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# Institutions, financial markets, and firm debt maturity<sup>☆</sup>

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## Abstract

We examine firm debt maturity in 30 countries during the period 1980–1991. In countries with active stock markets, large firms have more long-term debt. Stock market activity is not correlated with debt levels of small firms. By contrast, in countries with a large banking sector, small firms have less short-term debt and their debt is of longer maturity. Variation in the size of the banking sector is uncorrelated with the capital structures of large firms. Government subsidies to industry are positively related and inflation is negatively related to the use of long-term debt. We also find evidence of maturity matching. © 1999 Elsevier Science S.A. All rights reserved.

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## 1. Introduction

Conflicts of interest between a firm's insiders and outside investors are important determinants of the firm's ability to obtain capital. Jensen and Meckling (1976), Myers (1977) and Myers and Majluf (1984), among others, suggest that these conflicts can be mitigated by the appropriate choice of securities or contracts between the firm and its investors. An extensive theoretical literature in corporate finance shows that the optimal choice of securities for this purpose depends on the information available to investors and their ability to monitor compliance and enforce their legal rights.<sup>1</sup> Since the amount of information available to investors and their ability to protect their investment both depend on financial and legal institutions, firms' financial structures should differ systematically across countries. However, little is known about how observed differences in the institutional and legal environments across countries affect the financing choices of firms.

In this paper we examine how differences in financial and legal institutions affect the use of debt and especially the choice of debt maturity by firms in a sample of 30 countries in the period 1980–1991. The sample includes both developed and developing countries as well as countries with both common-law and civil-law legal systems. We ask four questions. First, are there any systematic differences in the maturity of debt claims issued by firms in different countries? Second, can any such differences be accounted for by the characteristics of the firms in each country? Third, can the differences in the use of debt be explained by institutional differences, particularly in the development of markets and the enforceability of contracts? Differences in the use of debt could occur if institutional arrangements in each country facilitate the use of particular securities to control opportunistic behavior by a firm's insiders. Finally, is there evidence that some firms, especially small firms, obtain less long-term debt financing in countries with less-developed financial systems?

Several authors explore the effect of the institutional environment on firm financing choices in specific countries. Hoshi et al. (1990) show that membership in industrial groups linked to banks reduces financial constraints on Japanese firms. Calomiris (1993) examines the effect of differences between the banking systems of the U.S. and Germany on firm financing. He argues that large-scale universal banks in Germany engage in long-term monitoring which is reflected

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<sup>1</sup> Diamond (1991,1993) and Rajan (1992) discuss the choice of maturity structures and the choice of whether to borrow from the market or from an intermediary who has an advantage in monitoring. For recent examples of optimal financial structures when investors can observe the firm's cash flows but cannot enforce legal rights to these cash flows, see Hart and Moore (1995) and Bolton and Scharfstein (1993). For reviews of the literature see Ravid (1996) and Harris and Raviv (1990).

in a higher propensity of German firms to issue equity. Rajan and Zingales (1995) explore capital structure decisions of firms in seven developed countries. They find that variables which are commonly used to explain financial structure in the U.S. are also correlated with leverage in their sample of foreign firms. Demirgüç-Kunt and Maksimovic (1995) consider financing choices in a sample of ten developing countries and find analogous, albeit weaker, results.

Recently, Barclay and Smith (1995) and Stohs and Mauer (1996) have examined term financing in the U.S. Barclay and Smith (1995) find strong support for the hypothesis that firms with larger information asymmetries issue more short-term debt. Stohs and Mauer (1996) find that long-term debt is issued by larger, less-risky firms in relatively low-growth industries. There have been fewer cross-sectional studies of the effect of financial and legal institutions on firm financing. Demirgüç-Kunt and Maksimovic (1998) explore the relation between firm growth and access to external finance for a sample of both developed and developing countries. They show that the proportion in each country of firms that grow at rates that exceed those that can be financed internally is correlated with the perceived effectiveness of the country's legal system and several indicators of financial market and institutional development. Rajan and Zingales (1998) examine the effect of the development of financial institutions on industry growth in a sample of countries, and Demirgüç-Kunt and Maksimovic (1996) explore complementarities in stock market and banking-sector development on the financing decision of firms in a cross-country sample of firms, but neither paper addresses the question of debt maturity or the quality of enforcement of contracts by the legal systems in each country. In a comparative study of legal systems, La Porta et al. (1998), hereafter LLSV, argue that the tradition on which a country's system of law is based as well as several specific protections are important in determining whether investors can enforce their claims on the firm's assets. Their paper classifies the legal systems of a sample of countries according to their legal tradition and whether or not they grant investors those specific protections. In the tests below, we use their classification of legal systems to supplement an index measuring the effectiveness of each country's legal system.

The rest of the paper is organized as follows. In Section 2 we take a preliminary look at the differences in term financing between countries. In Section 3 we discuss possible explanations for these differences. Section 4 introduces the data and presents summary statistics. Section 5 reports cross-sectional empirical tests of financial maturity across countries. Section 6 concludes.

## **2. Cross-country comparison of term financing**

Financial theory suggests that a major factor in a firm's choice of capital structure is the existence of agency costs. The extent to which these costs can be

controlled by appropriate financial contracts depends on both the characteristics of firms and the institutional environment in which the contracting takes place. Thus, since countries have very different institutional systems and firm characteristics, the observed financial structures in a cross-country sample should vary systematically across both countries and firms.

We can obtain an initial assessment of the extent of these differences by comparing the long-term and short-term indebtedness of firms for a sample of countries at different levels of economic development. Our sample consists of firms in 19 developed economies and 11 developing economies for the period 1980–1991. The developed countries in our sample are Austria, Australia, Belgium, Canada, Finland, France, Germany, Hong Kong, Italy, Japan, the Netherlands, New Zealand, Norway, Sweden, Singapore, Spain, Switzerland, the United Kingdom, and the U.S. The developing countries are Brazil, India, Jordan, Korea, Malaysia, Mexico, Pakistan, South Africa, Thailand, Turkey, and Zimbabwe. The selection of countries and the variables discussed in this paper are described in detail in Section 3.

For the developed economies we obtain firm-level data from Global Vantage. We include all the countries in the database for which there are more than 40 firms available. We eliminate observations that do not lie within a band centered on the median observation and having a width 12 times the interval between the 5th percentile and 95th percentile observations. (Fewer than 1% of observations are eliminated.) The firm-level data for developing countries are from the International Finance Corporation's (IFC) database. They consist of financial statement data for the (approximately) 100 largest publicly traded corporations in these economies. The IFC data are described in detail, together with primary sources, in Singh et al. (1992); the data for Brazil are from the publications of the Vargas Foundation of Brazil. For both databases, the number of firms available in each country, the years available, and the calculation of each variable we use are described in the appendix.

Fig. 1 displays the average ratios of long-term liabilities (measured as total liabilities less current liabilities) to total assets for firms in our sample for each of the 30 countries. The developing countries in our sample are denoted by the darker outline. Norway has the highest ratio of long-term debt to assets, whereas Zimbabwe has the lowest, at about one-fifth of Norway's. There is a marked clustering of developing countries at the bottom of the range, indicating that firms in these countries do not employ as much long-term debt financing. This pattern is confirmed in Fig. 2, which displays the ratio of long-term to total liabilities in our sample of countries. Firms in developing countries use less long-term debt as a proportion of total debt.

The differences in financing patterns across countries reflect differences in institutions and contracting environments across countries. However, firms with different characteristics have different access to financial markets and institutions even within the same economy. In particular, smaller firms are likely to

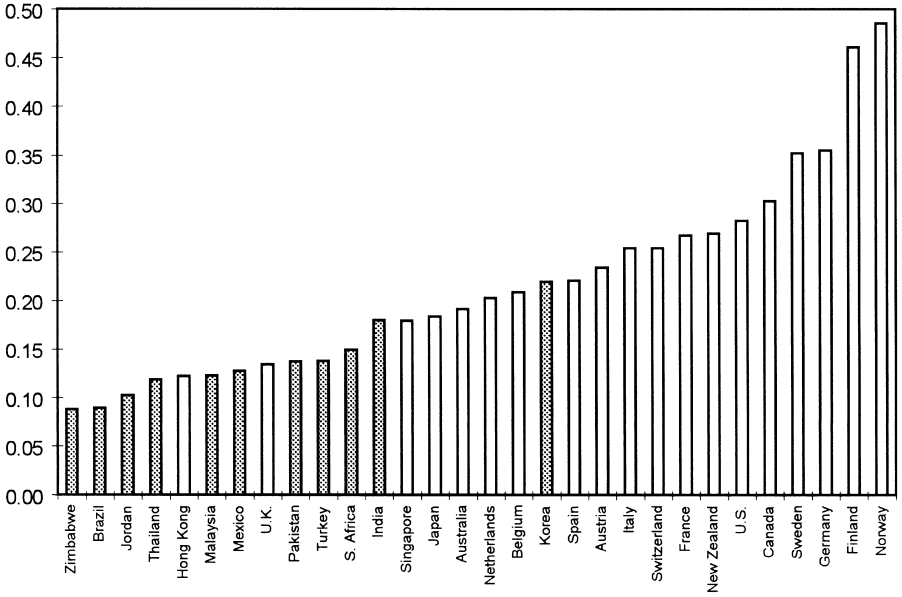


Fig. 1. Long-term debt/total asset ratios. The figure presents the average long-term debt to total asset ratios for firms in each country for the 1980–1991 period. Developing countries are denoted by the darker outline. The countries in the figure are ordered by their utilization of long-term debt financing.

have higher monitoring costs than larger firms, relative to the amount of the loan. We expect these differences to be reflected in different financing patterns. Fig. 3 depicts the ratios of short-term, long-term, and total indebtedness to total assets and the ratio of long-term to total debt by firm size. We divide the firms in each country in the sample into quartiles by value of total assets, and report the average debt ratios of each quartile calculated across countries. Inspection of the figure reveals that there are marked and consistent differences across quartiles in the use of long-term debt. Large firms report higher ratios of long-term debt to total assets and long-term debt to total liabilities. By contrast, there do not appear to be differences in the ratios of short-term debt to total assets across firm-size quartiles.

The figures indicate that there are differences in financing patterns for countries at different levels of development and for large and small firms. The most pronounced differences are in the use of long-term debt contracts. In principle, greater reliance on long-term debt in more-developed countries could be attributable to differences in the type of assets owned by firms in developed and developing countries. Thus, if firms in developed countries own more fixed assets, which have longer maturity, then the differences in capital structures can

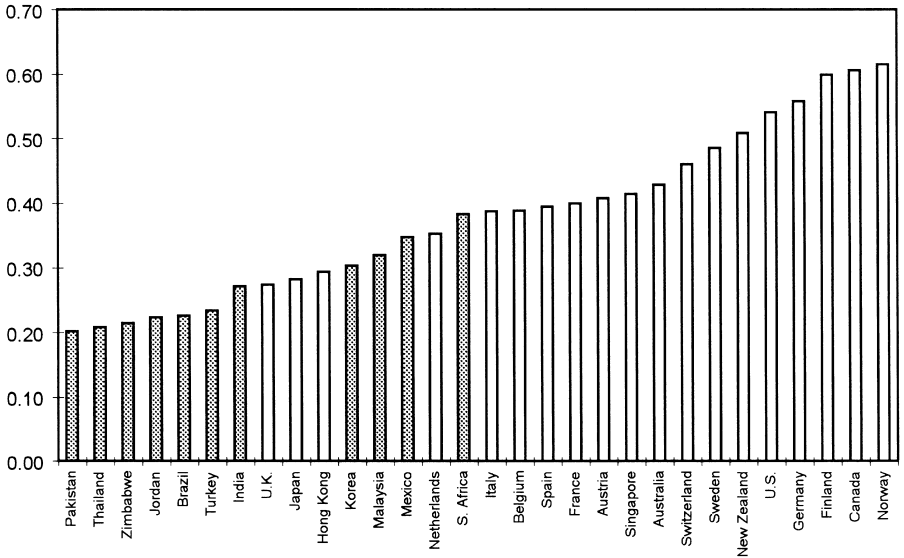


Fig. 2. Long-term debt/total debt ratios. The figure presents the average long-term debt to total debt ratios for firms in each country for the 1980–1991 period. Developing countries are denoted by the darker outline. The countries in the figure are ordered by their debt maturity.

be explained by simple maturity matching. We explore this possibility by plotting the average ratio of net fixed assets to fixed assets for the sample of firms in Fig. 4. Inspection of Fig. 4 shows that firms in several developing countries have higher ratios of net fixed assets to total assets than firms in many developed countries. Thus, simple maturity matching cannot explain the variation in long-term financing.

A more formal measure of the covariation of the level of development and long-term corporate indebtedness can be obtained by regressing the ratio of long-term debt to total assets on gross domestic product (GDP) per capita and country dummies. For large firms these variables ‘explain’ 44% of the covariation in long-term financing over the sample period. The size of the coefficient indicates that differences in per capita GDP in our sample are associated with very different levels of long-term debt. Thus, a relatively small \$1000 increase in per capita GDP (the difference between, say, Pakistan and Thailand) translates into an increment of 0.09 in the value of the ratio of long-term debt to total assets. Increases of \$10,000 in per capita GDP (the difference between, say, Pakistan and Singapore) translates into an increase of 0.09 in long-term leverage, whereas differences between some of the richest and poorest countries in the sample (the difference of approximately \$20,000 between, say, Pakistan and Norway) is associated with an impressive increase of 0.18 in the value of the ratio of long-term debt to total assets. The results of corresponding regressions of the

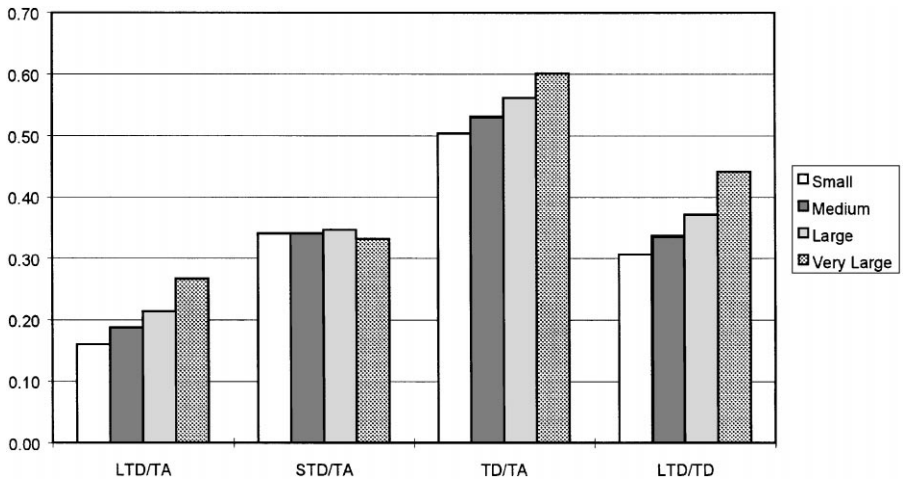


Fig. 3. Debt ratios: small vs. large firms. The figure presents the average long-term debt to asset ratio (LTD/TA), short-term debt to assets (STD/TA), total debt to total assets (TD/TA), and long-term debt to total debt (LTD/TD) across 30 countries by firm size. The firms in each country are divided into quartiles by value of total assets, and the average debt ratios of each quartile, calculated across countries, is reported. Countries in the sample are: Australia, Austria, Belgium, Brazil, Canada, Germany, Finland, France, Hong Kong, India, Italy, Jordan, Japan, Korea, Malaysia, Mexico, Netherlands, Norway, New Zealand, Pakistan, Singapore, Spain, Switzerland, Sweden, Thailand, Turkey, United Kingdom, United States, South Africa, and Zimbabwe.

ratio of long-term debt to total assets for small firms on per capita GDP are qualitatively similar. Together with country dummies, per capita GDP 'explains' 41% of the variation.

In the remainder of the paper we take a closer look at the differences in the financing of firms across countries and test whether it can be explained by firm characteristics and the characteristics of contracting environments and financial institutions.

### 3. Markets, institutions, and debt maturity

In order for a firm to obtain outside financing, and particularly loans, the firm must credibly commit to investors to respect contracts that control opportunistic behavior. The types of contracts that permit commitment in any particular case depend both on firm characteristics (Smith and Warner, 1979) and on the institutions in the economy that facilitate monitoring and enforcement of financial contracts.

When the legal system is inefficient or costly to use, short-term debt is more likely to be employed than long-term debt. As Diamond (1991,1993) and Rajan

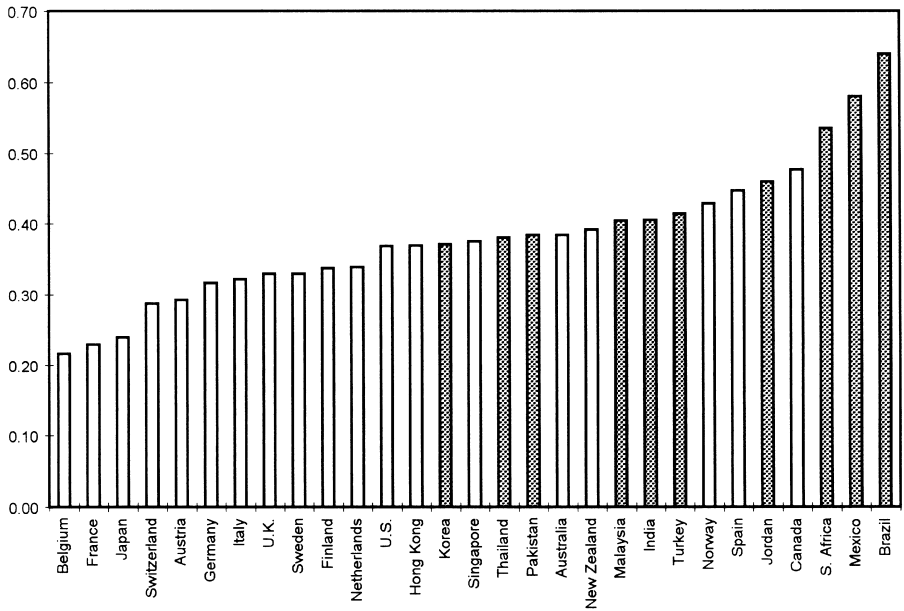


Fig. 4. Net fixed assets/total assets ratios. The figure presents the average net fixed asset to total asset ratios for firms in each country for 1980–1991. Developing countries are denoted by the darker outline. The countries in the figure are ordered by the value of the ratio.

(1992) argue, short-term financing makes it more difficult for borrowers to defraud creditors. Shorter maturities limit the period during which an opportunistic firm can exploit its creditors without being in default. The creditors can review the firm's decisions more frequently and, if necessary, vary the terms of the financing before sufficient losses have accumulated to make default by the borrower optimal. Thus, we would expect an inverse relation between the inefficiency of a country's legal system and the use of long-term debt.<sup>2</sup> To the extent that there are fixed litigation costs in enforcing contracts, long-term debt is likely to be used most heavily by large firms. The fixed costs also make the use of long-term debt, particularly by small firms, less responsive to small year-to-year changes in the economic environment. Of course, this presupposes the existence of a trade-off between the use of long-term and short-term debt.

Governments can facilitate the issuance of long-term debt by maintaining a predictable currency value. High and/or variable rates of inflation make it costly for investors and firms to contract. This contracting problem caused by

<sup>2</sup> We are grateful to the referee for bringing this aspect of the debt management policy of the New Zealand government to our attention.

inflation is compounded when the legal resolution of disputes is subject to delay. In principle, debt contracts can be indexed. For example, in Brazil all contracts specify a government price index used to adjust the nominal payments for inflation. However, the indexes are subject to adjustments made for political reasons. Furthermore, the judicial system does not index judgments, which are subject to appeal and other delays. Perhaps not coincidentally, Table 1 reveals that Brazilian firms have little long-term debt.

The government can promote the use of long-term financing directly by granting implicit loan guarantees when it adopts a policy of subsidizing loss-generating firms or sectors. Governments can also encourage the development of longer-maturity public debt markets by choosing to issue public debt with long maturities because a market in long-term government debt gives investors information about the risk-free term structure.

Financial intermediaries and stock markets directly influence the financial structures of firms. A prime function of financial intermediaries, such as banks, is that of monitoring borrowers. As Diamond (1984) argues, intermediaries have economies of scale in obtaining information. Intermediaries also have greater incentives to use the collected information to discipline borrowers than do small investors subject to free-rider problems. Thus, we would expect that a developed banking sector would facilitate access to external finance, particularly among smaller firms. The implications for the debt maturity of firms are less clear. A developed banking sector leads to an increase in the availability of short-term financing, since this form of financing enables intermediaries to use their comparative advantage in monitoring. However, banks' economies of scale and their ability to monitor covenants also permit them to offer long-term loans that would not be available in a market without intermediaries. Which of these tendencies predominates is an empirical question.

Developed stock markets provide opportunities for diversification by entrepreneurs. Thus, in countries with developed stock markets, there is an incentive for firms to switch from long-term debt to equity. However, stock markets also affect transmission of information that is useful to creditors. As Grossman (1976) and Grossman and Stiglitz (1980) demonstrate, prices quoted in financial markets at least partially reveal information that more-informed investors possess. This revelation of information makes lending to a publicly quoted firm less risky. As a result, the existence of active stock markets increases the ability of firms to obtain long-term credit. On the other hand, the additional liquidity that stock markets provide makes it easier for informed shareholders to escape the consequences of failed gambles, and therefore encourages risk-taking behavior costly to shareholders. Which of these effects predominates is another empirical question. Initial evidence by Demirgüç-Kunt and Maksimovic (1996) suggests that the informational effect is stronger and that in countries with developing financial markets debt–equity ratios increase with an increase in stock market size and activity.

The amount of long-term and short-term debt that is optimal even when financial markets are perfect depends in general on the opportunities that the firm's insiders have for diverting resources and on the assets that the firm can offer as collateral. Thus, theory predicts that firms whose principal asset is the present value of growth opportunities do not optimally borrow against that asset (Myers, 1977). By contrast, firms with a large quantity of fixed assets already in place do not distort their incentive value when they borrow. The fixed assets also facilitate borrowing by serving as collateral.

Barclay and Smith (1995) find that these predictions of the theory are supported in the U.S. We expect that in an international context, the observed financial structure choices depend on these considerations and also on the institutional factors discussed above. We next investigate the relation empirically.

## **4. Firms and countries in our sample**

### *4.1. Economic variables*

In Table 1 we summarize some important facts about the economic development of the countries in our sample. (The sources for the variables discussed in this section are given in the appendix.) Per Capita GDP is a broad indicator of differences in wealth in each country. In 1991, per capita GDP in the sample ranges from \$27,492 in Switzerland to \$359 in Pakistan. Thus, the sample includes some of the richest and poorest countries in the world.

Three additional macroeconomic indicators are presented in Table 1. The average annual growth rate in GDP over the sample period is an indicator of the financing needs of firms. On an individual firm level, the growth rate is a proxy for the investment opportunity set faced by firms (Smith and Watts, 1992) and its effect on the optimal financing of projects (Myers, 1977). The average inflation rate over the sample period, shown in the third column, provides both an indicator of the government's management of the economy and evidence on whether the local currency provides a stable measure of value to be used in long-term contracting. There are major variations in the average rate of inflation in the sample countries. The average annual rate of inflation is highest in Brazil, at 327.6%, and lowest in Japan, at 1.5% per annum.

The final economic indicator shown in Table 1 is a measure of the government's subsidies to the corporate sector in each country. Government subsidies affect financial structure decisions because implicit or explicit backing of corporations by the government distorts market incentives and permits some firms to obtain long-term loans on favorable terms. Our measure of the government's subsidies is the level of government grants as a percentage of GDP. More precisely, we measure the sum of grants on current account by the public

Table 1  
Economic indicators

GDP/Cap is the real GDP per capita in US\$ in 1991, obtained from World Bank National Accounts. Growth rate is the average annual growth rate in GDP/Cap for the period 1980–1991. Average annual inflation is given for the period 1980–1991. It is the annual inflation of the GDP deflator, obtained from World Bank National Accounts. Government subsidies are defined as grants on current account by the public authorities to private industries and public corporations as well as to government enterprises. The figures are a percent of GDP averaged over 1983–1991. Data are obtained from various issues of the World Competitiveness Report, The World Economic Forum, IMD International, Geneva, Switzerland.

	GDP/Cap (US \$)	Growth 1980–1991 (%)	Inflation 1980–1991 (%)	Government subsidies to private and public enterprises 1983–1991
Switzerland	27,492	1.7	3.8	1.4
Japan	23,584	3.9	1.5	0.6
Norway	19,664	1.7	5.2	5.9
Sweden	19,649	1.6	7.4	4.8
United States	18,972	1.9	4.2	0.6
Finland	18,046	1.6	6.6	3.0
France	17,365	1.8	5.7	2.4
Austria	17,288	2.2	3.6	1.3
Netherlands	16,479	2.3	1.8	2.6
Germany	16,439	1.8	2.8	2.0
Canada	16,098	2.0	4.3	1.9
Belgium	16,051	2.2	4.2	3.5
Italy	14,570	2.5	9.5	2.9
Australia	13,095	1.6	7.0	3.0
United Kingdom	12,585	2.3	5.8	1.5
New Zealand	10,643	1.0	10.3	1.2
Singapore	10,294	4.9	1.9	1.9
Hong Kong	9820	5.8	7.5	n.a.
Spain	8752	3.3	8.9	2.4
Korea	4259	6.8	5.6	6.3
Malaysia	2465	3.6	1.7	4.6
South Africa	2198	1.0	14.4	n.a.
Brazil	2073	2.1	327.6	10.7
Mexico	1801	1.0	66.5	2.3
Turkey	1375	3.1	44.7	2.2
Jordan	1372	–2.1	1.6	n.a.
Thailand	1362	7.0	3.7	1.4
Zimbabwe	630	1.7	12.5	n.a.
India	375	3.3	8.2	5.8
Pakistan	359	3.9	7.0	5.4

authorities to private industries and public corporations as well as to government enterprises. These grants presumably compensate for losses that are the consequence of policies of the public authorities. Thus, this variable measures realized expenditures but not direct instructions to business or the level of ex ante commitments made by each government. Over a period, we would expect a correlation between commitments and expenditures. As the last column of Table 1 reveals, the level of government subsidies is significant in some countries, and exceeds 10% of GDP in the case of Brazil.

#### *4.2. Legal and financial institutions*

We explore the relation between firms' financing choices and the state of development of both the legal and financial institutions in our sample of countries. The principal indicators of legal and financial development are given in Table 2.

##### *4.2.1. Legal institutions*

As an indicator of the efficiency of the legal system in each country, we use a commercially available index of the level of law and order in each country. This index, prepared by the International Country Risk Guide, is scored on a scale of ten to six and aggregates annual reports by a panel of more than 100 analysts. It measures the extent to which citizens of a country are willing to rely on established institutions to make and implement laws and to adjudicate disputes. Low levels of the index denote less reliance on the legal system to mediate disputes. A second indicator, the index of legal efficiency, produced by Business International Corporation, is also presented for comparison. This second indicator is an index of the efficiency and integrity of the legal environment as it affects business, and particularly foreign firms. This index is scored from zero to ten, with lower scores indicating lower efficiency.

LLSV, argue that legal systems based on common law offer investors different protections than those based on civil law. Watson (1974) also discusses differences in legal traditions based on common law and civil law, and argues the latter provide individual investors better protections. Such differences translate into differences in the optimal contracts between firms and investors. To test for this relation, we follow LLSV in defining an indicator variable that equals one if the country's legal system is based on common law and zero if it based on civil law. As Table 2 reveals, the legal systems of 13 countries in our sample are based on common law and those of 17 countries are based on civil law.

Financial structure choices should also be affected by the specific provisions of each country's commercial laws. To investigate further the effect of differences in legal systems we use the indicators of creditor and shareholder rights compiled and discussed in detail in LLSV. LLSV classify countries according to whether they provide creditors with four specific protections. The first is

whether the bankruptcy laws prohibit an automatic stay on assets, which would prevent automatic liquidations of insolvent firms by secured creditors. The existence of an automatic stay gives managers and shareholders of a distressed firm greater bargaining power over secured creditors. This provision also benefits unsecured creditors over secured creditors. The second is whether secured creditors are permitted to repossess their collateral in bankruptcy or whether some third party claims, such as those of the government or the employees, take priority. The third is whether the bankruptcy law prohibits borrowers from unilaterally obtaining court protection from creditor demands. If distressed borrowers can obtain such protection unilaterally, their bargaining power is increased. The fourth is whether creditors can dismiss managers and replace them with administrators when a firm becomes bankrupt. In addition, LLSV note whether or not the law of each country requires all firms to maintain a reserve of equity capital. In countries where this requirement exists, firms that do not fulfill it can be dissolved.

In principle, the creditor rights identified are important in defining feasible contracts between firms and investors. However, there need be no direct statistical relation between the existence of a specific right and a specific financial contract, such as long-term debt, even when that right is important in enforcing the contract. For example, if the existence of a specific right is necessary, but not sufficient, to make a financial contract enforceable, the statistical relation between that right and the use of the contract will be weak. The relation between a particular creditor protection and a particular debt contract is also affected by the existence of spillover effects of the creditor protection on other contracts. For example, strong creditor rights increase the incentives of financial institutions to monitor firms, thereby also making stock investments in those firms more attractive. The size of these spillovers depends on the development of the stock market and financial institutions and on the precise provisions of the investor-protection laws. Spillovers also work in the opposite direction. In some countries, financial intermediaries hold both the equity and debt of corporations. Hauswald (1996) shows that ownership of both stock and equity by intermediaries increases their incentives to reorganize firms in distress. Intermediaries with an equity stake in a firm should be willing to make loans even when creditor protection is relatively weak.

Our examination of the relations between specific creditor protections and financial structure is thus exploratory in nature. We give each country a score on an empirically defined 'index of creditor rights' based on whether its laws grant creditors the legal protections identified above. Specifically, we give each country a score of one for each of the following conditions that its bankruptcy law satisfies: (i) does not permit an automatic stay on assets, (ii) does not allow borrowers to unilaterally seek bankruptcy protection, (iii) assures secured creditors the right to collateral, and (iv) does not grant the managers tenure pending resolution of bankruptcy. If corporations are required to maintain a capital

Table 2  
Institutional indicators

The law and order indicator, produced by the International Country Risk rating agency, reflects the degree to which the citizens of a country are willing to accept the established institutions to make and implement laws and adjudicate disputes. It ranges from zero to six with higher scores indicating sound political institutions and a strong court system and lower scores indicating a tradition of depending on physical force or illegal means to settle claims. Values reported are 1985–1991 averages. The legal efficiency indicator, produced by Business International Corporation, is an assessment of the efficiency and integrity of the legal environment as it affects business, particularly foreign firms. It ranges from zero to ten with lower scores for lower efficiency levels. An average value for 1980–1983 is available. The common-law dummy equals one for common-law countries and zero for others. Creditor rights is an index that ranges from zero to 4.5 and aggregates creditor rights. Shareholder rights is an index that ranges from zero to five and aggregates shareholder rights as described in the text. These three variables are obtained from La Porta et al. (1998). Market capitalization/GDP is the stock market capitalization divided by GDP. Turnover is the total value of shares traded divided by market capitalization. Stock market data are from IFC's Emerging Market Data Base. Values are 1980–1991 averages. Bank/GDP is the total assets of the deposit money banks divided by GDP obtained from IMF, International Financial Statistics. Bank is the summation of IFS lines 22a through 22f. Values are 1980–1991 averages. GDP values are from World Bank National Accounts.

	Law and order Indicator	Legal Efficiency Indicator	Common Law Dummy	Creditor Rights Index	Shareholder Rights Index	Market Capitalization/GDP	Turnover	Bank/GDP
Switzerland	6.00	10.00	0	1.50	1.00	0.75	0.40	3.12
Japan	5.00	10.00	0	2.25	3.00	0.96	0.52	2.41
Norway	6.00	10.00	0	2.20	3.00	0.18	0.41	1.50
Sweden	6.00	10.00	0	2.20	3.00	0.44	0.24	1.37
United States	6.00	10.00	1	1.00	5.00	0.60	0.58	0.96
Finland	6.00	10.00	0	1.00	2.00	0.18	0.18	1.41
France	5.00	8.00	0	0.10	2.00	0.23	0.31	1.91
Austria	6.00	9.50	0	3.10	2.00	0.08	0.55	2.26
Netherlands	6.00	10.00	0	2.00	2.00	0.44	0.39	1.86
Germany	5.57	9.00	0	3.10	1.00	0.24	1.22	2.07
Canada	6.00	9.25	1	1.00	4.00	0.46	0.28	0.95
Belgium	6.00	9.50	0	2.10	0.00	0.31	0.12	1.14
Italy	5.00	6.75	0	2.20	0.00	0.15	0.24	1.05
Australia	6.00	10.00	1	1.00	4.00	0.50	0.29	1.01

United Kingdom	4.43	10.00	1	4.00	4.00	0.85	0.38	1.62
New Zealand	6.00	10.00	1	3.00	4.00	0.38	0.15	0.88
Singapore	5.00	10.00	1	4.00	3.00	0.93	0.32	1.88
Hong Kong	4.71	10.00	1	4.00	4.00	1.19	0.40	n.a.
Spain	4.00	6.25	0	2.20	2.00	0.22	0.30	1.80
Korea	2.17	6.00	0	3.50	2.00	0.22	0.69	0.92
Malaysia	3.86	9.00	1	4.00	3.00	0.79	0.15	1.54
South Africa	1.71	6.00	1	3.00	4.00	1.35	0.05	0.76
Brazil	4.00	5.75	0	1.20	3.00	0.11	0.48	0.45
Mexico	3.00	6.00	0	0.20	0.00	0.10	0.69	0.41
Turkey	2.67	4.00	0	2.20	2.00	0.05	0.08	0.49
Jordan	2.00	8.66	0	n.a.	1.00	0.47	0.13	1.32
Thailand	3.57	3.25	1	3.10	3.00	0.18	0.59	1.19
Zimbabwe	2.00	7.50	1	4.00	3.00	0.10	0.08	0.33
India	1.71	8.00	1	4.00	2.00	0.07	0.59	0.63
Pakistan	2.00	5.00	1	4.00	4.00	0.04	0.11	0.66

reserve, then the size of that reserve as a proportion of assets is added to the index. The index is presented in Table 2. Scores range from a high of four to a low of 0.1. In addition to using our empirical index of creditor rights, in the regressions below we also test separately for the effect of each component of the creditor-rights index.

We proxy for the rights of shareholders using an index developed by LLSV. This index is scored on a scale of one to five. It is obtained by adding a score of one for each of the following elements: (i) shareholders are allowed to vote by mail, (ii) shareholders are not required to deposit their shares with a trustee prior to voting, (iii) the law allows cumulative voting for directors, (iv) the law gives minority shareholders special protection, and (v) the minimum percentage of share capital that entitles a shareholder to call for an extraordinary general meeting is less than or equal to 10%. This index measures the costs faced by minority investors who want to influence decision-making within the firm and is presented in Table 2. The index is subject to the same caveats as the index of creditor rights presented earlier. Whether the costs faced by small shareholders when exercising their rights are important in determining firms' financial structure decisions will depend on whether there also exist large investors or financial intermediaries who can enforce investor rights. If these large investors exist, then costs faced by small outside investors are not necessarily material in determining financing patterns. Note that both indexes are additive and linear. Thus, we do not address the possibility that these factors are not equally important or that they interact in a more complicated way.

#### *4.2.2. Financial institutions*

We measure access to publicly traded equity markets by the ratio of stock market capitalization to gross domestic product (MCap/GDP). Demirgüç-Kunt and Levine (1996) discuss alternative indexes of stock market development. The statistics on financial markets and intermediaries quoted in this paragraph are compiled in that paper. Within our sample there is considerable variation in this ratio, ranging from 1.35 in South Africa to 0.04 in Pakistan. Interestingly, in some of the more developed countries, such as Italy, the MCap/GDP is lower than in some of the developing countries, such as Malaysia (0.15 compared to 0.88, respectively).

In addition to size, we also measure the level of activity in the stock markets of each country by the turnover ratio (TOR), computed by dividing the total value traded by the market capitalization. Higher values of the turnover ratio indicate a higher level of liquidity. As noted above, a high turnover also increases the incentives for investors to become informed. Thus, a high turnover facilitates external monitoring of corporations. Demirgüç-Kunt and Levine (1996) and Demirgüç-Kunt and Maksimovic (1996,1998) find the turnover ratio to be a good indicator of stock market development.

Access to financial intermediaries by firms is measured by the ratio of the domestic assets of deposit banks to GDP. Again, there are wide variations across countries, both within developed countries (for example, Japan has a ratio of 2.3 while the U.S. has a ratio of 0.94) and developing countries (compare Malaysia at 1.37 with Turkey at 0.46). Comparable data on other financial institutions, such as development banks and finance companies, is harder to obtain. For 19 countries in our sample, including several developing countries, we obtain the sum of the deposits of all deposit-taking financial institutions that do not offer checking or demand accounts (lines 42a–f from IMF's International Financial Statistics). The correlation between the size of these other financial institutions relative to GDP and Bank/GDP for the 19 countries in our subsample is 0.24, which is not significant ( $p = 0.32$ ). Thus, there is no evidence that Bank/GDP is a proxy for other financial institutions.

### *4.3. Firm-specific characteristics*

An important consideration in the choice of financial structure by firms is the reduction of agency costs. The particular types of agency costs to which the firm is exposed and their magnitude will in general vary from firm to firm. Thus, the observed differences in financial structures in our sample of countries depend in part on the characteristics of the population of firms in each economy. We control for the differences in firm characteristics between countries by introducing firm-specific variables that are suggested by theory and that are empirically useful in explaining financial structure decisions of individual firms in a subset of our sample (Demirgüç-Kunt and Maksimovic, 1995).

Two of these firm-specific variables are descriptors of the firm's operating characteristics. The ratio of net fixed assets to total assets, NFA/TA, is an indicator of the structure of the firm's assets. Fixed assets can be used as collateral. Thus, firms with a high ratio of fixed assets should have greater borrowing capacity. Moreover, since firms in the U.S. have been found to match the maturity of assets with that of liabilities (Stohs and Mauer, 1996), NFA/TA should be correlated with long-term leverage for firms in our sample. Our second firm-specific variable is a descriptor of the firm's operating cycle: measured by the ratio of net sales to net fixed assets, NS/NFA. A firm with high NS/NFA is more likely to need short-term financing to support sales. It is likely to generate short-term assets, such as accounts receivable and notes from its customers. Thus, if firms match the maturity of their assets and liabilities, a high ratio of sales to assets will be associated with short-term indebtedness.

Two variables measure the cash constraints of firms. A high ratio of dividends to total assets, Div/TA, suggests that the firm has a cash surplus relative to its investment needs. Such firms would be expected to reduce their leverage. The second indicator of liquidity is the ratio of earnings before interest and taxes to total assets. Several studies find a strong negative relation between this variable

and leverage, both in the U.S. (e.g., Spence, 1985) and in developing countries (Demirgüç-Kunt and Maksimovic, 1995). Firms' capital structures also depend on the tax advantages of debt and equity financing. The complexity of tax systems, with both federal and local taxes, makes it difficult to compare the benefits of debt across a large sample of countries. And effective tax rates can differ significantly from statutory tax rates (see Graham et al., 1996). The implications of different tax systems for the composition of debt and for debt maturity are not clearcut. As a result, we do not include tax variables in our cross-sectional regressions.

The use of accounting data requires that accounting rules are similar enough that the numbers are comparable across countries. Fitzgerald et al. (1979) compare the principal reporting requirements across countries. A direct comparison across countries of the key requirements shows that the principles on which they based are similar enough in stated intent to make them comparable. However, as Ball (1995) points out, countries differ in the extent to which their accounting systems emphasize the importance of public disclosures useful to investors. Accounting systems in the Anglo-Saxon common-law tradition tend to emphasize the importance of strict matching of revenues and expenses, whereas systems in the Continental European tradition place a greater stress on conservatism, and allow corporations to smooth profits using hidden reserves. Watts and Zimmerman (1986) describe how accounting systems are shaped by the market for accounting information and the politics of accounting. These differences in the way principles are applied can translate into significant differences in the timing of reported profits, as occurred when Daimler-Benz decided to report its profits using U.S. rules (Ball, 1995).

Because we use averages over time in forming the variables for our regressions, our research design shields us from some of the problems posed by these differences in emphasis and timing. However, a significant concern in interpreting the financial statements from the sample of countries pertains to differences arising from different levels of inflation and the difference in how inflation is treated in financial statements. This problem is likely to be most severe for Brazil, Mexico, and Turkey, which, as Table 1 shows, have the highest rates of inflation during the sample period. Whereas in most countries in the sample fixed assets are stated at their historical cost, the financial statements of firms in Mexico and Brazil are adjusted during part or all of the sample period. Since 1984, listed firms in Mexico have been required to use current replacement costs for valuing inventories and property, plant, and equipment. Other nonmonetary assets and stockholders' equity are restated using specified consumer price indexes. Any gains or losses resulting from inflation adjustments are reported in the income statement. The financial accounts of Brazilian firms have been adjusted for inflation throughout the sample period, although specific requirements were modified in 1987 and again in 1989. Permanent assets and shareholder equity are adjusted using specified government indexes. As in the case of

Mexico, the adjustment is reflected in the income statement. However, observers note that the increases in the specified index do not fully reflect the realized inflation. Turkey, which has the third highest average inflation rate, 24%, does not permit inflation-adjusted accounting (Price Waterhouse, 1993). The high average return on assets reported by Turkish firms could be caused by this underreporting. Care must be exercised in comparing the results for Brazil and Turkey with those of other countries in the sample.

The preliminary evidence presented in Figs. 1–4 suggests that the financing decisions of large and small firms are differently determined. Accordingly, we analyze them separately in the regressions reported below. For each economy we divide our panel of firms into quartiles based on asset size. We define as ‘large firms’ the firms in the largest quartile in their respective country. These firms are likely to have the best access to financial markets and institutions in their respective countries. In selecting the sample of ‘small firms’ in each country, we attempt to maintain comparability of firm sizes across countries. Since what is perceived as a ‘small firm’ differs across countries, to obtain a standardized size we divide firm asset size by the country’s GDP. By this measure, the smallest firms in the dataset for each of the developing countries are of approximately similar size. For these countries, we defined as ‘small firms’ those firms in the smallest quartile in their respective countries. For every other country in the sample, ‘small firms’ are firms in that quartile of firms in each country which most closely approximates in size the smallest quartile of firms in the developing countries, where size is measured by the ratio of firm’s assets to the economy’s GDP. For each country, the firm-specific variables are constructed by taking equally weighted averages of the annual values for the whole period for the subsamples of large and small firms separately. Weighting by firm size does not alter the results.

We present correlation matrices in Table 3. Simple correlations between country means of the leverage variables of interest and the explanatory variables are shown in Panel A of Table 3 for large and small firms separately. The two variables measuring the effectiveness of the legal system are significantly correlated with all of our financial structure variables. The effectiveness of the legal system is highly correlated with greater reliance on long-term debt and less reliance on short-term debt. The signs of the correlations between the financial structure variables and per capita GDP parallel those between the financial structure variables and the legal-effectiveness variables. However, the correlations with the legal-effectiveness variables are higher and more statistically significant. Of the other legal variables, the most interesting correlations are with the creditor-rights index. High scores on the index of creditor rights are associated with a greater reliance on short-term debt over long-term debt and lower absolute levels of the ratio of long-term debt to total debt. This is consistent with the argument by Diamond (1991) that lenders who engage in monitoring have an incentive to make short-maturity loans. The correlations

Table 3  
Correlation matrices

The dependent variables are long-term debt to total assets (LTD/TA), short-term debt to total assets (STD/TA), and long-term debt to total debt (LTD/TD). The independent variables are defined as follows: NFA/TA is net fixed assets divided by total assets. Profit is income before interest and taxes divided by total assets. NS/NFA is net sales divided by net fixed assets. Div/TA is dividends divided by total assets. GDP/Cap is GDP per capita. Growth is the growth rate of real GDP per capita. Inflation is the inflation rate of the GDP deflator. TOR is stock market turnover defined as the total value of shares traded divided by market capitalization. MCap/GDP is the stock market capitalization of the country divided by its GDP. Bank/GDP is the total assets of the deposit money banks divided by GDP. Gov. Subs./GDP are the grants on current account by the public authorities to private industries and public corporations as well as to government enterprises, divided by GDP. Law Order, which ranges from zero to six, is an indicator of the degree to which citizens of a country are able to utilize the existing legal system to mediate disputes and enforce contracts. Legal is an index ranging from zero to ten assessing the 'efficiency and integrity of the legal environment as it affects business, particularly foreign firms'. For both indexes lower scores indicate lower enforcement/efficiency levels. Common is a dummy variable that equals one for common-law countries and zero for others. Shareholder Rights is an index ranging from zero to five that aggregates shareholder rights and Creditor Rights is an index ranging from zero to 4.5 that aggregates creditor rights as described in the text. All variables, except the last four, are averaged over the 1980–1991 period when available, so that each country has one observation. In Panel A averages of firm level variables (LTD/TA, STD/TA, LTD/TD, NFA/TA, Profit, NS/NFA, Div/TA) are calculated for the largest and smallest firms separately. Panel B calculates averages using all firms in the sample. Correlations reported are Pearson correlation coefficients. *P*-values are given in italics. Numbers of observations are reported under the respective *P*-values

Panel A: Correlations of Dependent and Independent Variables

	NFA/TA	Profit	NS/NFA	Div/TA	GDP/Cap	Growth	Infl.	TOR	MCap/GDP	Bank/GDP	Gov. Sub./GDP	Law & Order	Legal	Common	Shr. Rights	Srd. Rights
<i>Large firms</i>																
LTD/TA	-0.127	-0.132	-0.269	-0.437	0.676	-0.226	-0.372	0.192	-0.108	0.290	-0.205	0.639	-0.460	0.194	0.061	-0.337
	<i>0.511</i>	<i>0.488</i>	<i>0.158</i>	<i>0.018</i>	<i>0.000</i>	<i>0.230</i>	<i>0.043</i>	<i>0.308</i>	<i>0.569</i>	<i>0.127</i>	<i>0.316</i>	<i>0.000</i>	<i>0.011</i>	<i>0.304</i>	<i>0.748</i>	<i>0.073</i>
	29	30	29	29	30	30	30	30	30	29	26	30	30	30	30	29
STD/TA	-0.520	0.159	0.553	0.035	-0.094	0.262	-0.229	-0.108	-0.286	0.074	0.072	-0.338	-0.353	-0.334	-0.282	0.166
	<i>0.004</i>	<i>0.402</i>	<i>0.002</i>	<i>0.855</i>	<i>0.620</i>	<i>0.162</i>	<i>0.223</i>	<i>0.569</i>	<i>0.125</i>	<i>0.703</i>	<i>0.725</i>	<i>0.068</i>	<i>0.056</i>	<i>0.071</i>	<i>0.132</i>	<i>0.391</i>
	29	30	29	29	30	30	30	30	30	29	26	30	30	30	30	29
LTD/TD	0.152	-0.173	-0.470	-0.290	0.547	-0.284	-0.214	0.193	0.141	0.186	-0.291	0.658	0.533	0.092	0.209	-0.343
	<i>0.432</i>	<i>0.360</i>	<i>0.010</i>	<i>0.127</i>	<i>0.002</i>	<i>0.128</i>	<i>0.257</i>	<i>0.306</i>	<i>0.458</i>	<i>0.334</i>	<i>0.149</i>	<i>0.000</i>	<i>0.003</i>	<i>0.629</i>	<i>0.268</i>	<i>0.069</i>
	29	30	29	29	30	30	30	30	30	29	26	30	30	30	30	29

*Small firms*

LTD/TA	-0.184 0.339 29	-0.227 0.228 29	-0.079 0.684 29	-0.473 0.010 29	0.655 0.000 30	-0.146 0.443 30	-0.231 0.219 30	0.215 0.253 30	-0.205 0.277 30	0.208 0.278 29	-0.044 0.832 26	0.556 0.001 30	0.402 0.028 30	-0.303 0.103 30	-0.052 0.783 30	-0.331 0.080 29
STD/TA	-0.186 0.335 29	0.414 0.023 29	0.221 0.249 29	0.023 0.907 29	-0.320 0.085 30	0.539 0.002 30	-0.073 0.700 30	0.070 0.714 30	-0.289 0.121 30	-0.121 0.533 29	0.168 0.413 26	-0.448 0.013 30	-0.436 0.016 30	-0.083 0.664 30	-0.103 0.587 30	0.309 0.103 29
LTD/TD	-0.163 0.398 29	-0.318 0.087 29	-0.133 0.491 29	-0.462 0.012 29	0.726 0.000 30	-0.250 0.183 30	-0.232 0.218 30	0.211 0.263 30	-0.099 0.601 30	0.251 0.189 29	-0.176 0.391 26	0.685 0.000 30	0.521 0.003 30	-0.191 0.313 30	0.009 0.962 30	-0.397 0.033 29

Panel B: Cross-Correlations of Independent Variables

	Profit	NS/ NFA	Div/ TA	GDP/ Cap	Growth	Infl.	TOR	MCap/ GDP	Bank/ GDP	Gov. Sub./ GDP	LAW and Order	Legal	Common	Shr. Rights	Std. Rights
NFA/TA	0.122 0.527	-0.612 0.000	0.224 0.252	-0.607 0.001	-0.232 0.226	0.639 0.000	-0.050 0.798	-0.069 0.723	-0.621 0.000	0.461 0.018	-0.471 0.010	-0.440 0.017	0.171 0.374	0.172 0.371	-0.109 0.583
Profit		0.108 0.576	0.818 0.000	-0.423 0.020	0.034 0.858	-0.080 0.675	-0.292 0.118	0.095 0.619	-0.378 0.044	-0.090 0.663	-0.504 0.005	-0.494 0.006	0.227 0.227	0.177 0.350	0.324 0.087
NS/NFA			0.001 0.998	0.217 0.258	0.255 0.182	-0.431 0.020	0.103 0.595	0.144 0.457	0.281 0.147	-0.332 0.098	0.035 0.858	0.075 0.698	0.219 0.253	0.234 0.222	0.231 0.237
Div/TA				-0.489 0.007	-0.044 0.822	-0.106 0.583	-0.387 0.038	0.350 0.063	-0.349 0.069	-0.299 0.146	-0.465 0.011	-0.351 0.062	0.361 0.055	0.204 0.289	0.339 0.077
GDP/Cap					-0.176 0.353	-0.323 0.082	0.196 0.300	0.179 0.343	0.697 0.000	-0.404 0.041	0.872 0.000	0.709 0.000	-0.350 0.058	-0.053 0.781	-0.429 0.020
Growth						-0.089 0.641	0.164 0.387	0.004 0.983	0.054 0.779	0.142 0.489	-0.084 0.658	-0.255 0.173	0.194 0.305	0.176 0.051	0.426 0.021
Inflation							0.66 0.728	-0.232 0.218	-0.391 0.36	0.649 0.000	-0.179 0.345	-0.363 0.049	-0.197 0.296	-0.013 0.948	-0.258 0.176
TOR								-0.140 0.459	0.262 0.170	-0.013 0.950	0.140 0.460	0.025 0.894	-0.211 0.263	-0.187 0.322	-0.040 0.835

Table 3 (continued)

	Profit	NS/ NFA	Div/ TA	GDP/ Cap	Growth	Infl.	TOR	MCap/ GDP	Bank/ GDP	Gov. Sub./ GDP	LAW and Order	Legal	Common	Shr. Rights	Srd. Rights
MCap/GDP									0.367 0.50	-0.436 0.026	0.101 0.595	0.414 0.023	0.370 0.044	0.412 0.024	0.216 0.259
Bank/GDP										-0.391 0.048	0.531 0.003	0.521 0.004	-0.51 0.062	-0.189 0.325	-0.038 0.847
Gov.Sub/ GDP											-0.381 0.05	-0.286 0.156	-0.210 0.303	-0.056 0.786	0.142 0.488
Law & Order												0.699 0.000	-0.206 0.275	0.036 0.837	-0.432 0.019
Legal													0.026 0.891	0.149 0.433	-0.060 0.757

Common	0.722	0.473
	0.000	0.010
Shareholder		0.235
Right		0.220

Variable definitions and sources

Firm-level data

Global Vantage definitions:

Variables are from the industry/commercial tape of Global Vantage data base, frozen as of December 1995.

LTD/TA = (total liabilities – current liabilities)/total assets = (DA118 – DA104)/DA89.

STD/TA = current liabilities/total assets = DA104/DA89.

LTD/TD = (total liabilities – current liabilities)/total liabilities = (DA118 – DA104)/DA118.

TD/TA = total liabilities/total assets = DA118/DA89.

NFA/TA = net fixed assets/total assets = DA76/DA89.

Profit = (income before income taxes + interest expenses)/total assets = (DA21 + DA15)/DA89.

NS/NFA = net sales/net fixed assets = DA1/DA76.

Div/TA = total dividends/total assets = DA34/DA89.

For the eight countries that are from IFC's corporate finance data base, variables follow the definitions given above.

Other data sources

Inflation is the annual inflation of the GDP deflator obtained from World Bank National Accounts.

Real GDP per capita and its growth rate are obtained from World Bank National Accounts.

Bank/GDP is the deposit money bank domestic assets to GDP, obtained from IMF, International Financial Statistics, various years. Deposit money domestic assets are the summation of IFS lines 22a through 22f.

Stock market variables (market capitalization and turnover) are from IFC's Emerging Markets Data Base. The original source for developed countries is Morgan Stanley Capital International.

The Law and order indicator is obtained from the International Country Risk Guide. It has been used by Knack and Keefer (1995).

The Legal efficiency indicator is from Business International Corporation.

Other legal indicators (common-law dummy, creditor rights, and shareholder rights indicators) are obtained from La Porta et al. (1998).

Government subsidies to private and public enterprises data are obtained from various issues of the World Competitiveness Report, The World Economic Forum, & IMD International, Geneva, Switzerland.

between the financial structure variables and two other legal variables, the index of shareholder rights and the dummy for common law, are of smaller magnitude. Finally, correlations involving the institutional and firm-specific control variables show less evidence of statistical significance.

Panel B of Table 3 explores the raw correlations between the explanatory variables using data for all firms in the sample, regardless of size. The legal-effectiveness variables are highly positively correlated with income per capita as well as with the existence of a large banking sector. The relation between these variables and the other institutional variables is mixed. However, firms in countries with an effective legal system, as measured by both these variables, tend to have a lower ratio of net fixed assets to total assets, are on average less profitable, and pay out lower dividends than firms in countries with less effective legal systems.

The three legal variables that measure specific characteristics of the legal system show fewer significant correlations. As pointed out by LLSV, countries with a common-law tradition have better shareholder and creditor rights. However, in these countries the correlation with shareholder rights is stronger, indicating a relative predilection for protecting shareholders. This may be one of the explanations for the positive correlation that we observe between the common-law dummy variable and the ratio of stock market capitalization to GDP and the negative correlation between the common-law dummy and the ratio of bank assets to GDP.

Inspection of the table also reveals that countries with large banking systems tend to have higher ratios of market capitalization to GDP. This finding has been reported by Demirgüç-Kunt and Levine (1996). Large banking systems are also negatively correlated with inflation. Finally, it is interesting to note that firms in countries with larger banking systems have lower ratios of net fixed assets to total assets. This would be consistent with the hypothesis that financial intermediaries have a greater willingness to lend against short-term assets, perhaps as a result of their ability to monitor corporations.

Table 4 presents summary statistics for the variables we use in the regressions reported below.

## **5. Determinants of financial structure**

Differences in the legal systems and financial institutions between countries affect the borrowing of firms in developed and developing countries in two ways. First, these differences affect the absolute levels of long-term and short-term borrowing. Second, they create incentives to alter the mix of long-term and short-term debt. Accordingly, we analyze both the ratio of long-term to total debt and the levels of long-term and short-term debt relative to total assets.

Table 4  
Summary statistics

Firm variables are reported separately for large and small firms. These are defined as follows: LTD/TA is long-term debt to total assets, STD/TA is short-term debt to total assets, and LTD/TD is long-term debt to total debt. NFA/TA is net fixed assets divided by total assets. Profit is income before interest and taxes divided by total assets. NS/NFA is net sales divided by net fixed assets. Div/TA is dividends divided by total assets. Institutional variables are available at the country level. GDP/Cap is the GDP per capita in thousands of US\$. Growth is the growth rate of real GDP per capita. Inflation is the inflation rate of the GDP deflator. TOR is stock market turnover defined as the total value of shares traded divided by market capitalization. MCap/GDP is the stock market capitalization of the country divided by its GDP. Bank/GDP is the total assets of the deposit money banks divided by GDP. Gov. Subs./GDP are the grants on current account by the public authorities to private industries and public corporations as well as to government enterprises, divided by GDP. Law & Order, which ranges from zero to six, is an indicator of the degree to which citizens of a country are able to utilize the existing legal system to mediate disputes and enforce contracts. Legal is an index ranging from zero to ten assessing the 'efficiency and integrity of the legal environment as it affects business, particularly foreign firms'. For both indices lower scores indicate lower enforcement/efficiency levels. Common is a dummy variable that equals one for common-law countries and zero for others. Shareholder Rights is an index ranging from zero to five that aggregates shareholder rights and Creditor Rights is an index ranging from zero to 4.5 that aggregates creditor rights as described in the text. All variables, except the last four, are averaged over the 1980–1991 period when available, so that each country has one observation

	<i>N</i>	Mean	Std. Dev.	Minimum	Maximum
<i>Large firms</i>					
LTD/TA	30	0.269	0.103	0.105	0.528
STD/TA	30	0.326	0.099	0.170	0.489
LTD/TD	30	0.446	0.125	0.248	0.706
NFA/TA	29	0.412	0.104	0.227	0.704
Profit	30	0.100	0.032	0.070	0.202
NS/NFA	29	4.687	3.738	0.883	19.632
Div/TA	29	0.019	0.012	0.002	0.052
<i>Small firms</i>					
LTD/TA	30	0.175	0.115	0.056	0.500
STD/TA	30	0.338	0.088	0.227	0.538
LTD/TD	30	0.321	0.146	0.158	0.664
NFA/TA	29	0.355	0.088	0.149	0.534
Profit	30	0.110	0.044	0.048	0.273
NS/NFA	29	6.236	3.545	1.436	16.997
Div/TA	29	0.028	0.022	0.002	0.088
<i>Economic and institutional variables</i>					
GDP/Cap	30	10.234	7.737	0.299	26.348
Growth	30	0.024	0.020	-0.023	0.070
Inflation	30	0.141	0.341	0.016	1.866
TOR	30	0.364	0.248	0.053	1.221
MCap/GDP	30	0.419	0.358	0.043	1.351
Bank/GDP	29	1.307	0.669	0.325	3.123
Gov. Subs./GDP	26	3.130	2.262	0.600	10.686
Law & Order	30	4.447	1.597	1.714	6.000
Legal	30	8.247	2.069	3.250	10.000
Common	30	0.433	0.504	0.000	1.000
Shr. Rights	30	2.533	1.332	0.000	5.000
Srd. Rights	29	2.453	1.224	0.100	4.000

Significant changes in the legal systems of countries from year to year are rare, and the indicators of investors' legal protections do not vary over time. As a result, our investigation of the determinants of financial structure relies primarily on cross-sectional analysis across countries, taking as our observations the time-series country means of each variable.<sup>3</sup>

The first specification, estimated using ordinary least squares (OLS) and White's adjustment for heteroskedasticity, is reported in Columns 1 and 4 of Panels A–C of Table 5. The dependent variables in the three panels are the ratios of long-term and short-term debt to total assets and long-term debt to total debt, respectively. The explanatory variables are the firm-specific characteristics and descriptors of the legal system and financial institutions.

We follow the conventional approach of interpreting a significant positive (negative) coefficient in the regressions reported below as evidence of a positive (negative) relation between the dependent variable and the corresponding explanatory variable. This approach enables us to describe associations within our sample. As pointed out by Barclay et al. (1997), claims that these relations are more general require specific restrictions on the functional form describing how the firm's value depends on the explanatory variables.

A potential problem in explaining differences in financial structures across nations by institutional factors is that some of these institutions can themselves be influenced by firms' financing decisions or by the development of other institutions. At the country level it is unlikely that the major legal and financial institutions develop completely independently. In such cases, a causal interpretation requires a model of dependence between institutions.

In the present context a key concern is whether a country's financial institutions are an independent determinant of firms' financial structures. While an individual firm takes the size of the banking sector as given, that size is affected by the aggregate decisions of all firms. More importantly, characteristics of the legal system that facilitate enforceable contracts between firms and their creditors also facilitate contracting between banks and other borrowers.

In our second statistical specification we allow for the possibility that the size of a country's banking sector is influenced by a country's legal system and the financing choices of firms. We use a two-stage estimator to control for this dependence. In the first stage we obtain a predicted size of the banking sector, given the country's level of development and its legal system. In the second stage we replace the ratio of the total assets of deposit banks to GDP, Bank/GDP, by its predicted value in the cross-sectional regressions.

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<sup>3</sup> We also estimate panel regressions in which each financial structure variable of interest is regressed on the explanatory variables and country and year dummies. This specification is potentially misspecified because it treats cross-sectional and time-series variation equally. Moreover, annual observations may not be independent. However, it has the advantage of using all the data, and was reported in an earlier version of this paper.

Specifically, we regress Bank/GDP on the legal-effectiveness variables, per capita GDP, and on Inflow, the sum of short-term and long-term capital flows plus foreign direct investment and portfolio flows into the country divided by GDP. The last two variables proxy for the level of development of the country and for foreign funds flowing into the country's financial system, respectively. Since these variables are not used in the regressions reported below, they also provide identifying restrictions for the coefficients. The regression controls for potential simultaneity bias when both the financial structures of firms and the size of the banking sector depend on the legal system. As most of the descriptors of the legal system are time-invariant, the predicted values of Bank/GDP in the first-stage regression are estimated cross-sectionally, using the means of the time-varying explanatory variables (*t*-statistics are reported in parentheses):

$$\begin{aligned} \text{Bank/GDP} = & 0.32 + 0.01\text{Law \& Order} - 0.11\text{Shareholder Rights} \\ & (0.66) \quad (0.06) \quad (-1.03) \\ & + 0.22\text{Creditor Rights} - 0.11\text{Common-Law dummy} \\ & (2.58) \quad (-0.35) \\ & - 0.02\text{Inflow} + 0.073\text{Per Capita GDP} \\ & (-0.00) \quad (2.77) \\ \bar{R}^2 = & 0.57, n = 26. \end{aligned}$$

The null hypothesis that the regression has no explanatory power is rejected at less than the 1% level. As expected, more-developed countries have larger banking sectors. The banking sector is also larger in countries in which creditor rights are better protected. Interestingly, we do not find a relation between Bank/GDP and the efficiency of the legal system or any of the other descriptors of the legal system. Of course, causality can also run in the other direction, i.e., financial and non-financial firms influence commercial laws, but the incentives for such behavior in a general equilibrium context have not been explored and are beyond the scope of this paper.

We also find a relation between legal variables and the ratio of firms' net fixed assets to total assets. (We do not find legal variables useful in explaining stock market development.) However, replacing the fixed asset ratio by its predicted value does not cause us to change any of our interpretations of the legal or institutional variables.

### 5.1. Long-term debt

Panel A of Table 5 presents OLS regressions explaining the ratio of long-term debt to total assets (LTD/TA) for the large and small quartiles of firms in each country over the sample period. Two results pertaining to the legal environment are of particular interest. First, reliance on long-term debt by large

Table 5

## Determinants of debt maturity

*Panel A: Long-term debt* — The regression equation estimated is:  $LTD/TA = \beta_0 + \beta_1 NFA/TA + \beta_2 Profit + \beta_3 NS/NFA + \beta_4 Growth + \beta_5 TOR + \beta_6 Bank/GDP + \beta_7 Gov. Subs./GDP + \beta_8 Inflation + \beta_9 Law \& Order + \beta_{10} Shareholder Rights + \beta_{11} Creditor Rights + \beta_{12} Common-Law dummy$ . The dependent variable ( $LTD/TA$ ) is the long-term debt to total asset ratio.  $NFA/TA$  is net fixed assets divided by total assets. Profit is income before interest and taxes divided by total assets.  $NS/NFA$  is net sales divided by net fixed assets. Growth is the growth rate of real GDP per capita. TOR is stock market turnover defined as the total value of shares traded divided by market capitalization.  $Bank/GDP$  is the total assets of the deposit money banks divided by GDP.  $Gov. Subs./GDP$  are the grants on current account by the public authorities to private industries and public corporations as well as to government enterprises, divided by GDP. Inflation is the inflation rate of the GDP deflator. Law & Order, which ranges from zero to six, is an indicator of the degree to which citizens of a country are able to utilize the existing legal system to mediate disputes and enforce contracts. Shareholder Rights is an index ranging from zero to five that aggregates shareholder rights and Creditor Rights is an index ranging from zero to 4.5 that aggregates creditor rights as described in the text. The common-law dummy equals one for common-law countries and zero for others. In specifications (1) and (2) all variables, except last three, are averaged over the 1980–1991 period so that each country has one observation. In specification (2)  $Bank/GDP$  is replaced with its predicted value from the following regression:  $Bank/GDP = \beta + \beta_1 Inflow + \beta_2 GDP/Cap + \beta_3 Law \& Order + \beta_4 Shareholder Rights + \beta_5 Creditor Rights + \beta_6 /Common-Law dummy$ . Inflow is the sum of short-term and long-term capital flows plus foreign direct investment and portfolio flows into the country divided by GDP.  $GDP/Cap$  is real GDP per capita in US\$. For all specifications White's heteroskedasticity-consistent standard errors are given in parentheses

	Large firms		Small firms	
	(1)	(2)	(1)	(2)
NFA/TA	0.287 <sup>b</sup> (0.130)	0.358 <sup>c</sup> (0.118)	0.469 <sup>b</sup> (0.208)	0.506 <sup>b</sup> (0.212)
Profit	0.281 (0.336)	0.716 <sup>c</sup> (0.248)	0.189 (0.398)	0.610 <sup>a</sup> (0.315)
NS/NFA	− 0.002 (0.002)	− 0.001 (0.002)	0.007 (0.006)	− 0.006 (0.006)
Growth	− 0.434 (0.501)	− 0.292 (0.668)	− 0.411 (0.959)	− 0.923 (0.863)
TOR	0.111 <sup>c</sup> (0.035)	0.094 <sup>b</sup> (0.037)	0.113 <sup>a</sup> (0.062)	0.088 (0.075)
Bank/GDP	− 0.026 (0.020)	0.022 (0.052)	− 0.047 (0.026)	0.160 <sup>a</sup> (0.095)
Gov. Subs./GDP	0.019 <sup>c</sup> (0.006)	0.024 <sup>c</sup> (0.005)	0.026 <sup>c</sup> (0.007)	0.035 <sup>c</sup> (0.004)
Inflation	− 0.275 <sup>c</sup> (0.028)	− 0.268 <sup>c</sup> (0.034)	− 0.263 <sup>c</sup> (0.043)	− 0.233 <sup>c</sup> (0.057)
Law & Order	0.043 <sup>c</sup> (0.010)	0.042 <sup>c</sup> (0.016)	0.052 <sup>b</sup> (0.019)	− 0.004 (0.028)

Table 5 (continued)

	Large firms		Small firms	
	(1)	(2)	(1)	(2)
Shareholder Rights	0.023 <sup>b</sup> (0.009)	0.012 (0.009)	0.015 (0.013)	0.028 (0.019)
Creditor Rights	-0.014 (0.009)	-0.023 (0.016)	-0.011 (0.015)	-0.050 (0.033)
Common-Law dummy	-0.074 <sup>b</sup> (0.031)	-0.033 (0.033)	-0.106 <sup>c</sup> (0.041)	-0.001 (0.062)
Adj. $R^2$	0.62	0.62	0.28	0.30
No. of observations	26	25	26	25

*Panel B: Short-term debt*—The regression equation estimated is:  $STD/TA = TA = \beta_0 + \beta_1 NFA/TA + \beta_2 Profit + \beta_3 NS/NFA + \beta_4 Growth + \beta_5 TOR + \beta_6 Bank/GDP + \beta_7 Gov. Subs./GDP + \beta_8 Inflation + \beta_9 Law \& Order + \beta_{10} Shareholder Rights + \beta_{11} Creditor Rights + \beta_{12} Common-Law dummy$ . The dependent variable ( $STD/TA$ ) is the short-term debt to total asset ratio.  $NFA/TA$  is net fixed assets divided by total assets. Profit is income before interest and taxes divided by total assets.  $NS/NFA$  is net sales divided by net fixed assets. Growth is the growth rate of real GDP per capita. TOR is stock market turnover defined as the total value of shares traded divided by market capitalization. Bank/GDP is the total assets of the deposit money banks divided by GDP. Gov. Subs./GDP are the grants on current account by the public authorities to private industries and public corporations as well as to government enterprises, divided by GDP. Inflation is the inflation rate of the GDP deflator. Law & Order, ranging from zero to six, is an indicator of the degree to which citizens of a country are able to utilize the existing legal system to mediate disputes and enforce contracts. Shareholder Rights is an index ranging from zero to five that aggregates shareholder rights and Creditor Rights is an index ranging from zero to 4.5 that aggregates creditor rights as described in the text. The common-law dummy equals one for common-law countries and zero for others. In specifications (1) and (2) all variables, except the last three, are averaged over the 1980–1991 period so that each country has one observation. In specification (2) Bank/GDP is replaced with its predicted value from the following regression:  $Bank/GDP = \beta + \beta_1 Inflow + \beta_2 GDP/Cap + \beta_3 Law \& Order + \beta_4 Shareholder Rights + \beta_5 Creditor Rights + \beta_6 Common-Law dummy$ . Inflow is the sum of short-term and long-term capital flows plus foreign direct investment and portfolio flows into the country divided by GDP. GDP/Cap is real GDP per capita in US\$. For all specifications White’s heteroskedasticity-consistent standard errors are given in parentheses

	Large firms		Small firms	
	(1)	(2)	(1)	(2)
NFA/TA	-0.601 <sup>c</sup> (0.110)	-0.502 <sup>c</sup> (0.090)	0.035 (0.113)	0.207 (0.157)
Profit	0.738 <sup>b</sup> (0.365)	1.016 <sup>c</sup> (0.330)	0.286 (0.302)	0.473 (0.304)
NS/NFA	0.005 <sup>a</sup> (0.003)	0.004 <sup>a</sup> (0.002)	0.019 <sup>c</sup> (0.005)	0.018 <sup>c</sup> (0.005)

Table 5 (continued)

	Large firms		Small firms	
	(1)	(2)	(1)	(2)
Growth	0.274 (0.598)	0.434 (0.595)	2.838 <sup>c</sup> (0.638)	2.361 <sup>c</sup> (0.640)
TOR	-0.035 (0.028)	0.046 (0.030)	-0.005 (0.045)	0.006 (0.047)
Bank/GDP	-0.022 (0.017)	0.058 (0.047)	-0.047 <sup>b</sup> (0.013)	-0.015 (0.048)
Gov. Subs./GDP	0.007 (0.007)	0.008 (0.006)	-0.006 (0.008)	-0.001 (0.008)
Inflation	-0.037 (0.031)	-0.019 (0.033)	0.016 (0.032)	-0.013 (0.035)
Law & Order	-0.033 <sup>c</sup> (0.010)	-0.051 <sup>c</sup> (0.014)	-0.008 (0.008)	-0.015 (0.017)
Shareholder Rights	0.012 (0.008)	0.014 (0.014)	-0.006 (0.010)	0.000 (0.014)
Creditor Rights	0.001 (0.007)	-0.013 (0.011)	0.006 (0.009)	0.002 (0.014)
Common-Law dummy	-0.103 <sup>b</sup> (0.036)	-0.067 (0.042)	-0.068 (0.042)	-0.065 (0.052)
Adj. $R^2$	0.75	0.75	0.69	0.64
No. of observations	26	25	26	25

*Panel C: Debt maturity*— The regression equation estimated is:  $LTD/TD = \beta_0 + \beta_1 NFA/TA + \beta_2 Profit + \beta_3 NS/NFA + \beta_4 Growth + \beta_5 TOR + \beta_6 Bank/GDP + \beta_7 Gov. Subs./GDP + \beta_8 Inflation + \beta_9 Law \& Order + \beta_{10} Shareholder Rights + \beta_{11} Creditor Rights + \beta_{12} Common-Law dummy$ . The dependent variable (LTD/TD) is the long-term debt to total debt ratio. NFA/TA is net fixed assets divided by total assets. Profit is income before interest and taxes divided by total assets. NS/NFA is net sales divided by net fixed assets. Growth is the growth rate of real GDP per capita. TOR is stock market turnover defined as the total value of shares traded divided by market capitalization. Bank/GDP is the total assets of the deposit money banks divided by GDP. Gov. Subs./GDP are the grants on current account by the public authorities to private industries and public corporations as well as to government enterprises, divided by GDP. Inflation is the inflation rate of the GDP deflator. Law & Order, ranging from zero to six, is an indicator of the degree to which citizens of a country are able to utilize the existing legal system to mediate disputes and enforce contracts. Shareholder Rights is an index ranging from zero to five that aggregates shareholder rights and Creditor Rights is an index ranging from zero to 4.5 that aggregates creditor rights as described in the text. The common-law dummy equals one for common-law countries and zero for others. All variables, except last three, are averaged over the 1980–1991 period so that each country has one observation. In specification (2) Bank/GDP is replaced with its predicted value from the following regression  $Bank/GDP = \beta + \beta_1 Inflow + \beta_2 GDP/Cap + \beta_3 Law \& Order + \beta_4 Shareholder Rights + \beta_5 Creditor Rights + \beta_6 Common-Law dummy$ . Inflow is the sum of short-term and long-term capital flows plus foreign direct investment and portfolio flows into the country divided by GDP. GDP/Cap is real GDP per capita in US\$. For both specifications White's heteroskedasticity-consistent standard errors are given in parentheses

Table 5 (continued)

	Large firms		Small firms	
	(1)	(2)	(1)	(2)
NFA/TA	0.603 <sup>c</sup> (0.116)	0.592 <sup>c</sup> (0.101)	0.420 (0.257)	0.373 (0.237)
Profit	– 0.610 (0.449)	– 0.351 (0.379)	0.201 (0.482)	0.629 (0.423)
NS/NFA	– 0.005 (0.003)	– 0.005 (0.003)	0.000 (0.007)	– 0.015 <sup>a</sup> (0.008)
Growth	– 0.417 (0.687)	– 0.562 (0.696)	– 1.491 (1.301)	– 1.876 <sup>b</sup> (0.965)
TOR	0.108 <sup>b</sup> (0.039)	0.105 <sup>b</sup> (0.039)	0.154 <sup>a</sup> (0.079)	0.116 (0.093)
Bank/GDP	– 0.022 (0.018)	– 0.034 (0.046)	– 0.033 (0.029)	0.209 <sup>b</sup> (0.104)
Gov. Subs./GDP	0.004 (0.008)	0.009 (0.006)	0.030 <sup>c</sup> (0.008)	0.038 <sup>c</sup> (0.007)
Inflation	– 0.210 <sup>c</sup> (0.062)	– 0.222 <sup>c</sup> (0.040)	– 0.283 <sup>c</sup> (0.044)	– 0.229 <sup>c</sup> (0.061)
Law & Order	0.055 <sup>c</sup> (0.011)	0.067 <sup>c</sup> (0.019)	0.069 <sup>b</sup> (0.024)	0.002 (0.031)
Shareholder Rights	0.012 (0.010)	0.001 (0.012)	0.014 (0.017)	0.026 (0.022)
Creditor Rights	– 0.013 (0.011)	– 0.011 (0.015)	– 0.021 (0.020)	– 0.068 <sup>b</sup> (0.025)
Common-Law dummy	0.015 (0.035)	0.026 (0.036)	– 0.041 (0.044)	0.091 (0.072)
Adj. $R^2$	0.73	0.73	0.39	0.47
No. of Observations	26	25	26	25

<sup>a</sup>indicate significance levels of 10%.

<sup>b</sup>indicate significance levels of 5%.

<sup>c</sup>indicate significance levels of 1%.

firms is clearly higher in countries with an effective legal system. In the reported equations the efficiency of the legal system is measured by the International Country Risk Guide index. The Business International Corporation index is not used since this index is targeted towards foreign firms; its coefficient is of the same sign, although not always significant (and if so, at a lower level). The magnitude of the coefficient on legal effectiveness in the cross-sectional

regressions suggests that the marginal effect of the difference between a very efficient legal system (e.g., Switzerland) and an inefficient one (e.g., Turkey) is to increase the ratio of large firms' long-term assets to total assets by 0.25. For small firms the coefficient is only significant in the OLS specification. Second, there is only limited evidence that indexes of specific protections or common-law traditions directly affect a firm's long-term indebtedness. Thus, while both large and small firms in common-law countries have less long-term debt, this effect disappears when we adjust for the endogeneity of the banking system. This suggests that the legal tradition affects financial structures through its effect on institutions. Interestingly, high values of the index of creditor rights are not correlated with the use of long-term debt. We explore the role of creditor rights in more detail below.

Of the financial institution variables, for large firms the only significant coefficient is that of the stock market's turnover ratio, TOR. Thus, for large firms an active stock market is associated with higher long-term leverage. However, the marginal effect of the variation of stock market activity on the long-term debt of large firms is relatively smaller than that of the efficiency of the legal system. Comparing countries with relatively high turnover (such as the U.S. or Thailand) and countries with low turnover (such as Pakistan) indicates that the higher turnover in the former increases long-term debt by about 5 percentage points. The stock market size variable, MCap/GDP, is not included in the reported specifications since it is not significant, consistent with the results in Demirgüç-Kunt and Maksimovic (1998).

The coefficient of the size of the banking sector is not significant in the large-firm equations. By contrast, for small firms the coefficients of the banking variable exhibit an interesting pattern. The size of the banking sector by itself is not significant. However, when the predicted values of Bank/GDP are used instead of actual values in Column 5, the coefficient changes sign and is significant at the 10% level. Since creditor rights are an important determinant of the predicted value of Bank/GDP, this provides some evidence that strong rights promote access to long-term credit for small firms, albeit indirectly by increasing the size of the banking system. This is consistent with the hypothesis that small firms are 'marginal' and that their long-term borrowing is correlated with year-to-year changes in the size of the banking sector. Large firms are likely to be inframarginal borrowers, whose needs are satisfied even when the banking system is undeveloped.

Four of the control variables are also significant for both large and small firms. Extensive government subsidies are associated with a high ratio of long-term debt to assets. High average rates of inflation are negatively associated with the use of long-term debt for both large and small firms. An increase of 5% in the inflation rate reduces the ratio of long-term to total assets by approximately 1.25 percentage points. High average ratios of net fixed assets to total assets are associated with a higher ratio of long-term debt to total

assets. This is consistent with the notion that fixed assets serve as good collateral for long-term debt. Profitable firms have more long-term debt. The ratio of dividends to total assets is not significant when entered into the regression equation, and we drop it from subsequent regressions. An additional variable, the mean standard deviation of firm-level cash flows in each country, is also insignificant and are not reported.

Taken together, the results suggest that for large firms the observed variation in the levels of long-term debt across countries is related to the effectiveness of the legal system and the liquidity of the stock market. For all firms, high profitability, the availability of collateral, a low rate of inflation, and a high level of government subsidies are associated with long-term financing. There is some evidence that increased creditor protection increases the amount of long-term debt used by large firms indirectly by increasing the size of the banking sector.

We also estimate these equations using a panel that allows for both time-series and cross-sectional variation. The results suggest that year-to-year within-country variations in the explanatory variables affect large and small firms differently. Within countries, changes in the use of long-term debt by large firms are related to changes in the efficiency of the legal system, the level of government subsidies, and the activity level in the stock market. These factors are not associated with changes in the use of long-term debt by small firms in the panel regressions. A likely explanation for this difference is that small firms, with their reduced access to financial markets, governmental subsidies, and the legal system, are less likely to be affected by marginal improvements in financial markets and the legal system and changes in the level of subsidies. This is consistent with the additional finding that within-country variation in long-term borrowing by small firms is more strongly related to yearly changes in the size of the banking sector. By contrast, the cross-sectional differences between countries that we measure in the paper are likely to be of a greater magnitude. Thus, they affect small firms as well as large firms.

## *5.2. Short-term debt*

Panel B of Table 5 examines cross-country variation in the use of short-term debt. For large firms, the coefficients of the legal-efficiency variables and the common-law dummy are significant. Large firms in countries with more effective legal systems have less short-term debt. This effect is economically significant and is of the same magnitude as the positive effect of legal efficiency on long-term debt. However, we do not find that the use of short-term debt by small firms is affected either by the effectiveness of the legal system or by whether or not the legal system is based on common law. The other indexes of shareholder or creditor rights do not help explain the use of short-term debt for either large or small firms.

Only one of the coefficients of financial system variables is statistically significant. Small firms in countries with a large banking sector have less

short-term debt. However, this effect disappears when the Bank/GDP variable is replaced by its predicted value. Cross-country variation in the stock market or in values of the indexes of investor protection do not help explain differences in the usage of short-term debt. Similarly, the indicator of government subsidies as a fraction of the GDP does not improve the explanatory power of the regressions.

Inspection of Panel B reveals that several firm-specific variables help explain short-term leverage. One of these variables, the ratio of net sales to net fixed assets, is positively associated with short-term borrowing for both small and large firms. A high ratio of net fixed assets to total assets is associated with lower levels of short-term borrowing for large firms. This is consistent with the notion that such firms more easily match the maturity of borrowing with the maturity of their assets. Thus, large firms with fixed assets prefer long-term over short-term borrowing. Interestingly, more-profitable large firms have more short-term debt, whereas we do not obtain a similar significant relation for small firms. Small firms that grow fast rely more heavily on short-term debt. This finding is consistent with Myers' (1977) hypothesis that growth options are not financed using long-term debt.

In unreported regressions we also regress the ratio of total debt to total assets on our explanatory variables. For large firms, the total amount of debt does not vary with the efficiency of the legal system, but the coefficients on the shareholder rights index, stock market turnover, Bank/GDP, firm profitability, and of the ratio of government subsidies to GDP are positive and significant. The coefficients on the common-law dummy and inflation are negative and significant. For small firms the results are less clear: the coefficient on the rate of inflation is negative and significant and the coefficient of the ratio of government subsidies to GDP is positive and significant.

### 5.3. *Debt maturity*

We explore how the maturity of the firm's liabilities varies across countries in Panel C. As our indicator of maturity, we use the ratio of long-term liabilities to total liabilities. The specifications parallel the regressions reported in Panels A and B.

The results of cross-country regressions of debt maturity on firm-specific and institutional variables are consistent with the results for long-term and short-term debt reported above. We find evidence that the higher the quality of legal institutions, the greater the proportion of long-term financing, particularly in the case of large firms. The indicator of the legal system's efficiency in settling disputes is positive and significant at the 1% level in the large-firm equation. The predicted ratio of long-term to total debt is higher by about 0.35–0.4 in countries with the most efficient legal systems than in countries with the least efficient systems. There is less evidence that legal efficiency is important for small firms — the coefficient is positive significant at the 5% level in the small-firm

OLS equation, but the effect disappears when predicted values of Bank/GDP are used.

Consistent with the previously reported results, large firms in countries with active stock markets have longer debt maturities. There is less evidence that the level of market activity is related to the debt maturity of smaller firms. Similarly, the evidence on the effect of the banking system on the debt maturity of small firms is mixed. When the predicted values of Bank/GDP are used as an explanatory variable, the debt maturity of small firms in countries is positively related to the size of the banking sector. The predicted ratio of long-term debt to total debt increases by approximately 30% in a country whose banking system is in the lower end of the range (say, New Zealand) compared to a country at the high end (Japan). Together with the finding that small firms in countries with large banking systems have less short-term debt, this finding suggests that a large banking sector enables small firms to extend the maturity of their debt. However, the coefficient of Bank/GDP is significant at the 5% level in only one of the two specifications.

The coefficients of several of the control variables are of interest. The coefficient of inflation is negative and highly significant for both large and small firms. High ratios of net fixed assets to total assets are positively associated with longer debt maturities for large firms. High levels of government subsidies are positively associated with longer debt maturities for small firms.

#### 5.4. *Specific legal protections*

In Table 5 we find no evidence that the index of creditor rights helps predict either short-term or long-term leverage or debt maturity. In this subsection we explore the relation between creditor rights and debt levels in more detail. First, we replace the creditor-rights index by all its individual components in the large-firm and small-firm cross-sectional equations in Panels A–C of Table 5. Specification (1) of Table 6 show the coefficients of the individual components of the index in these equations for large and small firms, respectively. In Specification (2) we replace the creditor-rights index by each component in turn. Finally, in Specification (3) the index is replaced by each component in turn, but this time Bank/GDP is replaced by its predicted value.

Inspection of Table 6 reveals that the variation in most of the components of the creditor-rights index in this sample is not significantly related to the debt composition of large firms. The one exception is variation in the right of secured creditors to be paid first in bankruptcy. This right is associated with increased short-term borrowing and a significantly shorter maturity of debt for large firms. The interpretation of a significant partial correlation between any single legal protection and the use of a financial contract must be tentative because the importance of the protection varies in different systems. Moreover, because we are estimating a series of regressions, the statistical significance of any single

Table 6  
Impact of creditor rights

The regression equation estimated is specification (1) from Table 5, Panels A–C. In (1) the aggregate creditor rights variable is replaced by all the individual indicators, (2) enters each indicator one at a time. Creditor right variables are restrictions for going into reorganization, automatic stay on assets, secured creditors paid first, management stays in reorganization, and legal reserve requirement as a percentage of capital. Entries are respective coefficient estimates for the individual legal indicator obtained from the basic equation. In specification (3), individual rights are again entered one at a time, but the regression is in two stages with Bank/GDP replaced by its predicted value obtained by regressing it on Inflow, GDP/Cap, Law & Order, Shareholder Rights, Common-Law dummy, and the creditor right variable entered in the second stage. In all specifications White's heteroskedasticity-consistent standard errors are given in parentheses

	Large firms			Small firms		
	(1)	(2)	(3)	(1)	(2)	(3)
<i>LTD/TA</i>						
Restrictions for going into reorganization	-0.018 (0.036)	-0.027 (0.025)	-0.054 <sup>b</sup> (0.026)	-0.050 (0.057)	-0.001 (0.037)	-0.006 (0.054)
Automatic stay on assets	-0.009 (0.027)	0.001 (0.021)	0.011 (0.025)	0.083 <sup>b</sup> (0.036)	0.068 <sup>b</sup> (0.028)	0.113 <sup>b</sup> (0.040)
Secured creditors first paid	-0.039 (0.036)	-0.039 (0.028)	-0.069 (0.048)	0.095 (0.076)	0.071 (0.066)	0.044 (0.100)
Management stays in reorganization	0.029 (0.037)	0.022 (0.036)	0.052 (0.065)	-0.106 (0.072)	0.009 (0.051)	0.173 <sup>b</sup> (0.070)
Legal reserve required as % of capital	0.020 (0.143)	0.046 (0.118)	-0.082 (0.170)	-0.303 (0.248)	-0.158 (0.210)	-0.748 <sup>c</sup> (0.192)
<i>STD/TA</i>						
Restrictions for going into reorganization	-0.011 (0.027)	-0.001 (0.002)	0.005 (0.019)	0.003 (0.026)	-0.015 (0.016)	0.013 (0.022)
Automatic stay on assets	0.006 (0.021)	0.007 (0.016)	0.033 (0.024)	0.040 <sup>a</sup> (0.021)	0.012 (0.024)	0.017 (0.033)

Secured creditors first paid	0.044 <sup>a</sup> (0.024)	0.039 <sup>a</sup> (0.023)	-0.016 (0.038)	-0.025 (0.026)	-0.040 (0.026)	-0.043 (0.036)
Management stays in reorganization	-0.018 (0.032)	0.003 (0.022)	0.047 (0.040)	-0.072 <sup>c</sup> (0.036)	-0.063 <sup>c</sup> (0.019)	-0.047 (0.037)
Legal reserve required as % of capital	-0.034 (0.079)	-0.017 (0.057)	-0.152 (0.103)	0.015 (0.102)	0.046 (0.075)	0.001 (0.117)
<i>LTD/TD</i>						
Restrictions for going into reorganization	0.004 (0.038)	-0.019 (0.029)	-0.049 (0.032)	-0.025 (0.070)	-0.006 (0.063)	-0.011 (0.058)
Automatic stay on assets	-0.018 (0.024)	-0.004 (0.020)	-0.011 (0.037)	0.087 <sup>a</sup> (0.045)	0.080 <sup>b</sup> (0.037)	0.143 <sup>c</sup> (0.049)
Secured creditors first paid	-0.071 <sup>b</sup> (0.033)	-0.058 <sup>b</sup> (0.023)	-0.013 (0.061)	0.085 (0.093)	0.094 (0.093)	0.044 (0.118)
Management stays in reorganization	0.065 (0.037)	0.032 (0.037)	-0.002 (0.054)	-0.035 (0.087)	0.061 (0.059)	0.253 <sup>c</sup> (0.076)
Legal reserve required as % of capital	0.086 (0.132)	0.072 (0.109)	0.067 (0.135)	-0.219 (0.293)	-0.132 (0.235)	-0.810 <sup>c</sup> (0.189)

<sup>a</sup>indicate significance levels of 10%.

<sup>b</sup>indicate significance levels of 5%.

<sup>c</sup>indicate significance levels of 1%.

coefficient can be overstated. However, the signs of the coefficients of the right of secured creditors to be paid first in bankruptcy are consistent with the proposition that short-term lenders have a greater incentive to monitor borrowers and benefit most from an ability to repossess secured assets, as suggested by Diamond (1991). Interestingly, the rights of secured creditors are not similarly correlated with the financing decisions of small firms. In the U.S., trade creditors possess rights that other secured creditors do not possess. Thus, systematic differences in the amount of trade credit used by large and small firms would confound our results.

Table 6 also provides evidence that small firms in countries with automatic stays on the assets of bankrupt firms have more long-term debt and a higher ratio of long-term debt to short-term debt. There is no evidence that these firms are substituting long-term for short-term debt. Again, an interpretation must be tentative. In bankruptcy, an automatic stay benefits borrowers at the expense of secured creditors. As a result, small firms might wish to borrow more if the automatic stay credibly commits lenders not to defraud them in the event that they become financially distressed.

## 6. Conclusions

We examine the maturity of firms' liabilities in 30 developed and developing countries during the period 1980–1991. We find systematic differences in the use of long-term debt between developed and developing countries and small and large firms. In developed countries, firms have more long-term debt and a greater proportion of their total debt is held as long-term debt. This is true regardless of firm size across our sample of countries. This difference cannot be explained by matching of maturities of assets and liabilities as firms in developing countries have higher proportions of net fixed assets to total assets. Also, large firms have more long-term debt as a proportion of total assets and debt compared to smaller firms. We attempt to explain the observed cross-country variation in leverage and maturity of liabilities by differences in the legal systems, financial institutions, and government subsidies, as well as by firm characteristics and macroeconomic factors (such as the rate of inflation and the economy's growth rate).

We find strong evidence that large firms in countries with effective legal systems have more long-term debt relative to assets, and their debt is of longer maturity. Large firms in countries with effective legal systems have lower short-term liabilities, suggesting that such firms are substituting long-term debt for short-term debt. For small firms, evidence of a relation between the effectiveness of the legal system and the ratio of long-term debt to assets is weaker. We also do not find evidence of lower short-term liabilities by small firms in countries with more-effective legal systems, perhaps because small firms tend to

use less long-term debt than do large firms. These conclusions are consistent with the findings of Demirgüç-Kunt and Maksimovic (1998) that a higher proportion of firms in countries with effective legal systems finance their growth externally.

We also test the hypothesis that the tradition on which a country's legal system is based influences the optimal financing of firms in that country. We find limited evidence that both large and small firms in countries with a common-law tradition use less long-term debt, relative to their assets, than firms in countries with a civil-law tradition. There is also limited evidence that large firms in common-law countries use less short-term debt. Debt maturity does not differ between common-law and civil-law countries.

The structure of financial institutions is also an important determinant of firms' financing choices. Consistent with Demirgüç-Kunt and Maksimovic's (1998) results on external financing of investment, we find that whereas the variation in the size of the stock market relative to the country's economy is not correlated with financing patterns, variation in the level of activity of the stock market does have explanatory power for large firms. In countries with active stock markets, large firms have more long-term debt and debt of longer maturity. Neither the level of activity nor the size of the market is correlated with the financing choices of small firms. By contrast, in countries with a large banking sector, small firms have less short-term debt and their debt is of longer maturity. Variation in the size of the banking sector does not have a corresponding correlation with the capital structures of large firms. At the margin, large banking sectors enable smaller firms to substitute long-term debt for short-term debt.

We also find that the magnitude of government subsidies to industry is positively related to the use of long-term debt by both large and small firms, perhaps as a result of implicit guarantees. Inflation is negatively related to the use of long-term debt. Variation in several firm-specific characteristics is also related to the use of debt of different maturities. In particular, high ratios of net fixed assets to total assets are positively related to the use of long-term debt by both large and small firms and to longer debt maturities for large firms only. This finding suggests that large firms can more easily use their fixed assets to obtain long-term debt. By contrast, high ratios of sales to fixed assets are associated with more extensive use of short-term debt. This would be consistent with maturity matching if firms with high ratios of sales to fixed assets also have high ratios of accounts receivable to fixed assets.

In sum, the underlying legal and institutional differences explain a large portion of the variation in the use of long-term debt. While we have identified relations between financial institutions and legal system origin and efficiency, on the one hand, and financial structures of firms on the other, we have not been able to consistently relate specific investor protections with firm financing. This is not surprising, since the constraints that specific features of the legal system

impose on contracting by firms and investors depend on the characteristics of the financial system in each country. The exact way in which this happens is an open research question.

Our paper has several policy implications. First, it provides evidence that firms in developing countries have less long-term debt, even after accounting for their characteristics. Second, the paper shows that this lack of term financing is mainly due to institutional differences, such as the extent of government subsidies, differences in the levels of development of stock markets and banks, and differences in the underlying legal infrastructure. Third, the results indicate that while policies that help develop countries' legal and financial infrastructures might be effective in increasing the access of firms to long-term debt, different policies would be necessary to lengthen the debt maturity of large and small firms. Improvements in legal effectiveness seem to benefit all firms, although this result is much less significant for the smallest firms, which have limited access to the legal system. Similarly, policies that would help improve the functioning and liquidity of stock markets would again benefit mostly large firms. In contrast, policies that would lead to improvements in the development of the banking system would improve the access of smaller firms to long-term credit.

## Appendix A

### Number of firms and the sample period

	No. of firms	Time period
Australia	401	1983–1991
Austria	44	1983–1991
Belgium	89	1983–1991
Brazil <sup>a</sup>	100	1985–1991
Canada	494	1983–1991
Switzerland	150	1983–1991
Germany	359	1983–1991
Spain	116	1983–1991
Finland	55	1983–1991
France	544	1983–1991
United Kingdom	1275	1983–1991
Hong Kong	173	1983–1991
India <sup>a</sup>	100	1980–1990
Italy	81	1983–1991
Jordan <sup>a</sup>	38	1980–1990
Japan	1104	1983–1991
Korea <sup>a</sup>	100	1980–1990
Mexico <sup>a</sup>	100	1984–1991
Malaysia	143	1983–1991

	No. of firms	Time period
Netherlands	165	1983–1991
Norway	52	1983–1991
New Zealand	41	1983–1991
Pakistan <sup>a</sup>	100	1980–1988
Singapore	213	1983–1991
Sweden	68	1983–1991
Thailand	137	1983–1991
Turkey <sup>a</sup>	45	1982–1990
United States	3247	1983–1991
South Africa	67	1983–1991
Zimbabwe <sup>a</sup>	48	1980–1988

<sup>a</sup>The data source for the firm level variables is IFC's corporate finance data base. Otherwise, the data are from Global Vantage data base.

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