8	180.6
Emerging, not rated	≠	2,996	158.6	121.3	154.0	163.2
	=	1,325	122.3	84.0	116.4	128.1
Industrialised, rated	≠	632	116.0	70.0	107.4	124.6
	=	7,248	139.9	100.0	137.3	142.6
Industrialised, not rated	≠	2,706	161.5	144.4	157.0	166.0
	=	19,539	186.4	180.8	184.9	188.0

NB loan pricing is LIBOR spread + fees. Source: Dealogic Loanware, author's calculations.

In Tables 8 and 9 we calculate loan pricing confidence intervals for various subsamples of syndicated loan facilities classified according to whether the facility of the currency is the home currency of the borrower or of the senior bank. It is interesting to notice that there are no rated borrowers from developing countries who borrow in their domestic currency. The existence of a rating seems to systematically warrant borrowing in a hard currency[79]. Rated and unrated industrialised country borrowers are having to pay significantly more for loans expressed in their domestic currency. For all subsamples, facilities where the currency is the home currency of the senior bank cost significantly more than others, possibly reflecting a premium charged by the senior bank for potentially better knowledge about raising funds or inviting underwriters in its own currency than a foreign currency.

Table 8: Loan pricing and currency of facility vs. borrower's home currency

Borrower country and borrower rating	Currency of facility vs. borrower's home currency	N	Mean	Median	95% conf. interval	
Emerging, rated	currency of facility ≠ borrower's home currency	608	149.1	109.4	138.9	159.2
	currency of facility = borrower's home currency	0	-	-	-	-
Emerging, not rated	≠	4,335	149.0	106.5	145.2	152.7
	=	52	168.8	128.4	127.8	209.8
Industrialised, rated	≠	566	70.5	41.6	64.1	76.9
	=	7,593	144.6	110.0	142.0	147.2
Industrialised, not rated	≠	2,038	110.4	70.0	105.8	115.0
	=	21,698	192.7	200.0	191.3	194.2

NB loan pricing is LIBOR spread + fees. Source: Dealogic Loanware, author's calculations.

Table 9: Loan pricing and currency of facility vs. senior bank's home currency

Borrower country and borrower rating	Currency of facility vs. senior bank's home	N	Mean	Median	95% conf. interval	
Emerging, rated	currency of facility ≠ senior bank's home currency	275	124.2	90.0	111.2	137.2
	currency of facility = senior bank's home currency	318	170.6	136.3	155.4	185.8
Emerging, not rated	≠	2,995	127.0	93.3	123.1	130.8
	=	1,326	193.8	157.1	185.9	201.6
Industrialised, rated	≠	650	110.2	62.1	102.0	118.4
	=	7,230	140.5	100.0	137.8	143.2
Industrialised, not rated	≠	2,923	152.0	125.0	147.7	156.3
	=	19,322	188.2	187.5	186.6	189.7

NB loan pricing is LIBOR spread + fees. Source: Dealogic Loanware, author's calculations.

[79] Such as US dollar, euro, Japanese Yen, Swiss Franc and Sterling.

Table 10: Median loan pricing and borrower residence for industrialised country borrowers

year	Rated borrowers		Unrated borrowers	
	Not from EMU area	From EMU area	Not from EMU area	From EMU area
1993	150.0	58.5	175.0	62.5
1994	75.0	42.5	150.0	50.3
1995	62.5	21.0	175.0	34.5
1996	62.2	19.5	175.0	30.0
1997	62.5	16.0	175.0	42.5
1998	75.0	24.7	187.5	75.0
1999	140.6	51.5	201.3	120.0
2000	150.0	65.0	200.0	145.0
2001	137.5	73.8	200.0	152.5

NB loan pricing is LIBOR spread + fees. Source: Dealogic Loanware, author's calculations.

Table 11: Median loan pricing and senior bank residence for industrialised country borrowers

year	Rated borrowers		Unrated borrowers	
	Senior bank not from EMU area	Senior bank from EMU area	Senior bank not from EMU area	Senior bank from EMU area
1993	150.0	94.2	156.3	150.0
1994	75.0	86.3	150.0	125.0
1995	68.8	42.5	175.0	67.5
1996	62.5	44.3	175.0	99.5
1997	75.0	37.5	175.0	105.0
1998	75.0	68.8	200.0	127.5
1999	162.5	77.5	215.0	175.0
2000	175.0	122.5	215.0	162.5
2001	200.0	90.0	212.5	155.7

NB loan pricing is LIBOR spread + fees. Source: Dealogic Loanware, author's calculations.

Looking at the extent to which the advent of the euro may have contributed to these currency- or residence related pricing advantages, Tables 10 and 11 above show that the median pricing of facilities granted to industrialised country borrowers where the borrower or the senior bank are from the EMU area is lower than on facilities where they are not. The pricing advantage seems to have widened for facilities arranged by banks from the EMU area after 1999 in the case of rated borrowers.

In order to quantify these results we regress loan pricing on a number of loan and borrower characteristics listed in Table 12 below, together with dummies to signal "proximity" effects. We also test for the effects of the borrower or the senior bank

residing in the EMU area before or after 1 January 1999, i.e. the introduction of the single currency. We estimate several specifications of the model, for industrialised and developing country borrowers, rated and not rated. We introduce a numeric conversion of the actual Standard & Poor's rating at signing in the case of rated borrowers and purpose and sector dummies in the case of unrated borrowers.

Our findings on the residence of the borrower vs. that of the senior bank confirm the descriptive statistics presented earlier. Local knowledge about the borrower by the senior bank – reflected by identical residencies – can lower the pricing of loans in the case of unrated borrowers where monitoring information is not widely available to the public, the coefficient on the *bbnat* dummy is strongly significant and negative for specifications D, E and F. The absolute value of the coefficient is highest in the case of Specification D (non-rated borrowers from developing countries). We explain this by relationship effects and the importance of local knowledge, notably in the legal domain, being potentially most acute in the case of non-rated borrowers from developing countries. The *bbnat* dummy does not lower loan pricing in the case of rated borrowers; in fact in Specification A it even increases loan pricing – a premium can be demanded on loans where the senior bank has to operate out of the country of residence of the borrower when the latter is rated. Since in such a set-up, public monitoring information is widely supplied about such borrowers to the general public by rating agencies, the senior bank that has established a presence may be considered a waste of resources, resulting in higher loan pricing.

Table 12: Local presence and the advent of the euro

We estimated the following regression with robust standard errors

lndrawn = β_0 **Intercept** + β_1 **lnsize** + β_2 **maturity**+ β_3 **secured** + β_4 **g_implic**+ β_5 **g_explic** + β_6 **spn** + β_7 **cc** + β_8 **cs** + β_9 **gen** + β_{10} **prj** + β_{11} **pty** + β_{12} **tr** + β_{13} **multi** + β_{14} **constrpty** + β_{15} **finservb** + β_{16} **finservn** + β_{17} **high-tech** + β_{18} **util** + β_{19} **infrastruct** + β_{20} **popserv** + β_{21} **state** + β_{22} **tradind** + β_{23} **tansport** + β_{24} **bbnat** + β_{25} **brcur** + β_{26} **bkcur** + β_{27} **bremu98** + β_{28} **bremu99** + β_{29} **bkemu98** + β_{30} **bkemu99** + ε

- lndrawn = natural logarithm of drawn return (spread over LIBOR plus fees)
- lnsize = natural logarithm of facility size converted to US dollars
- maturity = maturity of loans, in years
- g_implic, g_explic = dummies for implicitly or explicitly guaranteed loan (implicitly in the sense for instance that the borrower is another major firm's subsidiary)
- secured = dummy for secured loan
- spn = numerical conversion of borrower's Standard & Poor's rating (on a scale of 0 to 28, with 0 standing for default and 28 for AAA)
- cc, cs, gen, prj, pty, tr, multi = purpose dummies for corporate control, capital structure, general corporate purpose, project finance, property, transport finance, multi-purpose. The residual dummy for other purposes not listed here has been excluded as it would have overspecified the model.
- constrpty, finservb, finservn, high-tech, util, infrastruct, popserv, state, tradind, transport = sectoral dummies for construction and property, financial services (banks), financial services (non-banks), high-tech industry, utilities, infrastructure, population-related services, state, traditional industry, transport. The residual dummy for other sectors not specified here was excluded from the equation as the case by default as its inclusion would have overspecified the model.
- bbnat = dummy to indicate that the residence of at least one senior bank in the syndicate is identical to that of the borrower.
- brcur = dummy to indicate that the currency of the facility is identical to the home currency of the borrower.
- bkcur = dummy to indicate that the currency of the facility is identical to the home currency of a senior bank.
- bremu98, bremu99 = dummies to indicate that the borrower is resident of a country of the EMU/euro zone (respectively before and after the first of January 1999)
- bkemu98, bkemu99 = dummies to indicate that a senior bank is resident of a country of the EMU/euro zone (respectively before and after the first of January 1999)
- ε is a random disturbance

The sectoral dummies are correlated with borrower ratings so we included them into separate specifications of the model:

Specification A:	rated borrowers from emerging economies
Specifications B and C:	rated borrowers from industrialised countries
Specification D:	unrated borrowers from emerging economies
Specifications E and F:	unrated borrowers from industrialised countries

Table 12 (continued): Local presence and the advent of the euro

Dependent variable is *ln_drawn* (natural logarithm of drawn return = LIBOR pricing + fees). Variables are defined above. OLS estimation with robust standard errors.

Variable	Specification A		Specification B		Specification C		Specification D		Specification E		Specification F	
lnsize	-0.0186	(0.041)	-0.1080‡	(0.007)	-0.1121‡	(0.007)	-0.0816‡	(0.011)	-0.1746‡	(0.003)	-0.1734‡	(0.003)
maturity	-0.0331†	(0.014)	0.0139‡	(0.003)	0.0201‡	(0.003)	-0.0097‡	(0.004)	0.0079‡	(0.002)	0.0135‡	(0.002)
secured	0.3605‡	(0.121)	0.3382‡	(0.018)	0.3313‡	(0.018)	0.2489‡	(0.026)	0.3046‡	(0.009)	0.2919‡	(0.009)
g_implic	0.4674‡	(0.116)	-0.0929‡	(0.036)	-0.1087‡	(0.035)	-0.0402	(0.043)	-0.101‡	(0.028)	-0.0966‡	(0.028)
g_explic	-0.0851	(0.130)	-0.1047‡	(0.036)	-0.0744†	(0.035)	-0.1515‡	(0.025)	-0.2395‡	(0.023)	-0.2035‡	(0.022)
spn	-0.1092‡	(0.016)	-0.1331‡	(0.003)	-0.1316‡	(0.003)						
cc	0.0703	(0.174)	0.2844‡	(0.023)	0.2778‡	(0.023)	0.6082‡	(0.067)	0.3334‡	(0.014)	0.3073‡	(0.014)
cs							0.1449‡	(0.040)	-0.0382‡	(0.013)	-0.0461‡	(0.012)
gen							0.3126‡	(0.034)	-0.0062	(0.016)	-0.0280*	(0.016)
prj							0.3139‡	(0.035)	-0.0144	(0.034)	-0.0143	(0.035)
pty							0.3492†	(0.142)	0.0757	(0.048)	0.0384	(0.046)
tr							-0.1092†	(0.052)	-0.1284†	(0.059)	-0.0957	(0.059)
multi							0.4348‡	(0.047)	0.1099‡	(0.014)	0.0744‡	(0.014)
constrpty							-0.4902‡	(0.155)	-0.0233	(0.060)	-0.0265	(0.060)
finservb							-0.6762‡	(0.152)	-0.6106‡	(0.065)	-0.5484‡	(0.065)
finservn							-0.5288‡	(0.150)	-0.3455‡	(0.061)	-0.3485‡	(0.061)
high-tech							-0.5408‡	(0.150)	-0.1049*	(0.059)	-0.0967	(0.060)
util							-0.5277‡	(0.152)	-0.4006‡	(0.061)	-0.3972‡	(0.062)
infrastruct							-0.1733	(0.241)	-0.1163	(0.074)	-0.1282*	(0.074)
popserv							-0.1292	(0.161)	-0.0411	(0.059)	-0.0312	(0.060)
state							-0.5512‡	(0.161)	-1.1095‡	(0.112)	-0.9574‡	(0.114)
trandind							-0.4528‡	(0.150)	-0.1214†	(0.059)	-0.1093*	(0.060)
transport							-0.6037‡	(0.154)	-0.2147‡	(0.063)	-0.1953‡	(0.063)
bbnat	0.1468†	(0.066)	0.0517	(0.044)	0.0088	(0.042)	-0.155‡	(0.023)	-0.0431*	(0.026)	-0.0798‡	(0.025)
brcur			0.1897‡	(0.032)	0.1292‡	(0.033)	-0.0432	(0.092)	0.4058‡	(0.021)	0.2799‡	(0.021)
bkcur	0.1608†	(0.067)	0.1026†	(0.043)	0.1152‡	(0.040)	0.286‡	(0.027)	0.1931‡	(0.026)	0.1898‡	(0.025)
bremu98					-0.3097‡	(0.052)					-0.5488‡	(0.029)
bkemu98					-0.1495‡	(0.021)					-0.1016‡	(0.016)
bremu99					-0.1822*	(0.106)					-0.3459‡	(0.034)
bkemu99					0.2417‡	(0.020)					0.1709‡	(0.016)
intercept	6.7139†	(0.329)	7.1336‡	(0.071)	7.1892†	(0.702)	5.3686‡	(0.152)	5.1479‡	(0.064)	5.3026‡	(0.065)
N	574		7,869		7,869		4,239		22,200		22,200	
R^2	0.2615		0.6153		0.6285		0.1921		0.3335		0.3595	

NB Robust standard errors in parentheses.

*: significant at the 10% level; †: significant at the 5% level; ‡: significant at the 1% level.

In a study of the US national mortgage market in Louisiana, Sirmans and Benjamin (1990) present evidence that national lenders, on average, have higher mortgage interest rates than local lenders. Our results on an international level are similar to the authors' findings but nuance it to the extent that the pricing gain is greatest when the amount of private information about the borrower held by the senior bank is potentially highest, i.e. in the case of unrated developing country borrowers. Petersen and Rajan (2000) argue that distance does not matter anymore in bank lending, at least in the US domestic market, because of the greater ease with which large national banks can access and process information about borrowers located in distant rural areas. This research provides evidence contradicting this theory for international loans, highlighting the fact that the presence of senior banks operating out of the country of residence of the borrower can lower the pricing of syndicated credits, especially in case of the most informationally opaque borrowers such as unrated ones from developing countries. Thus the access of such borrowers to the international syndicated credit markets seems an important policy concern.

Loan facilities expressed in the home currency of the borrower are significantly more expensive than others in all cases except for rated developing country borrowers (we did not include the variable into Specification A, as they tend to borrow exclusively in hard currency) and for unrated developing country borrowers.

Industrialised country borrowers from the EMU area have been able to arrange relatively cheaper loans than others, but the effect seems to have been greater before the advent of the euro than after (reflected by higher absolute values of the coefficients on bremu98 than on bremu99[80]). Curiously, while facilities arranged by senior banks from the EMU area are relatively cheaper than others before the introduction of the euro, they carry a premium after its introduction.

[80] bremu98 and bremu99 can also be interpreted as controlling for changes in institutional structure or regulatory environment.

5. Conclusion

This study, as far as we are aware, is the first to analyse the effects of individual bank characteristics including non-US banks on the structure and pricing of syndicated loans at an international level, combining individual loan transaction data from Dealogic Loanware and information on individual lenders (the supply side) from BankScope IBCA.

In accordance with the credit rationing hypothesis developed by Thakor (1996) we have shown that syndicated loan prices are lower when less capital- or liquidity- constrained banks participate in the syndication process. The relationship between bank characteristics and loan pricing, appears stronger (in significance, magnitude, or both) in the case of senior banks than of junior banks. This confirms the stronger pricing power of senior banks when arranging loans, while junior participants tend to act more as price takers. In the context of the New Basel Capital Accord which ties capital requirements more tightly than before to credit risk, the use of such market power of senior banks to set loan prices is important all the more because this paper also shows that as information about borrowers becomes less transparent, junior banks rely more on the reputation of the senior bank to determine their level of financial commitment within the syndicate. In other words, risk in the economy may end up with outsiders – even nonbanks such as insurance companies, pension funds, CDO arbitrage funds or non-financial corporations – whose knowledge about the borrower may be limited, especially if, as we show, the senior banks tend to pass on higher shares of riskier loans to junior banks. This research shows that the remuneration junior participants is influenced by the characteristics of the senior banks who arrange the credit facilities. The effect of this on loan pricing is at least as great as that of the true riskiness of the borrower.

However, we also observe a factor that should assuage policymakers' concerns about possible risk exposures associated with the price-setting practices of large senior banks arranging syndicated credits. This paper highlights the importance of local knowledge by senior syndicate banks about the most informationally opaque borrowers if those borrowers are to access international syndicated credit markets.

Literature cited

Altman, E.I. and H.J. Suggitt, 2000: Default rates in the syndicated bank loan market: a mortality analysis, Journal of Banking and Finance 24, 229-253

Angbazo, L. A., J. Mei and A. Saunders, 1998: Credit spreads in the market for highly leveraged transaction loans, Journal of Banking and Finance, 22(10-11), pp. 1249-1282

Banerjee S. and O. Cadot, 1996: Syndicated lending under asymmetric creditor information, Journal of Development Economics, (49)2, pp. 289-306

Banerjee S. and O. Cadot, 1996: Syndicated lending under asymmetric creditor information – Erratum, Journal of Development Economics, (50)1, pp. 211-212

Berger, A., 1995: The relationship between capital and earnings in banking, Journal of Money, Credit, and Banking, 27, pp. 432-456

Berger, A. and D.B. Humphrey, 1997: Efficiency of financial institutions: international survey and directions for future research, European Journal of Operational Research 98, pages 175-212.

Berger, A. and G. Udell, 1990: Collateral, loan quality and bank risk, Journal of Monetary Economics 25, 21-42.

Bester, H., 1985: Screening vs. rationing in credit markets with imperfect information, American Economic Review 75, 850-855.

Boot, A.W.A and A.V. Thakor, 2000: Can Relationship Banking Survive Competition? Journal and Finance, Vol 51, No. 2 (April), 679-713

Chen, A.H., S.C. Mazumdar and Y. Yan, 2000: Monitoring and bank loan pricing, Pacific-Basin Finance Journal 8, 1-24

Degryse, H. and S. Ongena, 2002: Distance, Lending Relationships and Competition, Centre for Studies in Economics and Finance Working Paper No. 80, Dipartimento di Scienze Economiche – Università degli Studi di Salerno

Dennis, S. and D. Mullineaux, 2000: Syndicated loans, Journal of Financial Intermediation 9, 404-426

Eichengreen, B. and A. Mody, 2000: Lending booms, reserves and the sustainability of short-term debt: inferences from the pricing of syndicated bank loans, Journal of Development Economics, Vol. 63, pp. 5-44.

Flannery, M., 1989: Capital regulation and insured banks' choice of individual loan default risks, Journal of Monetary Economics 24, 235-258

Freixas, X. and J.C. Rochet, 1997: The Microeconomics of Banking, MIT Press

Jones, J., W. Lang and P. Nigro, 2000: Recent Trends in Bank Loan Syndications: Evidence for 1995 to 1999, Economic and Policy Analysis Working Paper 2000-10, Comptroller of the Currency Administrator of National Banks

Kishan, R.P. and T.P. Opiela (2000). Bank Size, Bank Capital, and the Bank Lending Channel, Journal of Money, Credit and Banking 32(1), pp. 121-141

Madan, R., R. Sobhani and K. Horowitz, 1999: The Biggest Secret of Wall Street, Paine Webber Equity Research

Patrick, H., 1997: How the Japanese Financial System and Its Main Bank System Have Dealt with Generic Issues of Financial Development, remarks at presentation to the World Bank Mediterranean Development Forum, Marrakesh, Morocco, May 13

Pavel, C. and D. Phillis, 1987: Why banks sell loans: an empirical analysis, Economic Perspectives, Federal Reserve Bank of Chicago 3-14

Pennachi, G., 1988: Loan sales and the cost of bank capital, Journal of Finance 43, 375-396

Petersen M.A. and R.G. Rajan, 2000: Does Distance Still Matter? The Information Revolution in Small Business Lending, Kellogg Graduate School of Management Northwestern University and Graduate School of Business University of Chicago, unpublished manuscript

Simons, K., 1993: Why do banks syndicate loans? New England Economic Review, Federal Reserve Bank Boston, 45-52

Sirmans, C.F. and J.D. Benjamin, 1990: Pricing Fixed Rate Mortgages: Some Empirical Evidence, Journal of Financial Services Research 4: 191-202

Smith, C. and J. Warner, 1979: On financial contracting: An analysis of bond covenants, Journal of Financial Economics 7, 111-161.

Sommerville, C.T, 2001: A Booming Market is Where the Heart is: Local vs National Lenders and Real Estate Development Financing, University of British Columbia, unpublished manuscript

Thakor, A., 1996: Capital requirements, monetary policy and aggregate bank lending: Theory and empirical evidence, Journal of Finance 51, No. 1 (March), 279-324

Wagster, J., 1996: Impact of the Basel Accord on international banks, Journal of Finance 51, 1321-1346.

Appendix 1: The literature about the influence of lender characteristics on the supply of syndicated credits

Authors	Lead bank's characteristics as independent variables	Dependent variable	Methodology and data	Main results
Pavel and Phillis (1987)	• Regulatory taxes (reserve requirements, primary capital ratio, total domestic deposits/total insured deposits) • Degree of loan type diversification • Funding/Liquidity (growth rate of the loan portfolio) • Loan quality (charge-offs/total loans) • Comparative advantage (Non-interest expense in year y)/(total loans sold during year y + total loans at end year y) • Total Assets • Bank member of multibank holding cy	Probability of bank being a seller of loans	The data used for the study are survey data for 13,763 banks from the *Reports of Condition* and *Reports of Income* for 1983, 84 and 85 filed with the appropriate regulatory agency and from the *Report of Transactions Accounts, Other Deposits and Vault Cash* as of December 24, 1984 filed with the Federal Reserve. Logit and Tobit models are run with banks' decision to sell or not to sell loans (and amounts sold) as dependent variable.	Bank's size, its ratio of non-interest expense to loans and its level of diversification have the largest impact on its probability to sell loans. Undiversified banks are likely to sell loans. Regulatory tax burden also has a large impact. An increase in the bank's capital ratio or a decrease in its net charge-offs both reduce the probability of selling loans. Twenty-three per cent of all commercial banks in the sample act as investment banks, i.e. selling off loans throughout the year. For these banks, their comparative advantage in originating and servicing loans as well as their size, that is, their level of sophistication, are more important than regulatory taxes in their decisions to sell loans. This is especially true for the 100 largest banks in the sample.

Authors	Lead bank's characteristics as independent variables	Dependent variable	Methodology and data	Main results
Sirmans and Benjamin (1990)	• Lender type (national mortgage banker, regional mortgage banker or local mortgage banker)	Fixed rate mortgage interest rate	Weekly mortgage quotations (primary rates) are taken from 54 different Baton Rouge, Louisiana lenders over a two-year period beginning in 1985. OLS regression of mortgage interest rates is run on lender geographical characteristics, loan processing time, collateralisation and securitisation dummies	National lenders, on average, have higher mortgage interest rates than local lenders.
Simons (1993)	• Capital-to-Asset Ratio • Loan-to-Capital Ratio	Share of loan retained by lead bank on its books	4,332 syndicated loans' characteristics (corresponding to 3,601 borrowers) are taken the US Shared National Credit Program[81] database for 1991. from the OLS regressions of the share of loans retained by the agent bank and of the ratio of bank loan exposure to bank capital on lender characteristics, controlling for loan quality and borrower sector	Agent banks who are more capital-constrained are also more likely to retain on their books a smaller share of syndicated loans. The agent bank's capital-to-asset ratio is positively and significantly related to the share of syndicated loans retained on the agent's books. The effect of the loan-to-capital ratio is more ambiguous. Agent banks typically hold greater shares of real estate loans, which in 1991 were typically more risky than other types of loans. There is no indication of opportunistic behaviour in 1991 because agent banks are found to keep on their books a smaller share of higher-quality loans.

[81] US regulatory data. The database is jointly owned by the three US federal regulatory agencies – the Federal Reserve, the Federal Deposit Insurance Corporation and the Office of the Comptroller of the Currency.

Authors	Lead bank's characteristics as independent variables	Dependent variable	Methodology and data	Main results
Angbazo, Mei and Saunders (1998)	• Lender behaviour (retention of a share of the loan by the lead bank)	Loan Spread	OLS regression of Highly Leveraged Transaction (HLT) loan spreads on a series of loan and borrower characteristics and lender behaviour (retention of share of the loan by the lead bank). 4,122 HLT deals are taken from the Loan Pricing Corporation's database for 1987-94.	HLT loan spreads are lowered by the presence of a lead lender who retains a large share of the loan (and thus bears broad monitoring responsibilities). Other members of the syndicate then supposedly perceive that the risk is lower in that case and hence are prepared to earn a lower margin.
Dennis and Mullineaux (2000)	• Dummy to indicate if managing agent has a bank charter or not • Growth of loan portfolio, ratio of noncurrent loans to total loans, gearing, tier1 ratio • Loan facility's size divided by equity of managing agent bank • Ratio of loan charge-offs to total loans • Frequency of managing agent bank's repeat business • Managing agent's rating	Likelihood of the loan being syndicated or not	3,410 syndicated loan facilities comprising bank and non-bank lenders taken from the Loan Pricing Corporation for the 1987-95 period. controlling for loan and borrower characteristics, including presence of borrower rating or stock listing to control for cross-monitoring effects. A two-step procedure is used to estimate the decision to syndicate a loan.	A loan is more likely to be syndicated as the managing agent is more heavily involved in repeat business, as agent's credit rating improves and as the agent is a bank rather than a nonbanking institution. The identity of the managing agent also influences whether a particular loan will be syndicated. Moreover, although banks are more likely to engage in syndication when they are capital constrained (in accordance with the regulatory tax hypothesis for loan sales developed by Pavel and Phillis, 1987 and Simons, 1993), managing agents of syndicates hold larger proportions of information-problematic loans on their portfolios. This is in keeping with the standard view that the saleability of a debt contract depends on the scale and scope of information asymmetries, thus engaging in relationship-oriented finance that draws on their specialised monitoring skills.

Authors	Lead bank's characteristics as independent variables	Dependent variable	Methodology and data	Main results
Chen, Mazudmar and Yan (2000)	• Dummy for presence of Japanese bank in the syndicate • Dummy to indicate whether loan was written before or after the Basel Accord of 1988 • Joint dummy based on the two variables above	Loan Spread	A sample of 22,224 loan facility records for 1982-93 is obtained from the Loan Pricing Corporation's database. Considering only listed borrowers reduces the sample size to 6,352 loans. Model with logarithmic transformation is used to regress the loan spread on borrower balance sheet and share-price characteristics, presence of public debt or rating (to test the cross-monitoring hypothesis) and loan characteristics	US branches of Japanese banks that participate in syndicated lending to US firms charge significantly higher spreads compared to syndicated loans to US firms without Japanese participation. This pricing disparity is primarily due to regulatory differences (that is, tougher regulation imposed on US banks). Banks price loans primarily on their own monitoring, i.e.. the borrower's bond rating or the ease with which loan contract covenants can be implemented on assets in place do not affect loan pricing in a significant way. Japanese banks seem to have been extracting premia from borrowers who would otherwise have faced a credit crunch.
Jones, William and Nigro (2000)	• Leverage ratio (equity capital to assets; proxy for capital constraints) • Geographical distance from borrower • Quality of loan portfolio	Share of loan retained by lead bank on its books	Over 23,000 syndicated loans for the period 1995 to 1999 are taken from the US Shared National Credit Program database. Panel regression with random effects to test the effect of capital constraints, loan quality and information variables (relative size of loan, presence of borrower rating or stock listing, sector; loan quality, maturity and size) on an agent bank's share of syndicated loans held in portfolio.	Capital constraints positively influence the share of loans held by agent banks. Agent share tends to be lower if the borrower is a public company and the loan is large (i.e. in cases where the agent's informational advantage is lesser). While agent banks generally hold a larger share of their low-quality loans, agent banks that have a greater portfolio concentration of lower quality credits hold a smaller share of their loans. That is, some banks specialise in originating low-quality loans and these banks are relatively successful in finding participants for such loans.

Appendix 2: Correlation matrices

Table 13: Correlation matrix between variables – loan pricing and senior bank characteristics

	lndrawn	lnsize	maturity	spn	deqas	dllr	dci	dliq	lnassts	droa	diita
lndrawn	1										
lnsize	-0.4921*	1									
maturity	0.2267*	-0.1520*	1								
spn	-0.7297*	0.5083*	-0.2391*	1							
deqas	-0.0110*	0.0302*	-0.0287*	0.0361*	1						
dllr	0.0577*	-0.0429*	-0.0022	-0.0429*	-0.0193*	1					
dci	0.0371*	-0.0181*	0.01	-0.0409*	-0.0708*	-0.0626*	1				
dliq	0.0126*	-0.0045	0.0342*	-0.0251*	-0.0551*	-0.0601*	0.0205*	1			
lnassts	-0.0378*	0.0802*	-0.0559*	0.0622*	0.1391*	-0.0200*	0.0031	0.0072	1		
droa	0.0096	0.0159*	-0.0115*	0.0138*	0.3254*	-0.2699*	-0.1773*	0.0584*	0.0305*	1	
diita	0.0412*	-0.0375*	-0.0083	-0.0262*	0.0415*	-0.0230*	0.1869*	-0.1194*	-0.1266*	-0.0314*	1

*: significant at the 10% level

Table 14: Correlation matrix between variables – loan pricing and junior bank characteristics

	lndrawn	lnsize	maturity	spn	deqas	dllr	dci	dliq	lnassts	droa	diita
lndrawn	1										
lnsize	-0.5034*	1									
maturity	0.2569*	-0.1210*	1								
spn	-0.7709*	0.5086*	-0.2545*	1							
deqas	-0.0420*	0.0382*	-0.0365*	0.0468*	1						
dllr	0.1098*	-0.0495*	-0.0415*	-0.0727*	-0.0573*	1					
dci	0.0368*	-0.0356*	0.0127*	-0.0315*	-0.0677*	-0.0550*	1				
dliq	-0.0136*	0.009	-0.0134*	0.0133*	0.0905*	-0.0630*	0.0750*	1			
lnassts	-0.0784*	-0.0105	-0.0682*	0.0858*	0.0908*	-0.1135*	0.0132*	0.0433*	1		
droa	-0.0468*	0.0436*	-0.0148*	0.0379*	0.3908*	-0.2200*	-0.2704*	0.1007*	0.0002	1	
diita	0.1002*	-0.0940*	0.0274*	-0.1048*	0.0093	0.1035*	0.2473*	-0.1199*	-0.1239*	-0.0167*	1

*: significant at the 10% level

Table 15: Correlation matrix between variables – share of loan retained by senior bank

	shr	lndrawn	maturity	league	eqas	llr	liq	iita	spn
shr	1								
lndrawn	0.1147*	1							
maturity	-0.0413*	0.1568*	1						
league	-0.0610*	-0.0519*	-0.0771*	1					
eqas	0.0614*	0.1168*	-0.1027*	-0.0279*	1				
llr	-0.0241*	-0.0384*	0.0624*	0.0068*	-0.1119*	1			
liq	-0.0784*	-0.0584*	-0.0081*	0.4984*	-0.1736*	0.0363*	1		
iita	0.0661*	0.0504*	-0.0253*	-0.0523*	0.3396*	0.0225*	-0.3521*	1	
spn	-0.1122*	-0.7274*	-0.2426*	0.0467*	-0.0756*	0.0042	0.0402*	-0.0306*	1

*: significant at the 10% level

SUMMARY AND CONCLUDING REMARKS

1. Summary

THE MAIN FINDINGS OF THIS THESIS can be summarised as follows.

In Paper 1, we first defined the main features of a syndicated loan and explained why it lay on the borderline between public and private finance. The roles and motivations of the various parties (lender and borrower) to a syndicated credit were discussed and the different components of pricing were clarified. The historical analysis that followed identified three important periods: (i) the 1970s, when syndicated loans were a major source of finance for developing countries, (ii) the 1980s, marked by a period of sharp contraction in syndicated lending in the aftermath of the Mexican debt moratorium of 1982, (iii) the renaissance of the 1990s. We moved on to present the richness of the breakdown available in the micro-level syndicated loan data used, and analysed the evolution of various loan market segments corresponding to specific borrower types, nationalities, ratings, lender nationalities, facility types, currencies, purposes and maturities. We presented a logical loan pricing equation that identified loan, borrower, lender and market characteristics as determinants of loan pricing and served as a basis for the extensive risk-return analysis carried out in the remainder of the thesis. We began that analysis in Paper 2 by focusing on syndicated lending to developing countries, which were historically the first recipients of such credits, thus constituting a very important market segment.

In Paper 2 we began by reviewing the existing academic literature on the pricing and availability syndicated credits to developing countries. For the micro-economic determinants of loan pricing, the focus was on the information asymmetry literature of the late 1970s and early 1980s (Leland and Pyle, 1977; Stiglitz and Weiss, 1981; Fama, 1985; Diamond, 1991) and for the macro-economic determinants, on the external debt literature (Sachs, 1981, 1984; Eaton and Gersovitz, 1981, Edwards, 1983, 1986; Boehmer and Megginson, 1990, Eichengreen and Mody, 2000). We subsequently presented a simple loan pricing model including both micro- and macro-economic factors as determinants of the loan price, discussing the expected effects of each variable. The pricing model was then estimated for a sample of 5,000-plus developing country loans signed between 1993 and 2001. Inferences were made about the relative influence of macro- and micro- economic variables as determinants of loan pricing.

Furthermore, evidence was provided about the relationship between market structure and bank market power together with perceived risk concentration on the one hand and loan pricing on the other.

With regards to the effects of macro-economic factors on loan pricing, we found that higher values of indicators of developing countries' economic weakness (such as high ratios of debt to GDP, of debt service to exports, assistance from the IMF) resulted in higher loan prices. Meanwhile, favourable indicators (like high real GDP growth, high ratio of domestic credit to GDP) tended to lower loan pricing. This is in line with the existing literature. Our results establish a positive relationship between the borrower country's ratio of reserves to GDP and loan pricing in accordance with the willingness-to-pay approach developed by Gersovitz (1985).

Concerning micro-economic determinants of loan pricing, we presented evidence that loans granted to developing country borrowers for merger and acquisition purposes were pricier than other loans. Like Kleimeier and Megginson (2000), we found that guarantees – albeit only explicit[82] ones – can lower loan pricing, while collateralised facilities are more expensive, potentially because they are very risky. This result is similar to the findings of Smith and Warner (1979) and Berger and Udell (1990) on collateral.

Overall, the results show that risk is appropriately priced into loans, but lenders seem to attach more importance to macro-economic factors than to micro-economic ones when determining loan prices. In particular, if abstraction is made of macro-economic conditions, bank borrowers enjoy a discount on their loans over non-bank ones because of the presence of implicit or explicit state guarantees on their obligations. But that discount disappears when macro-economic factors are controlled for, possibly because bad macro-economic conditions prevailing in a country can wipe out the ability of the government concerned to bail banks out in times of crises. This result can be related to the findings of Martinez Peria and Schmukler (2001) who note that market discipline is present among insured depositors in selected Latin American countries, demonstrating that deposit insurance schemes are not always fully credible. Likewise, the significance

[82] Materialised by a written pledge, in contrast to implicit guarantees which can arise when the borrower is simply the emerging market subsidiary of a major Western corporation.

and absolute values of our coefficients on micro-economic variables are often lower when macro-economic variables are also present in the model.

The study also provides evidence of banks potentially using their market power against borrowers in developing countries: they charge extra for changing loan terms once the agreement has been signed, and grant higher discounts on relationship or club loans than on facilities where a high number of institutions compete to provide loans. In addition – possibly also because of higher perceived concentration or risk – we find that premiums are charged to borrowers from countries that depend relatively more heavily on the syndicated loan market to finance themselves. The same is true for borrowers from "wealthier" developing countries (countries with relatively higher purchasing power parity shares of world GDP).

All this poses a particular challenge for economic development in those countries whose new loan facilities are only sufficient to roll over existing lines of credit (i.e. provide no net new funding). They cannot seem to obtain funding at competitive rates for improving the quality of state-provided services such as health, education, for participating in world trade, or for supporting high-tech or innovative sectors. No loans are available at a discount for these countries and this inhibits their growth potential and future convergence prospects along the lines suggested by Balassa (1986), Barro and Sala-i-Martin (1992) and Barro (1997, 1999).

Since bonds and loans are competing means of raising funds and emerging country borrowers compete for investors' money with particular market segments such as the US junk bond market, and since contagion can happen from one market segment to another easily in times of financial crises or turbulence, we then extended the analysis of Paper 2 to industrialised country loan markets and to emerging and industrialised country bond markets. In Paper 3, we began by reviewing the loan and bond pricing literature (e.g. Berlin and Mester, 1992; Kamin and von Kleist, 1999; Bolton and Freixas, 2000), and then re-estimated, for developing and industrialised country loans and bonds, refined versions of the developing country loan pricing model elaborated in the preceding article. We compared the riskiness of developing and industrialised country bonds and loans with reference to the pecking order theory, explored how market sentiment may have affected pricing by spilling over from one market segment

to the other. We drew inferences about the relative influences on pricing of market structure, perceived risk concentration and bank market power on each market segment.

Our comparison of the four market segments (developing and industrialised country borrowers in loan and bond markets) found that on average, developing country bonds had been riskier than developing country loans and industrialised country loans riskier than industrialised country bonds. This provides confirmation, for industrialised countries, of the "pecking order theory" of external financing (Myers, 1984; Myers and Majluf, 1984; Diamond, 1991). Those theories posit that companies use internal money (retained profits) in the first instance to finance their development and when they subsequently seek external funds, they graduate from bank finance to bond finance as information about their creditworthiness becomes more complete. However, we only provided empirical verification of this for industrialised country borrowers. In developing countries, our results suggested, rather, the existence of a "reverse pecking order theory", with bonds appearing more costly than loans.

We also examined how contagion may have taken place from one market segment to the other in times of financial turbulence. We provided evidence that following the Asian, Russian and Latin American financial crises of 1998-99, market sentiment translating into higher risk premia demanded from borrowers by lenders may have spilled over from developing to industrialised countries in the case of loans, but less so for bonds. The comparison of market structure on the respective market segments led to the conclusion that market access appears to have been more difficult for developing country borrowers on loan markets, where banks and investors may have exercised their market power to the greatest extent or where perceived higher concentration of risk may have resulted in higher premia being demanded, more than vis-à-vis industrialised country borrowers and on bond markets.

While some of the existing literature suggests that the pricing of loans and bonds can empirically be estimated in the same way, we found differences in the way the two instruments were priced. Furthermore, pricing mechanisms for developing country borrowers appeared to differ from those observed for industrialised countries.

Firstly, the corruption index in the borrower's country was significantly related to bond and loan pricing in developing countries, but not in industrialised countries, possibly mirroring investors' view that the legal infrastructure may be insufficient in developing countries to enforce contracts. This result can be further be related to the findings of Bilson, Brailsford and Hooper (2002) who note that political risk is important in explaining stock return variation in individual emerging markets, particularly in the Pacific Basin, but not in developed markets. Our paper helps partially answer the research issue raised by these authors by providing evidence that there is some political risk exposure in emerging markets that is different to any exposure in developed markets, and this has implications for asset pricing and portfolio decisions in these markets.

Secondly, in accordance with Kamin and von Kleist (1999) we failed to detect a significant relationship between the pricing of developing country loans and bonds and industrialised country interest rates. Kamin and von Kleist note that upturns in industrialised country interest rates may thus imply smaller than expected upturns in developing country spreads. However, we detected a significantly negative relationship between industrialised country interest rates and industrialised country loan and bond spreads. This could reflect poorer credits dropping out of the market during a period of high interest rates.

We also analysed the structure of industrialised and developing country loan and bond markets during the 1990s. Regarding currency effects, we found that industrialised country bonds and developing country loans denominated in Japanese yen were relatively cheaper than others, and interpreted this as a funding cost effect for investors based in Japanese yen. This is in accordance with Eichengreen and Mody (2000). We also found industrialised country bonds denominated in euro or its predecessor currencies to be relatively cheaper than others, possibly reflecting the higher liquidity of that market segment. This effect did not materialise for developing country bonds denominated in euro, possibly because of relatively lower liquidity in that market segment.

The liquidity of markets for developing country bonds should be an area of concern for policymakers' attention all the more because this research also provides evidence of the

still relatively low reliance of developing countries on bonds – at the expense of loans – to finance their participation in world trade. Furthermore, when lending to developing country borrowers, banks are found to potentially exploit their market power. Possibly also because of higher perceived concentration of risk, the world share of the country concerned as a recipient of syndicated loans raises loan pricing and there is no positive reaction from the market in case of loan deals whose amount has been increased from the original facility amount. Finally, this research highlights the lower occurrence of contagion in financial markets from developing to industrialised country borrowers in the case of bonds than in the case of loans.

In Paper 4, we extended the two preceding demand-side papers by looking at (1) what the effects of lender characteristics – including location – are on loan specifications (2) how information asymmetry issues between lenders and borrowers common in normal lending manifest themselves among different layers of lenders in syndicated lending. We first reviewed the theoretical and empirical literature on lenders' capital and liquidity constraints resulting in credit rationing (e.g. Thakor, 1996), on agency issues between banks of different seniorities operating in syndicates (e.g. Dennis and Mullineaux, 2000) and on the effects of relative borrower/lender location on loan specifications (e.g. Petersen and Rajan, 2000). Following Simons (1993), Jones, William and Nigro (2000) and Dennis and Mullineaux (2000) we then estimated a loan pricing model where we used loan and lender characteristics as explanatory variables. Distinction was made between lenders of different seniorities in the syndicate with a view to gauging their relative price-setting power. Evidence was provided on the relationship between bank capitalisation and loan pricing, and the possible exploitation of private information about the borrowers by senior syndicate members vis-à-vis junior syndicate participants.

We established a positive relationship between bank capital constraints and syndicated loan pricing, in accordance with the credit rationing hypothesis developed by Thakor (1996). The characteristics of senior banks responsible for putting together the syndicate and arranging the loans were found to be more closely related to loan pricing (in significance, magnitude, or both) than those of junior banks who participated in the syndicates at a lower level. This appears to suggest that the pricing power of senior banks is stronger, leaving junior participants to act more as price takers. In the context

of the New Basel Capital Accord which ties capital requirements more tightly than before to credit risk, the possible use of such market power by senior banks to set loan prices is all the more important because this research also shows that as information about borrowers becomes less transparent, junior syndicate participants rely more on the reputation of the senior bank to determine their level of financial commitment within the syndicate. Transfer of risk in the economy to outsiders with possibly limited knowledge of the borrowers – banks or even nonbanks such as insurance companies, pension funds, CDO arbitrage funds or non-financial corporations – should be a concern for policymakers, especially, as we show, senior banks tend to pass on larger portions of riskier loans to junior banks. Likewise, caution should be exercised by policymakers if the pricing of risk is influenced by the characteristics of the originators (the senior banks) at least to the same extent as it compensates for the true riskiness of the borrower.

2. General discussion

Overall, the thesis makes several contributions to the existing academic literature on bond and loan pricing and bank market structure.

To begin with, we use measures of loan specifications that innovate over previous empirical studies, which rely on spreads over a benchmark interest rate (e.g. LIBOR) to represent syndicated loan pricing. However, this does not represent the true economic cost of loans as additional pricing factors, such as fees, are typically charged in loan syndications. Our empirical analysis uses a pricing measure known as the drawn return which includes both fees and spreads, and is therefore a more comprehensive measure than looking at merely spreads. In addition, we distinguish between the notion of explicit guarantees and implicit guarantees as determinants of loan pricing: the former are explicit commitments by third parties while the latter can arise from ownership of the borrower by a parent company. We find different effects on loan pricing.

We contribute to the developing country external finance literature in several respects. We investigate the relative importance of macro- and micro-economic determinants of

the pricing of syndicated loans granted to developing country borrowers; we find that macro-economic factors dominate micro-economic ones. Borrower market share and market structure variables are explicitly introduced into the analysis and conclusions are derived from this pertaining to banks' market power and the effects of perceived risk concentration on loan pricing. We establish that borrowers from developing countries that are more heavily dependent on syndicated loans are charged more to access funds.

As an innovation over numerous earlier studies which focus on industrialised or developing countries separately, industrialised and developing country borrowers' access to bond and loan markets is analysed together, with a view to comparing pricing, market structure and spill-over effects from one market segment to another in times of financial turbulence. Empirically, we establish differences in the way bonds and loans are priced, although theory suggests similarities. We also detect differences in pricing mechanisms between developing and industrialised countries. Regarding spill-over effects, we find that market access conditions faced by developing country borrowers can influence those faced by industrialised country borrowers. For the first time, the effects of the corruption index are studied on loan and bond pricing for developing and industrialised country borrowers. We find differences in the way corruption and political risk influence market access conditions for developing country borrowers on the one hand and industrialised country borrowers on the other.

Our contribution to the literature on the supply-side of syndicated lending consists in an investigation of the relationship between lender characteristics and loan specifications at an international level for the first time. Most studies so far have used US data, mainly from regulatory, i.e. national returns. But non-US banks appear to have arranged 54% of loans for US borrowers in 2001 and funded 51% of them, so our study makes an important contribution to the extant literature by extending the analysis to encompass the global syndication market.

Furthermore, for the first time as far as we know, distinction is made between banks of different seniorities within syndicates when analysing the relationship between lender characteristics and loan specifications. Senior banks are found to have more pricing power in syndicates while junior banks tend to act more as price takers. Junior banks appear to rely more on the reputation of the senior banks when participating in

syndications where information about the borrower is more opaque. Contrary to the previous literature, senior banks are found to behave in a potentially opportunistic way vis-à-vis junior banks by passing on relatively larger shares of riskier loans to junior participants after they have syndicated them.

To all intents and purposes, in contributing a detailed micro-economic analysis of borrower access to loan and bond markets, this thesis verifies the existence of Myers' pecking order theory for industrialised country borrowers by providing evidence that the loans granted to these borrowers have been riskier during the 1993-2001 period than bonds issued over the same period. On the other hand, in the case of developing country borrowers, the pecking order theory is reversed, with bonds being riskier than loans.

The thesis also contributes to the extant literature by being the first study of its kind to examine the relationship between lender characteristics and the specifications of individual syndicated loan transactions at an international level, distinguishing between banks of different seniority present in the syndicates. It thus adds to the discussion about the new Basel II Capital Accord – one of whose aims is to tie banks' capital requirements more closely to the risks they take – by directly linking bank capitalisation, loan pricing (some of the loan spreads must in principle compensate banks for the cost of their capital) and other loan characteristics at a transaction level.

Different competitive effects are highlighted, in particular the greater price-setting power of senior banks relative to junior banks. Senior banks may exploit these competitive effects vis-à-vis junior syndicate participant banks and borrowers, in particular when lending to the most informationally opaque borrowers.

Further evidence on the potential use of banks' market power vis-à-vis borrowers is provided in other parts of the thesis. Indeed, in the second paper, we demonstrate that banks potentially exploit their market power when engaging in syndicated loans to developing country borrowers. This phenomenon, most frequent in bank lending to developing country borrowers, (and less so in lending to industrialised country borrowers and on bond markets), can be seen as a concern for policymakers, especially because our results also reflect the relatively low participation of developing countries in world trade, or at least the low contribution of syndicated credits to support such

participation. Some of the most poorly rated developing countries further face a maturity trap because they are only able to obtain short-term loans which they can only use to refinance existing lines of credits (instead of genuinely improving state services). So for officials the issue is to find some form of financing for these countries to escape this maturity trap.

The results offer various avenues that could be explored to help alleviate shortcomings in the availability of foreign funds to developing country borrowers.

Firstly, as reflected in the results of the fourth paper, the local establishment of financial institutions acting as senior loan arrangers with local knowledge about the most informationally opaque borrowers and their countries appears to be important if those borrowers are to access international syndicated credit markets. Efforts to improve the local establishment of senior banks must come with safeguards attached, though. Boot and Thakor (2000) underline that interbank and capital market competition can either leave banks to act like capital market underwriters and originators of transaction loans or make them return to their roots as relationship lending experts. On the other hand, the greater, and more timely availability of borrower credit records, as well as the greater ease of processing these, makes it easier for banks to originate transaction loans even when they are at a great distance from the borrower (Petersen and Rajan, 2000). This research provides evidence for the interpretation of Boot and Thakor. Banks appear to perform a unique service especially when lending locally to the most opaque borrowers (i.e. non-rated borrowers in developing countries). Goldberg, Dages and Kinney (2000) also argue that foreign bank presence may increase the stability of available lending, by diversifying the capital and funding bases supporting the supply of domestic credit, especially in small and/or volatile economies. They further note that foreign banks improve the quality, pricing and availability of financial services, besides enhancing infrastructure, transparency and regulation[83]. However there may be risks for the stability of the financial system if such risk is subsequently purchased by outsiders with limited knowledge about the risk, who, in addition, are influenced by the reputation of the senior arrangers to make their lending decisions. Just as rating agencies' opinion about fund managers' professionalism cannot by itself justify investors' decision to buy

[83] Although one of their major conclusion is that bank health, not ownership per se, has been critical in the growth, volatility and cyclicality of bank credit.

into a particular fund, junior loan participants cannot fully rely on the reputation of senior loan arrangers to make their lending decisions. Compelling loan participants to make their own risk analysis to a greater extent would, in this context, contribute to improving financial stability.

Secondly, the findings of the third paper suggest that developing countries' access to bond markets could be enhanced, especially for the compartments denominated in euro, which appear to be potentially less liquid than others. Nowadays, the majority of emerging country bond issuers is sovereign and enhancing corporate access to emerging country bond markets could be a vital step in the right direction. Multilateral institutions that guarantee specific tranches of syndicated loans against political risk (e.g. suspension of transfers in foreign currency) also have a role to play as catalysts for marketing the non-guaranteed tranches of such loans to commercial banks. A history of successful loan contracting and repayment this initiated could then serve as a catalyst for issuing bonds.

Lastly, our evidence regarding the significance of the corruption index as a determinant of the pricing of foreign funds to developing country borrowers – but not for industrialised country borrowers – underscores the influence of a legal/political environment that is permissive to financial deepening in developing countries, as illustrated in seminal work on financial liberalisation[84] (McKinnon, 1973; Shaw, 1973; Fry, 1988). This suggests strong incentives for developing countries to improve their legal and political environments so as to promote access to cheaper international borrowing and therefore greater financial deepening.

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[84] Goldberg, Dages and Kinney (2000) also note that the Asian Crisis amply demonstrated a range of deficiencies in local financial systems, precipitating calls for reform in accounting and disclosure practices, bank corporate governance, and home country supervision and regulation.

3. Limitations and suggestions for further research

Our work is subject a number of limitations. We describe them below and provide suggestions for further research.

To begin with, the individual loan transaction data that we use are available as from 1993 onwards. Although we control for the effects of the macro-economic cycle in most of our loan pricing regressions, all our empirical work is cross-sectional. So there is scope for exploring the time-series properties of these data further or to perform the analysis over a longer period of time. We are also hampered by the frequency mismatch of the macro-economic data – most of it available on a yearly basis – and the loan transaction data – available on a daily basis.

Moreover, all the individual loans data used corresponds to announced or signed facilities, and we do not know to what extent and when they are drawn. Indeed, ascertaining drawing patterns for each credit line would unfortunately require such detailed access to banks' proprietary balance sheet information that it is practically impossible. Even information about some of the smaller banks' public balance sheets is difficult to obtain. Besides, credit risk transfer mechanisms such as loan trading and credit derivatives further influence the way in which loan commitments result in portfolio exposure. The effects of these mechanisms should become easier to gauge in the near future as professional bodies such as the Loan Market Association in Europe, the Asia-Pacific Loan Market Association in Asia and the Loan Pricing Corporation in the US, and indeed the third pillar of the Basel II Capital Accord contribute to more information disclosure in this domain.

Linking the specifications of individual loan transactions with detailed information on borrowers' balance sheet and profit and loss statement, in addition to detailed information on sector and nationality, could further enrich our analysis of corporate borrowers. For instance, no research exists as far as we know that explores the relationship between the conditions of firms' funding via syndicated loans and the evolution of some of their financial indicators such as leverage or profitability. Adding a dynamic aspect by looking at stock price movements and linking that information to the evolution of funding costs could also be explored as an avenue for further research.

Further analysis linking individual loan transactions with more detailed micro-economic information on borrowers could draw on Preece and Mullineaux (1996) who examine the size of abnormal returns achieved by borrowers on the stock market as a function of the size of the syndicates they obtain syndicated loans from. The papers of James (1987), Lummer and McConnell (1989), Wansley, Elayan and Collins (1992), Shockley and Thakor (1993), Kwan (1994), Billett, Flannery and Garfinkel (1995) could also be usefully expanded. These studies show that the existence of a bank-borrower relationship increases firm value. Some of these studies also indirectly provide evidence about the value of the strength of a bank-borrower relationship. For instance, it is found that announcements of renewals of existing bank letters of credit often generate greater abnormal market returns than do announcements of new letters of credit.

Finally, further research could be undertaken to examine the effects of financial sector development on the pricing of foreign funds more explicitly than by introducing the ratio of domestic credit to GDP into our loan and bond pricing models as a proxy for the extent of such development. Future research could also focus on the link between financial structure, bank profitability and economic development (King and Levine, 1993; Demirgüç-Kunt and Huizinga, 2000; Beck and Levine, 2002; Demirgüç-Kunt and Maksimovic, 2002) by using a wider range of firm- and bank-level information.

Literature cited

Balassa, B., 1986: Policy Responses to Exogenous Shocks in Developing Countries. The American Economic Review, Volume 76, Issue 2, Papers and Proceedings of the Ninety-Eighth Annual Meeting of the American Economic Association, May

Barro, R.J., 1997: Determinants of Economic Growth: A Cross-Country Empirical Study, Development Discussion Paper No. 579 (April), Harvard Institute for International Development

Barro, R.J., 1999: Inequality and Growth in a Panel of Countries, Harvard University

Barro, R.J. and X. Sala-i-Martin, 1992: Convergence, The Journal of Political Economy, Volume 100, Issue 2 (April), 223-251

Beck, T. and R. Levine, 2002: Industry growth and capital allocation: does having a market- or bank-based system matter?, Journal of Financial Economics 64, 147-180

Berger, A. and G. Udell, 1990: Collateral, loan quality and bank risk, Journal of Monetary Economics 25, 21-42.

Berlin, M. and L. Mester, 1992: Debt covenants and renegotiation, Journal of Financial Intermediation 2, 19-133

Billett, M., M. Flannery and J. Garfinkel, 1995: The effect of lender identity on a borrowing firm's equity return, Journal of Finance 50, 699-718

Bilson, C.M., J. Brailsford and V.C. Hooper, 2002: The explanatory power of political risk in emerging markets, International Review of Financial Analysis 11, 1-27

Boehmer, E. and W. L. Megginson, 1990: Determinants of Secondary Market Prices for Developing Country Syndicated Loans, Journal of Finance, Volume 45, Issue 5 (December), pp. 1517-1540.

Bolton, P. and X. Freixas, 2000, Equity, Bonds and Bank Debt: Capital Structure and Financial Market Equilibrium Under Asymmetric Information, The Journal of Political Economy, Volume 108, Issue 2, April, 324-351

Boot, A.W.A and A.V. Thakor, 2000: Can Relationship Banking Survive Competition? Journal and Finance, Vol 51, No. 2 (April), 679-713

Demirgüç-Kunt, A. and H. Huizinga, 2000: Financial Structure and Bank Profitability, World Bank Development Research Group and Department of Economics, Tilburg University, *mimeo*

Demirgüç-Kunt, A. and V. Maksimovic, 2002: Funding growth in bank-based and market-based financial systems: evidence from firm-level data, Journal of Financial Economics 65, 337-363

Dennis, S. and D. Mullineaux, 2000: Syndicated loans, Journal of Financial Intermediation 9, 404-426

Diamond, D., 1991: Monitoring and reputation: The choice between bank loans and directly placed debt, Journal of Political Economy 99:688-721

Eaton, J. and M. Gersovitz, 1981a: Debt with potential repudiation: Theoretical and empirical analysis, Review of Economic Studies 48, April, 208-309.

Eaton, J. and M. Gersovitz, 1981b: Poor country borrowing in private financial markets and the repudiation issue, Princeton Studies in International Finance, no. 47, International Finance Section, Princeton University, Princeton, NJ, June.

Edwards, S., 1983: LDC foreign borrowing and default risk: an empirical investigation, NBER working paper no. 1172, July.

Edwards, S., 1986: The pricing of bonds and bank loans in international markets, European Economic Review 30, 565-589.

Eichengreen, B. and A. Mody, 2000: Lending booms, reserves and the sustainability of short-term debt: inferences from the pricing of syndicated bank loans, Journal of Development Economics, Vol. 63, pp. 5-44.

Fama, E., 1985: What's different about banks?, Journal of Monetary Economics 15, 29-36.

Fry, M. J., 1988: Money, interest and banking in economic development, Johns Hopkins University Press

Gersovitz, M., 1985: Banks' international lending decisions: What we know and implications for future research, in: G.W. Smith and J.T. Cuddington, eds., International debt and the developing countries (World Bank, Washington, DC).

Goldberg, L.S., B.G. Dages and D. Kinney, 2000: Foreign and Domestic Bank Participation in Emerging Markets: Lessons from Mexico and Argentina, National Bureau of Economic Research Working Paper 7714

James, C., 1987: Some evidence on the uniqueness of bank loans, Journal of Financial Economics 19, 217-235

Jones, J., W. Lang and P. Nigro, 2000: Recent Trends in Bank Loan Syndications: Evidence for 1995 to 1999, Economic and Policy Analysis Working Paper 2000-10, Comptroller of the Currency Administrator of National Banks

Kamin, S.B. and K. von Kleist, 1999: The evolution and determinants of emerging market credit spreads in the 1990s, BIS Working Papers, No. 68, May

King, R. G. and R. Levine, 1993: Finance, entrepreneurship and growth, Journal of Monetary Economics, Volume 32, Issue 3, December, Pages 513-542

Kleimeier, S. and W. Megginson, 2000: Are project finance loans different from other syndicated credits?, Journal of Applied Corporate Finance, Vol. 13, Part 1, pp. 75-87.

Kwan, S.H., 1994: The certification value of bank loans. University of Tucson, Arizona Working Paper, April

Leland, H. and D. Pyle, 1977: Information asymmetries, financial structure and financial intermediaries, Journal of Finance 32, 371-87.

Lummer, S.L. and J.J. McConnel, 1989: Further evidence on the bank lending process and the capital market response to bank loan agreements, Journal of Financial Economics 25: 99-122

Martinez Peria, M.S. and S.L. Schmukler, 2001: Do Depositors Punish Banks for Bad Behaviour? Market Discipline, Deposit Insurance and Banking Crises, Journal of Finance Vol LVI, No. 3, June

McKinnon, 1973: Money and capital in economic development, Washington, D.C., Brookings Institution

Myers, S.C., 1984: The capital structure puzzle. Journal of Finance 39, 575–592.

Myers, S.C. and N. Majluf, 1984: Corporate financing and investment decisions when firms have information investors do not have. Journal of Financial Economics 13, 187–221.

Petersen M.A. and R.G. Rajan, 2000: Does Distance Still Matter? The Information Revolution in Small Business Lending, Kellogg Graduate School of Management Northwestern University and Graduate School of Business University of Chicago, unpublished manuscript

Preece, D. and D.J. Mullineaux, 1996: Monitoring, loan renegotiability and firm value: the role of lending syndicates, Journal of Banking and Finance, pp. 577-94

Sachs, J.D., 1981: The current account and macroeconomic adjustment in the 1970s, Brookings Papers on Economic Activity 1, 201-268.

Sachs, J.D., 1984: Theoretical issues in international borrowing, Princeton Studies in International Finance no. 54, July.

Shaw, E. S., 1973: Financial deepening in economic development, New York, Oxford University Press

Shockley, R. and A.V. Thakor, 1993: Information content of commitments to lend in the future: theory and evidence on the gains from relationship banking, University of Bloomington, Indiana working paper, January

Simons, K., 1993: Why do banks syndicate loans? New England Economic Review, Federal Reserve Bank Boston, 45-52

Smith, C. and J. Warner, 1979: On financial contracting: An analysis of bond covenants, Journal of Financial Economics 7, 111-161.

Stiglitz, J. and A. Weiss, 1981: Credit rationing in markets with imperfect information. American Economic Review 7(31): 393-410.

Thakor, A., 1996: Capital requirements, monetary policy and aggregate bank lending: Theory and empirical evidence, Journal of Finance 51, No. 1 (March), 279-324

Wansley, J.W., F.A. Elayan and M.C. Collins, 1992: Investment opportunities and firm quality: an empirical investigation of the information in bank lines of credit, University of Tennessee working paper, May