

Credit Constraints in Latin America: An Overview of the Micro Evidence

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September 2002

Abstract¹

This paper summarizes and discusses new evidence on the nature, extent, evolution and consequences of financing constraints in Latin America. The countries covered are: Argentina, Colombia, Costa Rica, Ecuador, Mexico, and Uruguay. All the new contributions share the characteristics of being based on microdata. Most of the data sources are firm's balance sheets. For Argentina information on debt contracts and credit history is also available, while for Costa Rica personal information on entrepreneurs was also collected. Some of the papers investigate the determinants of firms' financing choices, and the consequences of access or debt composition on performance. Other papers attempt to assess the severity of financing constraints, by focusing on firms' investment choices. All the papers (but one) were part of the project "Determinants and Consequences of Financial Constraints Facing Firms in Latin America and the Caribbean," financed by the IADB. However, other recent micro-econometric contributions are discussed as well.

The results suggest that access to credit (and its cost) depends not only upon favorable balance sheet characteristics, but also upon the closeness of the relationship between firms and banks as well as credit history. Access to long-term loans and to loans denominated in foreign currency is positively related to the size and tangibility of firms' assets and negatively related to measures of country risk. Moreover, firms that have foreign participation appear to be less financially constrained in their investment decisions. The same is true for firms that are associated with business groups. On the whole, it appears that financial liberalization tends to relax financial constraints for firms that were previously constrained, while financial crises tighten them. However, firms that have more access to external sources of finance via, for instance, exports or ownership links, appear to suffer less in the post-crisis period. The paper concludes with a discussion of the policy implications of these results.

¹ The opinions in this paper are those of the author's and not necessarily those of the IADB or its directors. We thank Gaston Gelos, Leora Klapper, Norman Loayza, Alejandro Micco, Sergio Schmukler, and Kim Staking for useful comments on preliminary versions of the papers included in this project. We also thank Thorsten Beck, Asli Demirguc-Kunt, Tullio Jappelli, Ross Levine, and Inessa Love for comments on this introduction.

1. Introduction

Bank credit plays a very important role for firms, especially in developing countries where equity markets are considerably underdeveloped. If access to bank loans is restricted, potentially profitable projects cannot be undertaken and economic activity can stagnate. If credit is constrained, so is investment, and since technology is often embedded in new capital goods, the capacity of economies to absorb new methods of production and to grow is adversely affected. Hence the ability of the banking industry to channel resources efficiently to firms becomes an important determinant for the process of economic development and growth.

Factors at both the micro and macroeconomic levels can affect the flow of credit to firms and individuals. Recently, an IDB research network project has investigated the impact of the institutional framework surrounding credit systems on credit supply.² The results confirm that institutional “quality” and a stable macroeconomic environment are essential for the adequate development of credit markets.³

The purpose of the papers undertaken for this project is to study the determinants and consequences of credit supply restrictions at the firm level in Latin America, using micro data.⁴ The countries covered are Argentina, Colombia, Costa Rica, Ecuador, Mexico, and Uruguay. The papers provide quantitative evidence on firms’ financing choices (access to bank loans, maturity structure, and currency denomination), and on how these choices are affected and constrained by firms’ characteristics and past history.⁵ They also analyze the effect of financing constraints on firms’ investment choices and show that their severity depends upon firm characteristics such as size, membership of a business group, and foreign ownership.⁶ The investigation of all these issues requires the availability of firm-level micro data. The use of such data is a common feature of all the papers in this volume and one of its strengths.

² See the contributions in Pagano, editor (2001). For cross-country evidence see the chapters in that volume by Padilla and Requejo and Japelli and Pagano.

³ See the seminal contribution by La Porta, Lopez-de-Silanes and Shleifer (1998), Levine (1998), and Claessens and Laeven (2002).

⁴ All of the papers but one, were part of the project “Determinants and Consequences of Financial Constraints Facing Firms in Latin America and the Caribbean,” financed by the IADB. The exception is the paper by Jaramillo and Schiantarelli (1997) on Ecuador, which was prepared for the conference “Term Finance: Theory and Evidence,” World Bank, Washington D.C. 1996, and had appeared as Policy Research Working Paper 1725 of The World Bank’s Policy Research Department, Finance and Private Sector Development Division.

⁵ The role of informational asymmetries in access (or lack of access) to credit has been amply discussed in the literature. See, for instance, the seminal contribution by Stiglitz and Weiss (1981).

⁶ See Schiantarelli (1996) and Hubbard (1998) for a critical review.

The results suggest that access to credit depends not only upon favorable balance sheet characteristics, but also upon the closeness of the relationship between firms and banks as well as credit history. Access to long-term loans and to loans denominated in foreign currency is positively related to the size and tangibility of firms' assets and negatively related to measures of country risk. Moreover, firms that have foreign participation appear to be less financially constrained in their investment decisions. The same is true for firms that are associated with business groups.

Another issue investigated in many of the papers is the evolution over time of financing constraints. In particular, the authors present evidence on the effect of financial reform on access to external finance, and on how this affects firms' real choices. Finally, the consequences of financial and banking crisis on financing constraints are also addressed. One of the interesting issues studied is whether crisis episodes and financial reform have a differential effect on different types of firms. On the whole, it appears that financial liberalization tends to relax financial constraints for firms that were previously constrained, while financial crises tighten them. However, firms that have more access to external sources of finance via, for instance, exports or ownership links, appear to suffer less in the post-crisis period.

This paper first reviews, in Section 2, the main issues concerning firms' financing choices and investment decisions in the presence of capital market imperfections. Section 3 discusses the methodology and the data sources used in the papers undertaken for this volume. Section 4 discusses in greater detail the main results, while Section 5 contains a discussion of the policy implications that can be drawn from this project.

2. The Main Issues

How are firms' financing and investment decisions affected by the presence of informational asymmetries and contract enforcement problems? How does the evolution of capital markets affect the severity of financial constraints? This section will briefly review the theoretical literature on these issues.

Access to Credit, and in What Form?

Stiglitz and Weiss (1981) formalize the effect of asymmetric information in the loan market and offer a rationale for the existence of limited access to credit. In essence, they assume that banks

can only classify the creditworthiness of firms at a broad level; that is, they have a global perception of the distribution of returns across a certain variety of projects, but lack knowledge about the creditworthiness of specific firms that wish to undertake particular projects. In this setting, the interest rate charged on loans not only influences the amount of loans granted, but also the riskiness of the creditor's own portfolio of loans, either by sorting potential borrowers according to their risk (the adverse selection problem) or by affecting the behavior of borrowers (the moral hazard problem). The combined result is a credit supply curve, which might not be monotonically increasing in the interest rate. Banks' profit maximization might then lead to an equilibrium where the market is not cleared and demand for credit exceeds its supply.⁷

Although Stiglitz and Weiss's conclusion on the possibility of credit rationing is derived in a model where debt is assumed exogenously to be in the form of the contract, it also holds in costly state verification models where debt arises endogenously as the optimal contract.⁸ Moreover the possibility of credit rationing is quite robust and survives the introduction of mechanism that are designed to address the adverse selection or moral hazard problem, such as the use of collateral.⁹ Although it has been shown that they mitigate the problems derived by informational asymmetries, they do not eliminate them completely, especially if potential borrowers exhibit decreasing average risk aversion.¹⁰ In such a case, wealthier agents are the only ones who would be granted credit, but they would also be the worst risks. Moreover, even if all agents have similar risk aversion, if asset markets are not developed, banks will still face the risk selection problem and the credit rationing problem may resurface—even if all debts are completely collateralized—given the difficulty of valuing assets pledged as collateral.

In addition to the use of collateral, there are several other mechanisms that can be used to screen across good and bad risks, such as the use of credit bureaus, and the development of credit scoring models. In many Latin American countries, however, credit bureaus are underdeveloped, the use of sophisticated credit scoring technologies is not a common practice, and banks rely on self-gathered information to sort out risks. Among the characteristics that might influence a firm's access to credit are its age and size, its property structure (such as foreign versus domestic, individual versus members of groups), and the existence of ongoing business relationships

⁷ Surveys and discussion of the literature on credit rationing can be found in Blanchard and Fischer (1989), Freixas and Rochet (1998) and Mazzoli (1998).

⁸ See Williamson (1986 and 1987).

⁹ See, for example, Bester (1985).

between firms and banks.¹¹ The papers undertaken for this project present empirical evidence on the importance of these factors.

It is important to identify and discuss the issues related to project selection, since the efficiency of banks in analyzing the creditworthiness of firms determines how resources are allocated and which firms will eventually have the chance to test their projects in the market's arena. From this perspective, banks' ability to distinguish firms with the greatest chance of success from the rest can determine a country's growth pattern.¹²

Not only is the issue of access to bank credit important, but the maturity structure of loans deserves further discussion. In particular, there has been a widespread perception both by domestic and international policymakers that asymmetric information and contract enforcement problems may lead to a shortage of long-term finance. This shortage is thought to have a cost in terms of productivity growth and capital accumulation, and it may justify some form of government intervention, because firms are prevented from choosing projects with higher returns that may, however, be more illiquid and with delayed returns. The setting up in most developing countries of long-term credit institutions (development banks) and/or of programs to foster the provision of long term credit was indeed the policy response to this problem. The emphasis on long-term finance and on potentially adverse consequences when such finance is in short supply is somewhat at odds with recent theoretical contributions emphasizing that the use of short-term debt may be associated with higher quality firms and may have better incentive properties.¹³ In particular, the possibility of premature liquidation may act as a discipline device that improves firms' performance. A re-thinking of the role of long-term debt, particularly when heavily subsidized, has also been prompted by the problems encountered in many countries by development banks in terms of non-performing loans and by doubts about the selection criteria used in allocating funds. In any case, the issue of the determinants of the maturity structure of debt and of its consequences for investment and productivity are important topics that deserve investigation.

¹⁰ See Stiglitz and Weiss (1986).

¹¹ See Petersen and Rajan (1994) on this issue.

¹² On the role of banks and stock markets in growth see Levine (2002), Beck and Levine (2002) and the contributions in Demirguc-Kunt and Levine (2001). For recent contributions on the more general issue of financial development and growth see Demirguc-Kunt and Maksimovic (1998), Beck, Levine and Loayza (2000), Levine, Loayza and Beck (2000), Wurgler (2000), and Galindo, Schiantarelli and Weiss (2002). See Levine (1997) for a review of earlier contributions. On maturity see Demirguc-Kunt and Maksimovic (1999). On financial structure in developing countries see Booth, Aivazian, Demirguc-Kunt et al. (2001).

Financing Constraints and Investment

In general, even if informational asymmetries and contract enforcement problems do not lead to outright credit rationing, they make external funds imperfect substitutes for internal funds and invalidate the separation between financing and investment choices implied by the Modigliani-Miller Theorem.¹⁴ The consequences of these information and incentive problems for investment have been explored in many recent papers.¹⁵ Although the models differ in their details, two main results emerge from this literature.¹⁶ First, unless the loans are fully collateralized, external finance is more costly than internal finance. Second, everything else equal, the premium on external finance is an inverse function of a borrower's net worth (liquid assets plus the collateral value of illiquid assets). It follows that any negative shock to net worth (due to technological reasons, shift in investors' preferences, or changes in monetary policy) leads to an increase in the premium and, therefore, to a reduction in investment and production. For this reason the initial impact of the shock may be amplified (the so-called "financial accelerator" effect).

Obviously, the problems associated with asymmetric information and contract enforcement affect firms differently, and several criteria have been used in the literature to divide firms into groups according to the likelihood of being financially constrained.¹⁷ The main cross-sectional criteria used in this project to identify firms for whom information and agency problems are more or less severe are affiliation with industrial groups and banks, foreign ownership, and size.

Business groups are a pervasive form of organization found in a variety of countries, both developed (such as Japan, Germany, and Italy) and developing (such as Indonesia, Korea and several Latin American countries). Business groups can be seen as an organizational form that helps to cope with information and contract enforcement problems in the capital markets. The knowledge by financial intermediaries or individual investors that in case of financial distress individual firms may also rely on the financial resources of the group is likely to improve their access to external financial resources. The diversification of the group's activities is an added

¹³ See, for instance, Diamond (1991).

¹⁴ Modigliani and Miller (1958).

¹⁵ See, for instance, Bernanke and Gertler (1989 and 1990), Gertler and Hubbard (1988), Calomiris and Hubbard (1990), Gertler (1992), Bernanke, Gertler and Gilchrist (1996 and 1999), Kiyotaki and Moore (1997) and Greenwald and Stiglitz (1988 and 1993).

bonus in this respect. Moreover, even in the absence of financial distress, business groups allow the formation of an internal capital market that supplements the capital allocation function of the external market. Finally, in some countries groups are organically linked with banks. Strong ties between banks and firms represent a possible way to reduce information costs. In this sense it is expected that firms affiliated with a business group will be less sensitive to cash flow, both because of the mitigation of information problems in accessing external finance (especially, if there are bank links), and because of the creation of an internal capital market. Similarly, direct foreign control or foreign participation in ownership can obviously alleviate financing constraints for similar reasons. In this case, financing constraints are also alleviated because it is likely that firms with a degree of foreign ownership will find it easier to access international capital markets.

Another criterion that has been used in some of the papers in order to identify firms that are more likely to be financially constrained has been size, on the presumption that size is highly correlated with the fundamental factors that determine the probability of being constrained. Smaller firms are more likely to suffer from idiosyncratic risk and, insofar as size is positively correlated with age, are less likely to have developed a track record that helps investors to distinguish good from bad firms. Moreover, small firms may have lower collateral relative to their liabilities and unit bankruptcy costs are likely to decrease with size. Finally, it is likely that transaction costs for issuing securities decrease with size. In any case, one must remember that this and other criteria used in sorting firms are to a varying degree potentially endogenous. Hence care should be taken in addressing these endogeneity issues in estimation.¹⁸

As described above, one of the implications of information-based models of investment is that the severity of financial constraints is likely to vary with overall macroeconomic conditions and with the stance of monetary policy because they influence firms' net worth. It is therefore expected, that during recessions or after a monetary tightening the cost of external finance increases and/or the access to it decreases. Similarly, negative shocks to balance sheets associated with depreciation, when part of the borrowing is in foreign currency, can be associated with tightening of financial constraints.

¹⁷ See Schiantarelli (1996) and Hubbard (1998) for a review.

¹⁸ See Schiantarelli (1996) for a discussion of this issue.

Finally, the occurrence of banking crisis, often associated with currency crisis, can disrupt and destroy information capital that had been accumulated and leads to a restriction in the supply of loans. This may lead to severe financial constraints for those firms that derive their external financing mostly from banks with negative consequences for their investment decisions.¹⁹

The tightness of financial constraints over time may vary, not only following changes in business cycle conditions and monetary policy, but also because of structural changes in financial markets. In the 1980s and early 1990s, several developing countries introduced financial reforms to facilitate capital accumulation and growth. These reforms consisted mainly of the removal of administrative controls on the interest rate and in the elimination or scaling down of directed credit programs. Barriers to entry in the banking sector were also lowered and the development of securities markets was stimulated. The main objective of the banking deregulation was to provide higher returns to depositors and to increase the supply of funds for investment, although whether this happens at the economy-wide level is a matter of controversy. It is likely, however, that the amount of saving intermediated by the banking system will increase. To the extent that there are economies of scale in information gathering and monitoring, it is possible that banking intermediaries may have an advantage over the curb (informal) market in allocating investment funds, and this may lead to a reduction in the premium of external finance over internal finance. On the other hand, the elimination of subsidized credit programs will increase the financing constraints on those firms that previously benefited from the system of administrative allocation of credit. This means that there are distributional consequences to programs of financial liberalization, and whether they relax financing constraints for different categories of firms is ultimately an empirical question.

3. Financial Constraints in Latin America: Methodology and Data

The papers in this project provide novel and intriguing evidence on the nature and consequences of capital markets imperfections in Latin America. The countries covered are Argentina, Colombia, Costa Rica, Ecuador, Mexico and Uruguay. All the papers are based on microdata, and most of the information sources are firm-level balance sheet data. In addition to firm-level

¹⁹ See Bernanke (1983), Bernanke and Blinder (1988) and Kashyap and Stein (1994), and Hubbard (1994), for a fuller discussion of the consequences of shocks to credit supply and of the implications for the transmission

data, for Argentina the researchers had access to the information on debt contracts and borrowers' characteristics collected by the Public Credit Bureau operated by the Central Bank. Finally, for Costa Rica, information was collected by means of a specially designed survey administered to manufacturing enterprises, and containing questions on entrepreneur's personal characteristics as well.

Some of the papers investigate the determinants of firms' financing choices using firm-level panel data containing balance sheet information. In particular they investigate econometrically how firms' characteristics, macroeconomic conditions, and financial reform affect firms' overall degree of leverage and/or the maturity structure of debt.²⁰ Fanelli, Bebczuk and Pradelli (2002) additionally present results on the currency denomination of debt, while Jaramillo and Schiantarelli (1997) analyze empirically the effect of the maturity structure of debt on productivity and investment. In contrast, Monge and Hall (2002) investigate how firms' and owners' characteristics at a point in time affect the access to bank finance, and the effect of the latter on several measures of firm performance such as investment, employment and profitability. Finally, Streb, Bolzico, Druck et al. (2002), adopt and extend the approach of Petersen and Rajan (1994), and provide evidence for Argentina using data from the Central de Deudores, on what affects the access to and the cost of bank credit, including factors such as closeness of bank relationships and past credit history.

The other papers focus instead on assessing the presence and severity of financing constraints, by focusing on firms' investment choices.²¹ All of them share a common methodological approach, in that they are based on panel estimation of an investment equation, containing, in addition to a proxy for fundamentals, financial variables that capture the availability of internal sources of finance and the net worth position of the firm. The basic strategy, following the spirit of the seminal contribution by Fazzari, Hubbard and Petersen (1988), is to test whether they are significant for the firms that a priori are thought more likely to face information and incentive problems. The measurement of fundamentals is based either on Tobin's average q or on proxies for the present value of the marginal product of capital based on the sales to capital ratio. Error correction models for investment or accelerator models are also

mechanism of monetary policy of imperfect substitutability between bank loans and other forms of credit.

²⁰ See Fanelli, Bebczuk and Pradelli (2002) for Argentina and Jaramillo and Schiantarelli (1997) for Ecuador.

²¹ See Arbeláez and Echavarría (2002) for Colombia, Castañeda (2002) for Mexico, de Brun, Gandelman, and Barbieri (2002) for Uruguay, and Fanelli, Bebczuk and Pradelli (2002) for Argentina.

estimated, in which case sales and sales growth capture profit opportunities.²² The measurement of net worth is a very difficult problem in an intertemporal context. In some of the papers in this volume cash flow is used as a proxy for internal net worth, while others rely on the stock of liquid assets.²³ Others also include other balance sheet variables, such as leverage in the investment equation. Whatever the choice, one expects that firms that suffer more from asymmetric information problems are more sensitive to variation in their net worth or in the availability of internal funds.

In the estimation both of the financing and investment equations one needs to address seriously endogeneity issues. The availability of panel data here is very important, because it allows one to deal with the presence of (relatively) firm-specific and time-invariant unobserved characteristics that appear as components of the error term in the investment or financing equations to be estimated. In addition, some variables, even after removing such components by an appropriate transformation, are correlated with the contemporaneous or lagged values of the idiosyncratic component of the error term. In the case of short panels, this calls for the use of Instrumental Variables or Generalized Method of Moments techniques.²⁴ Whereas there are well-developed techniques to address the problems outlined above in the context of dynamic panel data models with continuous data, the same is less true in dealing with models that have a discrete choice component. This affects for instance, the estimation of equations dealing with access to finance, and it is therefore more difficult to give a structural/causal interpretation to the results. The same caution must be exercised when results are based on only one cross section. However, even in that case, the correlations captured in estimation are extremely interesting, and provide very useful information on the financing problems faced by firms and on the factors that may be associated with different outcomes.

4. An Overview of the Results

What does the evidence suggest about the access by firms to bank credit and about the maturity structure and currency composition of debt? This section discusses the main results obtained by

²² In one case (Uruguay), in addition to the investment equations described above, the Euler equation for the capital stock is estimated, allowing for the presence of a ceiling on leverage and for an interest rate premium related to leverage itself.

²³ Note that cash flow captures both balance sheet conditions and expectations of future profitability.

²⁴ See Bond (2002) for a review of the econometric issues that arise in the estimation of dynamic panels.

the authors and will place them in the more general context of the literature. Table 1 summarizes the nature of the data sources used, while Table 2 summarizes the models that have been estimated, the sample separation criteria used, and the econometric methods. Starting with the composition of debt, the paper by Fanelli, Bebczuk and Pradelli for Argentina presents evidence that size (proxied by the fixed capital stock) has a significant positive effect on the percentage of total debt that is of longer duration (1 year or more).²⁵ The maturity structure is also significantly related to the tangibility/duration of assets (measured by the ratio of fixed to total assets) and there evidence of firms matching the maturity structure of assets and liabilities.²⁶ Size and tangibility are also positively related with the proportion of debt denominated in foreign currency. Finally, country risk, measured as the Emerging Market Bond Index Spread, alters the maturity structure of debt in favor of short-term debt denominated in domestic currency, while the opposite is true for financial development, captured by the private debt to GDP ratio. These results are in line with previous findings in similar literature. For example, Booth, Aivazian, Demirguc-Kunt et al (2000) find that for a sample of 10 developing countries (which does not include Argentina) size and tangibility are important determinants of debt ratios.²⁷ Schmukler and Vesperoni (2000) also analyze a sample of seven developing countries (including Argentina) and find similar results. Gallego and Loaya (2000) come to similar conclusions using a sample of Chilean firms. Notably Fanelli, Bebczuk and Pradelli. do not find significant evidence of an increase in the proportion of long-term debt for firms with access to foreign sources of funding (captured by ADRs or the ability to issue international bonds), contrary to the results obtained by Gallego and Loayza, and Schmukler and Vesperoni.

²⁵ The results are based on a smaller panel of 36 companies quoted on the Buenos Aires Stock Exchange and a larger one, provided by the Instituto Nacional de Estadística y Censos, of approximately 300 firms. The former has a quarterly frequency and covers most of the 1990s, while the latter is annual and is of shorter duration.

²⁶ See Hart and Moore (1994) for a theoretical model.

Table 1. Data

Paper	Country	Data	Data Source	Sample
Castañeda	Mexico	Annual balance sheet data for 176 listed firms	Mexican Securities Market (BMV)	1990-2000
De Brun, Gandelman, Barbieri	Uruguay	Annual balance sheet for 56 listed and unlisted firms	Superintendencia del Mercado de Valores, at the Central Bank of Uruguay and Liga de Defensa Comercial	1995-2000
Echavarría and Arbelaez	Colombia	Annual balance sheet data for 1488 listed and und listed firms	Superintendencia de Valores and Superintendencia de Sociedades	1978-1999
Fanelli, Bebczuk, and Pradelli	Argentina	Quarterly balance sheet data for 45 listed firms and annual data for 308 firms	Buenos Aires Stock Exchange for quarterly data, and Encuesta Nacional de Grandes Empresas (ENGE) by INDEC (Instituto Nacional del Estadísticas y Censos) for annual data	1986-2000 on quarterly data, 1994 -1998 on annual data
Hall and Monge	Costa Rica	Survey data for 150 manufacturing firms	Own Survey	2001
Jaramillo and Schiantarelli	Ecuador	Balance sheet data on 731 or 850 firms	Superintendencia de Compañías	1984-1988 / 1984-1992
Streb, Bolzico, Druck, Henke, Rutman, Sosa Escudero	Argentina	Balance sheet and debt information for 15,796 firms	Central de Deudores del Sistema Financiero at Central Bank of Argentina	Oct-00

²⁷ Moreover, they find that in general debt ratio in developing countries are affected in a similar way by the same types of variables that appear significant in studies for developed countries. However, they note that the way country-specific factors tend to affect debt varies substantially across countries.

Table 2. Models

Investment						
Paper	Dependent Variable	Proxy for Fundamentals	Proxy for Net Worth *	Cross Sectional Sample Separation	Macroeconomic Events	Estimation Method
Castañeda	Investment / Capital Stock	Production / Capital	Cash flow, cash stock	Group membership, Bank Ties, Export Orientation	Financial Crisis	GMM, OLS
De Brun, Gandelman and Barbieri	Investment / Capital Stock	First differences of log (Sales)	Cash flow (contribution margin)	Foreign Ownership, Size	Financial Crisis	GMM
Echavarría and Arbeláez	Investment / Capital Stock	Sales/ Capital	Cash flow	Group Membership, Foreign Ownership, Size	Financial Crisis, Financial Liberalization	GMM, OLS
Fanelli, Bebczuk, and Pradelli	Investment / Capital Stock	Tobin's q, Sales/Capital	Cash flow, cash stock	Group membership, ADRs and bond issues, recently privatized	Financial Crisis	GMM, FE
Jaramillo and Schiantarelli	Investment / Capital Stock	Growth in real sales	Cash flow	Size	Financial Liberalization	GMM
Access/Debt Composition/Performance						
Paper	Dependent Variable	Firm Characteristics	Credit History	Macroeconomic Events Used for Sample Separation	Estimation Method	
Fanelli, Bebczuk, and Pradelli	Debt/Equity, Long Term Debt/Total Debt, Dollar Denominated Debt/ Total Debt	Yes	No	Yes	GMM, FE	
Hall and Monge	Prob(Access to bank debt), amount of bank debt, Performance (employment, investment, profitability)	Yes	Yes	No	PROBIT, TOBIT, Heckman selection model and Semi Parametric Methods (for performance)	
Jaramillo and Schiantarelli	Prob(Access to long term debt), Maturity, Performance (Productivity, Investment)	Yes	No	Yes	PROBIT, TOBIT, Heckman selection model, GMM (for performance)	
Streb, Bolzico, Druck, Henke, Rutman, Sosa Escudero	Overdraft interest rate, Debt Ratio, Unused credit lines	Yes	Yes	No	OLS, TOBIT, Heckman selection model	

Notes: * Relative to the capital stock.

Jaramillo and Schiantarelli (1997) also find that size (and tangibility) is crucial in determining the access to and the amount of long-term debt for Ecuadorian firms.²⁸ These results are consistent with several explanations. One is simply that collateral is a prerequisite for obtaining long-term credit. Moreover, larger firms tend to be more profitable, so this result may reflect a positive association between firm quality and long-term debt. Also, larger firms are likely to have more bargaining power and greater political influence in obtaining long-term financial resources, particularly when they are available through government-subsidized programs. Jaramillo and Schiantarelli also find that estimation of an augmented production function suggests that the availability of long-term finance may have a positive effect on productivity. Perhaps the availability of long-term finance facilitates access to more productive technologies, and this effect dominates the positive incentive effects generated by more intense monitoring and by the fear of liquidation associated with short-term debt.²⁹

Monge and Hall present interesting evidence on the source of credit for Costa Rican firms. They find that while banks are the most important source of credit for larger firms, non-banking credit (trade credit and informal credit) is the leading source of funds for smaller firms. Moreover, own funds and informal credit are very important for newly created firms. The probability of having access to bank credit (or its share of total credit) is positively related to firm characteristics such as size, having formal accounting statements, and the existence of long-term relationship with a bank. Surprisingly, it is not significantly related to personal characteristics of the owners of the firm, such as education and age. Finally, both parametric and semi-parametric methods fail to deliver statistically conclusive results on the effect of access to bank credit on firm performance. The results suggest that bank credit can have large positive effects on firm's performance, but such effects are not precisely estimated.

The paper by Streb, Bolzico, Druck et al. on Argentina also focuses on the financing side of the firm. However, unlike the papers by Jaramillo and Schiantarelli and Monge and Hall, it does not address the issue of access to bank credit, but, conditional on access, it investigates the

²⁸ Their data source is the Superintendencia de Compañías and consists of balance sheets for several hundred companies over the period 1984-1992, and it therefore excludes therefore the most recent crisis period.

²⁹ One disturbing result for Ecuador is that, conditional on size, greater profits do not increase the probability of receiving a long-term loan. Moreover, conditional on access, profitability is negatively correlated with the length of the maturity structure of debt. This raises some questions on the mechanism used in allocating long term financial resources in Ecuador, during the period covered by the study. Actually, it is interesting to note that the negative effect of profits is greater before financial liberalization, while afterwards the profit coefficient increases but not enough to make it positive.

determinants of the availability and cost of bank credit for firms that have a relationship with the banking sector. The paper does so by using the information contained in the *Central de Deudores* records collected from financial institutions by the Banco Central de la Republica Argentina.³⁰ The data set is very rich and the empirical work is based on approximately four thousand observations. The marginal cost of credit is measured using overdrafts, which is the most expensive line of credit. The availability of credit is measured by unused credit lines as a proportion of total liabilities with the main bank.³¹

The availability of credit is found to depend positively on the closeness of the relationship between firms and bank. Closeness is measured by the debt concentration at the marginal bank and by the number of accounts with it. Favorable balance sheet characteristics (such as large assets, a high sales to asset ratio, low leverage, etc.) and a good credit history (a normal credit situation with no arrears and no bounced checks) lead to improved credit availability and lower cost. Additionally, a good credit history in the credit register is associated with higher credit availability, suggesting that the information contained in the *Central de Deudores* eases credit constraints for healthy firms. This evidence supports the importance of credit registries as one of the institutions that can help in relaxing financing constraints, as discussed recently by Pagano and Japelli (1993) and Japelli and Pagano (2001). Another interesting result is that, as the credit situation deteriorates, the interest rate does not increase monotonically. This is consistent with a credit-rationing story in which increases in interest rates beyond a certain limit may lead to a decrease in bank profits since they increase the probability of bankruptcy.

What can be learned from the estimation of the investment equations about the differences across firms and over time in the severity of financing constraints? The evidence presented by de Brun, Gandelman and Barbieri for publicly traded firms in Uruguay suggests that, even within this group of relatively large firms, size matters in the sense that smaller firms display greater sensitivity to cash flow.³² On the other hand, the results in Fanelli, Bebczuk and Pradelli for Argentina do not support the presence of significant differences related to size in their sample of quoted companies.

³⁰ For other work using the *Central de Deudores* see Berger, Klapper, and Udell (2000), who however do not use the information on interest rates and on the balance sheet of firms in their paper.

³¹ Petersen and Rajan (1994) measure, instead, credit constraints by the degree by which firms resort to trade credit, which is generally more expensive than bank credit.

The paper by Arbeláez and Echavarría on Colombia and the paper by Castañeda on Mexico, both based on large samples of several hundred firms,³³ present evidence of greater sensitivity to financial variables such as cash flow or the stock of liquid assets for independent firms not affiliated with business groups, confirming the role of groups in mitigating financing constraints.³⁴ There is also evidence that companies with foreign ownership (in Colombia) or those affiliated with a bank (in Mexico in the first half of the 1990s) are less financially constrained.

Some of the papers in the project also provide evidence on the time-varying nature of liquidity constraints. As predicted by many theoretical models of investment based on asymmetric information, there is evidence that episodes of financial and currency crises, such as those that have occurred in the middle and at the end of the 1990s, are associated with a tightening of financing constraints. This is true both in Colombia and Uruguay. In the latter case the worsening of financing constraints has affected mainly smaller firms. Note that this is the first hard econometric evidence, based on the estimation of an investment function, on the effect of financial crisis on the severity of financing constraints. It complements and extends nicely the evidence in Domac and Ferri (1999) for Korea and Malaysia, based on the estimation of VARS containing various measures of the interest spreads and of production for the aggregate of small and large firms, respectively.

The results for Mexico are more puzzling. In particular, they suggest that independent firms were less sensitive to cash flow after the 1995 crisis (that also coincided with NAFTA). Group members do not display excess sensitivity pre or post 1995. The fact that group members do not display excess sensitivity during the second half of the 1990s, despite the problems affecting the banking sector, is consistent with the idea that groups lessen financing constraints by creating an internal capital market.³⁵ It is, instead, more difficult to explain the result for independent firms, unless one assumes that firms that have internal liquidity or access to capital markets, such as export-oriented firms, recycle funds to independent firms, for instance through

³² The sample includes 54 firms and covers the period 1997-2000.

³³ The sample for Colombia includes 140 quoted and 1,348 unquoted firms for the period 1970-1999. The sample for Mexico includes 176 quoted companies for the period 1990-2000.

³⁴ Similar results had been obtained for Indonesian establishments by Harris, Schiantarelli and Siregar. (1994) and for Korean firms by Cho (1995).

³⁵ The author actually suggests that group structure may have become tighter in the second half of the nineties as a response to the problems of the financial sector. However, he also notes that one piece of evidence is not consistent

trade credit, as suggested by the author.³⁶ An interesting result is that firms affiliated with a bank experience greater financing constraints in the second half of the 1990s, which is not surprising given the continued weakness of the financial sector after the crisis. In summary, the Mexican experience is a source of both useful lessons and unresolved puzzles that will require further investigation.

Finally, there is evidence that financial liberalization in Colombia has relaxed financing constraints for investment. It is interesting that firms that are not member of a group are those who have benefited more from the liberalization of the financial sector. This result for Colombian firms complements and extends the conclusions reached by Harris, Schiantarelli and Siregar (1994) for Indonesia, who found that smaller or independent firms were those that had experienced a relaxation in constraints, while larger firms or members of industrial groups were not constrained before or after liberalization.³⁷ More recently, using data on quoted companies for several developing countries from World Scope and a time varying index of financial liberalization, Laeven (2000) also had found that financial liberalization had relaxed financing constraints for smaller firms. On a related note, Love (2000), using a larger panel from Worldscope, including developed countries, provides evidence that time invariant measures of financial development are associated with a relaxation of constraints for smaller firms, in the context of Euler equations. Even more importantly for the present purpose, Harrison, Love and McMillan (2001), using the same data set, find that foreign direct investment in a country relaxes financing constraints for firms that are not members of multinationals in developing countries. All this evidence is very interesting because direct foreign investment, by bringing in scarce capital, may ease domestic firms' credit constraints. However, if foreign firms borrow heavily from domestic banks, they may crowd local firms out of domestic capital markets. The empirical results suggest that the first effect dominates.³⁸

with this plausible story, namely the fact that the coefficient of total group liquidity is only significant in the pre 1995 period.

³⁶ Corroborating evidence is the fact that the coefficient for the stock of cash is not significant for either exporting or not exporting firms in the second period. It is significant only for exporting firms in the first period, which is somewhat puzzling.

³⁷ Jaramillo, Schiantarelli, and Weiss (1996) find, instead, that financial liberalization did not significantly relax financing constraints for small firms in Ecuador.

³⁸ However, Harrison and McMillan (2002) find that borrowing by foreign firms exacerbates the credit constraints of domestic firms in Cote d'Ivoire.

5. Policy Consequences and Conclusions

The results of the papers undertaken for this project help to explain how the tightness of financial constraints vary across different types of firms and over time. Firms that have access to foreign funds, via, for instance, ownership links, appear to be less constrained. So are firms that have access to internal credit markets of business conglomerates or can use group membership as a way to improve access to external funds.

The papers in this study provide several policy lessons that should be taken into account when reforming the financial sector (or redesigning it after a collapse as in Argentina in 2002 or Mexico in the mid 1990s). Financial liberalization for example, can have positive effects on real activity, by relaxing financial constraints. A direct implication that is derived from this study is that policies that promote liberalization of financial markets (in dimensions such as removing interest rate controls, directed credit, allowing foreign participation in domestic markets, etc) can have positive impacts on access to credit by firms. On the one hand, eliminating restrictions on how financial institutions need to allocate credit or manage their risks allows them to increase their efficiency in allocating resources towards firms with higher returns to investment.³⁹ On the other hand, liberalization is usually accompanied by capital account liberalization policies that allow firms to tighten their links with foreign funding sources. In this respect, this project finds that these policies can also help to ease constraints by allowing firms in a host country to access the financial markets of the home countries of their parent companies.

Currency and financial crises increase the tightness of financial constraints and can have severe real costs. This underscores the importance of prudent monetary and budget policies that minimize the risk of a financial crisis. Moreover, it also puts in sharp relief the important role of a system of prudential regulation and supervision that reduces the probability of episodes of excessive credit expansion and risk taking by banks.⁴⁰ Sound macro policies and effective prudential regulations are both crucial in avoiding the risk that financial liberalization may exacerbate the probability of a financial crisis, as suggested by Demirguc-Kunt and Detragiache (1999).

The results also suggest that the impact of the crisis is not equal across firms. Firms that have ties to external sources of funds, via exports or via ownership links, appear to be less

³⁹ Galindo, Schiantarelli and Weiss (2002) find that financial liberalization in fact increases the efficiency of investment.

constraint in the post-crisis period. This result, consistent with recent research by Calvo, Izquierdo and Talvi (2002) shows that policies that support openness are fundamental in alleviating the vulnerability of the real and financial sectors to international shocks. Moreover, policies that support foreign participation in domestic markets, can reduce the vulnerability of firms, at least from external shocks of a moderate size.

The debt structure of firms is strongly determined by size and by the tangibility of their assets. This reflects, among other things, the importance of the collateral that firms are able to pledge in accessing credit: firms with greater collateral have access to longer-term debt. From a policy perspective, the importance of collateral should attract attention to putting in place institutions and rules, regulations that facilitate the effective use of various assets as collateral in Latin American countries. At a general level, one should be concerned with policies and institutions that enforce creditor rights which, as shown by La Porta, Lopez-de-Silanes and Shleifer (1997 and 1998) are extremely unprotected in Latin America.⁴¹ More specifically, it is necessary to develop instruments and institutions that facilitate the process by which firms as well as individuals can register their property on assets that can then be used as collateral.⁴²

Information sharing, documentation of credit history, and the adequate functioning of credit registries, are important tools in reducing the impact of informational asymmetries, and hence, financing constraints. The availability of information about borrowers' history has been shown to be crucial for sound lending decisions.⁴³ The greater availability of information reduces default rates and increases access to credit, and better-informed lenders, are able to provide better financial services to borrowers.

In order to exploit the benefits of credit registries, an adequate legal framework that encourages information sharing among lenders must be in place. In this regard bank secrecy laws, which can restrict information flows, have to be reviewed. Similarly, laws that impose limits on credit reporting can hinder the usefulness of credit reporting agencies. However rules

⁴⁰ For a discussion on these issues see World Bank (2001).

⁴¹ See also Levine (1998), Claessens and Laeven (2002), and Beck, Demirguc-Kunt and Levine (2002) for an analysis of the effects of institutions on financial development and growth. .

⁴² As shown by Lora, Cortés and Herrera (2001) the size of firms all over the world tends to be positively associated with the quality of institutions, namely institutions that protect property rights. Where property rights tend to be protected, entrepreneurs are in less risk of expropriation and hence tend to increase their investments in their firms. This research project also suggests that those types of policies that allow firm building also alleviate credit constraints.

⁴³ Note that hat accurate credit information can have greater predictive power for the performance of firms than the data contained in financial statements (Japelli and Pagano, 2001).

that impede the improper use of credit information must exist, in order to guarantee an adequate balance between the benefits derived from the protection of individual privacy and those of information sharing. Moreover, one needs to minimize the risk that information sharing may harm the security and well-being of the people who appear in the registry.

Although there is still much to be learned, the papers contained in this volume represent significant contributions in understanding firms' financing and investment decisions in Latin America and the constraints they face. They provide useful evidence on how firms' characteristics and the evolving nature of capital markets shape those choices and affect the severity of the constraints. This paper has highlighted some of the policy implications of the results, and it is hoped that further empirical work based on microdata will make it possible to sharpen those conclusions and to provide answers to the many important questions that still need to be addressed in this area.

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