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What Do We Know about Capital Structure? Some Evidence from International Data

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ABSTRACT

We investigate the determinants of capital structure choice by analyzing the financing decisions of public firms in the major industrialized countries. At an aggregate level, firm leverage is fairly similar across the G-7 countries. We find that factors identified by previous studies as correlated in the cross-section with firm leverage in the United States, are similarly correlated in other countries as well. However, a deeper examination of the U.S. and foreign evidence suggests that the theoretical underpinnings of the observed correlations are still largely unresolved.

THIRTY SEVEN YEARS AND hundreds of papers after Modigliani and Miller's seminal work, what do we really know about corporate capital structure choice? Theory has clearly made some progress on the subject. We now understand the most important departures from the Modigliani and Miller assumptions that make capital structure relevant to a firm's value. However, very little is known about the empirical relevance of the different theories. Empirical work has unearthed some stylized facts on capital structure choice, but this evidence is largely based on firms in the United States, and it is not at all clear how these facts relate to different theoretical models. Without testing the robustness of these findings outside the environment in which they were uncovered, it is hard to determine whether these empirical regularities are merely spurious correlations, let alone whether they support one theory or another.

This paper attempts to start filling this gap in our knowledge. Our primary objective is to establish whether capital structure in other countries is related

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to factors similar to those appearing to influence the capital structure of U.S. firms. In doing so, we do not restrict ourselves to attempting to reproduce the regularities found in the United States in other countries, but we try to go deeper to understand the forces behind them. The use of international data provides a unique opportunity for this analysis. To the extent that other countries are similar to the United States, they provide an independent sample to test the received wisdom. To the extent that they have different institutional structures, they increase our ability to discriminate among alternative theories.

The cost of using an international sample is that some time has to be spent in analyzing the differences between the countries, ranging from accounting practices to legal and institutional environments. Thus, we start by presenting the typical balance sheet in each of the G-7 countries (the United States, Japan, Germany, France, Italy, the United Kingdom, and Canada). This analysis highlights the effects of different accounting rules, and also points to the corrections that need to be made so that measures of leverage are comparable across countries.

Unlike previous studies, we find that the extent to which firms are levered is fairly similar across the G-7 countries, with only the United Kingdom and Germany being relatively less levered. This finding does not seem to be an artifact of either our sample or the period it covers. Instead, our conclusions are different from those reached by most earlier researchers principally because we have more detailed measures, and more comparable calculations, of leverage.

We then analyze the major institutional differences across countries and their likely impact on financing decisions. Although the G-7 countries are fairly homogeneous in their level of economic development (in addition to data availability, this is another good reason to focus on them), their institutions—as exemplified by the tax and bankruptcy code, by the market for corporate control, and by the historical role played by banks and securities markets—are fairly different. Apart from establishing a framework within which to understand between-country differences, the review of institutions is important because they may affect the within-country cross-sectional correlation between leverage and factors such as firm profitability and firm size. This may help us identify the true economic forces underlying the factors.

Finally, we compute the within-country partial correlations between leverage and the factors identified as important in the United States. It is remarkable that these factors are, in general, similarly correlated with leverage in other countries also. While the consistency in correlations may indicate that there are indeed underlying forces that influence capital structure choice, there may also be reason to doubt our understanding of what these forces are or how the institutional differences identified above moderate their influence. For example, leverage increases with size in all countries except Germany. A possible explanation is that larger firms are better diversified and have a lower probability of being in financial distress. Lower expected bankruptcy costs enable them to take on more leverage. But a number of economists (see for

example, White (1993) and Kaiser (1994)) argue that in Germany the bankruptcy code is not conducive to reorganizing firms, and firms entering bankruptcy are usually liquidated. Since liquidation values are generally lower than going concern values, bankruptcy is potentially more costly in Germany. So we might expect a stronger positive correlation between size and leverage in Germany. Why then do we observe a significant negative correlation? This suggests that either our understanding of the economic underpinnings of the factors (e.g., that size is an inverse proxy for the expected costs of bankruptcy), or our understanding of the influence of institutions (e.g., bankruptcy laws), or both, is flawed.[1] More research is clearly called for.

The rest of the paper proceeds as follows. Section I describes the data. Section II computes leverage in each country after implementing the necessary accounting adjustments. Section III overviews the major institutional differences across the G-7 countries and examines how these relate to differences in leverage. In Section IV, we undertake a comparative study of the cross-sectional determinants of capital structure choices and attempt to rationalize the observed regularities. Section V concludes.

I. Data Description

A. Data

Previous studies that attempt to compare capital structures in different countries have been hampered by the lack of consistent accounting and market information outside the United States. A recently compiled database of international corporations, Global Vantage, helps us, at least partially, address this problem. The database contains accounting data and monthly stock prices for approximately 8,000 companies from 31 countries since 1982. Global Vantage started to collect the data only in 1987. From that year onward it included all the companies present in the Morgan Stanley Capital International Index, in the Financial Times Actuaries World Index or in the local market index.[2] Pre-1987 data were backfilled and therefore suffer from survivorship bias. However, Global Vantage retains firms even if they are dropped from the relevant index, so long as data is available. For this reason we concentrate our analysis on the 1987–1991 period, using pre-1987 data only as a robustness check.

We limit our attention to the largest economies where there are sufficient firms represented to make comparisons meaningful. In particular, we focus on

[1] This is not to say that there are no potential explanations of the pattern in Germany. For instance, external financing may be very costly in Germany, leading firms to rely largely on internal sources. Since large firms typically have fewer investment opportunities and greater cashflows from existing investments, one might expect them to be able to finance more through internal sources. If this argument is true, it still leaves the puzzle of why external financing is so costly in Germany.

[2] For the United States, Japan, Germany, France, Italy, the United Kingdom, and Canada (the seven countries we consider) the local market index is, respectively, S&P 500, Nikkei 500, FAZ Share Index, CAC General Index, MIB Current Index, FT Actuaries 500, and TSE 300.

non-financial corporations of the G-7 countries. In 1991, Global Vantage covers more than two thirds of the companies (representing more than 90 percent of the market capitalization) in countries with a small stock market (France, Germany, and Italy). In the other major countries Global Vantage covers between one third and one half of the companies traded, representing more than 75 percent of the market capitalization. We eliminate financial firms such as banks and insurance companies from the sample because their leverage is strongly influenced by explicit (or implicit) investor insurance schemes such as deposit insurance. Furthermore, their debt-like liabilities are not strictly comparable to the debt issued by nonfinancial firms. Finally, regulations such as minimum capital requirements may directly affect capital structure. The final sample covers between 30 and 70 percent of the companies listed in every country, and represents more than 50 percent of the market capitalization in each country.

There are at least two potential sources of bias we should worry about. First, the sample selection criterion used by Global Vantage biases the sample towards the largest listed companies in each country. Given the figures on coverage, this suggests that while the sample may do well in capturing aggregate leverage in a country, it probably is not representative of the average firm. Another selection bias arises from the fact that only listed companies are reported. The fraction of listed firms differs widely across different countries, and so does the average size of companies listed.[3]

It is important to understand why these differences arise, but this paper has more modest aims. The figures above suggest that while the companies followed by Global Vantage are fairly representative of listed companies, these, in turn, may represent only a small (and varying) proportion of firms in a country.[4] While listed companies, the tip of the proverbial iceberg, are perhaps of greatest interest to the financial community, the interests of academicians are broader. Unfortunately, it is hard to establish beyond doubt whether the tip of the iceberg is representative of the larger mass hidden below. But to the extent that common institutions within a country influence both the tip and the mass below, the information gathered from an analysis of tips will have broader implications. We will attempt to check for possible biases in the data throughout this paper. But ultimately, international data cannot be made

[3] Edwards and Fischer (1993) estimate that listed companies accounted for 30.5 percent of total sales by corporations in the United Kingdom in 1986, while listed Aktiengesellschafts (the closest German equivalent to public limited liability firms) accounted for just 10.6 percent in Germany. Pagano and Roell (1990) find that the market capitalization of the average company traded in Frankfurt or Milan is approximately 60 percent larger than that of the average company traded in London.

[4] One might be concerned that, given the different institutional environments, only the best firms have access to the public equity market in Germany and Italy. We do not think this is true. Very few firms went public in Germany after World War II and therefore being public can be regarded as exogenous from our point of view. This is true in Italy also, though to a lesser extent. Furthermore, The Economist (7/24/1993) reports that a McKinsey study finds unlisted firms in Italy perform twice "as well" as listed ones.

Table I

Distribution of Firms Followed by Global Vantage by Size

All consolidated firms in all G-7 countries are pooled and they are placed in size deciles according to the 1991 market value of their assets in U.S. dollars.

	Country (Percentage of Consolidated Firms[a])						
Decile	United States	Japan	Germany	France	Italy	United Kingdom	Canada
Smallest	15	0	1	9	3	4	8
2	12	0	5	2	7	11	13
3	11	0	5	8	8	17	10
4	11	0	13	4	14	13	13
5	10	3	11	11	14	12	12
6	10	5	14	13	11	12	12
7	8	16	13	17	15	10	11
8	8	22	13	13	14	8	9
9	8	25	13	13	10	7	9
Largest	8	30	11	9	4	7	3
Total number of firms	2583	514	191	225	118	608	318

[a] Columns may not sum to 100 because of rounding errors.

perfectly homogeneous, and the reader will have to interpret our results with all the caveats in mind.

To explore the magnitude of these biases and the homogeneity of our sample across countries we sort all the companies into deciles according to the market value of their assets (in U.S. dollars) at the end of 1991.[5] As Table I shows, the size distribution of companies within each country is fairly homogeneous across countries with the exception of Japan. Anglo-American countries (the United States, the United Kingdom, and Canada) have relatively more firms that are smaller than the overall median (respectively 59, 57, and 56 percent). By contrast, in Germany, France and Italy the sample is slightly tilted towards larger companies (only 35, 34, and 46 percent are below the median). Only Japan has almost the entire sample (97 percent) of firms larger than the overall median. In presenting the results, we will attempt to correct for differences in size.

II. International Comparisons of Leverage and Financing

A. Balance Sheets

Considerable insight can be obtained simply by comparing the average balance sheets of the firms in our sample. In doing so, we note three major sources of differences in accounting practices. First, not all countries require

[5] More precisely the quasi-market value of assets, defined as book value of assets minus shareholders' equity plus market value of equity plus book value of preferred stock. Market value is computed at the end of the corresponding fiscal year. End-1991 exchange rates are used.

firms to report consolidated balance sheets, although the majority of firms in each country do it (in 1991, the countries with the least proportion of firms reporting consolidated balance-sheets are Germany and Japan with approximately 76 percent each).[6] Companies with unconsolidated balance sheets report an affiliate's net assets (under the "equity" method of reporting affiliates) as a long term investment on their balance sheets. Hence these firms would (incorrectly) appear to have lower leverage than otherwise identical firms who report consolidated balance sheets. Alternatively, in an attempt to window-dress their balance sheet, they may place the debt they take on in less visible affiliated companies and then borrow it back via interfirm trade credit.[7] For ease of comparison, this paper focusses on firms reporting consolidated balance sheets, and Table II reports average country balance sheets for all firms in the sample that reported consolidated balance sheets in 1991.

Second, the valuation of assets (at historical cost or current value) may differ substantially across countries. For instance, it is generally believed (Nobes and Parker, 1991, p. 25) that German accounting places greater emphasis on "conservatism" and less on "true and fair" considerations. Asset values of German companies may therefore be understated relative to asset values in many other countries. Conversely, the Finance Acts of 1978 and 1979 made revaluation compulsory for French companies (Nobes and Parker, p. 17). There is no easy way to correct for this, and our results on book values must be interpreted with the appropriate caution.

The third difference relates to what is included and what is excluded from a balance sheet in different countries. For example, lease reporting varies substantially: financial leases appear on the balance sheet in the United States, Canada, and the United Kingdom (especially in the latter half of the eighties) but not regularly in Japan and Continental Europe. As the extent of leasing increases, however, more of these countries are forcing companies to report them.[8] Another difference is that in Germany, unlike the practice in the United States, both the funded and unfunded portion of pension liabilities are reported on the balance sheet (as are the assets held against pension liabilities). Furthermore, generally accepted German accounting practices allow firms to

[6] Towards the end of our study period, the implementation of the European Commission's Seventh Directive considerably reduced the leeway for firms in deciding whether to consolidate.

[7] Of course, to the extent that a parent borrows from a subsidiary, consolidation may understate the extent of leverage. Also, we do not claim that consolidated firms themselves do not pose problems for a study such as ours. Multinationals may consolidate foreign subsidiaries. We will incorrectly attribute all the leverage to the parent firm. This will automatically diminish differences between countries. The increasing globalization of the operations of large firms should reduce the differences between the capital structures of firms in different countries.

[8] Rutherford (1986) reports that leasing accounted for 17.1 percent of gross capital formation in the U.S. corporate sector in 1980, 8.7 percent in the United Kingdom, 4 percent in Japan, 3.2 percent in France, and 1 percent in Germany. Barclay and Smith (1995) find that lease obligations represent 9 percent of the total debt for a large sample of U.S. firms drawn from COMPUSTAT. This figure probably represents an upper bound of the error produced by lease undereporting in other countries, where leasing is less widespread. An error of this magnitude is not likely to affect our results in a major way.

set aside greater provisions for future potential liability in profitable years. This reserve is then used to smooth accounting income in lean years. Thus, in Germany, reported earnings may be less representative of true earnings than those in the United States (see Alford *et al.*, 1993).[9] An indication of the importance of these differences is that 29 percent of the liabilities of a German company are included in the category "Liability Other" (in no other country does this item represent more than 8 percent). Approximately 50 percent of "Liability Other" is represented by pension liabilities, the remaining 50 percent consists of special reserves for potential liabilities. We will correct for some of these differences when we discuss leverage.

Bearing the above caveats in mind, clear differences emerge between countries in Table II. Firms in Anglo-American economies have proportionately more fixed assets and less current assets in their balance sheet: 40 versus approximately 30 percent for Germany, France, Italy, and Japan.[10] However, the composition of current assets differs greatly in the latter group. Japanese companies have a larger amount of cash and short term investments (18 percent of assets versus at most 11 percent for other countries), and this accounts for most of the difference in current assets with respect to the United States. In Continental Europe, however, higher current assets are due to higher inventories and accounts receivable. We now turn to the liability side of the balance sheet.

B. Measures of Leverage

Given the observed differences in the composition of liabilities, before undertaking any investigation of leverage it is appropriate to define what we mean by this term. Clearly, the extent of leverage— and the most relevant measure—depends on the objective of the analysis. For instance, the agency problems associated with debt (Jensen and Meckling (1976), Myers (1977)) largely relate to how the firm has been financed in the past, and thus on the relative claims on firm value held by equity and debt. Here, the relevant measure is probably the stock of debt relative to firm value. Others (see Aghion and Bolton (1992)) have focussed on leverage as a means of transferring control when the firm is economically distressed, from shareholders (or their fiduciaries) to bondholders (or their fiduciaries). Here, the important question is whether the firm can meet its fixed payments, and consequently, a flow measure like the interest coverage ratio is more relevant. Rather than explor-

[9] Anecdotal evidence on this issue reveals the magnitude of the problem. Nobes and Parker (1991, p. 27) report that AEG Telefunken succeeded in generating exactly zero earnings for three years in a row. More recently, in 1994, Daimler Benz revealed its earnings restated according to U.S. standards while seeking a listing on the New York Stock Exchange. Daimler Benz had suffered substantial reverses in various markets, so one would expect its smoothed earnings to be higher than true (U.S. restated) earnings. But the extent of the difference, DM3 billion (approximately $2 billion), was surprisingly large. All this suggests that the objective of smoothing income may sometimes conflict with the objective of presenting a conservative picture.

[10] The larger proportion of fixed assets in Canada may simply be because a disproportionately large fraction (28 percent) of the Canadian companies in the sample are in oil and mining.

Table II

Balance Sheets for Non-Financial Firms in the G7 Countries—1991

The value of each item is calculated as a fraction of the book value of total assets and then averaged across all firms reporting consolidated balance sheets in the country. Only balance sheets of non-financial firms are included.

	United States	Japan	Germany	France	Italy	United Kingdom	Canada
ASSETS							
Cash and short-term investments	11.2	18.4	8.8	10.3	10.5	11.4	8.2
Account receivable/debtors	17.8	22.5	26.9	28.9	29.0	22.1	13.0
Inventories	16.1	13.9	23.6	17.4	15.6	17.7	11.0
Current assets-other	2.9	3.0	0.1	1.7	1.6	3.7	1.9
Current assets—total	48.0	57.7	59.4	58.3	56.5	54.7	33.2
Fixed assets (tangible)	36.3	28.7	32.7	24.4	32.4	41.3	51.6
Investments and advances—equity	1.4	1.4	1.4	3.4	1.9	1.5	4.8
Investment and advances—other	3.1	9.4	3.4	4.9	4.1	1.2	2.9
Intangible assets	7.6	0.8	2.4	8.5	2.6	0.9	4.7
Assets—other	5.8	2.9	0.7	0.7	3.3	0.5	3.7
Assets—total	100.0	100.0	100.0	100.0	100.0	100.0	100.0
LIABILITIES							
Debt in current liabilities	7.4	16.4	9.9	11.6	16.2	9.6	7.3
Accounts payable/creditors	15.0	15.4	11.5	17.0	14.7	13.7	13.3
Current liabilities—other	11.0	10.4	8.7	17.0	12.2	16.7	2.8
Current liabilities—total	33.4	42.2	30.0	43.4	43.2	40.0	23.1
Deferred taxes	3.2	0.1	0.8	1.3	1.5	0.9	4.4
Long-term debt	23.3	18.9	9.8	15.7	12.1	12.4	28.1
Minority interest	0.6	0.9	1.6	3.9	3.4	1.1	2.0
Reserves—untaxed	0.0	0.0	1.7	0.0	0.0	0.0	0.0
Liabilities—other	5.8	4.8	28.7	6.3	7.8	3.4	2.6
Liabilities—total	66.1	66.8	72.0	68.8	67.4	57.8	60.3
Shareholders equity	34.1	33.2	28.0	31.2	32.6	42.2	39.7
Total liabilities and shareholders equity	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Source: Global Vantage Data Base.

ing all possible theories and their associated measures of leverage, we use the ones suggested by the discussion above as illustrative.

The broadest definition of stock leverage is the ratio of total liabilities to total assets. This can be viewed as a proxy for what is left for shareholders in case of liquidation. However, it does not provide a good indication of whether the firm is at risk of default in the near future. Also, since total liabilities also includes items like accounts payable, which may be used for transactions purposes rather than for financing, it may overstate the amount of leverage.[11] Similarly, pension liabilities arising from labor market contracts will influence this ratio.

[11] However in countries, or specific classes of firms which use trade credit as a means of financing, accounts payables should be included in measures of leverage.

A more appropriate definition of financial leverage is provided by the ratio of debt (both short term and long term) to total assets. This measure, however, fails to incorporate the fact that there are some assets that are offset by specific nondebt liabilities. For example, an increase in the gross amount of trade credit is reflected in a reduction of this measure of leverage. Given that the level of accounts payable and accounts receivable may jointly be influenced by industry considerations, it seems appropriate to use a measure of leverage unaffected by the gross level of trade credit.

We could define leverage as the ratio of total debt to net assets, where net assets are total assets less accounts payable and other liabilities. Although this measure is not influenced by trade credit, it is affected by factors that may have nothing to do with financing. For example, assets held against pension liabilities may decrease this measure of leverage. Therefore, the effects of past financing decisions is probably best represented by the ratio of total debt to capital (defined as total debt plus equity).

One measure of the risk that equity holders will not be able to make fixed payments and will have to give up control is the coverage ratio, i.e., the ratio of earnings before interest and taxes (EBIT) to interest expense. This measure is appropriate if we believe that investments equal in magnitude to depreciation are needed to keep the firm a going concern. If no such investments are needed, a better measure of the firm's ability to service debt is the ratio of earnings before interest, taxes, and depreciation (EBITDA) to interest expense. A common problem for both measures is that they assume that short-term liabilities like accounts payable and short-term debt will be rolled over, which need not be true in times of distress. Furthermore, as Jensen (1989) argues, an inability to make fixed payments at low levels of debt may have very different implications for the control of the firm than an inability to make those payments at high levels of debt. The former is more likely to lead to liquidation while the latter may lead to reorganization (especially if the debt is closely held). Another problem is that these measures are very sensitive to income fluctuations.

With these caveats in mind, we report in Table III, Panel A all the above mentioned definitions of leverage for different countries. The stock measures are computed both at book value and quasi-market values—where the book value of equity is replaced by the market value of equity. At this stage, we do not attempt to adjust the measures for differences in accounting.

According to the first definition (nonequity liabilities to total assets) listed companies in the Anglo-American economies have considerably lower median leverage in 1991 (about 0.56) than companies in Continental Europe and Japan (0.70). The means as well as the aggregate ratio (obtained by summing total liabilities across companies in a country and dividing by summed assets) corroborate this. This measure, in a sense, offers an upper limit of the amount of leverage in different countries. If market values are used, Japan is not considerably more levered than the Anglo-American countries, while the countries of Continental Europe still seem to have higher leverage.

Table III

Extent of Leverage and Adjusted Leverage in Different Countries

Leverage measures are calculated for all non-financial companies reporting consolidated balance sheets in 1991. In the 'book' column, equity is measured at book value. In the 'market' column, equity is measured at market value. For instance, this alters the value of assets as follows: the (quasi) market value of assets is obtained by subtracting the book value of common equity from book assets and adding back the market value of common equity. In Panel A, Nonequity liabilities to total assets is the sum of all liabilities divided by the value of assets. Debt to total assets is the value of short term plus long term debt divided by total assets. Debt to net assets is the book value of debt divided by net assets where net assets is assets minus accounts payables and other current liabilities. Debt to capital is the book value of debt divided by the sum of the book value of debt and equity. EBIT is earnings before interest and taxes. EBITDA is earnings before interest, taxes, and depreciation. Aggregate ratios are obtained by summing the numerator across all reporting firms in the country and dividing by the denominator summed across the same firms. In Panel B, Adjusted liabilities are total liabilities less pension liabilities (in Germany) less cash. In Panels B and C, Adjusted debt is the book value of debt less the value of cash and marketable securities. Adjusted assets are total assets less cash and short term securities, less pension liabilities (in Germany), less intangibles. Adjusted book equity is book equity plus provisions plus deferred taxes less intangibles. In Panel C, Interest coverage ratio is income before interest and taxes divided by interest expense. Interest coverage is earnings before interest and taxes divided by interest.

Panel A: Extent of Leverage in Different Countries

Country	Number of Firms	Nonequity Liabilities to Total Assets (Medians (Means) Aggregate)		Debt to Total Assets (Medians (Means) Aggregate)		Debt to Net Assets (Medians (Means) Aggregate)		Debt to Capital (Medians (Means) Aggregate)		Interest Coverage Ratio (Medians Aggregate)	
		Book	Market	Book	Market	Book	Market	Book	Market	EBIT/ Interest	EBITDA/ Interest
United States	2580	0.58 (0.66)	0.44 (0.44)	0.27 (0.31)	0.20 (0.24)	0.34 (0.38)	0.24 (0.27)	0.37 (0.37)	0.28 (0.32)	2.41	4.05
		0.69	0.49	0.37	0.26	0.44	0.29	0.53	0.34	2.19	3.66
Japan	514	0.69 (0.67)	0.45 (0.45)	0.35 (0.35)	0.22 (0.24)	0.48 (0.35)	0.27 (0.29)	0.53 (0.52)	0.29 (0.31)	2.46	4.66
		0.75	0.55	0.42	0.31	0.58	0.39	0.63	0.41	2.20	3.71
Germany	191	0.73 (0.72)	0.60 (0.56)	0.16 (0.20)	0.12 (0.16)	0.21 (0.25)	0.15 (0.19)	0.38 (0.39)	0.23 (0.28)	3.20	6.81
		0.76	0.65	0.16	0.13	0.19	0.16	0.39	0.28	3.29	6.74
France	225	0.71 (0.69)	0.64 (0.61)	0.25 (0.26)	0.21 (0.23)	0.39 (0.39)	0.32 (0.33)	0.48 (0.46)	0.41 (0.41)	2.64	4.35
		0.78	0.68	0.29	0.25	0.43	0.34	0.57	0.45	2.15	3.47
Italy	118	0.70 (0.67)	0.70 (0.67)	0.27 (0.28)	0.29 (0.28)	0.38 (0.38)	0.38 (0.39)	0.47 (0.46)	0.46 (0.47)	1.81	3.24
		0.73	0.73	0.30	0.30	0.43	0.43	0.53	0.52	1.55	2.62
United Kingdom	608	0.54 (0.57)	0.40 (0.42)	0.18 (0.21)	0.14 (0.16)	0.26 (0.31)	0.18 (0.21)	0.28 (0.29)	0.19 (0.23)	4.79	6.44
		0.56	0.42	0.24	0.18	0.32	0.22	0.34	0.24	3.98	5.29
Canada	318	0.56 (0.61)	0.49 (0.47)	0.32 (0.36)	0.28 (0.27)	0.37 (0.39)	0.32 (0.31)	0.39 (0.39)	0.35 (0.36)	1.55	3.05
		0.64	0.55	0.38	0.33	0.44	0.37	0.50	0.43	1.19	2.55

Table III—*Continued*

Panel B: Extent of Adjusted Leverage in Different Countries

Country	Nonequity Liabilities to Total Assets (Medians (Aggregate))		Debt to Total Assets (Medians (Aggregate))		Debt to Net Assets (Medians (Aggregate))		Debt to Capital (Medians (Aggregate))	
	Book	Market	Book	Market	Book	Market	Book	Market
United States	0.52 (0.61)	0.42 (0.45)	0.25 (0.33)	0.16 (0.24)	0.32 (0.41)	0.20 (0.28)	0.33 (0.45)	0.23 (0.31)
Japan	0.62 (0.69)	0.37 (0.48)	0.21 (0.30)	0.12 (0.21)	0.33 (0.44)	0.16 (0.27)	0.37 (0.49)	0.17 (0.28)
Germany	0.50 (0.58)	0.41 (0.46)	0.11 (0.05)	0.10 (0.04)	0.17 (0.07)	0.13 (0.05)	0.18 (0.10)	0.15 (0.06)
France	0.69 (0.75)	0.59 (0.65)	0.18 (0.22)	0.13 (0.18)	0.32 (0.34)	0.25 (0.27)	0.34 (0.46)	0.28 (0.36)
Italy	0.68 (0.69)	0.68 (0.69)	0.21 (0.21)	0.21 (0.21)	0.33 (0.33)	0.31 (0.33)	0.39 (0.41)	0.36 (0.41)
United Kingdom	0.47 (0.48)	0.35 (0.35)	0.10 (0.13)	0.08 (0.09)	0.16 (0.18)	0.10 (0.11)	0.16 (0.19)	0.11 (0.13)
Canada	0.48 (0.56)	0.49 (0.50)	0.32 (0.36)	0.26 (0.32)	0.36 (0.41)	0.30 (0.36)	0.37 (0.44)	0.32 (0.40)

Table III—*Continued*

Panel C: Adjusted Leverage for Different Subsamples

	Debt levels for Consolidated Firms in 1986 (Median)		Debt to Book Capital for Consolidated Firms of Similar Size Across Countries (Median)		The effect of consolidation on Debt to Book Capital (Median)		Comparisons with Studies Using OECD Data: Nonequity Liabilities to Book Assets (Aggregate)			Comparison with OECD Data: Debt to Book Assets in 1982 (Aggregate)		Changes in Leverage over Time for Consolidated Firms Reporting through 1982–91 Debt to Book Capital (Aggregate)	
Country	Interest Coverage	Debt to Capital (Book Value)	Firms in the Largest Size Quintile[a]	Firms in the Smallest Size Quintile	All Firms in 1991[b]	Reduced Sample[c]	Rutherford[d]	Borio[e]	Global Vantage[f]	OECD	Global Vantage[f]	Level in 1982	Change between 1991 and 1982
United States	3.61	0.27	0.42	0.23	0.33	0.20	0.37	0.44	0.57	0.26	0.29	0.32	0.14
Japan	2.88	0.27	0.48		0.31	0.37	0.83	0.84	0.83	0.72	0.38	0.50	−0.01
Germany	4.53	0.05	0.12	0.17	0.13	0.18	0.63	0.66	0.78		0.20	0.29	−0.24
France	2.85	0.26	0.50	0.26	0.34	0.25	0.73	0.69	0.83	0.27	0.24	0.49	−0.05
Italy	2.67	0.18	0.37	0.39	0.37	0.32		0.68	0.81	0.35	0.31	0.43	−0.08
United Kingdom	7.14	0.15	0.20	0.14	0.16	0.11	0.50	0.53	0.53	0.19	0.19	0.19	0.03
Canada	3.27	0.30	0.41	0.20	0.37	0.26		0.59	0.66	0.32	0.39	0.42	0.02

[a] Consolidated firms from all countries are pooled and size quintiles are formed based on the market value of assets in U.S. dollars in 1991.

[b] Includes firms that present unconsolidated balance sheets also.

[c] Drops the most indebted consolidated firms such that the remaining sample contains consolidated firms numbering 76 percent of all reporting (consolidated and unconsolidated) firms in the country. For example, in the U.S. the 24% most indebted firms are dropped.

[d] Rutherford bases her computations on OECD statistics for 1982. The ratio is termed total debt to assets ratio and is the ratio of aggregate non-equity liabilities to total assets.

[e] Borio's computations use OECD statistics for 1980. The ratio is termed the gross debt to assets ratio and is again the ratio of aggregate non-equity liabilities to total assets.

[f] Aggregates are computed for all reporting firms in the Global Vantage database.

Moving on to debt to total assets, our findings change considerably. Now Germany and the United Kingdom appear to have low levels of leverage, both as a fraction of book value and market value of assets. Of course, part of the low leverage for Germany may be because of the way pension liabilities are treated. We will correct for this shortly. The debt to net assets ratio also suggests that corporations in Germany and the United Kingdom have lower leverage than in the other countries.

If leverage is defined as debt over capital, the North American countries and Germany have a similar median leverage around 38 percent, the United Kingdom appears substantially less leveraged (28 percent), while France, Italy, and Japan have substantially more leverage (respectively 48, 47, and 53 percent). However, the figures for Japan may be mainly due to the potential undervaluation of assets. In fact, leverage appears a more normal 29 percent if it is measured at the 1991 market value (recall that at the end of fiscal year 1991, the Japanese stock market had fallen approximately 50 percent from its 1989 peak, so this finding is not necessarily being driven by "excessive" stock valuations). Market value measures, however, confirm the higher level of stock leverage in France and Italy. The aggregate ratios again suggest that Germany and the United Kingdom are relatively underlevered.

We also compute median and aggregate interest coverage ratios. In the second to last column of Table III, Panel A we report the ratio of income before interest and taxes to interest expense. In the last column, depreciation is added to the numerator of the coverage definition. Despite the potential downward bias in German data, the interest coverage figures corroborate our earlier findings that Germany and the United Kingdom have lower leverage than the other countries in our sample.

Although country rankings are somewhat a function of the measure used, one major fact emerges: neither German nor Japanese companies are very highly levered by U.S. standards. This is surprising in light of the previous research which we will discuss shortly. Germany, in particular, comes across as a surprisingly low levered country. But firms in the United Kingdom also have low leverage, while corporate leverage in the other five countries seems to be quite similar.

C. Adjusting Leverage for Differences in Accounting

Before drawing strong conclusions from this exercise, we have to check if these findings are robust to adjustments for differences in reporting standards. We list the minimal adjustments that may be desirable. First, consider cash balances. Although we do not know how much cash and short-term investments are really needed to run a business, it is interesting to explore the implications of treating these as excess liquidity, offsetting them by an equivalent amount of debt, and removing both from the balance sheet.[12] There are other items which assume special importance in some countries because of

[12] These cash balances may also represent compensating balances required by banks.

accounting differences. For instance, unlike U.S. firms, German companies do not net out pension assets and pension liability in their balance sheets. While we do not know the level of pension assets, a first approximation is to assume that pensions are fully funded, and we subtract pension liabilities from assets in Germany.

There are three additional adjustments that need to be made. First, deferred taxes should really be considered a component of shareholders' equity.[13] Given that the importance of this item varies across countries, it seems appropriate to analyze the impact of adding it to the book value of equity. Second, the value of U.S. assets may be exaggerated with respect to those of the other countries by the wave of acquisitions of the 1980s. This is because the premium paid in an acquisition is recorded as goodwill and depreciated over 40 years. Evidence of this possible distortion can be found in the dramatic increase in intangibles in the United States over the 1980s (2.2 percent of assets in 1982 to 7.6 percent in 1991), and the much smaller number in other countries (except for France). To eliminate this potential bias we subtract the value of intangibles from the book value of equity in all the countries (and reduce assets accordingly). Finally, we argued that a large fraction of German liabilities is composed of dubious provisions for future liabilities, which are really equity. Therefore, for the sake of comparison, we reclassify these liabilities as shareholders' equity in all countries.

The net effect of all these adjustments is in Table III, Panel B. The amount of leverage in every country except Canada drops substantially. In particular the median ratio of adjusted debt to capital in Japan drops from 0.53 to 0.37 and in Germany from 0.38 to 0.18. But, if anything, the results seem to strengthen our claim; with the exception of the United Kingdom and Germany (median adjusted debt to book capital of 0.18 and 0.16, respectively), firms in the other five countries have similar leverage (median adjusted debt to book capital between 0.33 and 0.39). In everything that follows, we use the adjusted measures of leverage.

D. Additional Checks for Robustness

There are a number of additional checks that can be performed. To check that our results on leverage are not special to the year chosen, we look at the interest coverage ratio and the debt to capitalization ratio in 1986, a year that for many countries represented the peak of the economic expansion.[14] As Table

[13] The extent to which deferred taxes are equity-like may vary across countries. For instance, in much of the sample period (i.e., before FAS 109), U.S. firms used the deferral method in which (loosely speaking) the change in deferred tax liability was determined from the income statement. On the other hand, U.K. companies used the liability method in which the level of deferred taxes is determined after an assessment of probable future tax payments, and the change in deferred taxes is then calculated. Therefore, deferred taxes in the United Kingdom may be more debt like. Adjusting for this would not change our results qualitatively.

[14] It would appear that the best measure of leverage for Germany is debt to capital, where capital is defined as the sum of debt, equity, and untaxed reserves. Interest coverage may understate the amount of leverage because income from the pension assets held on the balance sheet will also count as income, and it may overstate leverage because of the propensity to hide income (though the latter effect may be small when we average over firms and time periods).

III, Panel C indicates, interest coverage is again high for Germany and the United Kingdom, while it is approximately equal for the other countries. The debt to book capital measure corroborates this.[15]

Differences in leverage can be attributed to the different size composition of the G-7 country sample. For this reason, we compare leverage of companies belonging in the smallest 20 percent and in the largest 20 percent of the distribution of firms sorted by the dollar market value of assets in 1991. Independent of the size of the firm, firms in the United Kingdom and Germany are less levered while all the other countries are approximately at the same level. Interestingly, Germany is the only country where larger firms have lower leverage (as can also be seen in Table III, Panel A and III, Panel B by comparing the median or mean leverage with aggregate leverage).

Some countries have a greater number of listed firms in which the state has a majority ownership. Firms in those countries may appear to have higher leverage because we do not account explicitly for state guarantees to debtholders. We identified the state owned companies in our sample for France and Italy, the countries with the largest state sector. There are 21 such companies in all. Median adjusted debt to capital for these firms is 0.83 in France, which is much higher than the median for firms in the private sector, 0.33. But for Italy, the medians are closer together, at 0.42 and 0.38, respectively. Since state owned firms are such a small proportion of our sample, dropping them does not alter our conclusions. In the rest of the analysis, they are dropped from the sample.

Another source of concern is that by restricting our attention to firms with consolidated balance sheets, we might have a significantly biased measure of leverage for some countries. During the 1980s, firms were under an increasing pressure to present consolidated balance sheets, both from local authorities and from financial markets. In 1989 alone, 109 Japanese firms in our sample moved to consolidated accounts. An estimate of the impact of consolidation can be obtained by looking at how the level of leverage changes when a firm starts to report consolidated balance sheets. We estimate this difference country by country.[16] In all the countries except the United Kingdom, we find that in the year when a firm moves to consolidate accounts, its debt to capital ratio increases relative to the previous year by about five percentage points. This difference is always statistically significant. In the United Kingdom, the difference is only two percentage points and is not statistically significant. This suggests that the absence of consolidated accounts for all the companies may lead us to underestimate the amount of leverage especially in Japan and Germany where approximately 24 percent of

[15] It is also possible that across country differences in leverage may be simply due to differences in the industry composition of the G-7 stock markets. For instance, 28 percent of Canadian firms are mining and oil companies (as compared with 6 percent in the overall sample). We therefore recompute the measures for a homogenous group of industries. Our results are qualitatively unchanged.

[16] In Canada and the United States all firms report on a consolidated basis. Therefore, our estimates are for the remaining five countries. In France, 4.3 percent of the firms do not consolidate, in Italy, 9.2 percent, and in the United Kingdom, 1.8 percent.

the sample is eliminated in each country by the consolidation requirement (for all the other countries the loss is less than 10 percent).

Interestingly, the firms that do not report consolidated balance sheets in these two countries have much lower leverage than firms that do. The median adjusted debt to capital ratio for Japanese firms not reporting consolidated accounts is 0.1 in Japan and 0 in Germany, which is much lower than the median ratio for firms reporting consolidated accounts. Obviously, when we include firms that do not present consolidated balance sheets in the sample, leverage in Japan and Germany is further reduced, though the overall pattern does not change. It is, however, important to ask why firms that do not consolidate appear to have such low leverage while leverage goes up when firms decide to consolidate. One explanation we have emphasized so far is that by not consolidating, firms may be concealing debt in subsidiaries. But the firms that do not consolidate are typically much smaller than firms that do; the median firm that has not consolidated by 1991 has sales of 122 billion yen in Japan and 356 million DM in Germany while the median firm reporting consolidated balance sheets has sales of 225 billion yen in Japan and 1271 million DM in Germany.[17] The small size of firms that do not consolidate suggests another reason why they might have low leverage: most firms may move to reporting consolidated balance sheets only when they have to raise external finance (usually debt) domestically or from abroad. This may account for the increase in leverage when firms consolidate. Firms that finance internally are likely to have low leverage and also not find much need for reporting consolidated balance sheets. Since firms that do not consolidate are somewhat more profitable than firms that do (median EBITDA to assets in Japan of 0.1 and in Germany of 0.17 compared to 0.09 and 0.14, respectively, for firms that consolidate), these may indeed be firms which do not need external finance, and thus have low leverage.

These are, of course, only conjectures. In the absence of more evidence on why firms that do not consolidate have low leverage, let us assume as an exercise that, on average, they have 10 percentage points more unreported leverage than they actually report (in other words, we assume twice the average increase when firms change reporting status). The median adjusted debt to capital ratio in Japan would go up from 0.33 to 0.395, and that in Germany from 0.15 to 0.205. This does not overturn our main results.[18]

[17] Obviously, reported sales increase when a firm consolidates accounts. But the increase (on average, 18 percent in Japan and 39 percent in Germany) seem too small to account for the difference in size.

[18] We assume twice the average level because the decision to start reporting on a consolidated basis may not be independent of the amount of hidden leverage that a company has. If this is the case, our estimate of 5 percent will represent only a lower bound of the impact of consolidation. Another way to control for this possibility is the following test: the worst case scenario for the results is that the firms that choose not to report on a consolidated basis are the most highly levered. Then to put Germany and Japan on an equal footing with the other countries we truncate the samples for other countries at the 76th percentile of leverage. Even with this, Germany

E. Comparison with Results in the Prior Literature

We are, of course, not the first to compare capital structures across countries. With a few notable exceptions, many of these studies conclude that companies in Japan and Continental Europe are more highly levered than companies in the Anglo-American economies.[19] For example, Borio (1990) classifies the former countries as "high leverage" and the latter as "low leverage". Rutherford (1988) summarizes previous studies and present additional evidence from the Organization for Economic Cooperation and Development (OECD) data suggesting that firms in France, Germany, and Japan are more highly levered than firms in the United States and the United Kingdom. While she acknowledges that adjustments for accounting differences, and the move to market values, could narrow the perceived difference in leverage, she concludes that it probably would not alter the main finding. Economists have explained these perceived aggregate differences as due to differences in the extent and nature of financial intermediation (see Borio (1990)), differences in institutional structures governing bankruptcy and debt renegotiation (see Frankel and Montgomery (1991)), and differences in the market for corporate control (see, for example, Berglof (1990)). Given that so much work is based on an empirical regularity that we do not find, it is important that we trace why our results differ from the received wisdom.

There are at least four possible sources of difference. The first is that our measures differ from previous ones used. The second is that the adjustments we have made to correct for differences in accounting were not possible with the earlier data. The third is that our sample of large firms differs from samples used in earlier work. Finally, it is possible that capital structures in the different countries have changed over time. As we shall argue, the first two sources seem to account for much of the difference in our findings. Capital structures have also changed over time in ways that strengthen our findings, but the differences in our findings from the previous literature existed even at the beginning of our sample period.

Both Rutherford (1988) and Borio (1990) use OECD data in arriving at aggregate measures of leverage. Unfortunately, the OECD figures for Germany do not report the stock of debt separately. Instead only nonequity liabilities are reported. So the *only* measure of leverage that can be reported for all G-7 countries is the ratio of nonequity liabilities to assets. Even though this measure is termed total debt to total assets in Rutherford, and gross debt to assets in Borio, it is actually a composite of debt, trade credit, pension liabil-

appears to be less levered than all other countries except the United Kingdom (see Table III, Panel C, column 6), and the other countries are higher.

[19] We should point out that we are not the first to question the received wisdom. For example, Kester (1986) finds that after controlling for a number of determinants, there are no major differences in the extent to which firms are levered in Japan and the United States. Mayer and Alexander (1990) find that large German firms borrow less than large U.K. firms. Yet no previous study that we know of has looked at all the G-7 countries in detail, nor has any study suggested that the supposed leverage differences between Anglo American firms and firms in Japan and Continental Europe are very sensitive to the way leverage is defined.

ities, deferred taxes, provisions, and other liabilities. As we have already argued, there are obvious problems in drawing inferences about leverage from this measure.

Interestingly, as can be seen in Table III, Panel C, the by-country aggregate nonequity liabilities to assets ratio in 1982 for firms in our sample corresponds closely to that reported in Rutherford and Borio (we choose 1982 because that is the only year that is common between the coverage of Rutherford's study and the Global Vantage Database). Since the OECD sample has far greater coverage than the Global Vantage database (for instance, the statistics for France in the OECD sample are based on over 800 firms) the fact that differences are minor suggests that the Global Vantage sample is fairly representative of the aggregate corporate sector. More evidence on this can be obtained by calculating the debt to book assets ratio using OECD data. We cannot compute this ratio for Germany, but the ratios for all other countries except Japan are close to the aggregate ratios computed from the Global Vantage sample. While the difference for Japan can stem from differences in sample (the OECD presents aggregate figures based on over 25,000 firms), there are other explanations: included in the definition of debt are bills that are discounted by financial institutions—arguably, this is not borrowing by the firm and should not enter a calculation of leverage. Also, the OECD data are not reported on a consolidated basis, so borrowing by a subsidiary from a parent would increase aggregate leverage in that sample.[20]

Finally, it is possible that changes in capital structures over the 1980s may partly explain why our findings are different. We report the changes in aggregate leverage for consolidated firms reporting throughout the period 1982 to 1991. There is an increase in debt to capital ratios for firms in the Anglo-American economies and a decrease for firms in the other economies (see Table III, Panel C). The increase in leverage is most pronounced for U.S. firms while the decrease in leverage is most pronounced for German firms. Yet the broad pattern of firms in Germany and the United Kingdom having lower leverage than the rest exists even in 1982. It, therefore, appears that our conclusions are different from those reached by most earlier researchers principally because we have more detailed measures, and more comparable calculations, of leverage.

To summarize our findings thus far: using different measures of leverage and correcting for major differences in accounting, we can conclude that: (i) the United Kingdom and Germany have the lowest leverage among the G-7 countries; and (ii) all other countries have approximately the same amount of leverage, with some changes in ranking based on the specific measure.

[20] Our sample of large firms is typical of those used in prior inter-country comparisons such as Kester's (1986) study of 344 Japanese firms listed on the first section of the Tokyo Stock Exchange. The total debt to book assets ratio for the firms in Kester's sample is 0.46 in 1983 which is not very different from the 0.4 for the firms in our sample. The small difference can be attributed to the fact that we have more firms in our sample; these are likely to be smaller and are thus likely to have lower leverage.

Table IV

Sources of External Financing (1984–1991)

External financing as a fraction of total financing is the ratio of net external financing to the sum of cashflow from operations and net external financing. The figures for the various components of external financing are aggregated across all non-financial companies in the country and across all years, then normalized by the net external financing obtained by firms in the country during the period 1984–1991. Net debt financing is the sum of net short term debt issuances and long term debt issuances less long term debt reduction. Equity issuance includes the issue of both common and preferred stock and conversions of debt to equity. Net equity financing is the sum of equity issuance less equity reduction. The data are obtained from the flow of funds statement. The number of firms varies year by year.

	External Financing as a Fraction of Total Financing		Composition of External Financing			
			Net Debt Issuance		Net Equity Issuance	
Country	Global Vantage	OECD[a] Data	Global Vantage	OECD Data	Global Vantage	OECD Data
United States	0.20	0.23	1.02	1.34	−0.02	−0.34
Japan	0.50	0.56	0.80	0.85	0.20	0.15
Germany		0.33		0.87		0.13
France		0.35		0.39		0.61
Italy		0.33		0.65		0.35
United Kingdom	0.36	0.49	0.55	0.72	0.45	0.28
Canada	0.30	0.42	0.62	0.72	0.38	0.28

[a] OECD data from 1991–1993 editions of the OECD publication "Financial Statements of Non-Financial Enterprises."

F. The Flow of Financing at the Aggregate Level

Up to this point we have largely restricted our analysis to stock-based measures of the existing capital structure. We now analyze the choice of financing with flow of funds data. A reason for extending our analysis is that data on capital structure do not distinguish between equity built through retained earnings and equity obtained through stock offerings. As Myers (1984) points out, the costs associated with these two forms of financing are very different.

In Table IV, we report the sources of financing for the firms in the four countries for which we have flow of funds data. For the United States, United Kingdom, and Canada, external financing is smaller than internal financing, with firms in the United States raising the least from external sources. But firms in Japan consistently raise more money externally than internally.[21] Is the greater dependence on external financing also true for the countries of Continental Europe? Unfortunately, this cannot be answered with the Global

[21] Using O.E.C.D. data we also checked that this was true for Japanese firms over the decade, 1972–1981, which precedes the period covered by our sample. Therefore, the greater reliance of Japanese firms on external financing is not driven by the rise in the Japanese stock market in the late 1980s.

Vantage Database. So in the second column of Table IV, we report the fraction of external financing computed from OECD data. Firms in Germany, France, and Italy raise substantially less from external sources than either firms in the United Kingdom or Canada. So, again, there is no clear distinction between the Anglo-American economies and the others.

The reason U.S. firms increased their leverage over the 1980s despite using so little external finance is because external finance has consisted entirely of debt. The figures for the United States are extreme, perhaps because of the intense activity in the market for corporate control over this period. But as the comparison with OECD data suggests, they may underestimate the increase in corporate leverage over this period. The Global Vantage database includes information only for publicly traded companies while OECD data is for all corporations. Therefore, Global Vantage will not include the additions to debt (and reductions in equity) that accompany leveraged buyouts. For instance, RJR Nabisco is not included in the sample after the 1989 buyout (although it re-enters the sample in 1991 after the reverse leveraged buyout). Finally, the extremely low leverage for the United Kingdom despite substantial levels of external financing is a result of a conscious emphasis on equity issuances rather than debt as a source of external financing. All this suggests that the levels of leverage that we see in different countries do not arise randomly, but are a consequence of conscious financing choices made by firms.

III. Institutional Differences and Leverage

In the previous section we showed that differences in leverage across the G-7 countries are not as large as previously thought. Only firms in the United Kingdom and Germany appear to be substantially less leveraged than firms in the other G-7 countries. These findings beg the question of why firms in countries such as Japan and the United States with such diverse institutions have a similar amount of leverage, and why firms in countries such as the United Kingdom and the United States with similar capital markets and financial institutions have such different levels of debt. Much of the previous literature has focussed on a classification of countries based on the size or power of the banking sector, hence the term "bank-oriented" (Japan, Germany, France, and Italy) and "market-oriented" countries (the United States, the United Kingdom, and Canada). In this section, we argue that this is just one, and perhaps not the most important, institutional difference between the G-7 countries. The tax code, bankruptcy laws, the state of development of bond markets, and patterns of ownership also may matter (of course, these institutional features may be influenced by the banking sector). Our aim in this section is not to settle the question of whether institutional differences are responsible for differences in aggregate corporate capital structure, but rather to raise questions that need to be addressed by future research.

Table V

Tax Treatment of Interest, Dividends, and Retained Earnings in Different Countries

Tax advantage of debt with respect to retained earnings (dividends) computed using the formulas derived by Miller (1977). The different rows correspond to different assumptions on the marginal personal tax rate of the investor. The "average" investor is assumed to head a family of three, and has three times the per capita income.

	United States	Japan	Germany	France	Italy	United Kingdom	Canada
Tax free investor							
Tax adv. w.r.t. retained earnings[a]	28.00	37.50	50.00	37.00	36.00	35.00	38.00
Tax adv. w.r.t. dividends[b]	28.00	37.50	36.00	42.00	36.00	35.00	38.00
Investor in the top tax bracket in 1990							
Tax adv. w.r.t. retained earnings	28.00	22.66	−6.38	−8.00	8.57	35.00	31.67
Tax adv. w.r.t. retained earn. no cap. gains tax[c]	8.33	21.88	−6.38	−26.00	8.57	−8.33	12.68
Tax adv. w.r.t. dividends	28.00	49.22	12.91	23.66	28.57	13.33	26.15
Investor in the top bracket in 1990 including local taxes							
Tax adv. w.r.t. retained earnings	40.25	40.15	14.89	−8.00	23.39	35.00	32.72
Tax adv. w.r.t. retained earn. no cap. gains tax	6.57	39.55	14.89	−28.57	23.39	−8.33	−3.55
Tax adv. w.r.t. dividends	40.25	60.71	30.32	23.66	40.15	13.33	35.32
Average Investor including local taxes							
Tax adv. w.r.t. retained earnings	40.25	40.15	37.50	27.70	23.39	35.00	20.79
Tax adv. w.r.t. retained earn. no cap. gains tax	7.79	39.55	37.50	13.93	23.39	−8.33	−3.55
Tax adv. w.r.t. dividends	40.25	59.01	30.34	13.00	28.17	13.33	35.32
Investor in the top bracket in 1983 including local taxes							
Tax adv. w.r.t. retained earnings	12.92	32.98	24.50	15.00	26.68	−8.39	27.14
Tax adv. w.r.t. retained earn. no cap. gains tax	−8.86	32.98	24.50	0.00	26.68	−54.84	2.37
Tax adv. w.r.t. dividends	51.69	44.37	34.27	47.51	63.34	31.43	27.85

Sources: various editions of "Doing Business in . . . ," "Individual Taxes: A Worldwide Summary," and "Corporate Taxes: A Worldwide Summary" published by Price Waterhouse.

[a] $[1 - (1 - t_c)(1 - t_{pE})/(1 - t_p)]$ where t_c is the corporate tax rate, t_{pE} the capital gain tax rate and t_p the personal tax rate.

[b] $[1 - (1 - t_c)(1 - t_{pD})/(1 - t_p)]$ where t_{pD} is the tax rate on dividends after dividend tax credit is accounted for.

[c] $[1 - (1 - t_c)/(1 - t_p)]$.

A. The Effect of Taxes on Aggregate Leverage

We first examine the effect of the tax code on aggregate leverage. The existing empirical literature on international capital structure differences (see, for example, Mayer (1990)) claims that taxes have no explanatory power. However, as we argue below, this conclusion may be unwarranted if personal taxes are also considered in addition to corporate taxes. Unfortunately, whether taxes have explanatory power or not is highly sensitive to assumptions about the marginal investor's tax rate.

Table V reports the relative tax advantage of debt with respect to retained earnings and dividends (see Miller (1977)) as of 1990, under different assump-

tions about the personal tax rate of the recipient. The relative tax advantage of debt is very sensitive to these assumptions. For instance, a tax-exempt investor finds debt more tax advantaged in Germany than in the United States (tax advantage of 50 versus 28 percent). However, this conclusion is reversed if we consider an investor who is taxed at the top marginal tax rate in each of the two countries (−6 versus 28 percent).

Clearly, these two cases do not exhaust the possibilities. Investors care about all the taxes they pay, not just taxes levied by the central government. We include the effect of corporate and personal taxes levied by the city where the primary stock exchange in the country is located (third row of Table V). This changes the magnitude of the computed tax advantage of debt. Furthermore, rather than having investors pay the maximum statutory rate or no taxes at all, we could assume that they have the personal tax rate of the "average" citizen (somewhat arbitrarily, we define this as somebody being the sole earner in a family of three and thus earning three times the per capita income). This again changes the ranking of countries on how tax advantaged debt is.

In addition to differences in the personal tax rate of the marginal investor, one must recognize that most of the G-7 countries experienced major fiscal reforms in the 1980s. The last row of Table V reports the tax advantage of debt as of 1983 for an investor in the highest tax bracket. In general, the tax reforms increased the tax advantage of debt with respect to retained earnings, but decreased its advantage with respect to dividends.

In sum, Table V shows the importance not only of including personal taxes in the computation of the tax advantage of debt, but also of including the "right" personal taxes. A precise computation of the effective tax rates, taking into account the income and wealth levels of the population, and the marginal corporate tax rate for firms, would require an entire study like the one undertaken by King and Fullerton (1984) for the 1970s. Our modest objective here is to explore whether such a study is warranted. We do that by examining whether changes in the tax treatment of debt and equity are at all associated with changes in the way operating profits are channeled to investors.

The first three rows in Table VI show how a dollar of pre-tax income is allocated across debt, dividends, and retained earnings in each country in the periods 1989–1991 and 1982–1984.[22] If taxes matter, we should observe a shift in the allocation of the pretax dollar towards the route that has increased its after tax value the most. At the same time the route that is most penalized (or least advantaged) by a tax reform should experience a reduction in its flow.

[22] Total debt payments are obtained by summing interest expenses across companies, total dividends are similarly obtained and then grossed up to a pre-tax rate by multiplying by the ratio of total pre-tax income to total after tax income (This overstates true dividends if the tax on distributed profits is different from the tax on retained earnings. Unfortunately, we have no way of systematically correcting for this). Total pre-tax retained earnings are obtained by subtracting (pre-tax) dividends and debt payments from pre-tax earnings. All these are normalized by total pre-tax earnings. We calculate these numbers over three year periods so as to minimize the noise from poor economic conditions in any single year. The findings are not qualitatively different if we restrict ourselves to the years 1983 and 1990.

Table VI

The Allocation of the Pre-Tax Dollar to Various Routes and Changes in the Allocation Over Time

The aggregate interest expense, dividends, and earnings for an economy are computed by summing the individual firm values across firms. The share of a pre-tax dollar paid to debt in the economy is the interest paid (all variables are aggregates) divided by income before interest and taxes. The share of a pre-tax dollar paid through dividends is the dividends paid grossed up to a pre-tax value divided by income before interest and taxes. The dividends are grossed up to a pre-tax value by multiplying by earnings after interest and before taxes and dividing by earnings after interest and after taxes. The share of a pre-tax dollar retained is one minus the share paid to debt minus the share paid in dividends.

	United States		Japan		Germany		France		Italy		United Kingdom		Canada	
	1982–1984	1989–1991	1982–1984	1989–1991	1982–1984	1989–1991	1982–1984	1989–1991	1982–1984	1989–1991	1982–1984	1989–1991	1982–1984	1989–1991
Share of a pre-tax dollar paid through the route														
Debt	0.26	0.40	0.46	0.43	0.33	0.25	0.57	0.39	0.68	0.62	0.21	0.23	0.42	0.52
Dividends	0.39	0.38	0.16	0.18	0.37	0.32	0.32	0.21	0.18	0.27	0.26	0.38	0.35	0.50
Capital Gains	0.35	0.21	0.38	0.39	0.30	0.42	0.11	0.40	0.14	0.11	0.53	0.40	0.23	−0.02
Route most tax advantaged by tax reforms between 1983 and 1990[a]	Debt		Debt		Retained earnings		Dividends		Dividends		Dividends		Debt	
Route least tax advantaged by tax reforms between 1983 and 1990[a]	Retained earnings		Dividends		Debt		Debt		Debt		Retained earnings		Dividends	
Change in share of pre-tax dollar flow between 1982–1984 and 1989–1991 allocated by companies consolidated and reporting throughout to route most tax advantaged	0.14		−0.03		0.12		−0.11		0.09		0.12		0.10	
Change in share of pre-tax dollar flow between 1982–1984 and 1989–1991 allocated by companies consolidated and reporting throughout to route least tax advantaged	−0.14		0.02		−0.07		−0.18		−0.06		−0.13		0.15	

[a] From Table V under the assumption that capital gains tax is paid at the statutory rate.

If we use the top personal tax rates, this is in fact what we see. The results are reported in Table VI. For instance, in the United States the debt route, which is most tax advantaged by the 1986 reform, increases its share of the pre-tax dollar from \$0.26 in 1982–1984 to \$0.40 in 1989–1991. By contrast, in the United States retained earnings are the least tax advantaged by the reform, and their share decreases from \$0.35 to \$0.21. The share of the pre-tax dollar going to the route that is most tax advantaged by tax reform between 1983 and 1990 increases in 5 of the 7 countries—with a mean increase in share of 6 cents ($t = 1.73$). Conversely, the route least advantaged by tax reforms between 1982 and 1991 saw a mean decrease in share of 6 cents ($t = -1.4$), with decreases in 5 of 7 countries. A t-test for differences in means suggests that there is a significant effect of taxes at the 5 percent level. By contrast, if we repeat the exercise by using the changes in the tax advantage of the different routes for an "average" citizen we do not find that taxes have a significant effect.

All we have shown is that one cannot easily dismiss the possibility that taxes influence aggregate corporate leverage in a country. In order to reach any conclusion on the effect of taxes, not only is it important that researchers include both personal and corporate taxes, but it is imperative they obtain the right effective rate.

B. Bankruptcy Law

As Harris and Raviv (1992) suggest, bankruptcy law should be regarded as an integral aspect of a debt contract. The G-7 countries vary considerably in their bankruptcy procedures, especially the extent to which liquidation is emphasized over renegotiation of claims, and the extent to which management has control during the bankruptcy process. Table VII outlines the salient features in each country (see White (1993) and Kaiser (1994) for details).

Bankruptcy law has a number of important effects: Strict enforcement of creditor rights enhances ex ante contractibility. Furthermore, it commits creditors to penalizing management (and equity holders) if the firm gets into financial distress, thus giving management strong incentives to stay clear of it. Finally, strict enforcement reduces the costly, and long drawn out, haggling between claimholders that ensues when there is a possibility that the original contracts may be violated. By contrast, it may be easier to keep profitable enterprises as going concerns, or provide managers the right incentives post-bankruptcy, if creditor rights are violated in bankruptcy. Countries differ in the extent to which they manage this trade-off in enforcing creditor rights.

For instance, bankruptcy law in the United States gives management substantial rights including the ability to propose a reorganization plan within 120 days of filing (the period is usually extended), a stay on attempts by any creditor to collect, and the right to manage the firm during the proceedings. By contrast, Germany's code is much more creditor friendly. A debtor has to present a plan of dealing with its insolvency within fifteen days of learning of it, secured creditors are not stayed by the filing, and management is replaced

by a receiver during the proceedings. This, Kaiser (1994) argues, leads to the little reorganization that takes place being conducted privately under the supervision of the banks. Similarly, Franks and Torous (1993) compare the U.K. bankruptcy code with that in the United States, and conclude that "the U.S. code appears to have strong incentives to keep the firm as a going concern even when it is worth more in liquidation [while] the U.K. code, by emphasizing the rights of creditors—and in some cases giving priority to one creditor—is likely to lead to too many premature liquidations." The other countries appear to fall in between the extremes of the United States and Germany or United Kingdom in the extent to which they support creditor rights.

Is it a coincidence that countries where the ex ante contract is most strictly enforced are also ones where firms have the least debt? Also, do firms efficiently maintain low leverage because the bankruptcy code results in too much liquidation of viable firms? Or do firms inefficiently maintain low leverage because managers fear losing their firm-specific human capital investment if the firm is liquidated? The answers await future research.

C. Bank Versus Market Based Countries

Contrary to previous studies (see, for example, Berglof (1990) and the references in it) we do not seem to find any systematic difference between the level of leverage in the so-called bank-oriented countries (Japan, Germany, France, and Italy) and in the so-called market-oriented countries (United States, United Kingdom, and Canada). This raises the questions of whether "bank orientation" is a meaningful distinction and whether differences in the importance of the banking sector have any effect on a firm's financing decisions.

There is no doubt that there are major differences in the power of banks across the G-7 countries.[23] The two polar cases are probably represented by Germany and the United States, with all the other countries falling in between. In Germany, banks are both allowed to underwrite corporate securities and to own equity in industrial companies. In the United States, significant limits are placed on both activities (see Kroszner and Rajan (1995), James (1994)). However, the above classification into bank-oriented and market-oriented countries does not match very well with the extent of bank powers. In the United Kingdom, banks have most of the powers German banks have, even if they do not use them. By contrast, France and Italy only recently moved to a universal banking system.

A better measure of the importance of the banking sector in financing firms is the ratio of bank loans made to the private sector to the gross domestic product (GDP). We report the ratio calculated for the middle of the period covered by our sample, 1986, in the first column of Table VIII. This measure suggests that the banking sector is more important in bank-oriented econo-

[23] Roe (1994) has a detailed discussion of bank powers in Germany, Japan, and the United States. Dermine (1990) lists bank powers in several developed economies.

Tale VII

Salient Features of the Bankruptcy Code in Different Countries

Country	Forms of Liquidation	Forms of Reorganization	Management Control in Bankruptcy	Automatic Stay	Rights of Secured Creditors
United States	Chapter 7: Can be voluntary (management files) or involuntary (creditors file).	Chapter 11: Can be voluntary (management files) or involuntary (creditors file).	Trustee appointed in Chapter 7. Management stays in control in Chapter 11.	Automatic stay on any attempts to collect debt once filing takes place.	Secured creditors get highest priority in any settlement. However, their attempts to collect payment are also stayed unless court or trustee approves.
Japan	Court Supervised Liquidation (*Hasan*) and Special Liquidation (*Tokubetsu Seisan*). The latter is less costly and a broader set of firms are eligible to file.	Composition (*Wagi-ho*), Corporate Arrangement (*Kaisha Seiri*) and Reorganization (*Kaisha Kosei-ho*). The list is in order of increasing eligibility. Only debtors file.	Third party is appointed except in composition and corporate arrangement.	All creditors are stayed except in court supervised liquidation and composition where only unsecured creditors are stayed.	Secured creditors have highest priority and greater voting rights in renegotiation. However, can be subject to stay depending on the petition that is filed.
Germany	Liquidation (*Konkursordnung*) can be requested by creditors or debtor. Management required to file as soon as it learns it is insolvent.	Composition (*Vergleich or Zwangsvergleich*) can be filed for only by debtor.	Receiver appointed to manage firm.	Only unsecured creditors are stayed.	Secured creditors can recover their claims even after a bankruptcy filing. No stay for secured creditors.
France	Liquidation (*Liquidation Judiciaire*)	Negotiated Settlement (*Règlement Amiable*) where a court appointed conciliator attempts a settlement with creditors and Judicial Arrangement (*Redressement Judiciaire*).	Debtor loses control in liquidation. Debtor remains in control otherwise but submits to court appointed administrator's decisions in a judicial arrangement.	Stay on all creditors in judicial arrangement.	Secured creditors may lose status if court determines the security is necessary for continuation of the business, or if the securing asset is sold as part of settlement.

Tale VII—*Continued*

Italy	Bankruptcy (*Fallimento*).	Preventive Composition (*Concordato Preventino*).	Debtor is removed from control over the firm.	Stay on all creditors.	Secured creditors stayed in bankruptcy, though composition allowed only if enough value exists to pay secured creditors in full and 40% of unsecured creditor claims. Secured creditors follow administrative claims in priority.
United Kingdom	Members' voluntary winding up, Creditors' voluntary winding up, Compulsory winding up.	Administration, Administrative Receivership (usually ends in sale of business), and Voluntary Arrangement.	Debtor is removed from control except in members' voluntary winding up.	Stay on all creditors in administration, on unsecured only in liquidation, and no stay in a voluntary arrangement until a proposal is approved.	Secured creditor may prevent administration order by appointing his own receiver. A creditor with a fixed or floating charge can appoint an administrative receiver to realize the security and pay the creditor.
Canada	Liquidation proceedings much like Chapter 7 in the United States.	Firms can file for automatic stay under the Companies Creditors Arrangement Act or the Bankruptcy and Insolvency Act.	Firm is in control in reorganizations while trustee is appointed for liquidations. Trustee may be appointed to oversee management in some reorganizations at the discretion of the court.	Stay on all creditors in reorganization.	Secured creditors have to give 10 days notice to debtor of intent to repossess collateral. Repossession even close to bankruptcy filing is permitted, but stayed after filing.

Sources: Kaiser (1994), Lo Pucki and Triantis (1994), Teichner (1991), and White (1993).

Table VIII

Size of Capital Markets in the G-7 Countries in 1986

Country	Domestic Bank Credit to the Private Sector as a Fraction of GDP (%)	Stock Market Capitalization ($ billion)	Stock Market Capitalization as a Fraction of GDP (%)	Bond Market Capitalization ($ billion)	Bond Market Capitalization as a Fraction of GDP (%)
United States	70.90	2128.00	49.85	993.20	23.27
Japan	104.22	1794.29	85.31	99.62	4.74
Germany	86.58	257.68	25.79	1.34	0.13
France	80.03	153.42	19.54	44.18	5.63
Italy	33.04	140.24	21.17	4.48	0.68
United Kingdom	53.85	472.90	83.70	14.01	2.48
Canada	44.21	185.20	50.56	27.17	7.42

Sources: Stock Market and GDP data are from Morgan Stanley Capital International Perspective, Domestic Credit from International Financial Statistics, and Bond Market Data are from Salomon Brothers International Bond Markets Analysis, 1992.

mies.[24] This distinction is also supported by other measures of the importance of financial markets. In Table VIII, we present the total capitalization of each country's corporate equity and corporate bond market in 1986 normalized by the GDP in the same year. Bank-oriented countries have very small financial markets. The exception is Japan where much of the growth in markets for corporate securities came in the 1980s when the strong hold of banks over corporate financing was relaxed (see Hoshi, Kashyap, and Scharfstein (1990a)).

In light of our evidence, it would appear that the difference between bank oriented countries and market oriented countries is reflected more in the choice between public (stocks and bonds) and private financing (bank loans) than in the amount of leverage. This is not surprising even from a theoretical point of view. While it might appear that the closer monitoring and control of firm management provided by banks should make more debt financing available in bank oriented countries, recent work (Diamond (1991), Rajan (1992), and Sharpe (1990)) has emphasized the costs of excessive bank debt. So despite the greater availability of debt finance from banks, firms in bank-oriented countries may not want to borrow beyond a point. An alternative explanation is that banks in these countries provide both debt and equity finance to firms so the greater availability of financing does not reflect in the leverage ratio. Which of the explanations, if any, is correct, is a question for future research.

[24] Loans to the private sector includes both consumer loans and loans to businesses. However, from Jappelli and Pagano (1994), we know that consumer credit is much more developed in the United States and Canada than in the other countries. If we adjust for this, banks become even less important sources of finance for firms in the Anglo-American economies.

D. Ownership and Control

Another major institutional difference across the G-7 countries is the level of ownership concentration and the working of the market for corporate control (Berglof (1990) and Franks and Mayer (1994)). The United States, the United Kingdom and to a much lesser extent, Canada have firms with diffused ownership, but also, an active takeover market. Some economists (see Roe (1994), for example) have even suggested that the active takeover market substitutes for the control over management provided by a concentrated ownership. By contrast, in Continental Europe and Japan, ownership is highly concentrated, thanks to the use of inter-company cross-holdings, pyramiding of ownership and dual class stock. As a consequence, hostile acquisitions are almost unheard of. Franks and Mayer (1994) report only three attempts at hostile acquisition in Germany in the entire post-World War II period.

The effect of ownership concentration on capital structure is far from obvious. On the one hand, the presence of large shareholders on the board of directors should reduce the extent of agency costs between managers and shareholders and facilitate equity issues. Furthermore, these shareholders may be undiversified, which may increase their aversion to debt. On the other hand, if some of these large shareholders are banks, they might have a vested interest in reducing the amount of outside sourcing of their clients, forcing them into borrowing from the banks. Therefore, it may not be surprising that we cannot detect a clear relationship between the concentrated ownership that characterizes some countries and aggregate leverage.

A strong pressure from the takeover market may force firms to increase leverage. Managers may take on debt so as to commit to paying out future cashflows (or so as to commit to restructuring the firm). This, in turn, may make the firm unattractive to raiders (see, for example, Zwiebel (1992)).[25] In this respect, the United States stands out for the intensity of the takeover pressure during the sample period. In fact, the United States is the only country where equity issues are, on net, negative over the period 1984–1991 (see Table IV). Moreover, as seen in Table III, Panel C, leverage increased considerably over this period even though, as discussed earlier, our dataset leaves out the highly leveraged going private transactions. Is the increase in debt in the United States over the 1980s a secular shift towards higher leverage, or will it reverse itself as the much-needed restructuring is effected? Only future research can tell.

Finally, it appears that the restructuring activity in the 1980s also had substantial impact on the cross-sectional distribution of leverage (see Bernanke, Campbell, and Whited (1990)). As Figure 1 shows, more firms in the United States have extremely high leverage. Thus the distribution of leverage in the United States has a "fatter" right tail than in countries without such pressure. The distribution is also fat-tailed in the United Kingdom and Can-

[25] The welfare effects of this increase, though, are less clear. While in Zwiebel (1992), takeovers push managers to the value maximizing capital structure, in Novaes and Zingales (1995) they may induce excessive leverage.

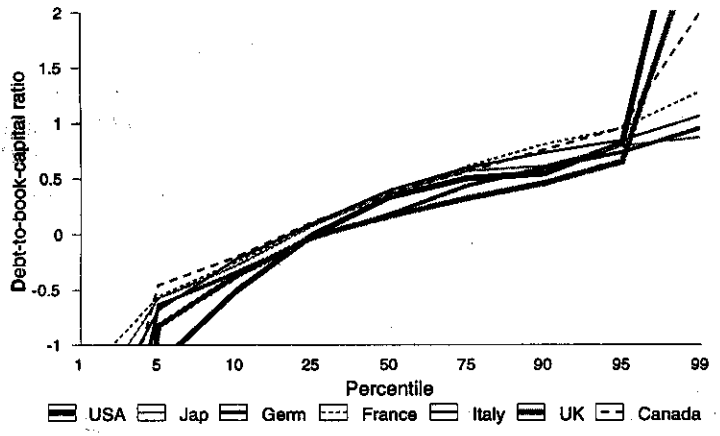

Figure 1. Distribution of debt-to-book-capital ratio. The graph plots the level of debt-to-book-capital ratio in 1991 at different percentiles of the within-country cross sectional distribution for each of the G-7 countries. The x-axis reports the percentile of the distribution, the y-axis the level of the debt-to-book-capital ratio. Debt-to-book capital is the book value of adjusted debt divided by the sum of the book value of adjusted debt and adjusted equity. Adjusted debt is the book value of debt less the value of cash and marketable securities. Adjusted book equity is book equity plus provisions plus deferred taxes less intangibles.

ada, the two other countries that experience at least some hostile takeover pressure. Furthermore, the right tail of the distribution for these countries increased over the 1980s (not shown).

IV. Cross Sectional Evidence

As the previous section suggests, differences in institutions do seem to have some power in explaining differences in aggregate capital structure. However, it also suggests a broader interpretation of institutions than the previous literature has focused on; the extent to which firms are levered in an economy does not seem to depend solely on the share of external financing that banks account for in that economy. Other factors such as the bankruptcy code, the tax code, and the market for corporate control may also influence aggregate capital structure.

We have concentrated thus far on identifying and explaining between-country differences in capital structure. We now shift our focus to cross-sectional differences between firms in a country. Previous studies on U.S. firms have established that capital structure is cross-sectionally correlated with certain factors. We first verify that these correlations continue to hold for the U.S. firms in our data set. We then go on to examine if these stylized relations hold in other countries. Finally, we attempt to establish why each factor has the correlation with leverage that we document. In other words, the use of international data has two purposes: the first is simply to document that the correlations hold generally, while the second—and more important one—is to try to explain the cross-country variation in these correlations. If, for

instance, a factor does not "work" in the predicted way in another country (conditional on no measurement or econometric problems), it must be either because the theoretical rationale for the factor working in the United States is spurious, or because institutional differences alter how the factor works.

A. The Factors Correlated with Leverage

According to Harris and Raviv (1991), the consensus is that "leverage *increases* with fixed assets, nondebt tax shields, investment opportunities, and firm size and *decreases* with volatility, advertising expenditure, the probability of bankruptcy, profitability and uniqueness of the product."

We focus on four of the above mentioned factors: tangibility of assets (the ratio of fixed to total assets), the market-to-book ratio (usually thought of as a proxy for investment opportunities), firm size, and profitability. We limit ourselves to these for two reasons. First, these factors have shown up most consistently as being correlated with leverage in previous studies (see Bradley, Jarrell, and Kim (1984), Long and Malitz (1985), and Harris and Raviv (1991)). Second, the data severely limits our ability to develop proxies for the other factors.[26]

Theories of capital structure suggest how some of the factors might be correlated with leverage. If a large fraction of a firm's assets are tangible, then assets should serve as collateral, diminishing the risk of the lender suffering the agency costs of debt (like risk shifting). Assets should also retain more value in liquidation. Therefore, the greater the proportion of tangible assets on the balance sheet (fixed assets divided by total assets), the more willing should lenders be to supply loans, and leverage should be higher.

Highly levered companies are more likely to pass up profitable investment opportunities (Myers (1977)). Therefore, firms expecting high future growth should use a greater amount of equity finance. As suggested in Myers (1977), we use the ratio of the market value of assets to the book value of assets as a proxy for growth opportunities.

The effect of size on equilibrium leverage is more ambiguous. Larger firms tend to be more diversified and fail less often, so size (computed as the logarithm of net sales) may be an inverse proxy for the probability of bankruptcy. If so, size should have a positive impact on the supply of debt. However, size may also be a proxy for the information outside investors have, which should increase their preference for equity relative to debt.

There are again conflicting theoretical predictions on the effects of profitability on leverage. Myers and Majluf (1984) predict a negative relationship, because firms will prefer to finance with internal funds rather than debt. Jensen (1986) predicts a positive one if the market for corporate control is effective and forces firms to commit to paying out cash by levering up. If it is ineffective, however, managers of profitable firms prefer to avoid the disciplinary role of debt, which would lead to a negative correlation between profitabil-

[26] For instance, the magnitude of nondebt tax shields other than depreciation is not available, there are too few observations to get a meaningful measure of earnings volatility, and advertising expenditure and R&D expenditure are rarely reported separately (and they are often capitalized).

ity and debt. On the supply side, suppliers should be more willing to lend to firms with current cashflows. We measure profitability as cashflow from operations normalized by the book value of assets.

Finally, there is the possibility that the correlations may stem from perceived mispricing. For instance, if firms typically issue stock when their price is high relative to book value (see Korajczk, Lucas, and McDonald (1991), Jung, Kim, and Stulz (1994) for evidence of this kind of behavior in the United States; and Loughran, Ritter, and Rydqvist (1994) for other countries) one might observe a negative correlation between the market-to-book ratio and leverage. We will discuss some of these possibilities in what follows.

B. Factor Correlations in the United States

The basic regression we estimate is

$$\text{Leverage[Firm } i] = \alpha + \beta_1 \text{ Tangible Assets}_i + \beta_2 \text{ Market to Book Ratio}_i + \beta_3 \text{ Log Sales}_i + \beta_4 \text{ Return on Assets}_i + \varepsilon_i$$

We use two measures of leverage based on the adjusted debt to capitalization ratio in 1991. When equity is measured at book value, we term the measure *book leverage* and we report the regression coefficients in Table IX, Panel A. The second measure is *market leverage* where the market value of equity is used in computing capitalization. Estimated coefficients are in Table IX, Panel B. All the regressors are four year averages (1987–1990) of the corresponding variables.[27] The coefficients are estimated using a censored Tobit model.[28]

It is not surprising that all the coefficients for U.S. firms have the sign found in previous work (see Harris and Raviv (1991)), and are significant at the 1 percent level. A one standard deviation increase in tangibility, the market-to-book ratio, log of sales, and profitability change book leverage by 23, −37, 23, and −11 percent of its standard deviation respectively.[29] Column (i) in Table IX, Panel B shows that all the coefficients retain their expected sign when the dependent variable is market leverage.[30]

[27] We average the explanatory variables to reduce the noise and to account for slow adjustments. We lag the explanatory variables one period to reduce the problem of endogeneity. Summary statistics on the variables for each country are available from the authors.

[28] In some cases the adjustment generates a negative value of leverage. To eliminate outliers we truncate the sample at −1. For this reason we compute Tobit regressions. The ordinary least squares (OLS) results are very similar.

[29] We measure the effect of changes on the latent variable.

[30] It is possible that some of the partial correlations may obtain because the explanatory variables are correlated with some firm specific omitted variables. Given the parsimony of our specification, it is important that we test for this by estimating an OLS regression of the first differences of the dependent variable (book leverage in 1991 less book leverage in 1986) against the first differences of the explanatory variables (we subtract the 1982–1985 average from the 1987–1990 average of the variable). All the coefficients have the same sign as in the levels regression. Also, we check whether between industry variations or within industry variations are largely driving the estimates. For the "between" estimation, observations are the average in the

Table IX

Factors Correlated with Debt to Book and Market Capital

The dependent variable is book leverage which is adjusted debt to adjusted debt plus book value of adjusted equity in 1991. Tangibility is the ratio of fixed assets to the book value of total assets. Market-to-book is the ratio of the book value of assets less the book value of equity plus the market value of equity all divided by the book value of assets. Logsale is the logarithm of net sales. Profitability is EBITDA divided by book value of assets. All the explanatory variables are four year averages (1987–90). Standard errors are in parentheses. The regression includes an intercept whose coefficient is not reported. The regression is estimated using maximum likelihood and a censored Tobit model. The estimated model is: $\text{Leverage}_{[\text{Firm i}]} = \alpha + \beta_1 \text{ Tangibility}_i + \beta_2 \text{ Market-to-book Ratio}_i + \beta_3 \text{ Log Sales}_i + \beta_4 \text{ Profitability}_i + \epsilon_i$.

Country Variable	United States	Japan	Germany	France	Italy	United Kingdom	Canada
Panel A: Book Capital							
Tangibility	0.50***	1.41***	0.42**	0.53**	0.36	0.41***	0.26***
	(0.04)	(0.18)	(0.19)	(0.26)	(0.23)	(0.07)	(0.10)
Market-to-book	−0.17***	−0.04	−0.20***	−0.17**	−0.19	−0.13***	−0.11***
	(0.01)	(0.04)	(0.07)	(0.08)	(0.14)	(0.03)	(0.04)
Logsale	0.06***	0.11***	−0.07***	0.02	0.02	0.026***	0.08***
	(0.01)	(0.02)	(0.02)	(0.02)	(0.03)	(0.01)	(0.01)
Profitability	−0.41***	−4.26***	0.15	−0.02	−0.16	−0.34	−0.46**
	(0.1)	(0.60)	(0.52)	(0.72)	(0.85)	(0.30)	(0.22)
Number of observations	2079	316	175	117	96	522	264
Pseudo R^2	0.21	0.29	0.12	0.12	0.05	0.18	0.19
Panel B: Market Capital							
Tangibility	0.33***	0.58***	0.28*	0.18	0.48**	0.27***	0.11
	(0.03)	(0.09)	(0.17)	(0.19)	(0.22)	(0.06)	(0.07)
Market-to-book	−0.08***	−0.07***	−0.21***	−0.15**	−0.18*	−0.06**	−0.13***
	(0.01)	(0.02)	(.06)	(0.06)	(0.11)	(0.03)	(0.03)
Logsale	0.03***	0.07***	−0.06***	−0.00	0.04	0.01	0.05***
	(0.00)	(0.01)	(0.02)	(0.02)	(0.03)	(0.01)	(0.01)
Profitability	−0.6***	−2.25***	0.17	−0.22	−0.95	−0.47**	−0.48***
	(0.07)	(0.32)	(0.47)	(0.53)	(0.77)	(0.24)	(0.17)
Number of observations	2207	313	176	126	98	544	275
Pseudo R^2	0.19		0.14	0.28	0.12	0.19	0.30

*, **, and ***, significant at the 10, 5, and 1 percent level, respectively.

two-digit Standard Industrial Classification industry. In the 'within' estimation, observations are differences from the industry means. From the magnitude of the coefficients (estimates not reported), in the United States tangibility, the market to book ratio, and size seem to be proxy for both the industry the firm is in, and idiosyncratic characteristics of the firm itself. Interestingly, the negative relationship between profitability and leverage appears to be specific to the within-industry regression. For the between industry regression, the coefficient is positive.

C. Cross-Sectional Correlations in International Data

Rather than examine each country separately, we outline broad patterns across countries, and then draw attention to exceptions.[31] Tangibility is always positively correlated with leverage in all countries (both for the book leverage and market leverage regressions). The market-to-book ratio enters with a negative coefficient in all countries, and is always significant at conventional levels in the market leverage regressions. Interestingly, market-to-book seems to both have a between industry component and a within industry component (estimates not reported). So the idiosyncratic component of the market-to-book ratio for a firm matters as much as the industry market-to-book.

Size is positively correlated with leverage except in Germany where it is negatively correlated. Recall from Table III, Panel C that the largest quintile of firms in Germany had much lower median leverage than the smallest quintile, so this correlation is not simply driven by outliers. The correlation continues to hold in within industry regressions suggesting that this is not simply an industry effect. Finally, profitability is negatively correlated with leverage in all countries except Germany. It is economically insignificant in France.

Overall, the factors found to be correlated with leverage in the United States appear to be similarly correlated in other countries as well. These factors explain, on average, about 19 percent of the cross-sectional variation in other countries (the explanatory power ranges from 5 to 30 percent, with higher explanatory power in general for the market leverage regressions). This suggests that the observed correlations are not completely spurious. However, we know that the relationship between the theories and the empirical proxies is, at best, weak. Therefore, before concluding that the existing theories have significant power in explaining capital structure, we should examine these correlations more carefully.

D. What is Behind these Factors?

D.1. Tangibility

The similarity in correlations across countries may actually be a cause for concern about our understanding of the theoretical underpinnings of those factors. For instance, an important factor seems to be the ratio of fixed to total

[31] Early attempts to explore the cross sectional determinants of capital structure in different countries were undertaken by Remmers, *et al.* (1974) and Stonehill, *et al.* (1975). Both studies analyze a sample of large firms from four selected industries in five countries (United States, Japan, France, Norway, and The Netherlands) in the period 1966–1972. They find that industry and firm size are not important determinants of leverage, while profitability and firm growth generally are. Toy *et al.* (1974) also conduct a survey on the objective of financial executives in different countries. Although their limited sample prevents from wide generalization, it is interesting to mention some of their findings. In all the countries managers think about capital structure targets in book value (and not in market value) terms. Furthermore, their main goal appears to be guaranteeing the financial stability of their company and the availability of funds needed rather than maximizing shareholders' value.

assets (which we call "tangibility"). The rationale underlying this factor is that tangible assets are easy to collateralize and thus they reduce the agency costs of debt. Berger and Udell (1994) show that firms with close relationships with creditors need to provide less collateral. They argue this is because the relationship (and more informed monitoring by creditors) substitutes for physical collateral. If so, we should find tangibility mattering less in the bank-oriented countries. While cautioning the reader about the obvious caveats that accompany comparisons of coefficient estimates across countries, it is interesting to note that a standard deviation increase in tangibility increases book leverage by about 20 percent of its standard deviation in all countries except Japan where it increases leverage by 45 percent (we check that the coefficient estimate is not influenced by outliers). A possible explanation comes from the market leverage regressions where the importance of tangibility in Japan is not very different from its importance in other countries. Perhaps Japanese firms with fixed assets such as land could borrow more over the 1980s because the collateral value of the land appreciated (and the appreciation was not reflected in the book value). So on a market basis, firms with a lot of fixed assets are not highly levered. But it is still puzzling if tangibility is only as important in Japan as elsewhere for the apparently stronger bank-firm relationships in Japan should imply a lesser role for tangibility.

D.2. Market-to-Book

The theory predicts that firms with high market-to-book ratios have higher costs of financial distress which is why we expect a negative correlation. There may be other potential reasons for why the market-to-book ratio is negatively correlated with leverage. For instance, the shares of firms in financial distress (high leverage) may be discounted at a higher rate because distress risk is priced (as suggested by Fama and French (1992)). If this is the dominant explanation, the negative correlation should be driven largely by firms with low market-to-book ratios. In fact, the negative correlation appears to be driven by firms with high market-to-book ratios rather than by firms with low market-to-book ratios. It is unlikely that financial distress is responsible for the observed correlation.[32]

Another reason for the market-to-book ratio to be negatively correlated with book leverage stems from the tendency for firms to issue stock when their stock price is high relative to earnings or book value. This would imply that the correlation between the market-to-book ratio and leverage is driven by firms

[32] We estimate a piecewise linear relationship between book leverage and the market to book ratio for firms in the United States. We estimate different slopes for the five different quintiles of the market to book ratio, constraining the functional relationship to be continuous. The results clearly indicate that the negative relationship is driven by firms with high market to book ratios rather than firms with low market to book ratios. In fact, for firms with a low market to book ratio, the relationship between leverage and market to book is weakly positive. This pattern holds in four of the other six countries with the average slope of the top two quintiles being lower than the slopes of the bottom two quintiles.

who issue lots of equity. We determine the amount of equity issued by a firm (net of repurchases) in the period 1986–1991 and divide firms into quartiles on this basis. We then estimate the standard book leverage regression within each quartile.

The negative correlation of market-to-book with leverage seems to be driven mainly by large equity issuers. In the United States the magnitude of the coefficient on the market-to-book ratio is thrice as large in the quartile issuing the most ($\beta = -0.30, t = -7.90$) as in the quartile issuing the least ($\beta = -0.09$, $t = -1.86$) and the difference is statistically significant. This result is not special to the United States. In Japan, United Kingdom, and Canada, market-to-book is more negatively correlated with leverage for firms issuing the most ($\beta_{\text{Japan}} = -0.74, t = -4.8, \beta_{\text{UK}} = -0.18, t = -1.83, \beta_{\text{Canada}} = -0.16, t = -1.28$) than for firms issuing the least ($\beta_{\text{Japan}} = -0.25, t = -1.48, \beta_{\text{UK}} = -0.14, t = -1.61, \beta_{\text{Canada}} = -0.12, t = -0.49$), though the difference in coefficients is significant only in Japan.[33]

From a theoretical standpoint, this evidence is puzzling. If the market-to-book ratio proxies for the underinvestment costs associated with high leverage, then firms with high market-to-book ratios should have low debt, independent of whether they raise equity internally via retained earnings, or externally. An alternative explanation suggested by the above evidence is that firms attempt to time the market by issuing equity when their price (and hence, their market-to-book ratio) is perceived to be high. Thus, these firms have temporarily low leverage. Evaluating the importance of each explanation is a task for future research.

D.3. Size

Size may be a proxy for the (inverse) probability of default. If so, it should not be strongly positively related with leverage in countries where costs of financial distress are low. Some economists such as Sheard (1989) and Hoshi, Kashyap, and Scharfstein (1990b) have suggested that Japanese firms tied to a main bank may face a lower cost of financial distress because the main bank organizes corporate rescues. Yet size is important in Japan; a standard deviation increase in size increases book leverage by 33 percent of its standard deviation (compared to 23 percent in the United States).[34] This suggests that size does not simply proxy for a low probability of default. Another argument against the association of size with low expected costs of financial distress is that firms tend to be liquidated more easily in Germany. Under the assumption that liquidation is very costly, small firms should be especially wary of

[33] It is interesting that we find these correlations because there is a mechanical reason why we should not. The issue of equity moves the post-issue market to book ratio towards one. So for firms issuing a lot, we will tend to find bunching in the market to book ratios and less significant correlations.

[34] One might argue that size is a proxy for whether a firm belongs to a main bank group; but the average capitalization of group and nongroup firms in Hoshi, Kashyap, and Scharfstein (1990b) is approximately the same, suggesting it is not.

debt in Germany. However, large firms have substantially less debt than small firms in Germany.

An alternative argument for size is that informational asymmetries between insiders in a firm and the capital markets are lower for large firms. So large firms should be more capable of issuing informationally sensitive securities like equity, and should have lower debt. Unfortunately, this neither squares with the negative correlation between size and leverage observed for most countries, nor is it true that large firms issue more. In all four countries for which we have flow of funds data, net equity issuances by firms in the largest size quartile is significantly less over the period 1986–1991 (as a fraction of the market value of assets in 1985) than for firms in the smallest size quartile. A similar result is true when we consider gross equity issues (i.e., without netting out repurchases). We have to conclude that we do not really understand why size is correlated with leverage.

D.4. Profitability

Finally, profitability is negatively correlated with leverage. If in the short run, dividends and investments are fixed, and if debt financing is the dominant mode of external financing, then changes in profitability will be negatively correlated with changes in leverage. As we have just noted, large firms tend to issue less equity. The negative influence of profitability on leverage should become stronger as firm size increases.

This is indeed the case for firms in the United States. For firms in the smallest size quintile a unit increase in profitability decreases leverage by -0.26. For firms in the largest quintile, a unit increase in profitability decreases leverage by -1.09, over 4 times the effect as that for the smallest quintile (and significantly different). The relationship across quintiles is nearly monotonic; the negative effect of earnings on leverage is considerably more important for large firms.

Of course, as already discussed, we do not quite understand why large firms are reluctant to issue equity. Furthermore, there may be other forces at work, and we cannot at present disentangle them. For instance, profitability for small firms may proxy for both the amount of internally generated funds and the quality of investment opportunities, which have opposing effects on the demand for external funds (debt). Looking at other countries, the leverage of larger firms is considerably more negatively correlated with profitability than for small firms in Japan, Italy, and Canada, while in the United Kingdom it is more positively correlated. There is no relationship in Germany and France. One explanation for why the United Kingdom differs so much from the United States may be that the dominant source of external finance in the United Kingdom is equity. So firms that are profitable and have few investment opportunities (i.e., large firms) will reduce equity issues drastically. These firms will have a more positive correlation between leverage and profitability. By contrast, if profitability is also correlated with the investment opportunities

small firms have, then an increase in profitability may lead to greater equity issuances, reducing the correlation between profitability and leverage.[35]

V. Conclusions

We find that, at an aggregate level, firm leverage is more similar across the G-7 countries than previously thought, and the differences that exist are not easily explained by institutional differences previously thought important. The factors identified by previous cross-sectional studies in the United States to be related to leverage seem similarly related in other countries as well. However, a deeper examination of the United States and foreign evidence suggests that the theoretical underpinnings of the observed correlations are still largely unresolved.

We believe that our work suggests two lines for future research. On the one hand, it is necessary to strengthen the relationship between theoretical models and empirical specifications of those models. This, we believe, will be possible only with more detailed data which will enable us to identify more accurate proxies. On the other hand, a deeper understanding of the effects of institutional differences is necessary. These two research issues are related. Only through a better understanding of the actual determinants of capital structure decisions can we think of designing tests to uncover the possible impact of the institutional environment. Conversely, a better understanding of the influence of institutions can provide us enough inter-country variation so as to enable us to identify the fundamental determinants of capital structure.

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[35] Firms in the United Kingdom above the median in size are much more reluctant to issue equity if above the median in profitability (median equity issue from 1985–1991 is 0.44 of equity value in 1985) than if below (median equity issue from 1985–1991 is 0.73 of equity value in 1985). Conversely, firms below the median in size are much more willing (able) to issue equity if above the median in profitability (median equity issue from 1985–1991 is 0.41 of equity value in 1985) than if below (median equity issue from 1985–1991 is 0.24 of equity value in 1985).

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