



## The Development of Colombian Bond Market

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### Abstract

In this paper we explore the determinants and the consequences of the development of the corporate bond market in Colombia. We use a large firm-level dataset for the period 1997-2004 and find that the larger, more profitable and more leveraged firms have a higher probability to issue bonds. The econometric results also show that the larger the treasury bond market, the lower the probability that a firm will issue bonds, suggesting the presence of a crowding out effect. On the demand side, the panel estimations indicate that investors with larger portfolios tend to hold more corporate bonds. Also, from the viewpoint of investors, average bond issue size is a critical variable. Finally, we find that sectors that have more corporate bonds (as percentage of total liabilities) have greater loan quality, and this result is stronger during periods of banking crises. We conclude that bond market development can play an important countercyclical role during periods of financial stress.

### Resumen

En este trabajo exploramos los determinantes y las consecuencias del desarrollo del mercado de bonos corporativos en Colombia. Utilizamos una muestra amplia con información por firma para el período 1997-2004 y encontramos que las firmas más grandes, rentables y apalancadas tienen una mayor probabilidad de emitir bonos. Los resultados econométricos también muestran que un mayor tamaño del mercado de deuda pública tiene un efecto negativo sobre la probabilidad de las firmas de emitir bonos, lo cual sugiere un efecto de *crowding out*. Por el lado de la demanda, las estimaciones de panel indican que los inversionistas con portafolios grandes tienen mayor probabilidad de adquirir bonos. Así mismo, desde el punto de vista de los inversionistas, el tamaño promedio de la emisión es una variable crítica. Finalmente, encontramos que los sectores económicos en donde la participación de los bonos dentro del total de pasivos es mayor, tienen una mejor calidad de la cartera y enfrentan con mayor fortaleza los períodos de crisis. Concluimos que el mercado de bonos puede tener un importante papel contra cíclico en períodos de *stress* financiero.

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In spite of recent progress, the Colombian financial sector remains small and shallow, and largely dominated by the banking sector. However, in terms of the debt market, Colombia appears as a medium size player, both in terms of the domestic public debt and the corporate bond market.

This chapter deals specifically with the determinants and the consequences of the development of the corporate bond market. This is an interesting issue, considering the recent growth of this segment of the capital markets (in 2004 the real value of outstanding corporate bonds was four times higher than in 1997). In spite of its recent growth, there are a relatively small number of issues and issuers (there were on average only 39 issuers per year between 1997 and 2004). The issuing firms, mostly in manufacturing and services, tend to be large and profitable. For example, in asset terms, bond issuers were on average 42 times larger than non-issuers in 2004. More importantly, issuing firms have grown much faster than non-issuers.

We use a large firm-level dataset for the period 1997-2004 and find some interesting results. First, the larger the firm, the higher the probability that it will issue bonds. Second, more profitable and more leveraged firms are more likely to issue bonds. Third, cost per peso issued has, as expected, a negative impact on the number of firms that issue corporate bonds, suggesting that only the larger firms are able to issue bonds because they spread the entry costs over larger size issues.

We also explore the interplay between the public debt and the corporate bond market that is a complex and relevant issue. At least for the case of Colombia, the evidence suggests that crowding out effects dominate: the larger the treasury bond market, the lower the probability that a firm will decide to look for financing in the market. This conclusion is at odds with the alternative view of these two markets as complements.

On the demand side, we use detailed information from institutional investors (all pension funds, both mandatory and voluntary, and severance pay funds are investors in corporate bonds). The main results indicate that investors with larger portfolios have a higher probability of holding corporate bonds. Interestingly, a large portfolio share invested in public debt tends to decrease the investor's probability of holding corporate bonds. This is an important result because it indicates that the crowding out effects of a large stock of treasury bonds negatively affect not only the supply but also the demand of corporate bonds. Also, from the viewpoint of investors, average bond issue size is a critical variable. Only large issues are sufficiently liquid to awake the appetite of potential investors.

The chapter concludes with a discussion on the consequences of the development of the corporate bond market. Using a third database, we look at the loan performance in the different economic sectors. The sectors that have more corporate bonds (as percentage of total liabilities) have greater loan quality. In other words, the share of nonperforming loans in these sectors is much lower. More importantly, this result is stronger during periods of banking crises. The normative implication is that the development of the bond market plays a countercyclical role during periods of financial stress. Thus, policies aimed at improving the workings of this market have a potentially large dividend.

The chapter is structured in the following way. After a brief literature review we present an overview of the Colombian financial sector (which can be omitted by the reader familiar with its history and evolution). After providing the reader with this background, we characterize the Colombian bond markets and introduce the databases that were constructed for this chapter. We then use these data to estimate the models that explain the probability that a firm issues bonds (supply) as well as the probability that an institutional investor holds them (demand). The next section provides some empirical evidence to support the

idea that having a larger bond market is desirable. The chapter ends with a brief section of conclusions and policy recommendations.

### **Literature Review**

The relatively scarce literature addressing the issue of bond market development has focused on the factors that explain the market's development in a multi-country regression setting. For example, Eichengreen and Luengnaruemitchai (2004) study the causes for the slow development of the Asian bond market, using a cross-section of developing and developed economies. They find that larger country size, stronger institutions, less volatile exchange rates, and more competitive banking sectors are positively associated with bond market capitalization. Asian countries' strong fiscal balances have not resulted in growth of the government bond markets. Their results suggest that the region's structural characteristics and macroeconomic and financial policies account fully for differences in bond market development between Asia and the rest of the world.

Zervos (2004) documents the costs of debt and equity issuance, both in the domestic and the international markets, for firms in Brazil, Chile and Mexico, collecting data on investment banking and legal fees, regulatory and exchange listing costs, taxes, rating agency fees, and expenditures for marketing and publishing. The paper suggests that Brazilian firms face similar costs in the local markets and abroad in issuing debt, but face significantly higher costs in the local markets when issuing equity. Chilean firms can issue debt more cheaply in the international markets, and while issuing equity in their local market is cheaper, transaction costs have resulted in a preference for bonds over equity as a source of financing. Finally, Mexican firms face the lowest costs when issuing debt, but the

highest to issue equity. In addition, the paper underscores the role played by the investors' base in influencing the ability of firms to access the domestic capital markets.

Beck and Levine (2002) study whether market-based or bank-based financial systems are better at financing the expansion of industries that depend heavily on external finance, at facilitating the birth of new establishments, and at improving the efficiency of capital allocation across industries. They do not find evidence for either the market-based or the bank-based hypothesis. While the efficiency of the legal system and the overall degree of financial development boost industry growth, having a bank-based or market-based system does not *per se* seem to matter for the formation of new establishments, or for an efficient capital allocation. Levine (2002) also explores the relative merits of bank-based and market-based financial systems. Using a broad cross-country database, his results indicate that although overall financial development is robustly linked with economic growth, there is no support for either the bank-based or the market-based view.

Faulkender and Petersen (2003) examine if, rather than being constrained in their access to incremental capital by the risk of their cash flows and by their characteristics, firms may be rationed by lenders. They find that firms with access to public bond markets have significantly different leverage ratios. Even after controlling for the firm characteristics previously found to determine observed capital structure and the possible endogeneity of having a bond rating, they find that firms which are able to raise debt from public markets have 40 percent more debt.

More recently, Burger and Warnock (2006a) analyze the development of 49 local bond markets. They show that countries with stable inflation rates and strong creditor rights have more developed local bond markets and rely less on foreign-currency-denominated bonds. Their results suggest that emerging economies are not inherently dependent upon

foreign-currency debt and that by improving policy performance and strengthening institutions they may develop local currency bond markets, lower their currency mismatch, and decrease the likelihood of future crises. In a follow up paper Burger and Warnock (2006b) analyze foreign participation in the bond markets of over 40 countries. They find bond markets in less developed countries have returns characterized by high variance and negative skewness, and that these factors largely explain the lack of participation of U.S. investors. While results based on a three-moment CAPM indicate that what U.S. investors avoid is diversifiable idiosyncratic risk, their analysis suggests that by reducing macroeconomic instability countries can improve foreign participation.

For the case of Colombia, the literature has focused on the capital markets in general, but not specifically on the bond market. Fedesarrollo (1996) led an umbrella project to examine the obstacles to the development of the capital markets from different angles, including a revision of the institutional and regulatory restrictions, of the potential suppliers and market participants, and of the structural macroeconomic variables that affect it. The result of this study, known as the Mission of the Capital Markets, is a set of policy recommendations that led the way for the development of a government bond market and proposed several regulatory and institutional reforms regarding the supply and demand of corporate debt.

More recently, Anif and Fedesarrollo (2004) studied the determinants of the firms' capital structure, in an effort to understand their reluctance to issue debt and equity. Using the input from interviews, workshops, and a survey, this study found that only large firms participate, and that the market is still very concentrated in short term debt. The diagnosis from the point of view of both firms and institutional investors was not far from that provided by the Mission of the Capital Markets a decade before.

## **Overview of the Financial Sector**

In spite of having experienced significant growth over the last 15 years, the Colombian financial sector is still small and shallow. Both the Colombian banking and non-banking financial sectors are relatively small compared to those of the developed countries and to the Asian emerging economies, in particular with regards to the banking sector and the stock market (see Table 4.1). When compared to Latin America, the banking sectors in Colombia, Mexico and Peru are of similar size, but much smaller than in Brazil and Chile. The picture is slightly different for the debt markets, in which Colombia appears as a medium size player, both in terms of the domestic public debt and the corporate bond market. In 2004, only Chile and Argentina had larger corporate bond markets (relative to GDP).

The Colombian bank-based financial system is much larger than the market-based segment. Thus, the banking sector remains the main source of funding of all productive activities. The stock market, active since the 1960s, and the more recent private bond market, are both still concentrated on a small number of issuers and issues, and are relatively illiquid<sup>1</sup>. The performance of the public debt market has been, by contrast, very dynamic since the early 1990s.

In the remainder of this section we describe the main developments of both the banking and non-banking sectors since the 1990s.

### **The Banking Sector**

Prior to the 1990s, the Colombian banking sector operated under a model of specialized institutions. Commercial banks had a monopoly on checking accounts and held about 60%

of the sector's total assets. The remaining 40% was held between three types of intermediaries: investment banks, mortgage banks, and consumer loan companies. Investment banks appeared in the late 1950s with the purpose of facilitating long term financing to the real sector through the issue of stocks and bonds. Their role, largely unfulfilled to this date, was to aid the development of the capital markets. Mortgage banks were the result of a reform of the system of housing finance in the early 1970s, which gave these intermediaries a monopoly over the use of the UPAC--an indexation mechanism applying both to saving deposits and mortgages.

Financial repression was pervasive between the mid 1960s and the 1980s. In the context of import substitution industrialization, credit was directed toward certain sectors while interest rates were heavily controlled and regulated. In addition, reserve deposits--monetary policy's main instrument at the time--and forced investments represented between 35% and 40% of total deposits. Foreign ownership of banks was heavily restricted, foreign exchange controls prevented the development of a foreign exchange market, and direct Central Bank lending to the government made the development of a public debt market unnecessary. All of the above contributed to the slow development of the financial sector at the time.

In addition, during the early 1980s, as a result of the Latin American debt crisis, the Colombian financial sector was under severe stress. The lack of adequate prudential regulation and supervision led to the intervention and nationalization of several intermediaries. The estimated net cost of these interventions was 3% of GDP<sup>2</sup>.

As a result of the crisis, financial regulation and supervision were strengthened in line with the Basel standards<sup>3</sup>, and a deposit insurance scheme was created.

Simultaneously, the predominant instrument of monetary policy shifted from reserve deposits to open market operations (purchases and sales of Central Bank securities).

An intense process of financial reform took place in the early 1990s. Laws 45 of 1990, 9 of 1991, and 35 of 1993 substantially changed the structure and operation of the financial sector. Reserve deposits were lowered, most forced investments were eliminated, and subsidized direct Central Bank lending to the government was made unconstitutional. Although interest rate controls had been lifted before, reforms restricted their use even more by limiting their potential application to 90 days only. In addition, restrictions on the foreign ownership of banks were dismantled, while intermediaries were authorized to a wider range of activities. At the same time, exchange rate controls were removed, allowing intermediaries to participate in a growing foreign exchange market.

As a result of the reforms, as well as of large capital inflows, financial intermediation grew rapidly. M3/GDP rose to 43.2% of GDP in 1997, up from 28% in 1990. The number of financial intermediaries increased, several public banks were privatized, and foreign ownership in the banking sector went from 10.2% in 1992 to 29% in 1998.

Given the unsustainable rates of growth in public and private expenditures, the current account deficit reached 5.4% of GDP in 1997 and the central government deficit increased up to 5% of GDP in 1998, making the economy vulnerable to the effects of the Asian and Russian crises. In response to the attacks on the currency resulting from the sudden stop in capital inflows, the central bank raised interest rates at the beginning of 1998. The economic consequences of the reversal in capital flows, the increase in interest rates, the reduction in expenditures, as well as the balance sheet effects of the depreciation of the currency, resulted in a severe contraction of the economy in 1999 (-4.2% of GDP).

The repercussions on the financial sector were far reaching. The share of non-performing loans over total loans rose to 16% in 1999, up from 6% in 1997. Progress in terms of size and depth of the financial intermediation suffered a major reversal. The stock of loans, which had risen from 28% to 40% of GDP between 1990 and 1997, fell to 25% in 2001. While commercial credit and consumer loans started recovering in 2002, the stock of mortgage loans fell to 4% of GDP in 2005, down from over 13% before the crisis (1997).

As a result of the crisis, financial regulation and supervision was elevated to new levels, where risk is more adequately evaluated and provisions are stricter, and this is apparently proving fruitful. Also, the financial crisis triggered a reform to the bankruptcy law (law 550 of 1999) given the large number of firms that were under severe stress. The existing legislation (law 222 of 1995) was considered inadequate. Its application would have resulted in the liquidation of a large percentage of firms during the crisis.

The new law was conceived as a transitory mechanism, initially for five years but later extended until the end of 2006. The law provided incentives for creditors and debtors to negotiate “restructuring agreements”. However, 28% of the firms under restructuring ended in liquidation, suggesting that in a large number of the cases the law delayed the execution of creditor rights.

Under the law, voting rights allowed for coalitions between shareholders and small creditors (euphemistically called *internal creditors*), in most cases detrimental for creditors in the financial sector. Also, tax authorities had privileges over other creditors. The law, although partially useful under a period of severe financial strain, had an anti-creditor bias.

Given these problems, a new bankruptcy law was approved at the end of 2006 (law 1116 of 2006). The new law follows international standards, providing better protection to creditor rights.

## **The Non-banking Sector**

Some important developments have taken place in this market since the early 1990s. In particular, the liberalization of foreign portfolio investment, the appearance of new institutional investors, the development of mortgage securitization and the progress made toward an improved market infrastructure (credit ratings, the unification of stock exchange markets, and the modernization of transactional systems, among others) imply more progress in recent years than in the preceding decades.

In Colombia, the firms' preference for bank loans over market-based instruments is, to a large extent, the result of policy choices. In 1951, for instance, the Central Bank became a development bank by providing subsidized loans to specific sectors, creating a bias against bonds or equity financing. Tax measures were also a determining factor in this direction. Perhaps the most important was the 1953 reform that introduced a system that taxed simultaneously corporate profits and shareholders' dividends. This measure, which proved detrimental for the development of the stock market, was eliminated in 1986. During the inflation acceleration of the 1970s, the stock market growth was also negatively affected by the tax deductibility of the inflationary component of interest payments.

Later measures were headed in the direction of correcting these and other policies to facilitate the development of the capital markets. Decree 1321 of 1989, for example, eliminated taxes on capital gains in the stock market. Law 49 of 1990 established that profits from the transfer of shares through the stock market would not constitute income or capital gains, and that investment funds and mutual funds that administrated trusts would be exempt from income taxes.

Only in the 1990s would significant progress be observed in the non-banking sector. Law 9 of 1991 allowed inflows of portfolio foreign investment, which in 1997 reached USD\$1.5 billion dollars. After drastically falling as a result of Asian and Russian crises, these flows have recovered in recent years. However, these funds continue to be low (0.4% of GDP).

Labour and pension reforms (Law 50 of 1990 and Law 100 of 1993, respectively) created new institutional investors that have played a key role in the development of the capital markets. The first of these reforms obliged employers to make a contribution equivalent of one month's salary per year. These contributions are deposited in the employees' individual accounts administered by Severance Pay Funds (employees are allowed to withdraw money in case of unemployment or, under certain circumstances, for education and housing). The assets of these funds represented about 1.3% of GDP in 2005.

The pension reform created the private Mandatory Pension Funds to administer the defined-contribution pension regime<sup>4</sup>. As in the case of the severance pay funds, pension contributions deposited in the individual accounts are invested in the capital markets. Since their creation, the pension funds have grown to become the most important player in the market. Their portfolio went from 0.04% of GDP in 1994 to almost 12% of GDP in 2005. Law 100 also created the Voluntary Pension Funds that are not as large (0.2% of GDP in 2005), but have grown dynamically in the recent years thanks to a tax benefit that applies to the contribution of high salary individuals. The pension reform also created new business opportunities for the life insurance companies (pension fund insurance and life annuities), providing them with additional resources to invest in the capital markets.

Other elements have also been key for the capital markets' recent development: (1) the creation of custody service entities in the early 1990s, to reduce operating risks and add

safety to financial transactions; (2) the development of mortgage securitization as an alternative long-term investment opportunity, introduced by Law 35 of 1993 and pushed further by Law 546 of 1999, to provide mortgage banks with longer term financing. By the end of 2005, mortgage securitizations amounted to 1.5% of GDP; (3) the merger of three local stock exchanges (Bogotá, Medellín and Occidente) into one national stock exchange in 2001, to avoid the inefficiencies resulting from the market segmentation; and (4) the development in the 1990s of a unified electronic transaction systems, providing real time information on the bonds and stocks traded, and speeding transactions<sup>5</sup>.

In 2005, the supervision of banks and securities was merged into one agency with the goal of eliminating the “regulatory arbitrage” between the two segments of the market. Also in 2005, legal changes improved corporate governance, requiring independent board members in entities that issue securities, with the purpose of protecting small investors. While these developments are still too recent to show any results, they are steps in the right direction.

### **Bond Markets**

Figure 4.1 shows the evolution of the Colombian private and public bond market. In 2004, the total outstanding debt in the Colombian bond market was close to US\$33 billion. About 70% was public debt, while the remaining 30% was equally split between corporate bonds and bonds issued by financial institutions.

The market size doubled between 1997 and 2004. The public debt component more than tripled over the same period, while the corporate debt market, although much smaller, also increased significantly. Debt issued by the financial sector appears to have lost participation in the market. In fact, the share of Treasury bonds rose to 23% of GDP in

2004, up from 8% in 1997. During the same period, debt issued by the financial sector fell from a similar starting point (7.8%) to about half (4.3%) as percent of GDP. Corporate bonds, on the contrary, rose to 3.9% of GDP in 2004, from close to 1% in 1997. This is a significant increase that we discuss in greater detail below.

These numbers suggest that, while the overall debt market evolution has been driven by a large and increasing public debt component, its performance has not hindered that of corporate debt in an evident way. On the contrary, the growth dynamics of the public debt market in Colombia may have facilitated the incipient development of the corporate bond market that remains small by international standards, but shows significant growth in size in recent years. The low growth of bank loans over the period 1997-2004 could explain the loss in the share of debt issued by financial institutions.

### **The Public Bond Market**

The Constitution of 1991 set the way for a new model of government financing by restricting the use of primary financing (which requires the unanimous approval of the independent central bank's board of directors). Treasury bonds (TES) rose to 35.7% of the total public debt in 2004, from 12.6% in 1995 (see Figure 4.2). This rapid increase reflects the critical role played by bonds in financing the central governments' deficit.

Not all treasury bonds are allocated through market mechanisms. A-type treasury bonds are issued with the exclusive purpose of covering the Government's liability with the Central Bank and do not reach the market. These are a minority of the total treasury bonds outstanding. B-type TES treasury bonds are used to raise funds in the market through three alternative mechanisms: (1) auctions, (2) agreed operations with decentralized public sector entities (at market interest rates), and (3) mandatory TES investments, to capture the excess

liquidity of publicly owned companies or public entities. As a share of the total public debt, B-type TES grew from 3.4% in 1994 to 35.6% ten years later, mostly allocated through auctions and agreed operations.

The Government's foreign debt composition also shows an increasing reliance on market-based instruments. Foreign debt bonds increased from 7.3% in 1995 to 22.3% in 2004 as a share of the total debt, reflecting the lower dependence on loans from agencies, governments, multilateral organizations and commercial banks (see Figure 4.2). The resulting re-composition of external financing lowers the degree of conditionality on certain policy reforms, common in multilateral lending.

Without doubt, the dynamism of the public debt market, domestic and external, has reflected the emergence of large fiscal imbalances. Public debt increased from 15% of GDP in 1999 to near 50% of GDP in the recent years. Also, the internal public debt market has allowed the government to substitute domestic debt for foreign debt: while in the early 1990s more than 80% of the public debt was external, since 1996 this share has fluctuated around 50%, subject to the conditions of both the internal and external markets.

The growth of the internal public debt market is also explained by demand factors. The growing supply of treasury bonds has found sufficient demand in the market, mostly from new institutional investors. In addition, the credit stagnation during the financial crisis of 1998-2000 contributed toward boosting this demand. Credit risk considerations led financial intermediaries to substitute loans for investments in treasury bonds during that period. In recent years, particularly since mid-2002, demand for treasuries has continued to thrive in response to an expansive monetary policy in a context of reduced alternative investments. The financing needs of the Government, in addition, have resulted in attractive returns to the investment in treasury bonds, relative to returns on alternative investments.

The public debt market has not only grown in size, but also has progressed both toward alternative denominations and toward longer average maturities. In addition to the peso denomination (68.4% of the total outstanding in 2004), B-type TES are also denominated in indexed units (36.4% of the total outstanding in 2004), and in U.S. dollars (6.7% of the total outstanding in 2004). With respect to maturities, the share of B-type TES with maturities of less than five years has dropped significantly (bonds with maturities less than one year are now nonexistent) while the share of B-type TES with maturities between 6 to 10 years has grown from nil to 52.7% over the same time period. These numbers evidence a significant success in replacing short-term debt by longer-term debt, which has been a goal of the government. Undoubtedly, the development of a more complete yield curve has contributed to the deepening of the debt market. The behavior of the share of B-type TES of maturities longer than ten years is, however, more random, and reflects the difficulties faced by the government in issuing long-term bonds in the local market.

On the demand side, financial institutions have been the largest buyers of government securities (their share in the outstanding central government bonds increased from 35.5% in 1995 to near 53% in 2004). Other private sector investors have also increased their holdings of government debt (from 11% in 1995 to near 19% in 2004). Other public sector entities now hold less debt issued by the central government (29.6% of the total, from a starting point of 53.5%).

### **The Corporate Bond Market**

Only a small share of Colombian firms finances their activity through the bond market<sup>6</sup>. Between 1997 and 2004 there were on average only 39 issuers per year, defined as the firms reporting bonds outstanding in their balance sheets (in contrast, on average there were

7243 non-issuer firms per year). Using the same definition, the median number of issuers and non-issuers were 46 and 7092, respectively<sup>7</sup>. Bond issues have tended to be concentrated in the manufacturing and services sectors (14 and 16 issuer firms on average per year in each of these sectors respectively). Issuing firms in other sectors are very scarce.

There are some marked differences between the firms that have access to the bond market and the firms that do not, which are apparent when considering their accounting statements for 2004. The first and most obvious difference is size. Bond issuers in 2004 were on average 42 times larger than non-issuers, as measured by their assets. When measured by the median, the difference in size appears even larger, by about 91 times. There is also less dispersion in size among issuers. These differences are statistically significant.

Also significant are the differences between issuers and non-issuers with respect to the composition of their liabilities. The share of debt with the banking sector is on average 12.7% for the former as opposed to 23.7% for the latter. The median issuer firm reports no debt at all with the banking sector, while for the median non-issuer firm bank loans represent 15% of total debt. However, not all bond issuers have completely substituted bank debt. Interestingly, accounts payable are also on average a much lower share of total liabilities in the case of issuers (13.1% against 27.8% for non-issuers), and the difference among median firms is also substantial (9.1% against 17.4% for non-issuers). In 2004, outstanding bonds represented 25% of the total liabilities in issuing firms (22.9% in the case of the median issuer firm). This share was only 12.1% in 1997.

Finally, issuer and non-issuer firms also differ in terms of their profitability. Issuers are not only more profitable—on average their operating profit as a share of assets is of 5.4% as opposed to 3.7% of the non-issuers—but also they show much less dispersion in

profitability (compare a standard deviation of 1.25 to one of 17). This difference is statistically significant. There is no evidence of significant differences between issuers and non-issuers with respect to their leverage.

The more careful revision of the issuers and issue characteristics between 1997 and 2004 shows at least two interesting facts (see Table 4.2). First, issuer firms, defined this time as those that are reported by Superintendencia Financiera as having issued bonds each year, are much larger (in asset terms) in 2004 than they were 7 years before. The larger issuer firm is 9.6 times larger, the median firm is 13.2 larger, and the smaller issuer firm is 11.7 times larger in 2004 than it was in 1997. Second, total amounts issued each year have considerably increased over time (the market size in 2004 was four times larger than in 1997). Considering that the total number of issues per year has not increased over time, the average issue size has shown a remarkable increase (compare the average issue size of \$202.3 million in 2004 to that of \$16.1 million in 1997, or the evolution of the median and the minimum issue sizes over the same period).

Thus, the size of the Colombian corporate bond market is explained by a small number of large issues placed by very large firms. The evidence points toward a pattern of bond market development that is increasingly supported on fewer larger issues: a market growing in size but apparently not getting deeper.

In other words, regardless of the reduced number of firms participating in the bond market, the fact that those who participate have a large scale has implied that the overall share of market-based financing has increased over time, substituting bank credit as a source of funding (see Figure 4.3).

To complete the picture of the corporate bond market, we take a look at the role corporate bonds play in the portfolios of the institutional investors. Table 4.3 summarizes the findings for 2004.

Mandatory pension funds are the larger institutional investors in Colombia as measured by their portfolio size, which amounted to about 50% of the total investment portfolio in 2004. They are followed, at a distance, by banks and investment banks.

Out of a total of 153 potential institutional investors in 2004, 56 do not report any participation in the corporate bond market in their financial statements. Non-participants are a majority of the consumer loan companies, investment banks, trust companies, and banks, and to a lesser extent insurance companies. All pension funds, both mandatory and voluntary, and severance pay funds are investors in corporate bonds. On average, however, the share of their portfolios invested in corporate bonds is near 11%, way below the ceiling of 30% that the regulation permits, for both mandatory pension funds and severance pay funds. Notwithstanding, in 2004, mandatory pension funds held 76% of the outstanding corporate debt. Severance pay funds and voluntary pension funds followed at a distance, with 9% and 7%, respectively.

The contrast is striking when we look at the shares of the various portfolios invested in treasury bonds (31.7% for the median institutional investor). Both mandatory pension funds and life insurance companies invest in treasury bonds at levels close to the ceilings of 50% and 60% dictated for them by the regulation, and the share of the median severance pay fund and the median bank portfolios invested in public debt in 2004 is of 70% and 65%, respectively.

The public component of the Colombian bond market is evidently getting a large share of the market liquidity. However, it is unclear whether there is indeed a liquidity restriction

affecting the development of the corporate bond market or whether there are other types of restrictions that are more binding. Before we explore this issue further in the following section, it is important to mention the results of an investors' survey that we conducted for the purposes of this project<sup>8</sup>. According to answers provided by investors, low appetite for this type of securities is the result of the absence of a complete reference index (which restricts adequate pricing) and the lack of a yield curve (apart from the low size and liquidity of the market which are almost always present in the responses). Institutional aspects get some attention: 53% of the surveyed investors mentioned the excessive regulation as an obstacle, while 45.2% mentioned the weakness of creditor rights. A very large share of the institutional investors considered that prudential regulation imposes unnecessary restrictions on the allocation of portfolios

The fact that the bond market, with respect to both its public and private components, is in the hands of a few large players subject to substantial regulation is an issue to revisit in gauging the long-term health of the market.

### **The Market Participation Choice**

This section explores the decisions of the firms to issue bonds and of the investors to acquire them. We use econometric techniques with the available firm-level data. Results of these exercises are summarized in Table 4.4.

### **The Firm's Decision to Issue Bonds**

We were able to construct a firm-level dataset for the period 1997-2004, containing firm characteristics and information about the firm's activity in the corporate bond market that

allows us to estimate a model to explain the probability of a firm to issue bonds. Both firm characteristics and market characteristics were considered as explanatory variables.

Firm characteristics include size (measured by the log of the firm's assets), leverage (total liabilities/total assets), and profitability (measured by the ratio of operating utility to total assets). The coefficient on the size variable is expected to have a positive sign since the evidence in Colombia points toward a large size as a key determinant of the firm's decision to search for financing through the bond market. The signs on the other two firm-level variables are, however, uncertain because there is no clear-cut difference between the leverage of issuers and non-issuers. With respect to profitability we know that it tends to be slightly higher at the mean and median for issuers relative to non-issuers, but this evidence may not be enough to guarantee a positive sign.

The firm's participation in the market as bond issuer in the previous period is controlled by the inclusion of a dummy variable equal to 1 if the firm issued bonds at time  $t-1$ . The firms' activity in the capital markets is also controlled with a dummy variable = 1 if at any previous time, before time  $t$ , the firm issued stocks. Both variables are expected to have a positive coefficient, since they capture the fact that previous activity in the market usually facilitates the decision to participate in it.

The explicit inclusion of variables identifying whether the firm was listed at the local or foreign stock exchanges, or whether it was under the supervision of Superintendencia Financiera at the time of issue, is not possible due to the lack of variation of the dependent variable within these categories. This is also true about the inclusion of fixed effects by sector of activity. Because participation in the bond market occurs only in a few sectors, the inclusion of 3-digit ISIC sector dummy variables results in lack of variation of the dependent variable within groups, rendering estimation impossible<sup>9</sup>.

Market characteristics included as explanatory variables are meant to capture particularities of the Colombian markets that are common to all firms and should affect their choices with regard to financing. We have chosen to focus on the role played by financial markets' characteristics<sup>10</sup>.

The first of these variables considered is a proxy of the cost per *peso* issued, constructed as the annual average cost per peso across all issues recorded by Superintendencia de Valores. Costs considered in this calculation include (1) the cost of registration at the Bonds and Stocks Registry (Registro de Valores) required for each issue, and (2) the cost to obtain the issue authorization from Superintendencia Financiera. Both of these costs are calculated as a percentage over the amount issued, with rates that vary with the issue size<sup>11</sup>. The expected coefficient on this variable is negative, since a large cost to enter the market should deteriorate the probability of choosing to participate in it.

Measures of the size of the stock market (value of domestic equities over GDP, also known as stock market capitalization), the depth of financial intermediaries (M3 over GDP), and the public debt market (treasury bonds outstanding over GDP) are included in the regression in order to capture the degrees of complementarity or substitutability across markets. Stocks should be a close substitute to corporate bonds, so the expected coefficient on the first of these variables is negative. With regard to the depth of financial intermediation, the expected coefficient has a positive sign. Finally, the sign on the public debt market size measure is uncertain. A negative sign will indicate a crowding-out effect, while a positive sign will signal that the development of the public debt market has aided the activity of the private side of the bond market.

The last explanatory variable considered is the size of the capital market relative to the financial intermediaries market. The proxy used as a measure in this case is the ratio of

the value of domestic equities over M3. A larger capital market, in relative terms, should facilitate the development of the corporate bond market, so the coefficient expected on this variable is positive. Note that this relative size measure may increase due to growth of the capital market either in volume or in prices. The expected impact on the decision to issue bonds is positive regardless of which of these prevail.

Estimation shows that all proposed explanatory variables are significant at the 5% level<sup>12</sup>. Although the resulting marginal effects of these variables are small, the estimation serves well the purpose of explaining the firm's choice to issue bonds<sup>13</sup> (see Table 4.4).

The model estimated underscores the importance of scale economies in a firm's decision to use market based financial instruments. Not only is it the large firms that show participation in the market over the years, but also the positive sign on the one-period lag of the firm size proxy indicates that the larger the firm, the higher the probability that it will issue bonds to finance its activity. There must be a threshold firm size below which the cost of obtaining financing through the corporate bond market is higher than that of obtaining banking credit.

The leverage and profitability variables both obtain positive coefficients too. The positive sign on the former indicates that more leveraged firms have a higher probability to finance through bond issues. This suggests that the probability of financing through bonds is higher for firms that already have a history of active participation in the financial sector. The positive sign on the profitability proxy indicates that after controlling for size, the more profitable firms are more likely to search for financing through the bond market.

The coefficients on the dummy variables controlling for state dependence--previous activity in the capital markets--are both positive as expected. While potential biases from

the inclusion of the lagged dependent variable in the right hand side of the regression are not explicitly controlled for, the results obtained are robust to the exclusion of this variable.

The coefficient on the corporate debt market entry cost variable is negative. This result is evidence that the cost per peso issued is a deterrent for firms to finance their activities through the market. In combination with the coefficient obtained on firm size, it may be pointing toward the fact that larger firms are able to issue bonds because they spread the entry costs over larger size issues; recall that the entry costs are calculated over the issue value, from percentage rates that vary with the issue size.

The financial markets' size variables also yield interesting results. For both the stock and financial intermediaries markets the estimated coefficients have the expected signs. The coefficient on the stock market size is negative, signalling that indeed stocks and bonds behave as substitutes. Growth of the equity market does not per se motivate bond issuance, and on its own may be detrimental for the development of the corporate bond market. And the positive coefficient on the financial intermediaries size proxy confirms that the larger the financial intermediaries sector (the more liquid the market) the larger the probability that a firm will choose to issue bonds. Perhaps the most interesting of these results is the negative sign of the coefficient obtained on the public debt market size measure, which provides evidence that there may be a crowding out effect: the larger the treasury bond market, the lower the probability that a firm will decide to look for financing in the market. This may be due to the difficulty in competing with the treasury bonds in terms both of risk and return, the latter having been high relative to other investment opportunities.

Finally, the size of capital markets relative to financial intermediaries shows a positive coefficient. This result is in line with the idea that firms will be more likely to participate in a more developed capital market. It also says that the market relative size

matters. It is not only a large capital market that is desirable from the corporate bond market development perspective, but also a capital market that is large relative to the financial intermediaries sector.

### **The Institutional Investor's Decision To Buy Corporate Bonds**

We use the firm level data available for the period 1995-2004, containing the accounting statements of each of the institutional investors and detailed information about the composition of their investment portfolios, to estimate a model to explain the investor's decision to hold corporate bonds.

Investor characteristics used as explanatory variables include a measure of firm size (the log of the investor's investment portfolio); the share of the investors' portfolio invested in public debt (the ratio of treasury bonds holdings to total portfolio investments); the average issue size at time  $t$ , a dummy variable which controls for investor type and a time dummy that controls for macroeconomic effects<sup>14</sup>. Firm-level variables enter the regressions lagged in order to control for potential endogeneity problems.

The probability of holding corporate bonds is expected to increase with portfolio size, as larger investment portfolios ought to be more diversified, so the coefficient on the size variable should be positive. With respect to the share of the portfolio invested in public debt, while the extent to which the firm is invested in treasury bonds can influence the investor's decision to hold corporate bonds, it is impossible to know ex ante what sign to expect on this variable's coefficient. It may be that investors holding more public debt in their portfolios tend to acquire fewer corporate bonds, in which case there would be evidence of a crowding-out effect (a negative effect). Alternatively, it may be that portfolios more strongly invested in public debt, with investments in treasury bonds at the

ceiling imposed by the regulation, tend to be also more invested in corporate bonds (a positive effect).

The dummy variables by investor type are intended to control for characteristics specific to each investor type. In particular, there are regulatory restrictions that may affect the possibility of investing in corporate bonds. These regulations have limited variance over time and differ only across investor types, so the inclusion of investor-type dummies should capture their impact.

The average issue size at time  $t$  (value of total bonds issued over number of issues) is included in the regression to capture the role of the corporate bond supply in inducing investors to buy corporate bonds. Since investors are concerned about the liquidity of their investments, it is reasonable to expect that their decision to buy corporate bonds will depend to some extent on the size of the bond supply available. On the one hand, if they buy a small issue of corporate bonds, their market movements may alter prices and expose them to the risk of not achieving the mandatory minimum profitability required by the law. On the other, the larger the issue, the larger the number of buyers, thus more participants may be interested in buying bonds when the investor needs to sell its bond holdings. The bond supply average size is measured as the log of the total amount issued divided by number of issues at time  $t$ . This market-level variable is constructed using the firm-level bond issue data from Superintendencia Financiera introduced above.

The coefficient on the investor size variable is positive and significant at the 1% level, indicating that the investors with larger portfolios have a higher probability of holding corporate bonds. This result may also indicate that larger portfolios tend to be more diversified. The coefficient on the portfolio share invested on public debt is negative and significant at the 5% level. Apparently a large portfolio share invested in public debt tends

to decrease the investor's probability of holding corporate bonds. This result, in line with that obtained while exploring the firms' choice to issue corporate bonds, signals once again that the market for public debt may be hindering the development of the corporate bond market in Colombia.

Perhaps the most interesting result of this exercise is the finding that the average bond issue size is a critical variable. The coefficient on this variable is positive and significant at 1%, indicating that the probability of investment is strongly dependent on the availability of a large bond supply in the market. No matter how many firms participate in the market, and the frequency of their issues, as long as they participate with large placements, investors will apparently be willing to buy these bonds. This result tells us that investment bankers have a key role to play in designing coordination schemes to make bond issuance an alternative for the smaller players.

### **Role of the Corporate Bond Market**

Up to this point we have explored what drives Colombian firms to use the market as a source of financing (or what limits them in their financing choices), and we have revised the demand-side elements that seem to play a role in determining the development of the corporate bond market. So far, we have obtained three main findings. First, the evidence suggests that bonds are not a cost-efficient financing alternative for the smaller firms. Second, the public debt market does not appear to be facilitating the development of the private side of the market in the recent years. Third, the probability to secure a demand for corporate bonds depends strongly on the size of the issue, leaving out of the game the firms with smaller financing needs.

But, do these findings justify government involvement in the development of the bond market? To answer this question further evidence has to be gathered. In particular, it remains to be seen if any of this matters from the point of view of economic growth and development. This section attempts to answer this question by analyzing the impact of the existence of a corporate bond market on the performance of the banking sector in an empirical setting.

Firms that are able to obtain financing through bonds should have a better bank loan-performance during periods of crisis. In theory, this should be the case because they are low-risk, having had access to financing through the market, and because they have had access to long-term financing, they face lower cash constraints during periods of crisis. If this is true, then the existence of a large corporate bond market aids the performance of the banking sector during periods of crisis, and its existence is desirable for purposes of macroeconomic stability.

We use loan performance data available at the ISIC 3-digit sector level from Superintendencia Financiera for the period 1998-2004, in combination with accounting information from the firm-level databases already mentioned, to examine if the sectors that issue bonds perform better in their interaction with the banking sector during periods of financial stress.

The dependent variable in the regression is the ratio at time  $t$  of sector  $i$ 's loans rated C, D, or E (i.e., low-quality loans) to sector  $i$ 's total loans--a measure of the sector's loan performance at time  $t$ . A measure of the size of the corporate bond debt outstanding per sector, a banking crises dummy variable, and their interaction, are included as explanatory variables to capture the impact of the bond market on the bank credit market during crisis periods.

The size of corporate bond debt outstanding for each sector  $i$  at time  $t$  is measured as the ratio of bonds outstanding to total liabilities reported by the firms in their financial statements aggregated to the ISIC 3-digit sector level. The coefficient on this variable should be negative if a lower dependence on banking credit improves the loan performance.

The banking crises dummy variable was built to equal 1 during the years in which FOGAFIN, the public entity in charge of deposit insurance, made large rescue payments to the banking sector. By construction, the coefficient expected on this variable is positive.

The interaction term captures whether sectors active in the bond market during crisis periods have a better loan performance. A negative coefficient on this variable would indicate that it is desirable, from a macroeconomic stability perspective, to have a large well-developed corporate bond market.

The regression also includes among the explanatory variables a measure of each sector's profitability constructed as the ratio of the sector's operating profits to its total assets, the sector's leverage (total liabilities to total assets) and sector level dummies to control for other unobserved sector-specific characteristics. The expected coefficient on the profitability variable is negative, since better operating performance should translate into better loan performance; the coefficient on leverage should be positive, because the more leveraged firms tend to default more on their obligations than the less leveraged.

Contemporaneous and lagged real GDP growth rates are included as macroeconomic controls. The expected signs on these variables are both negative reflecting the impact of recessions on loan quality. Estimation results are presented in Table 4.5. All coefficients in the regression have the expected signs and are significant at, at least, the 10% level.

The coefficients on current and lagged real GDP growth are both negative, confirming that economic growth also contributes to a better performance of the credit market. Good average performance at the sector level contributes to a better loan performance (see the negative coefficient on the sector average profitability and the positive coefficient on the average leverage level). The coefficient on the sector's average liabilities share represented by corporate bonds has a negative sign, indicating that the alternative of financing through the corporate bond market does contribute to a better loan performance. The coefficient on the banking crises dummy is indeed positive, and, most relevant to the question posed in this section, its interaction with the share of bond finance (in total corporate finance) yields a negative coefficient, suggesting that during periods of banking crises the existence of this alternative source of financing plays a countercyclical role, contributing to a better performance of banking loans.

The findings of this section are enough to conclude that a well-functioning corporate debt market is key for macroeconomic stability and, thus, it is desirable to design policies oriented to facilitating and promoting its development.

### **Concluding Remarks and Policy Recommendations**

Despite having experienced significant growth over the last 15 years, the Colombian financial sector is still small and shallow. Both the Colombian banking and non-banking financial sectors are small compared to those of the developed countries and the Asian emerging economies.

The development of the capital markets is recent and directly connected to a set of reforms introduced in the early 1990s that included the liberalization of foreign portfolio investment, the appearance of new institutional investors, the development of mortgage

securitization and significant progress towards an improved market infrastructure. Previous to these reforms, the dependence of firms on bank loans as a source of financing was largely induced by economic policy.

The Colombian bond market doubled in size between 1997 and 2004, largely explained by the dynamics of the public debt component. Corporate debt, although much smaller in size, also increased over time, contributing to the development of the non-bank segment of the financial markets.

Using new firm-level data, the paper confirms the findings of the previous literature that the corporate bond market in Colombia has been to date a source of financing exclusive to the larger firms. Our empirical approach allows us to go one step further in answering some policy implications. We show that having the market as a source of financing alternative to banking loans plays a critical stabilizing role during periods of banking crisis. The economy as a whole holds up better when the firms in the productive sectors are not exclusively dependent on banking credit. If nothing else, this evidence should underscore the convenience of having a well-developed corporate bond market and the importance of pursuing the appropriate policies to facilitate its growth.

Regarding market participation decisions of both firms and investors, the findings of this paper indicate that issue size is a key driver of this market's activity. Firm size matters but only to the extent that larger firms have so far been the only ones able to place large issues in the market. This is in line with a market preference for more liquid investments and for investments in which the market price is not exposed to fluctuations induced by the movement of individual players.

Evidently investment banks have a key role to play as market developers if they understand the relevance of devising schemes to package the financing needs of the smaller

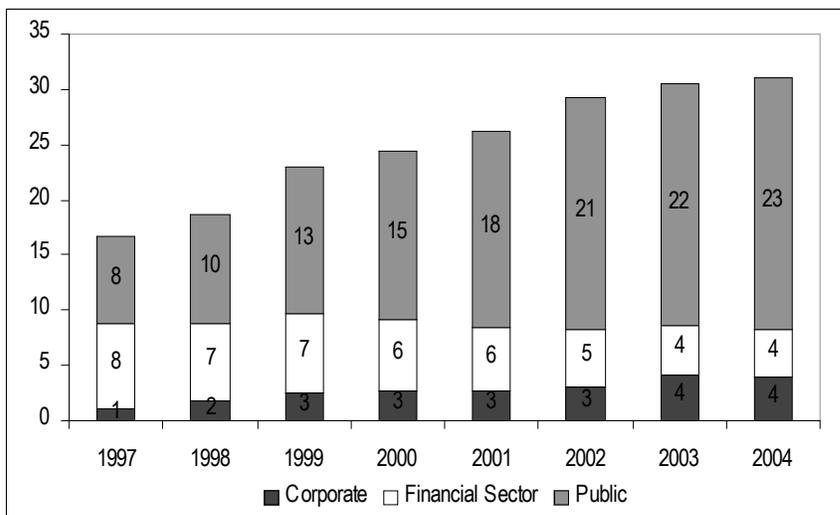
firms and coordinating them to reach the market with placements of the appropriate sizes. In doing this, investment bankers must overcome their reticence to work for the smaller players. The eye of the regulatory authorities must be placed on facilitating these coordination schemes. This may include a revision of the credit rating standards behind the institutional investors' portfolio choices, some of which are imposed by the regulation regarding the portfolio management of institutional investors. For instance, the asymmetries in the minimum profitability requirement currently affecting the mandatory pension funds ought to be revised, since the regulation does not reward above average portfolio performances, encouraging investments only in top-rated investments. Also, it is in the hands of the regulatory authorities to make investment-banking services accessible in terms of price to the smaller players.

We also find that the entry cost to the bond market discourages firm participation. It also explains why only large firms are issuers. While packaging the financing needs of the smaller players, as suggested in the previous paragraph, will surely aid in spreading these fixed costs, the government should also consider directly lowering them. In addition, any gain in efficiency from lowering the times required to obtain the required permissions and licenses from Superintendencia Financiera should be prioritized. In addition to lowering its own entry costs, the Stock Exchange of Colombia could help in the selection of candidate firms to “package” (reducing structuring costs) and spreading knowledge about the benefits of bond financing.

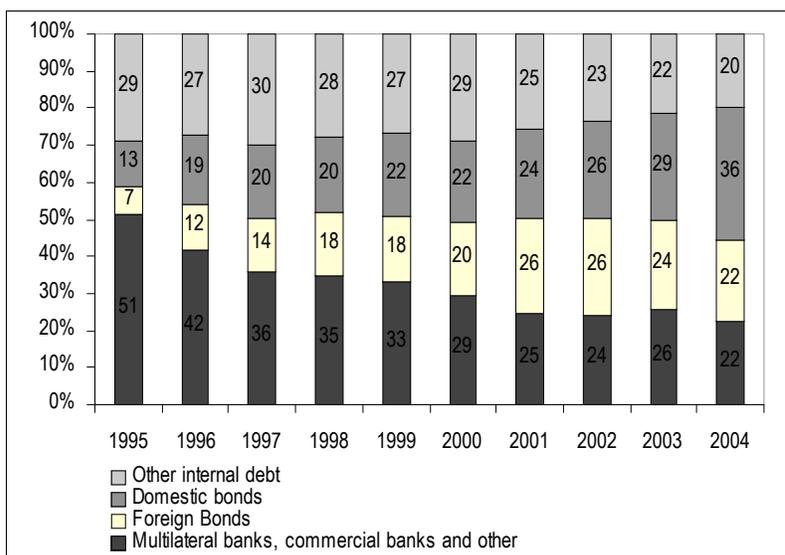
Finally we find evidence that the competition of the public-debt component for the market liquidity has hurt the growth potential of the corporate bond market. The fact that public debt has been placed at relatively high interest rates (due to the size of the fiscal deficit that needs to be financed) puts a question mark on the long-term consequences of

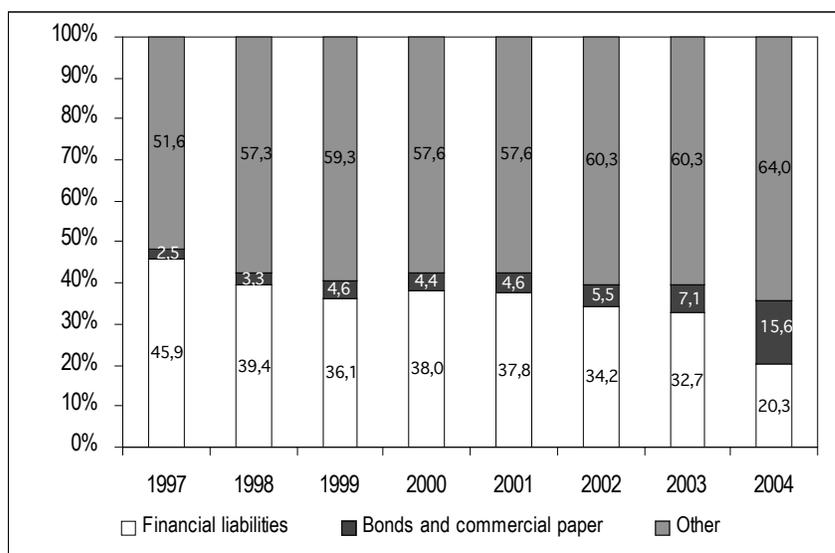
fiscal policy in Colombia. While it is not the aim of this paper to determine the ways in which the fiscal policy of Colombia should be adjusted, much progress needs to be done in this front.

**Figure 4.1: Bonds by Type as Percent of GDP, 1997-2004. Source: Superintendencia de Sociedades, Superintendencia Financiera and Ministry of Finance of Colombia**



**Figure 4.2: Public Debt by Source (Percent of total). Source: Banco de la República de Colombia, Boletín de Deuda Pública, September 2005**



**Figure 4.3: Liabilities by Type, 1997-2004. Source: Superintendencia Financiera****Table 4.1: Bank Credit, Stock Market Capitalization and Outstanding Domestic Debt,****2004**

	Bank credit	Stock market capitalization	Domestic debt		
			Government	Financial	Corporate
<b>Mature Markets</b>					
Japan	94,4	78,5	141,0	25,6	16,3
United States	45,8	129,0	47,1	94,4	22,0
Euro Area	103,9	54,6	53,6	29,8	10,0
<b>Emerging markets</b>					
Asia	103,6	74,1	22,3	13,4	6,9
Europe	24,3	34,1	26,9	0,5	1,0
Latin America	20,9	40,2	28,9	5,3	2,6
Argentina	10,4	30,7	5,8	3,4	6,4
Brazil	25,2	50,0	44,7	10,8	0,6
Chile	56,8	114,8	19,6	10,2	11,3
Peru	17,6	28,3	5,6	1,3	3,1
México	14,3	25,4	22,6	0,8	2,7
<b>Colombia*</b>	<b>18,0</b>	<b>24,3</b>	<b>22,8</b>	<b>4,3</b>	<b>3,9</b>

Source: IMF (2005). Data for Colombia: Banco de la República de Colombia,

Superintendencia Financiera.

**Table 4.2. Issuer and Issue Characteristics, 1997-2004**

		1997	1998	1999	2000	2001	2002	2003	2004
Firms	<b>Real assets in 2004 million dollars</b>								
	max	479.036	90.067	2.750.759	515.367	494.927	3.838.823	4.297.296	4.622.397
	min	100.062	90.067	97.317	2.894	44.330	33.240	124.396	1.165.800
	median	113.784	90.067	283.188	167.685	280.742	215.507	420.410	1.497.680
	<b>Average corporate debt as share of total liabilities</b>	12,1%	2,9%	28,0%	17,7%	17,9%	26,4%	35,2%	22,3%
	<b>Number of issuers</b>	4	1	7	5	5	9	6	3
	<b>Number of issues</b>	9	1	11	6	5	11	6	3
	<b>Total amount issued in 2004 million dollars</b>	145,24	6,43	397,13	158,10	213,77	935,53	856,44	606,76
	<b>Average issue size in 2004 million dollars</b>								
	mean	16,14	6,43	36,10	26,35	42,75	85,05	142,74	202,25
median	22,52	6,43	23,55	16,78	30,18	18,80	50,77	125,54	
min	0,94	6,43	6,25	10,83	22,63	11,75	13,24	62,77	
Total including holdings	<b>Number of issues</b>	13	3	13	10	11	14	8	9
	<b>Total amount issued in 2004 million dollars</b>	182,77	7,15	582,11	255,55	405,40	1.050,71	856,31	1.258,90
	<b>Average issue size in 2004 million dollars</b>	14,06	2,38	44,78	25,56	36,85	75,05	107,04	139,88

Source: Superintendencia Financiera.

**Table 4.3: Institutional Investors by Type, 2004**

	Banks	Consumer loan companies	Trust funds	Investment banks	General insurance companies	Life insurance companies	Mandatory pension funds	Severance pay funds	Voluntary pension funds
<b>Number of investors with corporate bonds outstanding in their portfolio</b>	13	1	7	4	16	17	7	6	7
as share of total	28,3%	1,6%	12,7%	11%	39,0%	68,0%	100%	100%	100%
<b>Portfolio size in 2004 million dollars</b>									
Mean	493.357	3.899	6	391.707	52	87	1.550.366	210.614	209.392
Standard deviation	539.482	3.062	7	288.946	50	100	1.089.213	119.593	189.196
Median	290.259	3.124	3	362.023	32	41	1.689.383	218.739	122.594
<b>Portfolio share in corporate bonds</b>									
Mean	2,4%	0,0%	2,9%	2,1%	4,2%	8,3%	11,5%	10,7%	11,0%
Standard deviation	5,8%	0,2%	9,2%	1,5%	5,4%	8,3%	4,5%	6,9%	4,9%
Median	0,0%	0,0%	0,0%	2,0%	2,5%	7,2%	12,9%	9,3%	13,1%
Ceiling imposed by the regulation					30,0%		30%	30%	
<b>Portfolio share in treasury bonds</b>									
Mean	63,7%	63,6%	54,9%	29,0%	52,4%	64,8%	47,9%	68,2%	47,6%
Standard deviation	22,3%	28,9%	37,0%	13,7%	21,4%	20,3%	14,1%	10,0%	17,3%
Median	64,6%	74,7%	53,3%	31,7%	56,2%	67,1%	53,1%	69,9%	43,1%
Ceiling imposed by the regulation					60,0%		50%		

Source: Superintendencia Financiera

**Table 4.4. Probit Regressions to Explain Decisions to Participate in the Bond Market**

Dependent variable: Dummy = 1 if firm issued bonds at time t			Dependent variable: Dummy = 1 if investor has corporate bonds outstanding in its portfolio at time t		
	Coefficient	dF/dx		Coefficient	dF/dx
Constant	-135,27 (35608)***		Constant	-14.16 (1.934)***	
Size (t-1)	0,47 (0.062)***	2.55e-10	Investor size (t-1)	0.34 (0.032)***	0.006
Leverage (t-1)	0,44 (0.158)***	2.40e-10	Share of investor's portfolio in treasury bonds (t-1)	-0.29 (0.128)**	-0.005
Profitability (t-1)	0,45 (0.230)***	2.48e-10	Average issue size	0.82 (0.155)***	0.014
Dummy = 1 if firm issued bonds in (t-1) <sup>2</sup>	0,57 (0.213)***	2.87e-09			
Dummy = 1 if firm issued stocks before (t) <sup>2</sup>	0,63 (0.306)**	4.02e-09			
Corporate debt market entry cost	-11,45 (3.413)***	-6.26e-09			
Stock market size	-6,67 (1.947)***	-3.65e-09			
Financial intermediaries market size	4,20 (1.185)***	2.30e-09			
Public debt market size	-0,51 (0.175)***	-2.79e-10			
Relative size stock vs. financial intermediaries markets	2,94 (0.871)***	1.61e-09			
No. Obs	46.813			1.864	
Loglikelihood	-107,59			-264,30628	

## Notes:

1. Standard errors in parentheses. \*\*\* denotes significance at 1%. \*\* denotes significance at 5%. Standard errors are robust standard errors that correct for the clustered nature of the yearly data.
2. dF/x is for discrete change of dummy variable from 0 to 1.
2. Time dummies and investor type dummies were included in the investor's decision estimation

**Table 4.5: Impact of the Corporate Bond Market on the Banking Sector (standard errors in parentheses)**

Dependent variable: Loan performance	
Constant	9.84*** (2.28)
Bonds outstanding/ Total liabilities (BO)	-0.42** (0.13)
Financial crisis dummy (FC)	2.81** (0.94)
FC*BO	-0.68*** (0.13)
Profitability (Operating utility/Assets)	-0.46*** (0.08)
Leverage (Total liabilities/Total assets)	0.10* (0.05)
GDP growth	-0.42*** (0.09)
Lagged GDP growth	-0.67*** (0.09)
Number of observations	367
Adjusted R-squared	0,17

Notes: (1) Standard errors are robust standard errors that correct for the clustered nature of the yearly data. (2) The equation includes sectoral control dummies. (3) \* denotes significance at the 10% level, \*\* at the 5% level and \*\*\* at the 1% level.

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### Notes

1. Only around 100 companies are listed.
2. See Echeverry and Salazar (1999), and Caballero and Urrutia (2006).
3. Dictated by the Basel Committee on Banking Supervision, created in 1974 and formed by the central banks' governors of the G-10 member countries. These goal of the standards is to improve the supervision guidelines that central banks or similar institutions impose on wholesale and retail banks.
4. The pay-as-you-go regime continues to be administered by a public entity, the Instituto de Seguro Social (ISS).
5. Before having a single stock exchange, each of the three stock exchanges had developed its own electronic transaction systems for fixed income operations and variable income operations. These systems were integrated with the creation of the Stock Exchange of Colombia.
6. Information about the workings of the Colombian corporate bond market during the period 1997-2004 is not available from a single source. Firm-level data are available from the Superintendencia de Sociedades (SS) and at the Superintendencia Financiera (SF). The SS database contains the annual financial statements of 7,317 medium and large size firms,

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obliged to report to this agency. The SF also includes accounting data, but only for the firms that issue equity or bonds. It contains information about the amounts issued by each of these firms at each point in time. Both databases were merged for the purposes of this research. Finally, detailed accounting statements are available at the firm level for all institutional investors for the period 1995-2004 from Superintendencia Financiera. This section and the sections that follow are based on these sources.

7. In the database, 350 firms on average per year do not have a sector identifier.

8. Investors' perceptions about the corporate bond market in Colombia were captured with a survey. A complete summary of the answers to the full questionnaire is available in the [Data Appendix](#).

9. Firms' characteristics that enter as explanatory variables are lagged to control for potential endogeneity.

10. Time-dummies were included as explanatory variables in an alternative model firm's financing decisions. The coefficients on the firm-level variables were robust to the specification to control for elements of the macroeconomic environment that may affect the inclusion of these controls, but the significance of the market variables was swept away by it. We consider the alternative model specification -without time dummies- much more interesting.

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11 . The calculated cost per peso issued does not include the costs paid to investment bankers and other costs that may be incurred during the issue process, so they underestimate the real costs.

12. Standard errors are robust standard errors that correct for the clustered nature of the market-level variables.

13. A version of the same model was estimated restricting the sample to include only the firms that report bonds outstanding in their balance sheets in each period. We found that the variables driving the decision of a firm to issue bonds are robust to whether the firm is a new or an experienced bond-issuer. The results of this exercise are available from the authors.

14. A measure of firm performance--the firm's return on equity (ROE)--was included in alternative model specifications and discarded due to lack of significance. Results are available from the authors.

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