The Determinants of Capital Structure: Capital Market Oriented versus Bank Oriented Institutions

Antonios Antoniou, Yilmaz Guney, and Krishna Paudyal*

***Forthcoming*: Journal of Financial and Quantitative Analysis**

* A. Antoniou, antonios.antoniou@durham.ac.uk, Centre for Empirical Research in Finance, Durham Business School, Durham University, Mill Hill Lane, Durham, DH1 3LB; Y. Guney, y.guney@hull.ac.uk, University of Hull, Hull, HU6 7RX; K. Paudyal, k.n.paudyal@durham.ac.uk, Centre for Empirical Research in Finance, Durham Business School, Durham University, Mill Hill Lane, Durham, DH1 3LB. This is a revised and extended version of previous working paper circulated under the title '*Determinants of Corporate Capital Structure: Evidence from European Countries*'. We would like to thank Paul H. Malatesta (the managing editor) and an anonymous referee for very helpful comments and suggestions. We also like to thank Gioia Pescetto for valuable comments. Any remaining errors are our own.

The Determinants of Capital Structure: Capital Market Oriented versus Bank Oriented Institutions

Abstract

The paper investigates how firms operating in capital market oriented economies (the United Kingdom and the United States) and bank oriented economies (France, Germany and Japan) determine their capital structure. Using panel data and a two-step system-GMM procedure, the paper finds that the leverage ratio is positively affected by the tangibility of assets and the size of the firm, but declines with an increase in firm profitability, growth opportunities and share price performance in both types of economies. The leverage ratio is also affected by the market conditions in which the firm operates. The degree and effectiveness of these determinants are dependent on the country's legal and financial traditions. The results also confirm that firms have target leverage ratios, with French firms being the quickest in adjusting their capital structure towards their target level, and the Japanese are the slowest. Overall, the capital structure of a firm is heavily influenced by the economic environment and its institutions, corporate governance practices, tax systems, the borrower-lender relationship, exposure to capital markets, and the level of investor protection in the country in which the firm operates.

Keywords: Dynamic capital structure, leverage, panel data, GMM.

JEL Classifications: G20, G32.

The Determinants of Capital Structure: Capital Market Oriented versus Bank Oriented Institutions

I. Introduction

In spite of extensive research, Myers' (1984) classic question "How do firms choose their capital structure?" remains unanswered. The trade-off theory postulates that optimal capital structure involves balancing the corporate tax advantages of debt financing against the costs of financial distress that arise from bankruptcy risks (Kraus and Litzenberger, 1973) and agency costs (Jensen and Meckling, 1976). The empirical support for this theory, however, is far from conclusive. For instance, while Bradley, Jarrel and Kim (1984) find no clear evidence, Trezevant (1992) find support for this theory. The inclusion of personal taxation (Miller, 1977) and non-debt tax shields (DeAngelo and Masulis, 1980) has made the debate even more complex. Later, in the early 1980s theories based on asymmetric information joined the debate (Myers, 1984).

The pecking order theory based on informational asymmetry suggests that firms do not have leverage targets. They use debt only when retained earnings are insufficient and raise external equity capital only as a last resort. More recent models of capital structure choice include 'windows of opportunity' and 'managerial optimism' (Heaton, 2002). Baker and Wurgler (2002) suggest that managers could minimize the cost of capital by timing the market (issuing equity when share prices increase) implying that market conditions influence the pecking order. However, Hovakimian (2006) shows that the timing of equity issuance does not have any significant long-lasting impact on capital structure. In a quest for the factors that managers consider in deciding the financing mix of a firm, many studies have examined the role of several firm-specific factors. In a review article, Harris and Raviv (1991) report that leverage is positively related to non-debt tax shields, firm size, asset tangibility, and investment opportunities, while it is inversely related to bankruptcy risk, research and development expenditure, advertising expenditure, and firm's uniqueness. In general, major studies so far have analyzed the role of firm-specific factors that represent taxation, agency costs and information asymmetries.

Previous studies have left at least two major gaps in the literature. Firstly, there are virtually no studies dedicated to the analysis of the implications of the financial orientation of the economy.[1]

---

[1] Nearest to this study is Rajan and Zingales (1995) who report international evidence and pave the way for comparative analysis of capital structure decisions in various countries. However, no study, to our knowledge,

However, an understanding of the implications of the traditions of capital market oriented and bank oriented economies on the capital structure decision is important because they have direct implications on the sources of funds available to the corporate sector. It is particularly important in the light of extant literature that shows the environment in which the firms operate differs across countries (see, for instance, Ball, Kothari and Robin, 2000). Therefore, the lessons learned from one environment cannot be generalized to countries with different legal and institutional traditions.[2] This paper bridges this gap by analyzing the determinants of capital structure in the G5 countries, which have different financial and institutional traditions. These countries include examples of capital market oriented economies with high transparency and investor protection, the U.S.A. and the U.K., and bank oriented economies with lower transparency and investor protection, France, Germany and Japan.

Secondly, empirical studies generally concentrate on identifying the firm specific factors that managers should consider in making the capital structure choice, while they ignore the possible implications of macroeconomic conditions that could affect the choice of financing mix. This paper controls for the possible implications of such factors on capital structure decisions. In addition, it is apparent that the role and strength of factors influencing firms' capital structure decisions do change over time. Hence, a cross sectional analysis of leverage ratios alone would not be sufficient for a clear understanding of the dynamic aspects of its determinants. It is important to analyze whether corporations react to new circumstances that occur in financial markets and how quickly they revert to their target capital structure when moved away by random events. Thus, this paper extends the literature by incorporating a more dynamic perspective on models of leverage. This is achieved by analyzing panel data using a two-step system-GMM procedure.[3]

---

explicitly compares the cases of bank oriented and capital market oriented economies and incorporates a comprehensive set of possible determinants as the model in the paper.

[2] Examples of such differences include companies operating in capital market oriented economies (such as the U.S.A. and the U.K.) are known to have lower level of leverage than firms operating in bank based economies (such as Japan and Germany). Agency costs and indirect bankruptcy costs are also known to be higher in Anglo-Saxon countries due to arms' length relation between creditors and borrowers (Edward and Nibler, 2000). Therefore, the role and strength of various determinants of leverage are likely to depend on the economic environment of the country in which the firms operate.

[3] Studies that examine some form of dynamic perspective in capital structure include Fischer, Heinkel and Zechner (1989) and Marsh (1982).

The results reveal considerable similarities and differences in the determinants of capital structures of firms operating in capital market oriented and bank oriented economies.[4] A positive effect of firm size and inverse impact of growth opportunities, term-structure of interest rates and share price performance on leverage is found in all sample countries. However, the impacts of asset tangibility, equity premium, profitability and the effective tax rate vary across countries, suggesting that differences in their institutional arrangements and traditions may contribute to the capital structure decisions of firms. The factors that were identified in earlier studies are found to be more relevant for firms operating in capital market oriented economies than for firms operating in bank oriented economies. These findings confirm that: (i) the lessons learned from the experience of a particular type of economy cannot necessarily be generalized to firms operating in other types of economies; and (ii) in deciding on a firm's financing mix, managers consider not only firm specific factors but also general market conditions. Finally, firms appear to have target leverage ratios but the speed at which they adjust their capital structure towards the target varies by country, with French firms being the fastest and Japanese the slowest.

The rest of the paper is organized as follows. The next section identifies the factors that affect the capital structure choice of firms and develops the hypotheses. The sample, estimation methods and their robustness are discussed in section 3. Section 4 analyzes the empirical results. Finally, section 5 concludes the paper.

II. Theories and Hypotheses Development

Based on the institutional set-ups and economic traditions, the sample countries are grouped into two categories, namely capital market oriented (the United States and the United Kingdom) and bank oriented (Germany, Japan and France).[5] This section identifies the firm specific factors and the market

---

[4] Whilst there are several merits in comparing international experiences, as correctly noted by Rajan and Zingales (1995), comparisons of firm-level accounting data across countries are not free from limitations. Although the harmonization in accounting standards and practices has improved in recent years and Datastream (our data source) attempts to standardize company accounts to facilitate international comparisons, the comparability problems cannot be undermined. Therefore, the results should be interpreted with some caution.

[5] Table 1 summarises the major institutional factors in sample countries. For most legal and institutional provisions the United States and Germany represent the two extremes of the spectrum. Therefore, the role of various factors and the magnitude of their effects on capital structure choice of firms is likely to vary across the countries and more so between the United States and Germany. A comparative analysis of institutional set-ups in sample countries is available in the working paper version of the paper.

related factors (control variables) that are potentially responsible for determining the leverage ratio of a firm. To examine the robustness of the results, two different measures of leverage are used, namely book-leverage and market leverage. All variables used in this study, namely dependent, explanatory and control variables, are defined in Appendix B.

A. Firm Characteristics and Leverage

Several studies have examined the role of firm specific factors on the capital structure decision.[6] Both the pecking order and the free cash-flow theories suggest that a firm's *profitability* affects its financing mix. The former states that firms prefer to finance new investments from retained earnings and raise debt capital only if internal resources are insufficient, while issuing equity is the least favored option. As the ability to retain earnings depends on profitability, we expect an inverse relation between leverage and profitability. Rajan and Zingales (1995), among others, empirically confirm this prediction. Jensen (1986) shows that agency costs increase with free cash flow. However, debt may reduce the agency cost of free cash flow by ensuring that managers are disciplined, make efficient investment decisions, and do not pursue individual objectives as this increases bankruptcy risk (Harris and Raviv, 1990). Increases in debt ratio also signal quality, and that lenders are prepared to lend. Therefore, the free cash flow theory implies a positive relation between leverage and profitability. In order to avoid the dilution of their ownership structure, closely held or family owned firms prefer not to raise external equity. The firms in bank-based countries (especially Germany and France) are closely held, while the corporate ownership in market-based nations is less concentrated (Table 1). Therefore, we expect a stronger effect of profitability on the capital structure of the firms operating in continental European nations than those operating in the Anglo-Saxon countries.

Table 1 about here

A negative relationship is expected between *growth opportunities* and leverage for two main reasons. Firstly, according to the trade-off theory, the cost of financial distress increases with expected growth forcing the managers to reduce the debt in their capital structure. Secondly, in the presence of information asymmetries, firms issue equity, instead of debt, when overvaluation leads to higher expected growth. However, internal resources of growing firms may not be sufficient to finance their positive NPV investment opportunities and hence they may have to raise external capital. If firms require

[6] Appendix C summarizes the relationship between capital structure and its determinants found in the literature.

external finance, they issue debt before equity according to the pecking order theory. In this case, growth opportunities should be positively associated with leverage. Due to the differences in disclosure practices and lender-borrower relations in the companies operating in bank-based and market-based countries, the role of growth opportunities is likely to vary across nations. It is anticipated that growth opportunity should have a stronger negative coefficient in capital market oriented economies than in bank oriented economies.

In the case of bankruptcy, *tangible assets* are more likely to have a market value, while intangible assets will lose their value. Therefore, the risk of lending to firms with higher tangible assets is lower and hence lenders will demand a lower risk premium. Furthermore, a firm's opportunity to engage in asset substitution can be reduced by secured debt (Stulz and Johnson, 1985), which reduces agency costs and hence the cost of borrowing. This suggests a positive relationship between leverage and the tangibility of assets. Since the need for collateral is more pronounced in traditional bank lending, the role of asset tangibility is expected to be more prominent in bank oriented economies. It is generally accepted that *firm size* is an inverse proxy of the probability of bankruptcy and hence larger firms have higher debt capacity and may borrow more to maximize their tax benefits. Due to lower information asymmetry, larger firms are likely to have easier access to debt markets, and be able to borrow at lower cost, irrespective of the type of economy's orientation, bank or market. Therefore, a positive relation is anticipated between leverage and firm size in all countries.

The gains from borrowing increase with the rate of tax. Therefore, a positive relationship between the *effective tax rate* and leverage is expected. However, the implication of tax on capital structure choice depends upon the tax policy objectives especially when the tax system is designed to favor the retention of earnings against dividend payout, or vice versa. For instance, the German tax system favors payout against retention, discouraging internal equity. Similarly, the split rate system of Japan favors dividends against retention. On the other hand, the French system encourages retention, reducing the need for external finance. Until 1997 the British tax system favored dividend payments, especially when the shares were owned by tax exempt institutions. Thus, the importance of this factor to corporate managers should vary across nations. The trade-off theory implies that a major borrowing incentive is the tax advantage of interest payment. However, DeAngelo and Masulis (1980) argue that tax deductions for depreciation and investment tax credits can be considered as substitutes for tax benefits of debt financing. These features can lead to a market equilibrium, where each firm has an interior optimal leverage. Accordingly, firms with higher amount of *non-debt tax shields* will have lower debt levels. Therefore, firms' motivation to borrow declines with increase in non-debt tax shields.

Firms with high *earnings volatility* carry a risk of earnings level dropping below their debt servicing commitments. Such eventuality may result in rearranging the funds at high cost or face

bankruptcy risk. Therefore, firms with highly volatile earnings should have lower debt capital. This particularly holds for firms operating in capital market oriented economies with arms-length relations between lenders and borrowers. However, firms operating in bank oriented markets have close ties with lenders. This, in turn, reduces the effective costs of failure to service debt. Therefore, the American and the British firms are expected to be more concerned with earnings volatility than their German and Japanese counterparts.

The *dividend payout ratio* is likely to play a prominent role in the financing-mix decision mainly because of market imperfections.[7] Based on agency and transactions costs arguments Rozeff (1982) predicts an inverse relation between dividend payout and leverage. On the other hand, Chang and Rhee (1990) theoretically prove and empirically confirm that when the effective capital gain tax rate is lower than the dividend tax rate, firms with high payout ratios are likely to borrow more than firms with low payout ratio. However, if increased dividends signal increased future earnings then the firm's cost of equity will be lower, favoring equity to debt. This implies a negative relation between leverage and payout ratio. The effect of dividend policy on capital structure is also likely to be influenced by country specific institutional factors that are beyond the control of the firm. For instance, owing to dispersed share ownership the signaling value of dividend should be higher in the U.S. and the U.K. than in Germany, France and Japan where share ownership is concentrated and/or firms have close ties with their lenders. Moreover the tax provisions affect the payout policy, which in turn affects the financing mix. Thus, the direction and significance of the relation between financing mix and payout policy should depend on the net impact of information asymmetries, agency costs, ownership structure, and tax laws of the country in which the firm is operating.

Share price performance is another factor that mangers are likely to consider while making a capital structure decision. Information asymmetries between managers and outside investors force managers to sell equity at a discount according to the pecking order theory. Managers offer such a discount when the benefit of raising external equity capital outweighs the cost of the discount. When shares are overvalued a discount could be offered without any real loss in the wealth of existing shareholders. This is possible if equity is issued after an increase in share price due to overvaluation. This suggests an inverse relationship between share price performance and leverage ratio. However, such an inverse relationship with market leverage may be observed due to statistical distortions as the market value of equity increases with the increase in share price even if there has not been any further equity issue. But, the book leverage ratio is independent of this effect. Therefore, the effects on these two

[7] It is also possible that the dividend payout is endogenous to the capital structure decision. We control for such possibility in our empirical models.

measures taken together should reveal the cause and the nature of the relationship between leverage and changes in share price.

B. Control Variables

If a firm requires external capital at the time of high *market equity premium* the managers are likely to opt for debt. This suggests a positive relationship between leverage ratio and market equity premium. However, if the observed high equity premium is due to overconfidence of investors driving equity prices up, the managers are likely to issue equity. This indicates an inverse relation between equity premium and leverage. Therefore, the effect of equity premium on leverage depends on the source of variation in equity premium. At times when long-term interest rates are expected to rise, managers are less likely to opt for debt. Thus, the *term structure of interest rate* is expected to have an inverse relation with the level of leverage. Due to their private interests, managers do not want their company to be acquired and hence look for ways to deter a potential predator. Agency theory based models (for example, Jensen 1986) suggest that firms with surplus debt capacity may become potential targets. To avoid such risk, managers are likely to borrow more when the market for mergers and acquisitions, *M&A activity*, is particularly active. This suggests a positive relation between book-leverage and M&A activity. However, M&A activity is positively related to booming stock markets, and when stock markets are booming a firm's market leverage declines due to an increase in the market value of its equity. This counteracts the expected positive relationship just stated. Therefore, the sign of the coefficient of M&A activity is dependent on both the measure of leverage, and the strength of the effect.

C. Target Leverage and Speed of Adjusting

The trade off theory suggests that firms have a target capital structure and managers adjust the ratios towards this target. The speed of adjustment depends on the cost of adjustment relative to the cost of being off target (see, Hovakimian, Opler and Titman, 2001). An examination of the effect of a one period *lagged leverage* on the current leverage should shed light on whether firms have a target capital structure and, if so, what is the speed of adjustment. A positive and below unity coefficient would suggest that firms have a target leverage ratio and revise their capital structure overtime. A coefficient greater than one implies that firms do not have any target debt-equity ratio.

III. Sample and Methodology

A. The Sample

The selection of sample countries is motivated by the existence of distinct financial and institutional traditions prevailing in the five major economies of the world – France, Germany, Japan, the United Kingdom and the United States. On the basis of their financial and institutional traditions, these countries could be categorized into two groups: (i) market-based economies (the United States and the United Kingdom), and (ii) bank-based economies (Germany, Japan and France). These two groups also coincide with the split between common law and code law countries, respectively. The sample comprises of all non-financial firms, including dead firms, traded in the major stock exchanges of the sample countries. The choice of sample period, from 1987 to 2000, is guided by the availability of data and the objective of maintaining the same period for all countries to allow for comparability. We use dynamic models of estimation that require at least three consecutive annual observations. Furthermore, at least five consecutive observations are required for diagnostics to be robust (see Arellano and Bond, 1991). Therefore, firms with less than five consecutive annual observations and missing variables are excluded from the sample. The final sample is comprised of 4,854 firms (244 French, 479 German, 1,442 Japanese, 1,562 British and 1,127 American) with 57,134 firm-year observations (2,513 for France, 5,744 for Germany, 18,963 for Japan, 16,363 for the UK and 13,551 for the US).[8]

Unless otherwise stated, all data are obtained from Datastream. Data on Mergers & Acquisitions activities in each country are downloaded from SDC platinum (Thomson Financial) database and measures of corporate governance for each sample country are obtained from La Porta, Lopez-de-Silanes, Shleifer and Vishny (1997, 1998). Table 2 reveals that, on average, Japanese firms have the highest book and market leverage ratios, 30.1% and 32.3% respectively, while British firms borrow the least, 17.9% and 21.3%, respectively. French and American firms follow Japanese firms closely. Among the Europeans, the relatively higher debt ratios of French and German firms confirm the view that companies in continental Europe borrow more than British firms. These observations are in line with the suggestion of Fukuda and Hirota (1996) that firms experiencing a strong main bank relationship have relatively high leverage ratios. On the other hand, the lower leverage ratios of American and British firms emphasize the managerial preference for equity capital. Such preference is possibly due to the dispersed share ownership and the firm's arm's length relation with their lenders. These observations indicate that the financial traditions in which the firms operate affect the level of borrowing. Firms

[8] See Appendix A for annual distribution of sample firms and observations.

operating in a system where the lenders and borrowers have close ties and face lower threat of bankruptcy borrow more. The standard deviations of the book leverage ratios show that they vary most across Japanese firms (19.1%), closely followed by German firms (18.9%), while they vary least among British firms (14.6%).

Table 2 about here

The market leverage ratios of French firms reveal a decreasing trend over the years while their book leverage ratios remain fairly stable.[9] On face value, the decreasing trend in market leverage may imply that France is moving towards a capital market oriented system. However, on closer observation, it is likely to be because of the high retention ratio (93.5%). Such strategy increases equity capital without affecting the ownership distribution. In Japan, the market leverage ratio has increased substantially and reached 44.8% in 2000 from its lowest level of 19.7% in 1990. Like in France, the book leverage ratio of Japanese firms has remained stable around 30%. The increasing trends of both measures of leverage for German firms suggest that they are raising more debt than equity. This further emphasizes the lenders oriented structure of German corporate sector. Book leverage in the United Kingdom is increasing steadily, while market leverage has high variability ranging from 15.0% in 1987, to 27.9% in 1990 and 23.8% in 2000. Such a high variation in market leverage could be attributed to the changes in market capitalization reflecting the fluctuations in the stock markets. Yet, the overall leverage ratio in the United Kingdom is lower than is other countries implying the importance of equity over debt financing. In contrast, both leverage ratios of U.S. firms are showing an increasing trend. The book (market) leverage ratio has increased from 25.7% (28.3%) in 1987 to 29.6% (32.0%) in 2000. In line with British firms, the market leverage ratios of American firms display a high variation corresponding to the fluctuations in stock market.

Consistent with the predictions of the pecking order theory, the correlation analysis reveals a negative association between both measures of leverage and profitability in all countries (not reported in table). Consistent with the theoretical reasons discussed in the previous section, the association between leverage and market-to-book ratio is negative in all cases. Similarly, except in Germany, both measures of leverage are found to be positively related to fixed assets and size in all the other countries. However, while revealing, these univariate analysis cannot provide a complete picture of the relation between the company features and their leverage ratios. Therefore, we model leverage as a function of several variables as described in the following sub-sections.

---

[9] In the interest of brevity these estimates are not reported, but are available on request.

B. The Model

Leverage is modeled as a function of various firm specific factors. The model controls for market conditions (see section 2). Panel data are used because this increases the degrees of freedom, reduces the possibility of collinearity among the explanatory variables, and consequently leads to more efficient estimates. As discussed by Devereux and Schiantarelli (1990), to construct a complete dynamic specification that allows for the possible effect of the AR-process on the stochastic term and the implications of adjustment costs, a one period lagged dependent variable ($Y_{i,t-1}$) is included in the model. Consider the autoregressive model:

$$(1) \qquad Y_{it} = \alpha_0 + \alpha_1 Y_{i,t-1} + \sum_{k=1} \gamma_k X_{k,it} + \mu_i + \eta_t + \varepsilon_{it}$$

where, Y_{it} is a measure of leverage[10] (book or market leverage) of firm *i* in year *t*; X represents the vector of explanatory variables; μ_i represents time-invariant unobservable firm-specific effects (e.g., management performance, reputation, capital intensity, etc.); η_t represents time-specific effects (e.g., stagflation, inflation rates, demand shocks), which are common to all firms and can change through time; α_0, is the constant; α_1, and γ_k are unknown parameters to be estimated. The time-varying disturbance term ε_{it} is assumed to be serially uncorrelated with mean zero and variance σ^2. The vector of explanatory variables, X, includes k factors, (k = 1, …, 12). These are measures of: (i) profitability, (ii) growth opportunities, (iii) tangibility of assets, (iv) firm size, (v) effective tax rate, (vi) earnings volatility, (vii) dividend payout, (viii) non-debt tax shields, (ix) share price performance, (x) equity premium, (xi) term-structure of interest rates, and (xii) M&A activity. These variables are defined in Appendix B. We also control for 15 industry groups effects (see Appendix D), using [0, 1] dummy variables.

C. Methods of Estimation

As summarised in Antoniou, Guney and Paudyal (2006), Hsiao (1985) suggests that the OLS estimation of equation (1) would result in biased coefficients because μ_i is not directly observable and is correlated with other regressors in the model. Furthermore, the correlation of $Y_{i,t-1}$ with μ_i would result in

[10] The dependent variable takes any value (*continuous)* between zero and one. All observations are positive, and the distribution is non-normal. Our statistical model considers this. It is established in the econometrics literature that GMM models are robust with respect to non-normality and heteroscedasticity (see, e.g., Arellano and Bond (1991); Blundell and Bond (1998)). For the same reason Korajczyk and Levy (2003), MacKay and Phillips (2005) and Mao (2003), among others, also use the GMM technique with the same type of dependent variable.

inconsistent estimates of coefficients. To overcome these problems, one could take the first differences of the variables and thereby eliminate time-invariant fixed effects (μ_i). However, the OLS estimators are still inefficient because of the correlation between $\Delta\varepsilon_{it}$ (i.e. ε_{it}-ε_{it-1}) and $\Delta Y_{i,t-1}$ (i.e. $Y_{i,t-1}$-$Y_{i,t-2}$) due to the correlation between $\varepsilon_{I,t-1}$ and $Y_{i,t-1}$. OLS specification assumes that all the explanatory variables are strictly exogenous. However, this is a naive presumption since the random events affecting the dependent variable are likely to influence the explanatory variables as well. To overcome this, Anderson and Hsiao (1982) propose an instrumental variables (IV) technique, where $\Delta Y_{i,t-2}$, or $Y_{i,t-2}$, can be used as instruments for $\Delta Y_{i,t-1}$. This is valid because $\Delta Y_{i,t-2}$, or $Y_{i,t-2}$, is correlated with $\Delta Y_{i,t-1}$ but not with $\Delta\varepsilon_{it}$. If ε_{it} is not serially correlated *per se,* the IV estimation results will be consistent. However, they might not be efficient estimators since the IV technique does not use all available moment conditions.

As an alternative solution, Arellano and Bond (1991) suggest using Generalized Methods of Moments (GMM). GMM uses additional instruments obtained by utilizing the orthogonal conditions that exists between the disturbances and the lagged values of the dependent variable. In general, one can find a GMM estimator of the true parameter by finding the elements of the parameter space which sets linear combinations of the sample cross products 'as close to zero as possible' (Hansen, 1982). Thus, the advantage of GMM stems from the fact that it optimally exploits all the linear moment restrictions specified by the model. It is argued in Antoniou, Guney and Paudyal (2006) that $E(\varepsilon_{it,}\varepsilon_{it-1})$ in equation (1) is not necessarily zero, but is assumed that $E(\varepsilon_{it,}\varepsilon_{it-2})$ is zero as the consistency of the GMM procedure is based on the absence of second-order correlation in differences and that of first-order correlation in levels. Assuming that the disturbances are not correlated, it is expected that $\Delta\varepsilon_{it}$ is orthogonal to the past history of the dependent variables (Y) and the explanatory variable (X), so that (Y_{it-2}, Y_{it-3},…., X_{it-2}, X_{it-3},….) can be used as valid instruments for $\Delta\varepsilon_{it}$. If ε_{it} follows an MA(1) process, the first valid instruments start from the third lag, not from the second, since the differenced disturbances follow an MA(2) process. As a result, it is essential to ensure that there is no higher-order serial correlation to have a valid set of instruments independent of the residuals. This can be investigated by using Sargan's test of over-identifying restrictions. This two-step GMM methodology can control for the correlation of errors overtime, heteroscedasticity across firms, simultaneity, and measurement errors due to the utilization of orthogonal conditions on the variance-covariance matrix.[11]

[11] Two-step GMM estimators, which use one-step residuals to construct asymptotically optimal weighting matrices, are more efficient than one-step estimators if the disturbances are expected to show heteroscedasticity in the large sample data with a relatively long time span. See Blundell and Bond (1998) for further discussion.

Although the GMM specification of the first differences (GMM-DIF) is superior to many other methodologies, recent studies in econometrics document that standard GMM-DIF estimator has a problem of weak instruments. As noted in Antoniou, Guney and Paudyal (2006), Arellano and Bover (1995) argue that the absence of information concerning the parameters in the level-variables causes substantial loss of efficiency in models estimated in first-differences using instruments in levels. Hence, they propose using instruments in first-differences for equations in levels and instruments in levels for equations in first-differences. Furthermore, Blundell and Bond (1998) document that the extended GMM (GMM-SYS) estimator of Arellano and Bover (1995) reveals dramatic efficiency gains, where the standard GMM-DIF estimator performs poorly (e.g. for short sample periods and persistent data). This is especially relevant when the coefficient of a lagged dependent variable approaches unity and when the ratio of variance(μ_i)/variance(ε_{it}) in equation (1) increases. Blundell and Bond (1998) further document that once lagged first-differenced and lagged levels instruments are included in the instrument set, one could reduce the finite sample bias substantially by exploiting the additional moment conditions in this approach. Their results show that the instruments used by the GMM-DIF estimator contain little information about the endogenous variables in first-differences, and that lagged first-differences are informative instruments for the endogenous variables in levels. Under GMM-SYS technique, the model is estimated in both levels and first-differences, as level equations are simultaneously estimated using differenced lagged regressors as instruments. In this way, apart from controlling for individual heterogeneity, variations among firms can partially be retained. For the reasons explained above the paper's examination of the determinants of corporate capital structure is based on the estimation of equation (1) using the GMM-SYS method.[12]

Although GMM-SYS is superior to many other methods some caveats are worth mentioning. For example, in most cases the two-step GMM-SYS estimates are more efficient than the first-step estimators. However, the superiority of the two-step estimators over the first-step is not always clear. Similarly, due to the absence of an optimal way of choosing the instrument set for GMM-SYS estimator it may lead to the 'many instruments' problem relative to the sample size.[13]

---

[12] To assess the applicability of the issues discussed in this section on the paper's data set, equation (1) has been estimated using OLS, Anderson-Hsiao type estimates, and GMM estimates in level and first difference. The diagnostic statistics suggest that these models do not provide efficient estimators and suffer from the problems discussed in the text.

[13] However, we determined the instrument set efficiently without employing all available instruments to avoid any such potential bias.

D. Industry Effects

It is known that some industries, for example capital-intensive manufacturing industries and utilities, are characterized by high leverage, while others are known to have low leverage, such as hi-tech and mineral extraction industries. Ferri and Jones (1979) emphasize the statistical relationship between relative debt structure class and generic industry class. Similarly, Harris and Raviv (1991) account for the industry classification by commenting that 'firms within an industry are more alike than those in different industries, and that industries tend to retain their leverage rankings over time'. More recently, Maksimovic, Stomper and Zechner (1999), MacKay and Phillips (2005) and Miao (2005) also emphasize the relevance of industry effects on capital structure decisions. Thus, to control for this effect we include industry dummies where appropriate.[14]

E. Target Leverage and Speed of Adjustment

The following procedure examines the existence of a target leverage in a framework that allows for adjustment costs and measures the speed of adjustment. Assuming that the desired target debt-ratio, $Leverage_{it}^{*}$, is a function of k explanatory variables, as in equation (1), then:

(2) $$Leverage_{it}^{*} = \sum_{k=1} \psi_k X_{kit} + \omega_{it}$$

where, X is a vector of k explanatory variables; ω_{it} is a serially correlated disturbance term with mean zero and possibly heteroscedastic; and ψ_k's are unknown parameters to be estimated and common to all firms. Equation (2) assumes the presence of a firm-level target capital structure, which is determined by firm-specific and country-specific factors, after controlling for market conditions, as in equation (1). Because of the existence of transaction costs, firms cannot adjust their leverage ratios too frequently. According to Leary and Roberts (2005), firms adjust their capital structure on average once a year. This relatively infrequent adjustment implies a trade-off between the costs of being off-target and the cost of leverage adjustment, as shown in Ju, Parrino, Poteshman and Weisbach (2005). Therefore, this model shows that firms adjust their current debt-ratios, $Leverage_{it}$, with the degree of adjustment coefficient "θ" to attain the desired capital structure, as follows:

(3) $$Leverage_{it} - Leverage_{it-1} = \theta(Leverage_{it}^{*} - Leverage_{it-1})$$

---

[14] These effects can only be investigated through the models in levels, not in differences. In addition, the models that include industry specific M&A activity do not include industry dummies.

If θ=1, the actual change in leverage is equal to the desired change and the adjustment is transaction cost free. If θ=0 there is no adjustment in leverage. The absence of adjustment is possible when adjustment costs are excessively high, or the cost of adjustment is significantly higher than the cost of remaining off target, and firms set their current debt-ratios to the past level, $Leverage_{it-1}$. Substituting (2) into (3), we obtain:

$$(4) \qquad Leverage_{it} = (1-\theta)Leverage_{it-1} + \sum_{k=1} \theta\psi_k x_{kit} + \theta\omega_t$$

In this model the value of θ measures how quickly firms adjust their leverage ratio, in line with Miguel and Pindado, (2001). It assumes that θ lies between zero and unity due to the existence of adjustment costs. If the cost of being in disequilibrium is higher (lower) than the cost of adjustment, θ tends to be unit (zero).

IV. The Results

Estimation of equation (1) using alternative methods suggests that the most appropriate methodology for testing a firm's dynamic capital structure is a two-step system-GMM specification that combines the differenced equations with level equations. The validity of this method is confirmed by the diagnostics reported in the tables. Therefore, we discuss the results from this method of estimation.

A. The Determinants of Leverage: Pooled Data for All Countries

The data of all five countries is pooled and equation (1) is estimated with four country dummy variables representing Germany, Japan, the U.K. and the U.S. The dummy variable for a given country takes a value of 1 if the firm operates in that particular country and 0 otherwise. A significant coefficient of a country dummy would suggest that there are country-specific determinants of leverage. After controlling for market conditions, the first column of results in Table 3 indicates that the market leverage[15] of firms operating in the G5 countries declines with an increase in their profitability, growth opportunities, and effective tax rate.[16] The inverse relation of leverage with profitability and growth

[15] In addition, following Rajan and Zingales (1995), we re-estimated the model using two further definitions of leverage: (a) the ratio of non-equity liabilities to total assets, and (b) the ratio of total debt to net assets. Since the results are not qualitatively different from the results reported in the paper, we do not report them.

[16] Following the argument that market leverage is more relevant than book leverage (see, for instance, Welch, 2004) the results presented are based on market leverage. In the interest of brevity, the estimates using book

opportunities is consistent with the findings of Flannery and Rangan (2006) and De Jong and Veld (2001), among others. Contrary to the predictions of the trade-off theory, the estimates reveal an inverse relationship between the effective tax rate and leverage. Similar evidence is reported by Kremp, Stoss and Gerdesmeier (1999). It can be argued that this is due to reverse causality, i.e. firms with low leverage pay higher effective tax.[17] However, why the firms do not adjust their leverage to minimize their tax burden remains a puzzle. Consistent with the findings of Titman and Wessels (1988) and Mao (2003), the effect of non-debt tax shields on market leverage is positive. If the amount of depreciation is the primary component of non-debt tax shields, the firm possesses relatively more tangible fixed assets that generate proportionally high levels of depreciation and tax credit. Such assets have collateral value for the attainment of secured debt, which in turn increase the debt capacity of firms allowing them to borrow more and save more on tax (see MacKie-Mason, 1990a). The estimates further show that larger firms and firms with higher tangible assets borrow more. Similar findings are reported by Flannery and Rangan (2006).

The estimates show that the payout policy does not have a significant effect on capital structure decisions of firms operating in the G5 nations. This finding differs from the positive relation reported by Chang and Rhee (1990) and the inverse relation reported by Rozeff (1982). Since the payout ratio could be endogenous to the capital structure decision, although the estimation method accounts for such endogeneity, equation (1) is re-estimated without this variable to examine the robustness of the results. This second set of results is reported in the final column of Table 3 and they show that overall findings remain qualitatively the same. Consistent with the prediction of the pecking order theory that managers issue shares when they are overvalued, the negative and significant effect of share price performance on both market and book leverage confirms that managers issue equity after an increase in the market price of their shares.[18] Hovakimian, Hovakimian and Tehranian (2004) also report an inverse relation between leverage and changes in share price.

Table 3 about here

---

leverage are not reported but are available on request. They are discussed in the text whenever they differ qualitatively from the estimates based on market leverage.

[17] It should be noted that such a potential endogeneity problem is controlled for in GMM.

[18] The negative effect of share price performance on book leverage confirms that the observed inverse relation between share price performance and market leverage is due to managerial decisions and not due to statistical distortions brought about by the increase in the market value of equity owing to an increase in share price.

The significant coefficients of all the control factors, equity premium, term-structure of interest rates, and M&A activity, support the prediction that, while choosing the financing mix, managers not only take into account the firm specific situation, but also the market conditions in which they operate. The estimates show a positive effect of equity premium on market leverage implying that firms raise debt capital at times of high market equity premia. Further, the term-structure of interest rates, prior changes in share price of the company, and the M&A activity are all inversely related to a firm's market leverage.[19] These estimates confirm that firms avoid issuing debt when long-term interest rate is relatively high.[20] The statistically significant coefficient of the lagged dependent variable confirms that firms have a target capital structure and on average they do not fully adjust to the target every year, consistent with the findings of Miguel and Pindado (2001), Frank and Goyal (2004) and Ju et al. (2005). Finally, all the coefficients of the country dummies are statistically significant, implying that there are country-specific effects. Therefore, a detailed country specific analysis is desirable to investigate this further.[21]

Due to differences in institutional factors affecting liquidation risk, the risk premium on loan capital and the level of information asymmetry among managers and outside investors, firms operating in various countries may consider different factors, or weigh them differently, while deciding their capital structure. To examine the proposition that the corporate governance and legal traditions of the country in which a firm operates play a significant role, equation (1) is modified to include measures of the rule of law, ownership concentration, creditors' rights, and anti-directors' rights. In this expanded model, firm specific characteristics are also included. Table 4 presents the findings for the three versions of this model that are estimated to avoid possible multicollinearity between the country specific variables. These estimates confirm that these factors have statistically significant effects on the capital structure choice of firms operating in the G5 countries. Higher rule of law implies more efficient law enforcement regulations, including bankruptcy laws. Thus, to avoid bankruptcy, firms in countries with higher rule of law index may keep their leverage ratio lower to decrease the risk of bankruptcy. The

---

[19] As anticipated and discussed in section II B the sign of the coefficient of the M&A activity on book leverage is positive while it is negative on market leverage.

[20] Unlike market leverage, book leverage is inversely affected by the equity premium and positively affected by the M&A activity. An inverse relation between book leverage and equity premium is possible when firms retain more earnings during periods of high equity premium.

[21] The M&A activity variable is industry and year specific and hence it represents industry and time dummies. Therefore no separate industry and time dummies are included in the model. To examine the robustness of the estimates to this specification, equation (1) is re-estimated with 14 industry dummies (see Appendix D for a list of the 15 industries) and time dummies. The results, available upon request, are qualitatively the same.

positive effect of ownership concentration supports the view that firms with concentrated share ownership favor debt as opposed to external equity to prevent possible dilution of ownership and control. The observed positive effect of ownership concentration may also be a reflection of differences in banks' ownership. Concentrated bank ownership reduces the cost of financial distress as the firms are likely to be rescued by the owner-banks. The positive effect of creditors' rights on leverage is self-explanatory as higher creditors' protection reduces the risk premium in the cost of borrowing and hence firms favor debt capital. The anti-director rights index also has a positive effect on leverage, since the higher this index, the less the information asymmetry between managers and external investors. As a result, firm's debt capacity increases. Thus, corporate governance and legal provisions appear to play a prominent role in capital structure decisions. Since the sample countries have different financial traditions, the role of the determinants of capital structure is thus expected to vary across countries. The significant coefficients of the country dummies reported in Table 3, and the variables representing corporate governance practices reported in Table 4 confirm this prediction. Therefore, in the following sub-section each sample country is examined separately and the effects of the determinants of capital structure are compared and discussed in the context of the institutional set-up in each country.

Table 4 about here

B. The Determinants of Leverage: Cross Country Comparison

The determinants of leverage of firms operating in the sample countries are further investigated by estimating equation (1) using a general dynamic system-GMM method. The estimates are reported in Table 5 and are based on an autoregressive model. Further, the static long-run equilibrium results obtained by using the error correction mechanism are presented in Table 6.

1. The Firm Specific Factors

The results in Table 5 reveal a significant inverse relation between *profitability* and market leverage in all sample countries, except Japan where profitability has a positive effect.[22] This inverse relation is consistent with the pecking order hypothesis that internal funding is preferred to the more expensive external sources. Higher profitability by enhancing internal resources reduces the need for external finance, as also reported by De Jong and Veld (2001) and Flannery and Rangan (2006). The long-run results in Table 6 also confirm these findings. Although the view that debt reduces the agency

[22] Book-leverage is significantly inversely related to profitability in all sample countries, including Japan.

cost of free cash-flow cannot be challenged just on the basis of these estimates, the evidence suggests that the information asymmetries effect is stronger than agency considerations. There is also a marked difference in the size of the coefficients of profitability, especially in the long-run (Table 6), across the G5 countries implying a different degree in the economic significance of profitability on capital structure decisions. The negative coefficient is largest (in absolute terms) in the United States. Among the European countries, the coefficient is the largest in France and this could be explained by a combination of various factors. Firstly, French managers prefer high earnings retention in order to maintain a closely held ownership structure (see table 1). Secondly, due to the strategic informational advantage over creditors, French managers may use the hierarchy of alternative financing strategies suggested by the pecking order theory. Finally, the relatively weaker protection of creditors in France (table 1) may lead to difficulties in raising debt, and thus companies may be forced to rely more on internal resources. Among the G5 countries the payout ratio of British firms is the highest with a relatively smaller negative coefficient. This could be because strong institutional share ownership encourages British firms to payout more in dividends and thus reducing the possibility of financing from internal equity. In summary, the impact of profitability on the financing mix is dependent on several country specific features.

Tables 5 and 6 about here

The estimated relationship between *growth opportunities* and market leverage is negative in all countries, apart from the United States where it is insignificant. This inverse relation is consistent with the findings of Johnson (1998), Rajan and Zingales (1995) and Flannery and Rangan (2006). Since the cost of financial distress and the agency costs of debt are higher for high growth firms, lenders demand higher return rates and thus debt is less attractive to managers. A cross-country comparison reveals the lowest impact in Germany, consistent with extant evidence that the large shareholders of German firms are in a position to better monitor managers and hence the opportunity for managers to pursue their own objectives at the expense of shareholders is very limited (see, for example, Edwards and Fischer, 1994). The relatively larger coefficients for Japanese and British firms suggest that the presence of information asymmetries in these countries raises the agency cost of debt, thus deterring managers from raising costly debt capital. The insignificant coefficient in the US remains a puzzle. In summary, the estimates confirm that the effect of growth opportunities on company's capital structure is dependent on regulations and provisions pertaining to investors' protection and corporate governance.

The relationship between leverage and the *tangibility of assets* is significantly positive in all G5 countries, apart from the United States. This is consistent with the view that tangible assets are more valuable to creditors should firms go into liquidation and the findings of Flannery and Rangan (2006)

and Mao (2003). The long-term coefficient (table 6) is largest in Germany, followed by Japan and France respectively. These estimates confirm that the effect of asset tangibility on corporate debt is more prominent in bank oriented (France, Germany and Japan) than in capital market oriented economies (the United States and the United Kingdom). Such stronger relation in bank oriented economies is likely to be caused by institutional provisions such as restrictions on banks' ability to grant unsecured loans and the traditional banking practices that require sufficient collateral.[23] The smaller (or insignificant) coefficients for asset tangibility in the UK and US suggest that firms operating in these countries have arm's length relation with their lenders and thus the role of collateral in raising debt is limited. Hence, the importance of asset tangibility depends upon the sources of debt financing – banks vs. capital markets.

Consistent with the findings of Michaelas, Chittenden and Poutziouris (1999), Mao (2003) and Flannery and Rangan (2006) the *size of the firm*, measured by total sales, appears to be positively related to leverage in all G5 countries, apart again from the US.[24] Larger firms are known to be less exposed to bankruptcy risk and hence are likely to be able to borrow more (Warner, 1977). The conventional wisdom that firms with high *volatile earnings* should borrow less is not supported by the evidence reported in Tables 5 and 6. Equally, the role of *effective tax rate* on market leverage is not statistically significant in any country. In line with Ang and Peterson (1986) and Titman and Wessels (1988), this observation may be caused by the lack of variation in the rate of corporate tax across firms. Any observed variation is likely to be a manifestation of the changes in corporate tax rate over the sample period.[25] Consistent with the prediction of the trade-off theory and the findings of Leary and Roberts (2005), firms with higher *non-debt tax shields* borrow less in Germany, Japan and the UK. On the contrary, this relationship is found to be positive in France. As discussed earlier, a positive effect is possible when the depreciation of tangible assets is the major component of non-debt tax shields (see, MacKie-Mason, 1990a).[26]

---

[23] An alternative view is that the firms in bank oriented economies (especially in Germany and Japan) have closer ties with their banks and hence the tangibility of assets should not matter. However, this view is not supported by the data. It is also possible that the banks who know the firms closely discourage/stop them from borrowing more, unless they have sufficient collateral.

[24] Results based on total assets are qualitatively the same.

[25] The estimates based on book-leverage show that German and Japanese firms with higher effective tax rate borrow more.

[26] It is also possible that non-debt tax shield is endogenously determined since it is a function of investment decisions, which is clearly endogenously determined. Since effective tax rate may be a function of non-debt tax shields and including both variables at the same time may raise some concerns. To test for the implications of this possibility, we reestimated the model in three other forms: first, we excluded the effective tax rate but retained non-

Also the effect of the *dividend payout ratio* on capital structure appears to be country dependent, being significantly negative in the US and insignificant in all other countries. The inverse relation between leverage and dividend in the United States, consistent with the findings of Rozeff (1982), supports the view that dividend payment signals firm's future performance and thus high dividend paying firms benefit from a lower equity cost of capital. In addition, firms with high payout policy are likely to be classified as higher risk by creditors and thus face a higher cost of debt.[27] Among the continental European countries, Germany had the higher average payout ratio (28.8%) than France (6.5%). In Germany the corporate tax rate on dividends (30%) is less than on retained earnings (45%). This encourages more payouts and more frequent external financing. However, this provision does not favor debt over equity and hence capital structure choice appears to be independent of dividend policy, as shown by the statistical insignificance of the payout ratio coefficient. The United Kingdom is an interesting case, since there was a change in the tax treatment of dividends in 1997. Before 1997, tax-exempted investors, such as pension funds, were able to reclaim part of the advance corporation tax paid on the dividends, but this provision was subsequently withdrawn. To control for the possible implications of this change, the model was re-estimated with an interactive dummy variable that takes the value of 0 before 1997 and the value of the dividend payout ratio afterwards.[28] The dividend payout coefficient became statistically significant and negative, while the interactive dummy was found to be statistically significant and positive. This implies that the negative impact of the dividend payout ratio is mitigated from 1997 onwards by the change in the tax treatment of dividends. The inclusion of the interactive dummy does not qualitatively alter the other results.

The results also suggest that market leverage declines after an increase in share price in all countries except the UK, implying that managers tend to issue more equity after a positive *share price*

---

debt tax shields; second, we excluded the non-debt tax shields but retained the effective tax rate, and finally, we excluded both the effective tax rate and non-debt tax shields variables from the model. The estimates of these alternative specifications remain qualitatively similar to the estimates of the main model confirming that our results are robust.

[27] It is also possible that the payout ratio is endogenous to the capital structure decisions. Although, our estimation method accounts for possible endogeneity by using two period lagged values, to further investigate whether the explanatory variables are endogenous, exogenous or pre-determined we followed the procedure conducted by Blundell, Bond, Devereux and Schiantarelli (1992). We find that all firm-specific factors, including the dividend payout, are endogenously determined. In addition, we re-estimate the equation without the payout ratio, the results remain qualitatively the same.

[28] An alternative dummy that takes the value of 1 after 1997 was also used and the result were qualitatively the same.

movement,[29] Assuming that managers are better informed than outside investors and they act in the best interest of existing shareholders, an issue of new equity would signal that shares are overvalued. Since the new equity investors would demand a discount, the realized value of new equity when share prices are high is more likely to be at least equivalent to the true value of equity. This may explain why managers tend to issue more equity at times of high share prices irrespective of the institutional environment in which they operate. Hovakimian et al (2004) also report a similar finding.

2. The Control Factors

The influence of the *equity premium* on firm's capital structure decision differs from country to country. Market-leverage is inversely affected by equity premium in France, Germany and the United States, while it is positively affected in Japan and the United Kingdom.[30] The positive effect suggests that managers have a preference for the relatively cheaper debt when the equity premium is high. On the other hand, the inverse relation implies that managers would issue more equity when the equity premium is high. This is likely if the observed high equity premium is due to a bull market and managers believe that even after offering a discount on new equity, the amount raised is at least equivalent to its true value, as predicted by the 'window of opportunity' hypothesis. The results also reveal a significant negative relation between the *term-structure of interest rates* and leverage in all sample countries except Germany. The inverse relation is consistent with the proposition that shareholders' wealth-maximizing managers prefer equity to debt when the term-structure of interest rates widen. This evidence confirms the view that when long-term interest rates are relatively high, firms are reluctant to raise debt capital, especially long-term debts. This conclusion holds in all countries irrespective of their differences in institutional arrangements and traditions and supports dynamism in capital structure decisions.

Another factor that appears to influence the capital structure decision of managers of firms operating in Japan, the UK and the US is the *M&A activity*. Firms operating in these countries seem to borrow less when the market for the M&A is more active, perhaps to avoid financial distress while predators are active. However, this variable has no significant impact on capital structure decision of firms operating in France and Germany. These findings are consistent with the view that hostile takeover bids are more common in market based economies than in bank based economies, with Japan being the

---

[29] The relation between book-leverage and share price performance of the firms operating in the UK is also negative, in line with the findings for other countries. Similar to the evidence from pooled sample (footnote 18) these estimates reconfirm that managers opt for equity issue, rather than debt, after an increase in share price.

[30] Book-leverage is related to equity premium differently from market-leverage in all countries except the US.

exception.[31] Overall, the results confirm the need to control for market conditions while analyzing the factors that determine the capital structure of a firm. The discussion in preceding paragraphs confirm that managers consider firm specific factors as well as country specific factors when deciding the capital structure of their firms.

C. Target Leverage and Speed of Adjustment

The results in Table 5 reveal a significant and positive effect of the one-period lagged dependent variable, leverage, on the capital structure of firms in all the sample countries.[32] Such a positive effect is consistent with the findings of Frank and Goyal (2004) and Miguel and Pindado (2001). The coefficients are between zero and one implying that the estimates are stable and the leverage ratio converges to its desired level over time. This confirms the existence of dynamism in the capital structure decision, in the sense that firms adjust their leverage ratios in order to achieve their target.[33] Moreover, the explanatory power of the model increases remarkably when the lagged dependent variable is included in the model.[34] The speed of adjustment varies across sample countries, being fastest among French firms, followed by American, British, German and Japanese firms respectively.[35] This is consistent with the view that the time dimension is an important variable in explaining the evolution of firms' debt ratios in France (Kremp et al, 1999). It is possible that for German and Japanese firms the cost of being off target relative to the cost of adjustment is low. Since German and Japanese firms have close ties with their creditors, it is feasible for them to adjust slowly towards their target level without incurring substantial agency costs. German and Japanese firms not only have easier access to debt finance, but they also need to rely less on using debt as a mechanism to signal firm quality to a large number of investors in capital markets, as their counterparts need to do in market oriented economies such as the United States and the United Kingdom. Overall, the results reveal the presence of dynamism in the capital structure decisions of firms operating in the G5 countries. Managers assess the tradeoff between the cost of adjustment and the cost

---

[31] The results based on two other measures of the M&A activity (defined in Appendix B) are qualitatively similar.

[32] This finding holds for both market-leverage and book-leverage.

[33] In their survey of 392 U.S. firms, Graham and Harvey (2001) find that 44% have strict or somewhat strict target debt ratios, and 64% of investment-grade firms have somewhat strict optimal capital structure implied by the static trade-off theory.

[34] The regression results based on the static forms of the capital structure model are available upon request.

[35] For instance, the speed of adjustment in France is 0.3935 ($\theta = 1 - 0.6065$) as reported in Table 5.

of being off target. Thus, the speed at which they adjust their capital structure may crucially depend on the financial systems and corporate governance traditions of the country.

D. Tests of Robustness

To examine the robustness of findings, the pooled sample is split according to several criteria and equation (1) is re-estimated. The criteria used for sub-sampling are: (i) firm size, (ii) growth opportunities, (iii) industry, and (iv) sample period. Firstly, since a firm's size may affect its access to capital markets, bankruptcy risks, and scale economies in raising capital, the sample firms are divided into three size categories based on their total sales. The results in Table 7 for small and large firms reveal some differences.[36] Although most variables have a similar impact on both small and large firms, effective tax rate, payout ratio, and earnings volatility differ as they are only significant for large firms. The impact of the M&A activity is important for all firms, but larger for smaller firms. This confirms that smaller firms are more likely to become acquisition targets than larger firms. Moreover, no country dummy is significant in the case of smaller firms, suggesting that firms of this category face similar situations in all sample countries, while larger firms are affected differently across countries. Secondly, sample firms are grouped into three categories according to their growth opportunities. The results reveal that firms in the lowest and highest growth categories are similarly affected by most firm specific variables and control factors. However, only the leverage of low growth firms is affected significantly by profitability, while the effective tax rate impacts on the capital structure of high growth firms only.

Table 7 about here

Thirdly, the determinants of leverage are examined in service and manufacturing industries. The findings reveal some differences in the factors that affect the capital structure choice of these two industries. For instance, only the leverage decisions of service firms are inversely affected by profitability, while only the manufacturing firms are influenced by growth opportunities, and asset tangibility plays a much stronger role on the capital structure choice of manufacturing firms. Finally, the sample is split into two seven-year periods, namely 1987-1993 and 1994-2000, to test for any structural

[36] Since the medium size firms do not offer any distinct pattern, the results for the medium size group are not presented in the paper. See Mao (2003).

breaks in the capital structure decision.[37] The results show that the impact of effective tax rate and the M&A activity changed significantly during these two sub-sample periods. The impact of effective tax rate has turned from being statistically significant and negative, to being insignificant. On the contrary, the coefficient of the M&A activity is only significant for the most recent period. The significant coefficients of most country dummies indicate that the country specific factors have played an important role across the whole sample period. Overall, the evidence suggests that the earlier findings are robust and confirms that the capital structure decision of firms is affected by firm specific as well as market specific factors.[38]

V. Conclusion

The paper investigates how firms operating in capital market oriented economies and bank oriented economies determine their capital structure. Among the five major countries included in the sample, the United States and the United Kingdom represent the cases of capital market oriented economies, while France, Germany and Japan represent the bank oriented economies. These countries also have different legal traditions. While the American and British legal systems are based on common law, French and German legal systems are based on code law traditions, and the Japanese system is a hybrid of both. These countries are characterized by different financial structures, accounting systems, tax provisions, corporate governance practices, and insolvency codes, all factors thought to be relevant for corporate capital structure decisions. A comparative analysis of the firm specific and market related factors that determine the capital structure of firms operating in different institutional and economic traditions enhances our understanding of how firms choose their financing mix. It also helps regulators to design a financial system consistent with the achievement of an efficient resource allocation.

A dynamic system-GMM method is applied to panel data. Although most of the variables identified in the literature affect the leverage of firms in the five countries when pooled together, the degree and importance of these determinants are country-specific. The results also suggest that firms adjust their leverage ratio regularly to maintain/achieve a target capital structure. The speed of adjustment is the quickest in France, while Japan has the slowest one. Among the firm specific determinants of capital structure, the leverage ratio is positively related to the tangibility of assets and to

---

[37] The sample period is split into two sub-periods of 7 years each. For GMM diagnostics to be robust, at least 5 years of data are needed.

[38] The cases of high leverage and low leverage firms were also estimated separately. The results remain qualitatively similar to those of the full sample.

the size of the firm in both types of economies. On the other hand, it declines generally with increases in profitability, growth opportunities and share price performance, with some evidence of cross-country variation. The impact of effective tax rate and dividend payout ratio is dependent on country's rules and regulations. Therefore, these results support the view that the impact of firm specific factors on firm's leverage ratio is crucially influenced by corporate governance practices, tax systems, the role of capital markets, corporate and banking relations and investor protection of the country in which the firm operates. Among the control variables, the term-structure of interest rates has a strong inverse effect on leverage, while the effects of equity risk premium and the M&A activity are country dependent. The estimates of the long-run static model and various sub-sampling analysis also confirm that the results are robust. These findings support the importance of incorporating market-wide factors while modeling the capital structure of a firm. In summary, the strength and the nature of the effect of firm specific as well as market related factors on the capital structure choice of a firm are dependent on the economic and legal traditions of a country. Therefore, the capital structure decision of a firm is not only the product of its own characteristics, but also the result of environment and traditions in which it operates.

References

Alderson, M. J., and B. L. Betker. "Liquidation Costs and Capital Structure." *Journal of Financial Economics*, 39 (1995), 45-69.

Anderson, T. W., and C. Hsiao. "Formulation and Estimation of Dynamic Models Using Panel Data." *Journal of Econometrics*, 18 (1982), 47-82.

Ang, J. S., and D. R. Peterson. "Optimal Debt versus Debt Capacity: A Disequilibrium Model of Corporate Debt Behavior." In Chen, A. W., ed. *Research in Finance,* 6 (1986), JAI Press.

Antoniou, A. Y. Guney and K. Paudyal. "The Determinants of Debt Maturity Structure: Evidence from France, Germany and the UK." *European Financial Management*, 12 (2006), 161-194.

Arellano, M., and S. Bond. "Some Tests of Specification for Panel Data." *Review of Economic Studies,* 58 (1991), 277-297.

Arellano, M., and O. Bover. "Another Look at the Instrumental Variable Estimation of Error-Components Models." *Journal of Econometrics*, 68 (1995), 29-51.

Baker, M., and J. Wurgler. "Market Timing and Capital Structure." *Journal of Finance*, 57 (2002), 1-32.

Ball, R., S. P. Kothari, and A. Robin. "The Effect of International Institutional Factors on Properties of Accounting Earnings." *Journal of Accounting and Economics,* 29 (2000), 1-51.

Blazenko, G. W. "Managerial Preferences, Asymmetric Information, and Financial Structure." *Journal of Finance*, 42 (1987), 839-862.

Blundell, R. W., and S. R. Bond. "Initial Conditions and Moment Restrictions in Dynamic Panel Data Models." *Journal of Econometrics,* 87 (1998), 115-143.

Blundell, R. W., S. R. Bond, M. Devereux, and F. Schiantarelli. "Investment and Tobin's Q." *Journal of Econometrics*, 51 (1992), 233-257.

Bradley, M., G. A. Jarrel, and E. H. Kim. "On the Existence of an Optimal Capital Structure: Theory and Evidence." *Journal of Finance,* 39 (1984), 857-877.

Chang, R. P., and S. G. Rhee. "The Impact of Personal Taxes on Corporate Dividend Policy and Capital Structure Decisions." *Financial Management,* 19(2) (1990), 21-31.

Chung, K. H. "Asset Characteristics and Corporate Debt Policy: An Empirical Test." *Journal of Business Finance and Accounting*, 20 (1993), 83-98.

DeAngelo, H., and R. W. Masulis. "Optimal Capital Structure under Corporate and Personal Taxation." *Journal of Financial Economics,* l8 (1980), 3-29.

De Jong, A., and C. Veld. "An Empirical Analysis of Incremental Capital Structure Decisions under Managerial Entrenchment." *Journal of Banking and Finance,* 25 (2001), 1857-1895.

Devereux, M., and F. Schiantarelli. "Investment, Financial Factors and Cash Flow: Evidence from UK Panel Data." *In Asymmetric information, corporate finance and investment*, R.G. Hubbard, ed. University of Chicago Press (1990), 279-306.

Edwards, J., and K. Fischer. *Banks, Finance and Investment in Germany*, Centre for economic policy research, Cambridge University Press (1994).

Edwards, J., and M. Nibler. "Corporate Governance in Germany: the Role of Banks and Ownership Concentration." *Economic Policy*, 31 (2000), 239-267.

Fama, E. F., and K. R. French. "Testing Trade-off and Pecking Order Predictions about Dividends and Debt." *Review of Financial Studies*, 15 (2002), 1-33.

Ferri, M. G., and W. H. Jones. "Determinants of Financial Structure: A New Methodological Approach." *Journal of Finance,* 34 (1979), 631-644.

Fischer, E. O., R. Heinkel, and J. Zechner. "Dynamic Capital Structure Choice: Theory and Tests." *Journal of Finance*, 44 (1989), 19-40.

Flannery, M. J., and K. P. Rangan. "Partial Adjustment toward Target Capital Structures." *Journal of Financial Economics*, 79 (2006), 469-506.

Frank, M. Z., and V. K. Goyal. "The Effect of Market Conditions on Capital Structure Adjustment." *Finance Research Letters*, 1 (2004), 47-55.

Friend, I., and L. Lang. "An Empirical Test of the Impact of Managerial Self-Interest on Corporate Capital Structure." *Journal of Finance*, 43 (1988), 271-281.

Fukuda, A., and S. Hirota. "Main Bank Relationships and Capital Structure in Japan." *Journal of the Japanese and International Economies,* 10 (1996), 250-261.

Graham, J. R., and C. R. Harvey. "The Theory and Practice of Corporate Finance: Evidence from the Field." *Journal of Financial Economics,* 60 (2001), 187-243.

Hansen, L. P. "Large Sample Properties of Generalized Methods of Moments Estimators." *Econometrica,* 50 (1982), 1029-1054.

Harris, M., and A. Raviv. "Capital Structure and the Informational Role of Debt." *Journal of Finance,* 45 (1990), 321-349.

Harris, M., and A. Raviv. "The Theory of Capital Structure." *Journal of Finance*, 46 (1991), 297-355.

Haugen, R. A., and L. W. Senbet. "Corporate Finance and Taxes: A Review." *Financial Management*, 15 (1986), 5-22.

Heaton, J. B., "Managerial Optimism and Corporate Finance." *Financial Management,* 31 (2002), 33-45.

Hovakimian, A. "The Role of Target Leverage in Security Issues and Repurchases." *Journal of Business*, 77 (2004), 1041-1071.

Hovakimian, A., "Are Observed Capital Structures Determined by Equity Market Timing?" *Journal of Financial and Quantitative Analysis*, 41 (2006), 221-243.

Hovakimian, A., G. Hovakimian, and H. Tehranian. "Determinants of Target Capital Structure: The Case of Dual Debt and Equity Issues.", *Journal of Financial Economics*, 71 (2004), 517-540.

Hovakimian, A., T. Opler, and S. Titman. "The Debt-Equity Choice." *Journal of Financial and Quantitative Analysis*, 36 (2001), 1-24.

Hsiao, C. "Benefits and Limitations of Panel Data." *Econometric Reviews,* 4 (1985), 121-174.

Jensen, M. "Agency Costs of Free Cash Flows, Corporate Finance and Takeovers." *American Economic Review*, 76 (1986), 323-339.

Jensen, M. C., and W. H. Meckling. "Theory of the Firm: Managerial Behavior, Agency Costs and Ownership Structure." *Journal of Financial Economics,* 3 (1976), 305-360.

Johnson, A. S. "The Effect of Bank Debt on Optimal Capital Structure." *Financial Management*, 27 (1998), 47-57.

Ju, N., R. Parrino, A. M. Poteshman, and M. S. Weisbach. "Horses and Rabbits? Trade-off Theory and Optimal Capital Structure", *Journal of Financial and Quantitative Analysis*, 40 (2005), 259-281.

Kester, C. W. "Capital and Ownership Structure: A Comparison of United States and Japanese Manufacturing Corporations." *Financial Management,* 15 (1986), 5-16.

Kim, W. S., and E. H. Sorensen. "Evidence on the Impact of the Agency Costs of Debt in Corporate Debt Policy." *Journal of Financial and Quantitative Analysis*, 21 (1986), 131-144.

Korajczyk, R. A., and A. Levy. "Capital Structure Choice: Macroeconomic Conditions and Financial Constraints." *Journal of Financial Economics*, 68 (2003), 75-109.

Kraus, A., and R. H. Litzenberger. "A State-preference Model of Optimal Financial Leverage." *Journal of Finance*, 28 (1973), 911-922.

Kremp, E., E. Stöss, and D. Gerdesmeier. "Estimation of a Debt Function: Evidence from French and German Firm Panel Data." In *Corporate finance in Germany and France*, Sauvé, A., and M. Scheuer, eds. A joint research of the Deutsche Bundesbank and the Banque de France, (1999), 139-194.

La Porta, R., F. Lopez-de-Silanes, A. Shleifer, and R. W. Vishny. "Legal Determinants of External Finance." *Journal of Finance,* 52 (1997), 1131-1150.

La Porta, R., F. Lopez-de-Silanes, A. Shleifer, and R. W. Vishny. "Law and Finance." *Journal of Political Economy*, 106 (1998), 1113-1155.

Leary, M. T., and M. R. Roberts. "Do Firms Rebalance their Capital Structures?" *Journal of Finance*, 60 (2005), 2575-2619.

MacKay, P., and G. M. Phillips. "How Does Industry Affect Firm Financial Structure?" *Review of Financial Studies*, 18 (2005), 1433-1466.

MacKie-Mason, J. K. “Do Taxes Affect Corporate Financing Decisions?” *Journal of Finance*, 45 (1990a), 1471-1493.

MacKie-Mason, J. K. “Do Firms Care Who Provides their Financing?” In R. G. Hubbard, ed. *Asymmetric Information, Corporate Finance and Investment*, (1990b), 63-103, University of Chicago Press.

Maksimovic, V., A. Stomper, and J. Zechner. “Capital Structure, Information Acquisition and Investment Decisions in an Industry Framework.” *European Finance Review*, 2 (1999), 251-271.

Mao, C. X. “Interaction of Debt Agency Problems and Optimal Capital Structure: Theory and Evidence.” *Journal of Financial and Quantitative Analysis*, 38 (2003), 399-423.

Marsh, P. “The Choice between Equity and Debt: An Empirical Study.” *Journal of Finance,* 37 (1982), 121-144.

Miao, J. “Optimal Capital Structure and Industry Dynamics.” *Journal of Finance*, 60 (2005), 2621-2659.

Michaelas, N., F. Chittenden, and P. Poutziouris. “Financial Policy and Capital Structure Choice in U.K. SMEs: Empirical Evidence from Company Panel Data.” *Small Business Economics*, 12 (1999), 113-130.

Miguel, A., and J. Pindado. "Determinants of Capital Structure: New Evidence from Spanish Panel Data." *Journal of Corporate Finance,* 7 (2001), 77-99.

Miller, M. H. “Debt and Taxes.” *Journal of Finance*, 32 (1977), 261-274.

Myers, S. C. “Determinants of Corporate Borrowing.” *Journal of Financial Economics*, 5 (1977), 147-175.

Myers, S. C. “The Capital Structure Puzzle.” *Journal of Finance,* 39 (1984), 575-592.

Nestor, S., and J. K. Thompson. “Corporate Governance Patterns in OECD Economies: Is Convergence under Way?” OECD Publications (2000).

Ozkan, A., “Determinants of Capital Structure and Adjustment to Long Run Target: Evidence from UK Company Panel Data.” *Journal of Business Finance and Accounting*, 28 (2001), 175-198.

Rajan, R. G., and L. Zingales. “What do We Know about Capital Structure? Some Evidence from International Data.” *Journal of Finance*, 50 (1995), 1421-1460.

Rozeff, M. S. “Growth, beta and Agency Costs as Determinants of Dividend Payout Ratios", *Journal of Financial Research,* 5 (1982), 249-259.

Scott, D. “Bankruptcy, Secured Debt, and Optimal Capital Structure.” *Journal of Finance*, 32 (1977), 1-19.

Stulz, R., and H. Johnson. “An Analysis of Secured Debt.” *Journal of Financial Economics,* 14 (1985), 501-521.

Swoboda, P. and J. Zechner. “Financial Structure and the Tax System.” In R. Jarrow et al., eds. *Handbooks in Operations Research and Management Science*, 9 (1995), 767-792.

Taub, A. J. “Determinants of the Firms' Capital Structure.” *Review of Economics and Statistics*, 57 (1975), 410-416.

Titman, S., and R. Wessels. “The Determinants of Capital Structure Choice.” *Journal of Finance*, 43 (1988), 1-19.

Trezevant, R. “Debt Financing and Tax Status: Tests of Substitution Effect and the Tax Exhaustion Hypothesis Using Firms’ Responses to the Economic Recovery Tax Act of 1981.” *Journal of Finance*, 47 (1992), 1557-1568.

Warner, J. B. “Bankruptcy Costs: Some Evidence.” *Journal of Finance*, 32 (1977), 337-347.

Welch, I. “Capital Structure and Stock Returns.” *Journal of Political Economy*, 112 (2004), 106-131.

Zimmerman, J. “Taxes and Firm Size.” *Journal of Accounting and Economics*, 5 (1983), 119-149.

Table 1

Panel A: Banking sector and stock market indicators of sample countries

Countries	*Market Capitalization*				*Value Traded*		*Turnover Ratio*		*Listed Companies*		*Bank Credit*	
	$-billions		*% of GDP*		*% of GDP*						% of GDP	
	1990	**2000**	**1990**	**1999**	**1990**	**1999**	**1990**	**2000**	**1990**	**2000**	**1990**	**1999**
France	314.4	1,475	25.9	103	9.6	53.8	n.a	62.4	578	968	106.1	103.1
Germany	355.1	1,432	22.2	67.8	21.4	64.3	39.3	107.5	413	933	108.5	146.9
Japan	2,918	4,546	98.2	104.6	54	42.5	43.8	52.5	2,071	2,470	266.8	142.4
UK	848.9	2,933	85.9	203.4	28.2	95.6	33.4	51.9	1,701	1,945	123.0	129.1
US	3,059	16,635	53.2	181.8	30.5	202.9	53.4	123.5	6,599	7,651	114.7	170.1

Market Capitalization: The share price times the number of shares outstanding. *Value Traded*: The total value of shares traded during the period. *Turnover Ratio*: The total value of shares traded during the period divided by the average market capitalization (average of the end-of-period values for the current and past values) for the period. *Listed Companies*: The number of domestically incorporated companies listed on the country's stock exchanges at the end of the year. This indicator does not include investment companies, mutual funds or other collective investment vehicles. *Bank Credit*: Domestic credit provided by the banking sector. *Source*: World Development Report, World Bank.

Panel B: Distribution of outstanding listed corporate equity among different categories of shareholders in 1996.

Owner	*France*	*Germany*	*Japan*	*UK**	*US*
Financial Sector (%)	30	30	42	68	46
Banks	7	10	15	1	6
Insurance Companies and Pension funds	9	12	12	50	28
Investment Funds	11	8	-	8	12
Others	3	-	15**	9	1
Non-financial Enterprises (%)	19	42	27	1	-
Public Authorities (%)	2	4	1	1	-
Households (%)	23	15	20	21	49
Rest of the World (%)	25	9	11	9	5
Total (%)	*100*	*100*	*100*	*100*	*100*

* end-1994. **Pension and investment funds are included. *Source*: Nestor and Thompson (2000).

Panel C: Selected Institutional Factors

	France	Germany	Japan	UK	US
Legal origin	French	Germanic	Germanic	English	English
Legal tradition	Code	Code	Code	Common	Common
Anti-directors rights	2	1	3	4	5
Creditor Rights	0	3	2	4	1
Rule of law	8.98	9.23	8.98	8.57	10
Ownership concentration	0.34	0.48	0.18	0.19	0.20
Restrictions on Reorganizations	0	1	0	1	0
Efficiency of Judicial System	8	9	10	10	10
No automatic stay	0	1	0	1	0
Secured creditors first	0	1	1	1	1

Anti-directors rights index shows the level of shareholders' rights ranging from zero (weakest) to six (strongest). *Creditor rights* index shows the level of creditors' rights ranging from zero (weakest) to four (strongest). *Rule of law* assesses the law and order tradition to indicate the quality of law enforcement ranging from zero (least tradition) to ten (most tradition). *Ownership concentration* is the mean % of common shares owned by the largest three shareholders in the 10 largest private non-financial firms. *Restrictions* is one if the reorganization procedure imposes restrictions (e.g., creditors' consent to file for reorganization), is zero if there are no such restrictions. *Efficiency of judicial system* assesses the integrity and efficiency of legal environment. It ranges from zero (least efficient) to ten (most efficient). *No automatic stay* is one if the reorganization procedure does not impose an automatic stay on the assets of the firm on filing the reorganization petition, zero otherwise; automatic stay prevents secured creditors from gaining possession of their security. *Secured creditors first* is one if secured creditors are ranked first in the distribution of the proceeds of the disposition of the bankrupt firm's assets, is zero if non-secured creditors are given absolute priority. *Source*: La Porta et al. (1997, 1998).

Table: 2
Summary statistics

FRANCE	BookLev	MktLev	PROFIT	MBR	FAR	SIZE	ETR	EARNV	DIVID	NDTS	CHSHP
Mean	0.232	0.317	0.115	1.478	0.235	15.091	0.311	1.272	0.065	0.048	0.068
Median	0.223	0.290	0.108	1.197	0.209	15.030	0.348	0.307	0.247	0.041	0.057
Std Dev	0.144	0.224	0.089	0.955	0.156	1.771	0.433	4.664	3.462	0.039	0.373
Kurtosis	0.525	-0.427	55.982	39.824	2.038	-0.323	70.003	202.61	187.42	23.877	2.868
Skewness	0.588	0.571	-2.381	5.077	1.221	0.090	4.043	12.608	-9.147	3.611	-0.137
Minimum	0.000	0.000	-1.414	0.481	0.003	8.677	-3.218	0.000	-66.90	0.000	-2.353
Maximum	0.998	0.997	0.994	13.096	0.985	20.526	6.576	94.674	51.77	0.547	2.074

GERMANY	BookLev	MktLev	PROFIT	MBR	FAR	SIZE	ETR	EARNV	DIVID	NDTS	CHSHP
Mean	0.199	0.256	0.119	1.832	0.342	12.447	0.398	6.046	0.288	0.062	0.007
Median	0.151	0.186	0.118	1.295	0.308	12.485	0.453	0.532	0.131	0.056	0.000
Std Dev	0.189	0.249	0.130	3.287	0.201	2.333	1.060	70.45	11.611	0.048	0.329
Kurtosis	0.397	-0.255	69.419	262.66	0.549	0.645	109.19	602.3	403.61	16.86	3.788
Skewness	0.970	0.852	-2.272	14.191	0.860	-0.310	-0.321	22.35	-1.849	2.561	0.296
Minimum	0.000	0.000	-2.920	0.296	0.000	1.231	-16.46	0.000	-301	0.000	-2.228
Maximum	0.998	0.994	1.742	88.476	0.999	18.761	16.638	2694	272.66	0.707	2.183

JAPAN	BookLev	MktLev	PROFIT	MBR	FAR	SIZE	ETR	EARNV	DIVID	NDTS	CHSHP
Mean	0.301	0.323	0.050	1.470	0.288	18.291	0.447	1.710	0.167	0.010	-0.042
Median	0.286	0.285	0.047	1.300	0.268	18.159	0.507	0.342	0.117	0.000	-0.018
Std Dev	0.191	0.226	0.045	0.681	0.158	1.457	1.705	14.079	1.673	0.020	0.404
Kurtosis	-0.235	-0.449	23.793	29.179	1.447	0.590	389.9	5695	1457	306	1.009
Skewness	0.479	0.584	0.751	3.853	0.931	0.482	0.226	63.203	17.246	8.267	-0.122
Minimum	0.000	0.000	-0.540	0.387	0.002	13.339	-38.40	0.000	-74.706	0.000	-2.30
Maximum	0.994	0.973	1.006	13.638	0.945	23.894	48.40	1414	95.40	0.997	2.241

U.K.	BookLev	MktLev	PROFIT	MBR	FAR	SIZE	ETR	EARNV	DIVID	NDTS	CHSHP
Mean	0.179	0.213	0.116	1.705	0.356	9.164	0.277	1.970	0.431	0.039	0.012
Median	0.160	0.160	0.127	1.309	0.316	9.028	0.330	0.342	0.397	0.033	0.033
Std Dev	0.146	0.201	0.161	2.007	0.224	1.971	0.592	28.677	3.162	0.029	0.478
Kurtosis	2.271	1.058	521.8	466.52	-0.079	0.670	483.29	8787	389.37	48.91	4.260
Skewness	1.182	1.184	-14.62	15.801	0.725	0.056	-2.087	85.376	1.932	3.810	-0.461
Minimum	0.000	0.000	-6.895	0.188	0.000	0.117	-18.50	0.000	-93.20	0.000	-4.013
Maximum	0.995	0.999	1.011	90.05	0.990	16.224	18.43	3094	98.60	0.824	3.268

U.S.	BookLev	MktLev	PROFIT	MBR	FAR	SIZE	ETR	EARNV	DIVID	NDTS	CHSHP
Mean	0.274	0.274	0.160	1.808	0.395	13.382	0.331	1.856	0.346	0.050	0.075
Median	0.269	0.236	0.150	1.380	0.345	13.317	0.370	0.247	0.213	0.045	0.076
Std Dev	0.185	0.216	0.126	2.111	0.241	1.622	1.418	18.842	4.091	0.031	0.372
Kurtosis	1.265	-0.124	578.82	374.58	-0.817	0.556	907	3381	4413	96.63	4.225
Skewness	0.790	0.717	17.109	16.321	0.493	-0.041	-10.84	48.92	49.364	5.836	-0.070
Minimum	0.000	0.000	-1.575	0.336	0.000	4.238	-59.14	0.000	-93.75	0.000	-2.899
Maximum	0.998	0.997	4.843	67.905	0.973	18.694	40	1500	356.11	0.862	2.937

This table records summary statistics of firm-specific variables. Book Leverage (BookLev) is the ratio of book value of total debt to book value of total assets. Market Leverage (MktLev) is the ratio of book value of total debt to market value of equity plus book value of total debt. Profitability (PROFIT) is the ratio of operating profit to book value of total assets. Market-to-Book Ratio (MBR) is the ratio of book value of total assets less book value of equity plus market value of equity to book value of total assets. Fixed Asset Ratio (FAR) is the ratio of net tangible assets to book value of total assets. Firm size (SIZE) is the natural logarithm of total sales. Effective Tax Rate (ETR) is the ratio of total tax charge to total taxable income. Earnings Volatility (EARNV) is the first-difference of earnings minus average of the first-differences. Dividend payout ratio (DIVID) is ordinary dividends to net income. Non-debt tax shields (NDTS) is the ratio of depreciation to total assets. Change in share price (CHSHP), or share price performance, is the difference between share prices at times [t] and [t-1] to share price at time [t-1]. All monetary units, for example SIZE, are measured in local currencies. The number of observations and firms in each country are in Appendix A

Table 3
The determinants of capital structure in G-5 countries system-GMM (pooled)

Explanatory Variables	Predicted sign	Market Leverage$_{it}$	Market Leverage$_{it}$
Leverage$_{i,t-1}$ (LDV)	+	0.7463***	0.7475***
		(0.0125)	(0.0127)
Profitability$_{i,t}$	-/+	-0.0512**	-0.0438*
		(0.0248)	(0.0245)
Growth opportunity$_{i,t}$	-	-0.0032***	-0.0021*
		(0.0012)	(0.0012)
Tangibility of assets$_{i,t}$	+	0.1657***	0.1723***
		(0.0248)	(0.0268)
Firm size$_{i,t}$	+	0.0329***	0.0340***
		(0.0037)	(0.0039)
Effective tax rate$_{i,t}$	+	-0.0124**	-0.0129**
		(0.0058)	(0.0066)
Earnings volatility$_{i,t}$	-	0.0001	0.0001
		(0.0001)	(0.0001)
Dividend payout$_{i,t}$	-/+	0.0002	-
		(0.0007)	-
Non-debt tax shields$_{i,t}$	-/+	0.2062**	0.1178
		(0.0946)	(0.1027)
Share price performance	-	-0.0296***	-0.0294***
		(0.0038)	(0.0039)
Equity premium	-	0.0005**	0.0005*
		(0.0002)	(0.0002)
Term-structure of interest rates	-	-0.0872***	-0.0843***
		(0.0058)	(0.0058)
M&A activity	-/+	-0.4171***	-0.4636***
		(0.0780)	(0.0823)
Dummy Germany		0.2502***	0.2720***
		(0.0610)	(0.0648)
Dummy Japan		0.1194**	0.1264**
		(0.0491)	(0.0516)
Dummy UK		0.3874***	0.4045***
		(0.0660)	(0.0695)
Dummy US		0.2150***	0.2252***
		(0.0561)	(0.0592)
Constant		-0.6173***	-0.6414***
		(0.0885)	(0.0944)
Correlation 1 (p-values)		0.00	0.00
Correlation 2 (p-values)		0.54	0.48
Sargan (p-values)		0.23	0.26
Wald test (p-values)		0.00	0.00
Firms		4,823	4,828
Observations		49,834	50,063
Estimation period		1989-2000	1989-2000
Adjusted R^2		0.6639	0.6512

The data is pooled for all 5 countries and the modified version of equation (1) that includes four dummy variables to represent Germany, Japan, the U.K. and the U.S. (equation 1') is estimated.

(1') $$Y_{it} = \alpha_0 + \alpha_1 Y_{i,t-1} + \sum_{k=1} \gamma_k X_{k,it} + D_j + \mu_i + \eta_t + \varepsilon_{it}$$

The dummy variable (D_j) for a given country takes the value of 1 if the firm is from country j, and 0 otherwise. See Appendix B for variable definitions. Asymptotic standard errors that are robust to heteroscedasticity and small sample bias are given in the parentheses. Correlation 1 and 2 are the first and second order autocorrelation of residuals, which is asymptotically distributed as N (0,1) under the null of no serial correlation. Sargan's Test is a test of the over-identifying restrictions, asymptotically distributed as χ^2 (df) under the null of instruments' validity. The Wald statistics tests the joint significance of estimated coefficients; asymptotically distributed as χ^2 (df) under the null of no relationship. (*), (**) and (***) indicate that coefficients are significant at 10, 5 and 1 percent level of significance, respectively.

Table 4
The determinants of capital structure in G-5 countries including corporate governance factors: system-GMM

Explanatory Variables	Predicted Sign	Market Leverage		
		Model I	Model II	Model III
$Leverage_{i,t-1}$ (LDV)	+	0.7673***	0.7532***	0.7460***
		(0.0117)	(0.0122)	(0.0126)
$Profitability_{i,t}$	-/+	-0.0156	-0.0331	-0.0520**
		(0.0280)	(0.0255)	(0.0245)
Growth $opportunity_{i,t}$	-	-0.0043***	-0.0036***	-0.0032***
		(0.0013)	(0.0012)	(0.0012)
Tangibility of $assets_{i,t}$	+	0.1300***	0.1393***	0.1643***
		(0.0238)	(0.0240)	(0.0248)
Firm $size_{i,t}$	+	0.0073***	0.0174***	0.0326***
		(0.0009)	(0.0018)	(0.0036)
Effective tax $rate_{i,t}$	+	-0.0144**	-0.0131**	-0.0123**
		(0.0061)	(0.0059)	(0.0058)
Earnings $volatility_{i,t}$	-	-0.0001	-0.0001	0.0001
		(0.0001)	(0.0001)	(0.0001)
Dividend $payout_{i,t}$	-/+	-0.0001	0.0001	0.0002
		(0.0007)	(0.0007)	(0.0007)
Non-debt tax $shields_{i,t}$	-/+	0.3359***	0.3196***	0.2121**
		(0.0961)	(0.0956)	(0.0947)
Share price performance	-	-0.0328***	-0.0310***	-0.0295***
		(0.0038)	(0.0038)	(0.0038)
Equity premium	-	0.0004**	0.0004*	0.0005**
		(0.0002)	(0.0002)	(0.0002)
Term-structure	-	-0.0926***	-0.0894***	-0.0873***
		(0.0060)	(0.0059)	(0.0058)
M&A activity	-/+	-0.4426***	-0.4478***	-0.4104***
		(0.0774)	(0.0789)	(0.0775)
Rule of Law	-/+	-0.0159*	-	-
		(0.0092)	-	-
Ownership concentration	-/+	-0.1623***	-	0.7120***
		(0.0531)	-	(0.1358)
Creditor rights	+	-	0.0421***	0.0864***
		-	(0.0070)	(0.0118)
Anti-director rights	-	-	0.0282***	0.0844***
		-	(0.0051)	(0.0121)
Constant		0.1489*	-0.3683***	-1.0458***
		(0.0842)	(0.0531)	(0.1448)
Correlation 1 (p-values)		0.00	0.00	0.00
Correlation 2 (p-values)		0.56	0.57	0.55
Sargan (p-values)		0.22	0.21	0.22
Wald test (p-values)		0.00	0.00	0.00
Firms		4,823	4,823	4,823
Observations		49,834	49,834	49,834
Estimation period		1989-2000	1989-2000	1989-2000
Adjusted R^2		0.7563	0.7201	0.6585

The data is pooled for all 5 countries and a modified version of equation (1) that includes corporate governance variables (equation 1") is estimated:

(1") $$Y_{it} = \alpha_0 + \alpha_1 Y_{i,t-1} + \sum_{k=1} \gamma_k X_{k,it} + CG_j + \mu_i + \eta_t + \varepsilon_{it}$$

Four factors representing the corporate governance systems (CG_j) in country j (j=1,5) are introduced in the model. See Appendix B for variable definitions. Asymptotic standard errors that are robust to heteroscedasticity and small sample bias are in the parentheses. Correlation 1 and 2 are the first and second order autocorrelation of residuals, which is asymptotically distributed as N (0,1) under the null of no serial correlation. Sargan's Test is test of the over-identifying restrictions, asymptotically distributed as χ^2 (df) under the null of instruments' validity. The Wald statistics tests the joint significance of estimated coefficients; asymptotically distributed as χ^2 (df) under the null of no relationship. (*), (**) and (***) indicate that coefficients are significant at 10, 5 and 1 percent level of significance, respectively.

Table 5
The determinants of market-leverage using system-GMM: cross-country comparison

Explanatory Variables	Predicted sign	France	Germany	Japan	UK	USA
$Leverage_{i,t-1}$ (LDV)	+	0.6065***	0.7644***	0.8893***	0.6815***	0.6779***
		(0.0372)	(0.0330)	(0.0163)	(0.0237)	(0.0224)
$Profitability_{i,t}$	-/+	-0.2400**	-0.0846*	0.5256***	-0.1173***	-0.3181***
		(0.1042)	(0.0507)	(0.1116)	(0.0384)	(0.0720)
Growth $opportunity_{i,t}$	-	-0.0175***	-0.0015*	-0.0875***	-0.0045*	-0.0013
		(0.0064)	(0.0009)	(0.0066)	(0.0024)	(0.0034)
Tangibility of $assets_{i,t}$	+	0.0949*	0.1697***	0.0405*	0.0581*	0.0377
		(0.0515)	(0.0556)	(0.0217)	(0.0305)	(0.0328)
Firm $size_{i,t}$	+	0.0237***	0.0139***	0.0082***	0.0196***	0.0019
		(0.0055)	(0.0035)	(0.0031)	(0.0043)	(0.0039)
Effective tax $rate_{i,t}$	+	0.0027	0.0088	-0.0057	0.0071	0.0018
		(0.0181)	(0.0063)	(0.0058)	(0.0115)	(0.0034)
Earnings $volatility_{i,t}$	-	0.0021	0.0002	-0.0002	0.0001	0.0001
		(0.0015)	(0.0002)	(0.0005)	(0.0006)	(0.0004)
Dividend $payout_{i,t}$	-/+	-0.0003	0.0001	0.0021	-0.0025	-0.0039*
		(0.0016)	(0.0003)	(0.0039)	(0.0035)	(0.0022)
Non-debt tax $shields_{i,t}$	-/+	0.5133***	-0.5572***	-0.2907*	-0.3198*	-0.1078
		(0.1924)	(0.1911)	(0.1724)	(0.1884)	(0.2551)
Share price performance	-	-0.0298***	-0.0857***	-0.0105***	0.0138	-0.0770***
		(0.0100)	(0.0160)	(0.0039)	(0.0085)	(0.0089)
Equity premium	-	-0.0026***	-0.0035***	0.0014***	0.0037***	-0.0017***
		(0.0006)	(0.0007)	(0.0003)	(0.0005)	(0.0005)
Term-structure	-	-0.1846***	-0.0128	-0.1594***	-0.0992***	-0.1117***
		(0.0220)	(0.0180)	(0.0104)	(0.0078)	(0.0105)
M&A activity	-/+	-0.1403	-0.0747	-0.1808***	-0.2901*	-0.1527*
		(0.2163)	(0.1577)	(0.0556)	(0.1678)	(0.0907)
Constant		-0.2124**	-0.1132***	0.0211	-0.0801*	0.1371**
		(0.0888)	(0.0393)	(0.0592)	(0.0464)	(0.0607)
Correlation 1 (p-values)		0.00	0.00	0.00	0.00	0.00
Correlation 2 (p-values)		0.69	0.56	0.24	0.13	0.23
Sargan (p-values)		0.82	0.23	0.22	0.19	0.15
Wald test (p-values)		0.00	0.00	0.00	0.00	0.00
Firms		242	479	1,442	1,558	1,102
Observations		2,145	4,952	16,664	14,495	11,584
Estimation period		1989-2000	1989-2000	1989-2000	1989-2000	1989-2000
Adjusted R^2		0.7458	0.7939	0.8557	0.6203	0.7870

Equation (1) is estimated for each sample country.

(1) $$Y_{it} = \alpha_0 + \alpha_1 Y_{i,t-1} + \sum_{k=1} \gamma_k X_{k,it} + \mu_i + \eta_t + \varepsilon_{it}$$

See Appendix B for variable definitions. Asymptotic standard errors that are robust to heteroscedasticity and small sample bias are reported in parentheses. Correlation 1 and 2 are the first and second order autocorrelation of residuals, which is asymptotically distributed as N (0,1) under the null of no serial correlation. Sargan's Test is test of the over-identifying restrictions, asymptotically distributed as χ^2 (df) under the null of instruments' validity. The Wald statistics tests the joint significance of estimated coefficients; asymptotically distributed as χ^2 (df) under the null of no relationship. (*), (**) and (***) indicate that coefficients are significant at 10, 5 and 1 percent level, respectively.

Table 6
Corporate capital structure in G-5 countries using system-GMM: Static long-run results

Explanatory Variables		Market Leverage				
	Predicted Sign	France	Germany	Japan	UK	USA
Profitability$_{i,t}$	-/+	-0.610**	-0.359*	4.747***	-0.368***	-0.987***
		(0.243)	(0.201)	(1.429)	(0.116)	(0.202)
Growth opportunities$_{i,t}$	-	-0.044***	-0.006*	-0.790***	-0.014**	-0.004
		(0.015)	(0.003)	(0.116)	(0.007)	(0.011)
Tangibility of assets$_{i,t}$	+	0.241*	0.720***	0.366*	0.182*	0.117
		(0.129)	(0.241)	(0.206)	(0.095)	(0.101)
Firm size$_{i,t}$	+	0.060***	0.059***	0.074***	0.062***	0.006
		(0.014)	(0.015)	(0.027)	(0.014)	(0.012)
Effective tax rate$_{i,t}$	+	0.007	0.037	-0.052	0.022	0.005
		(0.046)	(0.028)	(0.053)	(0.036)	(0.010)
Earnings volatility$_{i,t}$	-	0.005	0.001	-0.002	0.001	0.001
		(0.004)	(0.001)	(0.005)	(0.002)	(0.001)
Dividend payout$_{i,t}$	-/+	-0.001	0.001	0.019	-0.008	-0.012*
		(0.004)	(0.001)	(0.036)	(0.011)	(0.007)
Non-debt tax shields$_{i,t}$	-/+	1.304***	-2.365***	-2.626*	-1.004*	-0.335
		(0.473)	(0.831)	(1.531)	(0.604)	(0.794)
Share price performance	-	-0.076***	-0.364***	-0.095**	0.043	-0.239***
		(0.024)	(0.073)	(0.040)	(0.028)	(0.030)
Equity premium	-	-0.007***	-0.015***	0.013***	0.012***	-0.005***
		(0.002)	(0.004)	(0.003)	(0.002)	(0.002)
Term-structure	-	-0.469***	-0.054	-1.440***	-0.311***	-0.347***
		(0.064)	(0.076)	(0.239)	(0.033)	(0.038)
M&A activity	-/+	-0.356	-0.317	-1.633***	-0.911*	-0.474*
		(0.559)	(0.680)	(0.530)	(0.527)	(0.280)
Constant		-0.540**	-0.480***	0.191	-0.252*	0.426**
		(0.228)	(0.167)	(0.540)	(0.147)	(0.185)
Firms		242	479	1,442	1,558	1,102
Observations		2,145	4,952	16,664	14,495	11,584
Estimation period		1989-2000	1989-2000	1989-2000	1989-2000	1989-2000

See Appendix B for variable definitions. Asymptotic standard errors that are robust to heteroscedasticity and small sample bias are reported in parentheses. *, ** and *** indicate that coefficients are significant at 10, 5, and 1 percent, respectively. The significance level is obtained by dividing the estimated long-run coefficient with its standard error. The long-run relationship between $Y_{i,t}$ and $X_{i,t}$ in equation (1) is estimated as follows:

$$Y_{it}^{*} = \frac{\gamma_k}{1 - \alpha_1} X_{k,it}^{*}$$

Table: 7
Factors affecting market leverage of firms in G-5 countries: system-GMM (pooled)

	Firm Size		Growth Opportunities		Industry		Sample Year	
Explanatory Variables	Small	Large	Low	High	Service	Manufacturing	1987-1993	1994-2000
$Leverage_{i,t-1}$ (LDV)	0.7163***	0.8319***	0.6982***	0.7131***	0.7128***	0.7664***	0.5607***	0.7767***
	(0.0210)	(0.0151)	(0.0186)	(0.0192)	(0.0186)	(0.0139)	(0.0353)	(0.0218)
$Profitability_{i,t}$	-0.0510*	-0.0217	-0.1417*	-0.0153	-0.0349*	0.0167	-0.0157	-0.0555*
	(0.0292)	(0.0685)	(0.0830)	(0.0270)	(0.0208)	(0.0261)	(0.0857)	(0.0318)
$Growth\ opportunities_{i,t}$	-0.0040**	-0.0490***			-0.0013	-0.0044*	-0.0741***	-0.0035***
	(0.0016)	(0.0050)			(0.0014)	(0.0025)	(0.0177)	(0.0012)
$Tangibility\ of\ assets_{i,t}$	0.0987***	0.2160***	0.2317***	0.0530*	0.0515*	0.1858***	0.2472***	0.0613*
	(0.0299)	(0.0353)	(0.0406)	(0.0299)	(0.0300)	(0.0321)	(0.0575)	(0.0320)
Firm Size			0.0424***	0.0260***	0.0301***	0.0283***	0.0556***	0.0155***
			(0.0070)	(0.0042)	(0.0049)	(0.0042)	(0.0103)	(0.0056)
$Effective\ tax\ rate_{i,t}$	0.0105	-0.0041**	0.0003	-0.0095*	-0.0026	-0.0089**	-0.0171**	-0.0129
	(0.0111)	(0.0018)	(0.0021)	(0.0055)	(0.0018)	(0.0044)	(0.0078)	(0.0126)
$Earnings\ volatility_{i,t}$	0.0002	-0.0003**	0.0002	0.0001	0.0003*	0.0001	0.0001	-0.0002
	(0.0002)	(0.0001)	(0.0002)	(0.0001)	(0.0002)	(0.0001)	(0.0001)	(0.0003)
$Dividend\ payout_{i,t}$	-0.0016	0.0046*	0.0007	-0.0013	-0.0023	0.0005	0.0038	-0.0001
	(0.0016)	(0.0025)	(0.0008)	(0.0014)	(0.0017)	(0.0007)	(0.0026)	(0.0016)
$Non\text{-}debt\ tax\ shields_{i,t}$	-0.7184***	0.6710***	0.4851**	0.2532**	0.2201*	0.2800***	-0.1687	-0.0529
	(0.1658)	(0.1426)	(0.2070)	(0.1065)	(0.1321)	(0.0988)	(0.3797)	(0.1607)
Share price performance	-0.0126*	-0.0200***	-0.0471***	-0.0349***	-0.0257***	-0.0365***	-0.0220**	-0.0051*
	(0.0071)	(0.0036)	(0.0060)	(0.0062)	(0.0064)	(0.0041)	(0.0110)	(0.0030)
Equity premium	0.0049***	0.0012***	-0.0004	0.0011***	0.0014***	0.0003*	-0.0014***	0.0031***
	(0.0006)	(0.0002)	(0.0004)	(0.0003)	(0.0005)	(0.0002)	(0.0005)	(0.0003)
Term-structure of Int.	-0.0988***	-0.1842***	-0.1236***	-0.0681***	-0.0992***	-0.0921***	-0.1004***	-0.1909***
	(0.0087)	(0.0101)	(0.0109)	(0.0079)	(0.0091)	(0.0067)	(0.0113)	(0.0176)
M&A activity	-0.5803***	-0.2143***	-0.2311**	-0.1393*			-0.1184	-0.9979***
	(0.1714)	(0.0513)	(0.1139)	(0.0796)			(0.1301)	(0.1867)
Dummy Germany	0.1253	0.0218	0.1235**	0.0056	0.1429*	0.2880***	0.4156***	0.1238*
	(0.6976)	(0.0529)	(0.0579)	(0.1099)	(0.0788)	(0.0687)	(0.1584)	(0.0710)
Dummy Japan	0.0001	0.1163***	-0.0177	-0.0593	0.0389	0.1497***	0.0828	0.1825***
	(0.0001)	(0.0338)	(0.0449)	(0.0934)	(0.0680)	(0.0552)	(0.1366)	(0.0564)
Dummy UK	0.1815	0.2965	0.3235***	0.1492*	0.2904***	0.3576***	0.5984***	0.1957**
	(0.6980)	(0.7791)	(0.0686)	(0.0806)	(0.0835)	(0.0723)	(0.1676)	(0.0850)
Dummy US	0.2359	0.1070**	0.1341***	-0.0303	0.1123*	0.2556***	0.2413*	0.2443***
	(0.7005)	(0.0512)	(0.0526)	(0.1060)	(0.0630)	(0.0634)	(0.1384)	(0.0689)
Constant	-0.0684	-0.0108	-0.6667***	-0.3205**	-0.4934***	-0.6212***	-0.9022***	-0.2309**
	(0.6990)	(0.0348)	(0.1225)	(0.1338)	(0.1141)	(0.0985)	(0.2390)	(0.1095)
Correlation 1 (p-values)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Correlation 2 (p-values)	0.18	0.22	0.11	0.29	0.98	0.61	0.87	0.39
Sargan (p-values)	0.27	0.19	0.14	0.24	0.13	0.15	0.12	0.16
Wald test (p-values)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Firms	1,612	1,616	1,610	1,603	1,508	3,315	3,879	4,582
Observations	14,807	18,674	16,610	15,807	14,725	35,115	20,292	25,418
Estimation period	1989-2000	1989-2000	1989-2000	1989-2000	1989-2000	1989-2000		
Adjusted R^2	0.6302	0.8412	0.6394	0.5883	0.7056	0.6938	0.1758	0.7018

The data is pooled for all 5 countries and the modified version of equation (1) that includes four dummy variables to represent Germany, Japan, the U.K. and the U.S is estimated:

(1') $$Y_{it} = \alpha_0 + \alpha_1 Y_{i,t-1} + \sum_{k=1} \gamma_k X_{k,it} + D_j + \mu_i + \eta_t + \varepsilon_{it}$$

See Appendix B for variable definitions. Asymptotic standard errors that are robust to heteroscedasticity and small sample bias are given in the parentheses. Correlation 1 and 2 are the first and second order autocorrelation of residuals, which is asymptotically distributed as N (0,1) under the null of no serial correlation. Sargan's Test is test of the over-identifying restrictions, asymptotically distributed as χ^2(df) under the null of instruments' validity. The Wald statistics tests the joint significance of estimated coefficients; asymptotically distributed as χ^2 (df) under the null of no relationship. (*), (**) and (***) indicate that coefficients are significant at 10, 5 and 1 percent level, respectively. See Appendix D for industry groupings.

Appendix A
The structure of panel data

a) Number of firms						b) Number of observations					
N (years)	France	Germany	Japan	UK	US	***Year***	France	Germany	Japan	UK	USA
						1987	73	151	1195	971	723
						1988	89	348	1206	1054	780
5	33	18	42	222	58	**1989**	139	371	1263	1131	797
6	15	20	20	126	46	**1990**	140	396	1302	1189	822
7	23	12	25	104	64	**1991**	148	412	1328	1227	880
8	17	13	10	76	40	**1992**	161	424	1341	1195	921
9	14	12	12	70	45	**1993**	175	430	1353	1201	960
10	9	20	19	58	54	**1994**	197	442	1379	1243	1024
11	2	28	31	120	24	**1995**	208	462	1397	1276	1071
12	48	34	47	120	29	**1996**	239	474	1438	1334	1125
13	15	186	129	133	78	**1997**	238	470	1437	1290	1124
14	68	136	1107	533	689	**1998**	237	467	1441	1203	1123
						1999	236	461	1441	1097	1096
						2000	233	436	1442	952	1105
Total	**244**	**479**	**1,442**	**1,562**	**1,127**	***Total***	**2,513**	**5,744**	**18,963**	**16,363**	**13,551**
Total sample-firms					**4,854**	**Total sample-observations**					**57,134**

All dead and alive firms whose data are available are included in the initial sample. The total number of non-financial firms stands at 1,235 for France; 1,590 for Germany; 1,671 for Japan; 3,153 for the UK and 5042 for the USA. Our dynamic models require at least 3 consecutive observations. However, to improve the reliability of diagnostics, firms with less than five consecutive observations and missing variables are excluded from the sample. The final sample comprises of 4,854 unique firms with 57,134 firm-year observations distributed as below. The panel data set is unbalanced as there are more observations for some firms than for others. Sections in the table below are as follows: a) Number of firms having '*n*' continuous observations during the period; b) number of observations in each year. Unless otherwise stated, data are compiled from Datastream.

Appendix B
Variable definition

Variables	Definition / Source
The Dependent Variable:	
Book-Leverage	Ratio of book value of total debt to book value of total assets.
Market-Leverage	Ratio of book value of total debt to market value of equity plus book value of total debt.
The Explanatory Variables:	
Profitability	Ratio of operating profit to book value of total assets.
Growth opportunities	Market value-to-book value ratio. Ratio of book value of total assets less book value of equity plus market value of equity to book value of total assets.
Tangibility of assets	Ratio of net tangible assets to total assets (book value).
Firm size	Natural logarithm of total annual sales based on 1987 prices. Alternative measure: natural logarithm of total annual assets based on 1987 prices.
Effective tax rate	Ratio of total tax to total taxable income.
Earnings volatility	First-difference of annual earnings (% change) minus average of the first-differences.
Dividend payout	Ratio of ordinary dividends to net income for each year.
Non-debt tax shield	Deprecation to total assets ratio (annual).
Share price performance	Annual change in the share price. On average, a lag of six-month is expected to cover for the time required for decision making, preparing documents for raising debt or equity capital from the market, seeking approval from the stock exchanges, the issue to be subscribed by the investors and the effect to appear in the annual books of accounts. Therefore, the change in share price is matched to the month of the firm's fiscal year-end with a six-month lag.
The Control Factors:	
Equity premium	Annual equity premium. This is measured as the difference between the annual return on the stock market index (FT-All Share) and the return on three month treasury-bills (annualized). This variable is matched to the month of the firm's fiscal year-end with a six-month lag for the reasons explained in the case of "share price performance" variable.
Term-structure of interest rate	Annualized difference between the yields on long-term government bonds and the three-month treasury-bills. This variable is matched to the month of firm's fiscal year-end with a six-month lag for the reasons explained in the case of "share price performance" variable.
M&A activity	The number of the M&A deals in an industry in a given year divided by the total number of M&A deals in the country during the year. Alternative measures used are: (a) ratio of number of delisted firms to total number of listed companies in the market for each year, and (b) ratio of M&A deals in a given year to total M&A deals during the sample period (1987-2000). Mergers & Acquisitions details, required to compile the above measures for each country, are compiled from SDC Platinum (Thomson Financial) database.
Rule of Law	Assessment of the law and order tradition to indicate the quality of law enforcement ranging from zero (least tradition) to ten (most tradition). Source: La Porta et al. (1997, 1998).
Ownership concentration	Mean percentage of common shares owned by the largest three shareholders in the 10 largest private non-financial firms. Source: La Porta et al. (1997, 1998).
Creditor rights	Index showing the level of creditors' rights ranging from zero (weakest) to four (strongest). Source: La Porta et al. (1997, 1998).
Anti-director rights	Index showing the level of shareholders' rights ranging from zero (weakest) to six (strongest). Source: La Porta et al. (1997, 1998).

The variables used in the paper are defined in this appendix. The sample comprises of all non-financial firms, including dead firms, traded in the major stock exchanges of the sample countries covering annual observations from 1987 to 2000. Unless otherwise stated, all data are compiled from Datastream and measured for the end of company's accounting year.

Appendix C
A summary of selected studies on the Determinants of Capital Structure

Explanatory variable	Positive relation with leverage	Negative relation with leverage	No relation with leverage
Lagged Leverage	Frank and Goyal (2004), MacKie-Mason (1990b), Miguel and Pindado (2001), Ozkan (2001)		
Profitability	Blazenko (1987), Jensen (1986) Hovakimian (2004), Hovakimian et al. (2004)	De Jong and Veld (2001), Flannery and Rangan (2006), Kester (1986), Rajan and Zingales (1995), Titman and Wessels (1988)	
Growth opportunities (Market-to-book ratio)	Kremp et al. (1999), MacKay and Phillips (2005)	Flannery and Rangan (2006), Hovakimian (2004), Johnson (1998), Mao (2003), Myers (1977), Rajan and Zingales (1995), Maksimovic et al. (1999), Miao (2005)	
Fixed assets ratio	Alderson and Betker (1995), Flannery and Rangan (2006), Mao (2003), Myers (1977), Scott (1977), Titman and Wessels (1988)	Leary and Roberts (2005) Hovakimian et al. (2004)	
Firm size	Flannery and Rangan (2006), Friend and Lang (1988), Hovakimian et al. (2004), MacKay and Phillips (2005), Mao (2003)	Johnson (1998), Kester (1986), Titman and Wessels (1988)	Chung (1993), Ferri and Jones (1979), and Kim and Sorensen (1986)
Effective tax rate	Haugen and Senbet (1986), Swoboda and Zechner (1995), Taub (1975), Zimmerman (1983)	Kremp et al. (1999), Taub (1975)	Ang and Peterson (1986), Bradley et al. (1984), Fischer et al. (1989), Titman and Wessels (1988)
Earnings volatility			Leary and Roberts (2005)
Dividend payout	Chang and Rhee (1990)	Rozeff (1982)	
Non-debt tax shields	Bradley et al. (1984), Titman and Wessels (1988), MacKie-Mason (1990a), Mao (2003, for high-growth firms)	DeAngelo and Masulis (1980); Leary and Roberts (2005); Miguel and Pindado (2001), Mao (2003, for low-growth firms)	
Share price performance		Hovakimian et al. (2004); Korajczyk and Levy (2003)	
Presence of optimal capital structure	Fama and French (2002), Flannery and Rangan (2006), Frank and Goyal (2004), Graham and Harvey (2001), Hovakimian et al. (2004), Johnson (1998), Ju et al. (2005), Korajczyk and Levy (2003), Leary and Roberts (2005), MacKie-Mason (1990b), Mao (2003), Miguel and Pindado (2001), Ozkan (2001)		

Appendix D
Industry Classification

No	Industry Name	Two Groups
1	Automotive, Aviation and transportation	Manufacturing
2	Beverages, Tobacco	Manufacturing
3	Building and construction	Manufacturing
4	Chemicals, Healthcare, Pharmaceuticals	Manufacturing
5	Computer, Electrical and electronic equipment	Manufacturing
6	Diversified industry	Manufacturing
7	Engineering, Mining, Metallurgy, Oil and gas exploration	Manufacturing
8	Food producer and processors, Farming and fishing	Manufacturing
9	Leisure, Hotels, restaurants and pubs	Services
10	Other business	Services
11	Paper, Forestry, Packaging, Printing and Publishing, Photography	Services
12	Retailers, Wholesalers and distributors	Services
13	Services	Services
14	Textile, Leather, Clothing, Footwear and furniture	Manufacturing
15	Utilities	Services

Source: Datastream