Capital Structure Dynamics in the UK and Continental Europe

GABRIELLE WANZENRIED
IFZ Institute for Financial Services Zug, University of Applied Sciences Central Switzerland, Zug, Switzerland

ABSTRACT This paper investigates empirically the effects of institutions and market characteristics on corporate capital structure dynamics. Based on the fact that firms may temporarily deviate from their optimal capital structure due to the existence of adjustment costs, a partial adjustment model is used that links these transaction costs to country-specific characteristics such as the development of the financial markets, legal system, and macroeconomic environment. The sample comprises data from 873 firms in France, Germany, Italy and the UK over the period from 1982 to 2002. The results support the hypotheses that more developed financial markets, greater efficiency of the legal system and better protection of shareholders all have a positive effect on the speed at which firms adjust their capital structure towards the target. Similarly, higher economic growth and a higher inflation rate positively affect the speed of adjustment to the optimal capital structure as well.

KEY WORDS: Capital structure, dynamic analysis, institutions and markets

1. Introduction

How do firms choose their capital structure? That is, in what ways do they combine debt and equity to finance their assets? What are the main driving factors behind these decisions, and what are the consequences for firm performance? Do these choices differ depending on the firms’ institutional environment? Even though these and other questions have challenged economists for quite a long time, the answers are anything but certain. An important topic that is so far only partly understood involves the dynamics of a firm’s decisions concerning its capital structure. This paper provides empirical evidence for how institutional and macroeconomic factors affect the ways in which firms change their financial structure over time.

Most of the empirical work on capital structure decisions has investigated the effects of firm characteristics on corporate financing decisions (Harris and Raviv, 1991). While most studies focus on a single country, a rather small but growing strand of the literature has started to look at the impact of institutional characteristics on financing decisions.¹ The study of institutional effects on corporate finance decisions is important because different institutional environments may affect financial decisions in different ways. As Giannetti (2003) argues, different financial system characteristics and institutional arrangements may deal more effectively with market imperfections. Financial development, for instance, may spur economic growth by providing

¹ The study of institutional effects on corporate finance decisions is important because different institutional environments may affect financial decisions in different ways. As Giannetti (2003) argues, different financial system characteristics and institutional arrangements may deal more effectively with market imperfections. Financial development, for instance, may spur economic growth by providing
easier and cheaper access to external finance for certain firms. According to Rajan and Zingales (2001), the efficiency of the financial system and the interdependence of financial markets and institutions have a potentially large impact on a firm’s financial decisions and its performance.

Existing work on the impact of institutions on corporate financial decisions certainly advances our understanding of a firm’s behaviour in significant ways. However, all these papers apply a static perspective. They do not look at capital structure adjustments although firms typically restructure their financial structure over time, as a response to fluctuations of the underlying variables. Static capital structure models cannot take these adjustments into account. Furthermore, the well-established capital structure theories explain differences in the optimal debt/equity ratios that do not necessarily coincide with the observed capital structure (Heshmati, 2001). The optimal and the observed capital structure may differ due to the existence of adjustment costs. As Banjeree et al. (2004) argue, the extent of the transaction costs, which is commonly interpreted as speed of adjustment to the target leverage ratio, depends on a firm’s size, its growth opportunities, and the distance between the current and the optimal debt ratio. While they mention that some economy-wide factors could have an impact on the speed of adjustment, they do not pursue the analysis further. Our argument is that transaction costs also depend on the development of financial markets, the stability of the economic environment, or a country’s legal system. Overall, institutions are not only expected to affect a firm’s debt level, but they may have an impact on the dynamics of capital structure choice as well. Given that this paper examines corporate financial decisions in different institutional environments, it seems natural to analyse the impact of institutions within a dynamic framework.

Our paper focuses on non-financial firms in European countries. Europe provides an excellent sample for studying the impact of different institutional arrangements. Given the purpose of this study, firms were selected from countries that are fairly homogenous in their level of economic development, but that differ with respect to institutional characteristics such as the importance of banks and securities markets, the market for corporate control, or the legal system. In order to have a sufficient number of firms represented to make meaningful comparisons, this study follows Rajan and Zingales (1995) and limits its focus to the largest economies, namely those of France, Germany, Italy, and the UK.

The aim of this paper is to investigate the impact of major institutional and market characteristics on the capital structure dynamics of European firms. In particular, we are interested in determining whether these factors increase or decrease the pace at which firms adjust their financial structure over time. The data contain balance sheet and profit and loss account data from 873 companies in Continental Europe and the UK over the period 1982 to 2002. Also included are country-specific data on the development of financial markets, the economic environment, and the legal system. This paper uses a two-step cross-section approach. In a first step, we use a static capital structure model and compute fitted values as a proxy for the target leverage. In a second step, we estimate a standard partial adjustment model that explains the change in leverage from one period to another by deviations from the target leverage. This setup captures the existence of adjustment costs, which this study analyses with respect to characteristics of the financial institutions as well as the economic and legal environment of the firms considered. Given that financial structure changes cannot always be made immediately, we analyse the adjustment behavior over different time periods. Also, we look at different definitions of leverage.

This paper presents the first study that attempts to analyse the effects of institutions on corporate capital structure dynamics. This study is also one of the few that analyses financial structure decisions of firms from several Continental European countries. The main findings of the study are that the development of stock markets and certain aspects of the legal environment have a
positive impact on the speed at which firms adjust their capital structure. In particular, a better protection of shareholders affects the adjustment process in a positive way. Finally, a higher inflation rate speeds up the adjustment process as well, whereas a higher growth rate of GDP per capita has a significantly positive effect on debt adjustments taking place over several years only.

The paper proceeds as follows: Section 2 defines the capital structure measures and summarizes the characteristics of markets and institutions included in our analysis as well as the hypotheses tested. It also describes the firm-specific capital structure determinants. The description of the data is found in Section 3, and Section 4 specifies the econometric model. Section 5 presents the analysis with the results, Section 6 describes robustness tests, and Section 7 concludes.

2. Capital Structure Decisions of Firms

2.1 Measures of Capital Structure

No universally accepted definition of leverage exists in the literature. As Rajan and Zingales (1995) point out, the definition chosen depends on the objective of the analysis. Following Rajan and Zingales (1995) and Bevan and Danbolt (2002), this study measures the capital structure of a firm by the following two gearing measures. The first gearing measure is simply the ratio of total loan capital over total assets ($debt_{tlc}$). It is the broadest definition of leverage and includes both long-term and short-term debt. The second leverage measure is the ratio of total loan capital to capital calculated as total debt plus equity, including preference shares ($debt_{cap}$). This leverage definition refers to the employed capital, and therefore it best reflects the effects of past financing decisions.

In addition, it is not clear whether leverage should be computed as the ratio of book or market value of debt and equity. As Fama and French (2002) argue, most theoretical predictions apply to book values. Also, book ratios may better reflect management’s target debt ratios (Thies and Klock, 1992). Given that the market value of equity depends on a number of factors that often cannot be directly controlled by a firm, looking at market values may not well reflect the adjustments initiated by a firm’s decision makers. For the same reason, corporate treasurers as well as rating agencies prefer to use book values. Finally, market values of debt are often not available. In this paper, the main results are based on book values. To check the robustness of the book-based results, this study repeats the estimations using corresponding market values, for which the book value of equity is replaced by the market value of equity. That is, the estimations are repeated using the market value of equity instead of the book value of equity. As Bowmann (1980) shows, however, the cross-sectional correlation between the book value and the market value of debt is very large. Therefore, a potential misspecification resulting from the use of book values of debt does not seem to be a serious problem.3

In what follows, we explain potential impacts of market- and institution-specific factors on the dynamics of corporate capital structure. After a description of these factors, we formulate the main hypotheses that will be subjected to the empirical tests mentioned above. Finally, we give details of the firm-specific characteristics that are commonly used to explain a firm’s capital structure.

2.2 Market- and Institution-specific Capital Structure Determinants

The main focus of this paper is to investigate how market- and institution-specific characteristics affect the way firms change their financial structure over time. Assuming the existence of an optimal capital structure, we are particularly interested in the effects of these characteristics on
the speed with which companies adjust their financial structure in order to come as close as possible to their optimal capital structure. We consider country-specific characteristics of the financial institutions, the macroeconomic environment, and the legal system. The inclusion of those variables is motivated by the fact that firms must commit to investors in a credible way and respect contracts in order to obtain outside financing. Typically, the types of contracts not only depend on a firm’s characteristics, but also on those economic institutions that can facilitate the monitoring and enforcement of financial contracts. The development of financial markets, for instance, may be important for corporate finance decisions because it affects the power of banks, the costs of capital and the way agency problems between investors and firms, as well as between shareholders and managers are solved. Also, these mechanisms may differ between the countries considered. They are described next.

Size of stock markets (size_stockmarket): In countries with developed stock markets, firms have better opportunities for diversification. That is, they have incentives to switch from long-term debt to equity. In addition, stock markets reveal firm information that is useful to creditors and makes lending to publicly traded companies less risky (Grossman, 1976; Grossman and Stiglitz, 1980). Accordingly, the existence of active and more liquid stock markets increases the ability of firms to obtain credit. Also, in more developed stock markets, investors have more incentives to become informed, which facilitates external monitoring of firms (Demirgüç-Kunt and Maksimovic, 1999). We measure the size of stock markets by the stock market capitalization relative to gross domestic product (GDP).

Hypothesis 1 Larger stock markets have a positive effect on the speed at which firms adjust their debt ratios towards the target leverage.

Financial intermediaries (size_fin.intermed): A main activity of financial intermediaries, such as central banks, deposit banks, and other financial institutions is to monitor borrowers. According to Diamond (1984), these institutions have economies of scale in information acquisition. They also have greater incentives to use the information collected to discipline borrowers than do small investors, who are affected by the free-rider problem. From this point of view, a more developed banking sector is expected to facilitate access to external finance, especially for smaller firms. As Demirgüç-Kunt and Maksimovic (1999) mention, a developed banking sector leads to an increase in the availability of short-term financing given the comparative monitoring advantage enjoyed by intermediaries. However, the economies of scale and monitoring abilities available to banks also permit them to offer long-term loans that would not be available in a market without intermediaries. As to the effects of financial intermediaries on how firms adjust their capital structure, these are a priori unclear. On the one hand, easier access to capital, similar to more developed stock markets, is expected to have a positive effect on the speed of adjustment. On the other hand, the long-term feature of the relationship between lender and borrower leaves less room and possibly also less necessity for capital structure adjustments. Accordingly, the effect of financial intermediaries on capital structure adjustments is mainly an empirical question. We measure the importance of financial intermediaries using the ratio of domestic assets of deposit banks to GDP.

The efficiency of the legal system (legal_efficiency): The efficiency of the legal system indicates the extent to which laws are implemented. If a system is inefficient, firms are likely to use more short-term debt. According to Diamond (1991) and Rajan (1992), it is more difficult for borrowers to defraud creditors with short-term financing. Also, shorter maturities limit the period during which an opportunistic firm can exploit its creditors without being in default. The efficiency
of the legal system is measured by an index available from the Business International Corporation. It measures the efficiency and integrity of the legal environment as it affects business.

**Commercial law: creditor and shareholder rights (creditor_rgt, shareholder_rgt):** We use two indicators for creditor- and shareholder rights. The indicator for creditor rights is based on whether a country’s bankruptcy laws (i) prohibit an automatic stay on assets, (ii) do not allow borrowers to unilaterally seek bankruptcy protection, (iii) assure secured creditors the right to collateral, and (iv) do not grant the managers tenure pending resolution of bankruptcy. The indicator of shareholder rights is based on whether (i) shareholders are allowed to vote by mail, (ii) shareholders are not required to deposit their shares with a trustee prior to voting, (iii) the law allows cumulative voting for directors, (iv) the law gives minority shareholders special protection, and (v) the minimum percentage of share capital that entitles a shareholder to call for an extraordinary general meeting is less than or equal to 10%. This index measures the costs faced by minority investors who want to influence decision making within the firm. Overall, a more developed legal system is expected to facilitate corporate financial transactions.

**Hypothesis 2** A more efficient legal system and better protection of creditors and shareholders have a positive effect on the speed of adjustment with which firms adjust their debt ratios towards the target leverage.

**Growth rate in GDP per capita:** The growth rate of the GDP per capita is an indicator of corporate financing needs of firms. For the individual company, it proxies the investment opportunity set faced by firms and its effect on the optimal financing of projects (Demirgüc-Kunt and Maksimovic, 1999). The more an economy grows, the more firms need capital to finance their investments. According to Hackbarth et al. (2004), who studied the impact of macroeconomic conditions on credit risk and capital structure choice, firms are expected to adjust their capital structure more often and by smaller amounts in booms than in recessions due to a lower restructuring threshold during good states of the economy. Given that booms are typically characterized by a higher GDP growth, we expect a positive influence of the growth rate of GDP per capita on the speed of capital structure adjustments.

**Hypothesis 3** A higher growth rate for the per-capita GDP has a positive effect on the speed at which firms adjust their debt ratios towards the target leverage.

**Inflation rate:** The inflation rate, which is measured by the yearly change in consumer prices, relates to the government’s ability to manage the economy. Also, it provides information about the stability of the value of the currency in long-term contracts. According to Demirgüc-Kunt and Maksimovic (1999), higher and more variable inflation rates make it costly for investors and firms to contract. Mills (1996) argues that inflation affects the discount rate, and capital structure changes represent the major adjustment that a company can accomplish with respect to discount rates. Also, he shows that a higher inflation rate leads to higher costs of capital. Accordingly, one would expect firms to pay closer attention to optimizing their capital structure, given that deviations from the target leverage are likely to be even more costly in times of higher inflation.

**Hypothesis 4** A higher inflation rate has a positive effect on the speed at which firms adjust their debt ratios towards the target leverage.
2.3 Firm-specific Capital Structure Determinants

This section explains a firm’s optimal or target capital structure using five characteristics: the extent of fixed assets, size, profitability, the firm’s expected growth and the importance of non-debt taxshields. This analysis reflects the standard approach in the literature. Also, we assume the firm’s investment decisions to be exogenous and independent of its capital structure, which is in the spirit of the traditional finance literature.

*Fixed assets (fix)*: Firms with important fixed assets may obtain more favourable conditions to secure debt. First, it is easier for the lender to assess the value of tangible assets than intangibles. Besides this problem of asymmetric information, there is a higher probability for intangible assets to lose value in the case of a discovery. That is, it may be easier to sell machinery than to obtain money for goodwill (Jensen and Mecklin, 1976). We use the total amount of fixed assets over total assets to measure the importance of a firm’s fixed assets.

*Size of firm (size)*: Larger firms are likely to have more diversified market portfolios and therefore face a lower probability of bankruptcy. In addition, as Titman and Wessels (1988) explain, direct bankruptcy costs, which are fixed, constitute a smaller portion of firm value when the firm is larger. Accordingly, large firms may raise external capital at lower costs than smaller firms. This argument suggests a positive influence of the firm’s size on its debt level. According to Rajan and Zingales (1995), however, there may be less asymmetric information about large firms, which decreases their need for external finance. We approximate the size of the firm by the logarithm of its total assets.

*Profitability (profit)*: As Myers and Majluf (1984) point out, firms have a pecking order in the choice of financing their projects. The least costly method is retained earnings, and therefore, firms should prefer internal to external finance. The more profitable a firm is, the lower is its need for external finance. However, when there is asymmetric information about the quality of a firm, the more profitable companies may use a higher debt issue to signal their quality to the market. We use the ratio of earnings before interest and taxes over total assets to measure the profitability of a firm.

*Expected growth (growth)*: According to Titman and Wessels (1988), equity-controlled firms have a tendency to invest sub-optimally to expropriate wealth from bondholders in favour of shareholders, and these agency costs are likely to be higher for firms in growing industries due to more flexibility in the choice of future investments. Therefore, one would expect firms with higher expected growth opportunities to have lower long-term debt levels. We measure the growth potential of a firm by its market-to-book ratio, which is commonly used as a proxy for investment opportunities. The market-to-book ratio is defined as the ratio of the book value of total assets less the book value of equity plus the market value of equity over the book value of total assets.

*Non-debt taxshields (taxshields)*: According to Modigliani and Miller (1958), interest taxshields create strong incentives for debt issue. This holds, however, only when the firm has enough taxable income to justify debt. The tax advantage of debt decreases when other tax deductions, such as depreciation, increase, which has a potentially negative effect on leverage. We build the ratio of depreciations for the year over total assets to capture the importance of non-debt taxshields.

3. Data

3.1 Sample Selection

The basic sample for our investigation targets all the firms in the country-specific Datastream Thomson Financial market indices (TOTMK) of France, Germany, Italy, and the UK. For each
country, these indices include the top 80% of all listed firms by market capitalization.\textsuperscript{10} The selection of those four European countries follows Rajan and Zingales (1995). Note that these countries are fairly homogenous in their economic development, but are, at the same time, also characterized by different institutional arrangements. Also, this analysis needs a minimum number of firms per country in order to be statistically valid, and, for our data source, this condition is not satisfied for other European countries.

As is outlined in Table 1, the indexes for Germany and France each include 248 firms. The Italian index encompasses 159 corporations, and there are 548 firms in the British index.\textsuperscript{11} Due to missing observations for our main regression variables, however, the number of firms shrinks to a total of 1021 corporations. Furthermore, we focus exclusively on non-financial firms. This restriction is necessary because banks as well as investment and insurance companies are subject to specific rules and regulations, and their leverage is severely affected by exogenous factors (Rajan and Zingales, 1995). Therefore, we exclude an additional 109 companies that are categorized as banks, insurance firms, and investment companies according to the Datastream index industry classification. Finally, we require a minimum number of 3 years of consecutive observations for our leverage variables. This restriction eliminates additional 19 companies, which are more or less equally distributed across industries. Also, no systematic country pattern is visible. The firms with insufficient observations, however, are slightly smaller than the firms in the final sample. This leaves a panel of 893 firms, for which there are a total of 9656 observations over the years 1982 to 2002. The panel is unbalanced, and not all companies are present over all the years.

A detailed description of the number of firms by industry and country is given in Table 2. Overall, the Personal Business and Service Industries represent the largest group. The firm data include information on profit and loss accounts and balance sheets from Datastream. They are reported on 31 December of the corresponding year and expressed in euros. The information on institutions and markets are country-specific and are drawn from different sources. Data on the development of financial institutions are taken from \textit{A New Database on Financial Development and Structure} from the World Bank. This database reports indicators of financial development and structure across countries and over time, and it has recently been updated through 2001.\textsuperscript{12} The legal data go back to Demirgüç-Kunt and Maksimovic (1999) and La Porta \textit{et al.} (1998).

\begin{table} [H]
\centering
\begin{tabular}{lcccc}
\hline
 & France & Germany & Italy & UK & Total \\
\hline
Firms in the Datastream market indices & 248 & 248 & 159 & 548 & 1203 \\
Firms with nonmissing observations for main regression variables & 232 & 229 & 128 & 432 & 1021 \\
Firms in non-financial industries & 209 & 202 & 97 & 404 & 912 \\
Firms with at least 3 years of consecutive obs. & 201 & 197 & 91 & 384 & 873 \\
\hline
\end{tabular}
\caption{Number of firms in the original and final sample} \\
\end{table}

Table 1 reports the number of firms by country in the country-specific Datastream market indices \textit{TOTMK} and in the final sample. The Datastream market indices contain for each country the top 80% of all listed companies by market capitalization. The sample of firms in Datastream is unbalanced and not all companies are present over the considered time period from 1982 to 2002.
Table 2. Sample distribution by industry and country

| Industry description                                           | France | Germany | Italy | UK   | Total |
|---------------------------------------------------------------|--------|---------|-------|------|-------|
| Agriculture, Forestry, Fishing and Hunting (AGR)              | 1      | 1       | 0     | 0    | 2     |
| Mining, Oil, Construction (MIN)                               | 14     | 17      | 19    | 55   | 105   |
| Utilities (UTIL)                                              | 7      | 16      | 12    | 24   | 59    |
| Manufacturing of Food, Tobacco and Textiles (MANFT)           | 24     | 21      | 8     | 21   | 74    |
| Manufacturing of Concrete, Wood, Metal and Transportation Equipment (MANHW) | 23     | 23      | 14    | 24   | 84    |
| Manufacturing of Chemicals, Pharmaceuticals and Biotechnology (CHEM) | 14     | 27      | 2     | 21   | 64    |
| Engineering, Software, IT (ENG)                              | 28     | 44      | 9     | 51   | 132   |
| Wholesale and Retail Trade (WST)                             | 20     | 13      | 2     | 38   | 73    |
| Transportation and Warehousing (TRANS)                        | 11     | 3       | 5     | 27   | 46    |
| Personal and Business Services, incl. Health Care and Social Assistance (SERV) | 53     | 25      | 16    | 122  | 213   |
| Miscellaneous (DIV)                                          | 3      | 6       | 4     | 0    | 13    |
| Total                                                         | 201    | 197     | 91    | 384  | 873   |

Table 2 reports the number of firms in the sample per country and industry. The data are taken from the Datastream Thomson Financial database, and the firms represent a subsample of the firms in the country-specific market indices TOTMK, which include for each country the top 80% of all the listed firms by market capitalization. The time period is 1982 to 2002.

Collectively, the legal data represent average values over the years 1980–1991. Given that these characteristics remain rather stable over the years, the lack of yearly data does not represent a serious problem. The economic data, for which there are values up to 2002, are taken from the World Bank Development Indicators database.13

3.2 Descriptive Statistics

Descriptive statistics of the firm-specific variables across countries and overall are reported in Table 3. Looking at the debt ratios, the picture clearly differs depending on the leverage definition considered. For the broad leverage definition debt_tlc, the ratio of total loan capital over total assets, the French firms have the highest leverage, whereas German firms are characterized by the lowest leverage. For the third leverage definition debt_cap, which refers to the employed capital, Italy exhibits the highest value whereas both German and British firms are the least leveraged.

As to the capital structure determinants considered, British firms tend to have the highest fixed assets ratio. At the same time, British companies are also characterized, together with Italy, by rather low non-debt taxshields. Note that the British firms are smaller than the French, German and Italian companies, on average. As to profitability, the UK firms in our sample seem to be more profitable than the Continental European companies, even though the differences are no larger
Table 3. Descriptive statistic of firm-specific variables across countries

| Variable          | France | Germany | Italy | United Kingdom | All  |
|-------------------|--------|---------|-------|----------------|------|
| Broad debt ratio  | 0.16   | 0.10    | 0.14  | 0.14           | 0.14 |
| \((\text{debt}_{\text{tlc}})\) | (0.13) | (0.11)  | (0.11)| (0.14)         | (0.13)|
| Employed capital ratio | 0.32   | 0.23    | 0.39  | 0.23           | 0.26 |
| \((\text{debt}_{\text{cap}})\) | (0.23) | (0.22)  | (0.13)| (0.21)         | (0.22)|
| Fixed assets ratio | 0.28   | 0.32    | 0.27  | 0.41           | 0.35 |
| \((\text{fix})\) | (0.22) | (0.17)  | (0.19)| (0.25)         | (0.23)|
| Size              | 13.96  | 13.85   | 14.26 | 12.88          | 13.43|
| \((\text{size})\) | (1.70) | (1.69)  | (1.67)| (1.76)         | (1.81)|
| Profitability     | 0.07   | 0.07    | 0.06  | 0.09           | 0.08 |
| \((\text{profit})\) | (0.09) | (0.08)  | (0.07)| (0.12)         | (0.11)|
| Market-to-book ratio | 1.59   | 1.61    | 1.28  | 2.01           | 1.78 |
| \((\text{growth})\) | (1.34) | (1.53)  | (1.09)| (2.61)         | (2.09)|
| Non-debt taxshields | 0.05   | 0.07    | 0.04  | 0.04           | 0.05 |
| \((\text{taxshield})\) | (0.03) | (0.04)  | (0.03)| (0.03)         | (0.03)|
| No. of observations | 2032  | 2030    | 835   | 4759           | 9656 |
| No. of companies  | 201    | 197     | 91    | 384            | 873  |

Table 3 reports means and standard deviations (in brackets) by country of the debt ratios and the firm-specific capital structure determinants over the period 1982 to 2002 for all firms used in the final sample. The variables are defined as follows: \(\text{debt}_{\text{tlc}}\) is the broad debt ratio and defined as ratio of total loan capital (Datastream variable no. 321) over total assets (Datastream variable no. 392); \(\text{debt}_{\text{cap}}\) is the employed capital ratio and defined as ratio of total loan capital over the sum of the book value of equity capital and reserves (Datastream variable no. 305) plus preference shares (Datastream variable no. 306); \(\text{fix}\) is the ratio of fixed assets (Datastream variable no. 330) over total assets; \(\text{size}\) is the natural logarithm of total assets; \(\text{profit}\) is the ratio of earnings before interest and taxes \(\text{EBIT}\) (Datastream variable no. 154) over total assets; \(\text{growth}\) is the ratio of the book value of total assets less the book value of equity plus the market value of equity over the book value of total assets (market-to-book ratio); \(\text{taxshield}\) is the ratio of depreciation (Datastream variable no. 136) over total assets. The data are taken from the Datastream Thomson Financial database, and the firms represent a subsample of the firms in the country-specific market indices \(\text{TOTMK}\), which include for each country the top 80% of all the listed firms by market capitalization.

than two and three percentage points, respectively. Finally, British firms exhibit the highest and Italian firm the lowest growth rate over the time period considered.

Table 4 reports descriptive statistics of the country-specific characteristics on markets and institutions. In contrast to the considered Continental European countries, most of the largest companies in the UK are quoted on the stock markets. Accordingly, stock market capitalization, captured by the variable \(\text{size}_{\text{stockmarket}}\), is much larger than for France, Germany, and Italy over the period considered. Financial intermediaries are most important in Germany, where banks are dominant. As to the legal system variables, the UK has the most efficient legal system, even though it is closely followed by Germany. Protection of creditors and shareholders also seems to be most elaborate in UK. Note that creditor rights are particularly weak in France, whereas Italy has poor shareholder rights. Furthermore, the British economy is characterized by the highest growth rate, namely 2.24% on average. This figure is quite impressive compared to the corresponding values of the Continental European countries. Finally, concerning inflation, the highest rate is found in Italy, although the rate in Great Britain was also above 3.5% during the same period. Note that the time period covers the years 1982 to 2001 for the financial market variables and 1982–2002 for the economic variables. The legal variables do not vary over the time period studied.
Table 4. Descriptive statistic of country-specific variables across countries

| Variable                           | France | Germany | Italy | United Kingdom | All   |
|------------------------------------|--------|---------|-------|----------------|-------|
| Size of stock markets              | 0.47   | 0.32    | 0.29  | 1.17           | 0.77  |
| (size_stockmarket)                 | (0.28) | (0.17)  | (0.18)| (0.35)         | (0.49)|
| Size of financial intermediaries   | 1.01   | 1.31    | 0.87  | 1.07           | 1.09  |
| (size_fin.intermed)                | (0.06) | (0.15)  | (0.26)| (0.22)         | (0.23)|
| Growth rate of GDP per capita in % | 1.66   | 1.59    | 1.59  | 2.24           | 1.93  |
| (growth_gdp)                       | (1.17) | (1.5)   | (1.10)| (0.01)         | (1.92)|
| Inflation rate in %                | 2.27   | 2.07    | 3.87  | 3.59           | 3.02  |
| (inflation)                        | (1.90) | (1.3)   | (2.06)| (0.02)         | (3.01)|
| Efficiency of the law              | 8      | 9       | 6.75  | 10             | 9.08  |
| (legal_efficiency)                 |        |         |       |                | (1.06)|
| Protection of creditors            | 0.10   | 3.10    | 2.20  | 4              | 2.82  |
| (creditor_rgt)                     |        |         |       |                | (1.51)|
| Protection of shareholders         | 2      | 1       | 0     | 4              | 2.59  |
| (shareholder_rgt)                  |        |         |       |                | (1.47)|

Table 4 shows means and standard deviations (in brackets) by country for the following variables: size_stockmarket is the size of stock markets defined as ratio of the value of listed shares over GDP; size_fin.intermed is the size of financial intermediaries defined as ratio of domestic assets of deposit banks over GDP; growth_gdp is the annual growth rate of the GDP per capita and expressed in %; inflation is the inflation rate as measured by the annual change in consumer prices and expressed in %; legal_efficiency is an indicator measuring the efficiency of the legal system (with 0 as lowest and 10 as highest possible value); creditor_rgt is an indicator measuring the rights of creditors (with 0 as lowest and 4 as highest possible value); shareholder_rgt is an indicator measuring the rights of shareholders (with 0 as lowest and 4 as highest possible value. The time period covers the years 1982–2001 for the financial market variables and 1982–2002 for the economic variables. The legal variables do not vary over time. The financial market data are taken from ‘A New Database on Financial Development and Structure’ from the World Bank. The economic data stems from the World Bank Development Indicators Database. The legal data are taken from Demirgüç-Kunt and Maksimovic (1999) and La Porta et al. (1998).

4. Empirical Framework

4.1 The Econometric Model

To understand how firms restructure their capital structure over time, this paper uses a standard partial adjustment model, where the change in leverage from one period to another \((d_{it} - d_{it-j})\) is explained by the deviation of the current debt ratio from its target \((d_{it}^* - d_{it-j}^*)\). This specification implies that firms may face costs in adjusting their debt ratio. Therefore, it is also possible that firms are not always at their target leverage, and in each period a partial adjustment towards the optimal debt ratio can take place. Given that the financial structure adjustments take time and do not necessarily take place within one period, we consider the adjustment behaviour over a period of five years, that is, \(j = 1, \ldots, 4\):

\[
(d_{it} - d_{it-j}) = \beta_0 + \beta_1(d_{it}^* - d_{it-j}^*) + e_{it} \quad j = 1, \ldots, 4; \quad t = 1, \ldots, T
\]

(1)

\(\beta_1\) is the target-adjustment coefficient. It measures how adjustment costs slow the movement of leverage towards its target. If a firm completely adjusted to its target, the adjustment coefficient \(\beta_1\) would be one. Partial adjustment (\(\beta_1 < 1\)) is expected in a world in which adjustment is itself costly. The larger this value, the higher is the speed of adjustment to the target leverage. The remainder disturbance is captured by \(e_{it}\) with mean zero and constant variance.

To see which factors drive the debt adjustment process, we follow Fama and French (2002) and expand the simple adjustment model by including a vector \(Z\) of additional variables that are
expected to affect the adjustment behavior to the target leverage:

\[(d_{it} - d_{it-j}) = \beta_0 + \beta_1 (d^*_{it} - d_{it-j}) + \beta_2 Z + e_{itj} \quad j = 1, \ldots, 4; \quad t = 1, \ldots, T \]

(2)

This setup allows us to test whether a specific variable produces temporary movements in leverage away from the target. A positive coefficient for \(\beta_2\) means that this specific factor has a positive effect on the speed of adjustment, while the opposite holds for a negative coefficient for \(\beta_2\).

The \(Z\) vector includes the country-specific characteristics for financial institutions, the economic environment, as well as the legal system as explained in Section 2.2. Due to collinearity issues, we include each country-specific variable separately. In addition, we control for firm-specific variables that are considered to affect the adjustment process, namely the size of the firm, the absolute distance between the current and the optimal debt ratio, and expected growth (Banjeree et al., 2004).

Given that we cannot observe the optimal debt ratio \(d^*_{it}\), we follow again Fama and French (2002) by applying a two-step regression approach. In a first step, we compute the fitted values from estimating the static capital structure model given by (3) and use them as a proxy for the target leverage \(d^*_{it}\): we regress the observed debt ratio of firm \(i\) on a vector of the firm-specific capital structure determinants \(X\) as outlined in Section 2.3. We use the lags of these variables to reduce a potential endogeneity problem and to capture inertia in the expectation process. To allow for industry heterogeneity, we additionally include a set of industry dummy variables as defined in Table 2, with the Personal and Business Services industries as our benchmark case (Phillips, 1995). The remainder disturbance is again captured by \(e_{it}\) with mean zero and constant variance.

\[d_{it} = X_{it-1}\alpha = \alpha_0 + \alpha_1 fix_{it-1} + \alpha_2 size_{it-1} + \alpha_3 profit_{it-1} + \alpha_4 growth_{it-1} + \alpha_5 taxshield_{it-1} + e_{it}\]

(3)

In a second step, we estimate the adjustment models given by (1) and (2), respectively, while substituting the optimal debt ratio \(d^*_{it}\) by the fitted values from estimating Equation 3, \(\hat{d}_{it}\). Note also that it is common to include the target debt ratio \(\hat{d}_{it}\) as well as the lagged debt ratio \(d_{it-1}\) rather than the difference between the two variables as explanatory factors when estimating the partial adjustment model.

4.2 A Comment on the Estimation Methods

As Fama and French (2002) outline, most studies that use this type of model ignore the problem of cross-sectional correlation as well as the potential inference problem caused by autocorrelation of the residuals. In order to address these issues, we follow Fama and French (2002) and estimate Equations 1, 2 and 3 with year-by-year cross-section regressions, and use Fama–MacBeth time-series standard errors, which incorporate estimation errors caused by correlation of the residuals across firms (Fama and MacBeth, 1973). In particular, we first obtain estimates of the target leverage from separate time-series regressions for each company. In the second step, we run yearly cross-sectional regressions of Equations 2 and 3. We then compute the average from each time-series of parameter estimates that represent the coefficient of the variables. The \(t\)-statistics are computed according to

\[t(\hat{\beta}_k) = \frac{\hat{\beta}_k}{\hat{\sigma}(\hat{\beta}_k)/\sqrt{T}}\]

(4)
where $\hat{\beta}_{kt}$ is the cross-sectional estimate of the characteristic $k$ for each year $t$, with $t = 1, \ldots, T$, $\bar{\hat{\beta}}_k$ is the average of the cross-sectional estimates $\hat{\beta}_{kt}$, $\hat{\sigma}(\hat{\beta}_k)$ is the standard deviation of the $\hat{\beta}_{kt}$, and $T$ is the number of cross-sectional estimates or the number of years.

To control for the potential inference problem caused by autocorrelation of the residuals, we provide a robustness check of our results by estimating our model with pooled OLS regressions where we correct the standard errors for autocorrelation. Similarly to the Fama–MacBeth estimation method, we generate in a first step the fitted values of the static capital structure equation and include them as a proxy for the target leverage in the adjustment model. Note that we additionally include time dummies in order to control for effects that may change over the years. For both estimation methods, the standard errors are corrected for heteroscedasticity.

5. Analysis and Results

5.1 Determinants of Debt Levels Across Countries

Given the institutional differences between countries, one may expect that the importance of the firm-specific capital structure determinants varies as well. To see this, we first estimate the static capital structure model as given by (3) separately for each country. Table 5 reports the corresponding results. Similar to the results in Bevan and Danbolt (2002), the picture differs depending on the leverage definition.

As expected by standard capital structure theories, firms with more important fixed assets tend to be more leveraged. This result is significant except for the broad debt ratio of Italian firms. As to size, the picture is mixed. Firm size has a positive impact on leverage in the UK and France only, while for the latter country the result is significant for the employed capital definition only. The results for the profitability variable provide support for the pecking order argument of debt financing, for both British and Continental European firms except Germany, where the relationship is not significant for the broad debt ratio. The impact of expected growth on leverage is positive for British firms. This result stands in line with the agency cost argument mentioned above. However, we find a negative effect of expected growth on leverage for German and Italian companies, even though for Italy the result is significant for the employed capital debt ratio only. Finally, higher non-debt taxshields have a negative impact on the broad debt ratio, except for Italian firms. With the employed capital ratio, this negative relationship holds for German firms only.

Overall, the results show that the debt determinants vary depending on the leverage measure. Furthermore, we do not find strong evidence that the capital structure determinants systematically differ between the countries considered. In particular, there is no specific pattern indicating large differences between the financial structure decisions of British and Continental European companies.

5.2 Determinants of Debt Adjustments Across Countries

Let us now turn to the investigation of capital structure adjustments. To identify potential country-specific effects, we start again by looking at the dynamics of capital structure decisions across countries. First, we focus on changes in financial structure that firms realize within one year. That is, we estimate the adjustment model for $j = 1$ as given by (2), with the inclusion of the firm-specific control variables size of firm, distance from current to the optimal debt ratio and expected
Table 5. Determinants of debt levels across countries

|          | France | Germany | Italy | United Kingdom |
|----------|--------|---------|-------|----------------|
| debt_tlc |        |         |       |                |
| fix_{t-1} | 0.22** | 0.24** | -0.02 | 0.12**         |
|          | (11.56) | (12.92) | (-0.47) | (6.98)         |
| size_{t-1} | 0.001 | -0.002 | 0.002 | 0.02**         |
|          | (0.63) | (-1.02) | (0.44) | (19.08)        |
| profit_{t-1} | -0.35** | 0.001 | -0.29** | -0.33**         |
|          | (-3.42) | (0.01) | (-4.10) | (-4.36)        |
| growth_{t-1} | 0.001 | -0.03** | -0.02 | 0.01*          |
|          | (0.08) | (-3.49) | (-1.19) | (2.40)         |
| taxshield_{t-1} | -0.25* | -0.65** | 0.09 | -0.51**         |
|          | (-2.40) | (-8.87) | (0.33) | (-8.11)        |
| constant | 0.15** | 0.19** | 0.16\(^{(*)}\) | -0.04**         |
|          | (4.42) | (6.83) | (1.99) | (-2.94)        |
| R^2     | 0.29 | 0.25 | 0.11 | 0.28 |
| N       | 2035 | 2033 | 837 | 4762 |

|          |        |         |       |                |
|----------|--------|---------|-------|----------------|
| debt_cap |        |         |       |                |
| fix_{t-1} | 0.08* | 0.38** | 0.11\(^{(*)}\) | 0.04* |
|          | (2.61) | (14.55) | (1.73) | (2.13)         |
| size_{t-1} | 0.02** | 0.01 | 0.002 | 0.03**         |
|          | (6.75) | (1.07) | (0.07) | (19.55)        |
| profit_{t-1} | -1.13** | -0.38* | -1.23** | -0.62**         |
|          | (-8.86) | (-2.66) | (-3.61) | (-4.58)        |
| growth_{t-1} | 0.03 | -0.08** | -0.06* | 0.01*          |
|          | (1.09) | (-3.62) | (-2.62) | (2.65)         |
| taxshield_{t-1} | -0.45 | -1.28** | 0.34 | 0.10 |
|          | (-1.40) | (-6.52) | (0.70) | (0.90)         |
| constant | 0.09 | 0.39** | 0.46 | -0.09**         |
|          | (1.24) | (4.91) | (1.05) | (-4.03)        |
| R^2     | 0.30 | 0.24 | 0.29 | 0.23 |
| N       | 2014 | 1933 | 822 | 4749 |

Table 5 reports means of the estimates from yearly OLS regressions for each year from 1988 to 2002 of leverage on the lagged value of the following firm-specific capital structure determinants: fix is the ratio of fixed assets over total assets; size is the natural logarithm of total assets; profit is the ratio of earnings before interest and taxes (EBIT) over total assets; growth is the ratio of total assets less the book value of equity plus the market value of equity over total assets (market-to-book ratio); taxshield is the ratio of depreciation over total assets. The dependent leverage variables are defined as follows: debt_tlc is the broad debt ratio and defined as ratio of total loan capital over total assets; debt_cap is the employed capital ratio and defined as ratio of total loan capital to the sum of total debt and equity, including preference shares; t-statistics for the means are in brackets and are defined as the mean divided by its standard error, which is the time-series standard deviation of the regression coefficient divided by \(21^{1/2}\). Standard errors are corrected for heteroscedasticity. Industry dummies are included. \(**, *, (\cdot)\) denotes statistical significance at the 10%, 5%, and 1% level. The regression R^2 are adjusted for degrees of freedom. N refers to the total number of observations over all the years.

growth. Table 6 reports the corresponding results. Our main interest focuses on the movement of leverage towards its target. This is captured by the coefficient of the target leverage ratio, which indicates to what extent leverage is mean-reverting. As noted earlier, a larger coefficient can be interpreted as a higher speed of adjustment to the target debt ratio.
Table 6 reports means of the estimates from yearly OLS regressions for each year from 1988 to 2002 of the change in leverage from year $(t-1)$ to $t$ on the optimal debt level denoted by $d_t^*$, the debt level lagged by one year, size (ln of total assets), the absolute distance between the current and optimal debt level ($dist_t$), and the market to book ratio ($growth_t$). The dependent leverage variables are defined as follows: $debt_{tlc}$ is the broad debt ratio and defined as ratio of total loan capital over total assets; $debt_{cap}$ is the employed capital ratio and defined as ratio of total loan capital to the sum of total debt and equity, including preference shares; $t$-statistics for the means are in brackets and are defined as the mean divided by its standard error, which is the time-series standard deviation of the regression coefficient divided by $(21)^{1/2}$. Standard errors are corrected for heteroscedasticity. ***, *, and (°) denotes statistical significance at the 10%, 5%, and 1% level. The regression $R^2$ are adjusted for degrees of freedom. $N$ refers to the total number of observations over all the years.

Table 6. One-year capital structure adjustments across countries

|                  | France | Germany | Italy | United Kingdom |
|------------------|--------|---------|-------|---------------|
| $debt_{tlc}$     |        |         |       |               |
| $d_t^*$          | 0.23** | 0.11*   | 0.03  | 0.19**        |
| $(6.25)$         | (2.36) | (0.29)  | (7.14)|               |
| $d_{t-1}$        | −0.31**| −0.21** | −0.23**| −0.26**       |
| $(−10.13)$       | $(−7.32)$| $(−4.76)$| $(−14.59)$|               |
| $size_t$         | 0.002**| −0.001  | 0.01**| 0.003**       |
| $(2.20)$         | (−1.44)| (3.49)  | (4.34)|               |
| $dist_t$         | 0.43** | 0.22**  | 0.41**| 0.28**        |
| $(8.70)$         | (3.66) | (4.18)  | (7.40)|               |
| $growth_t$       | 0.01   | 0.01    | 0.03  | 0.002         |
| $(1.15)$         | (0.67) | (1.01)  | (0.33)|               |
| Constant          | −0.05**| 0.01    | −0.17*| −0.05**       |
| $(−2.87)$         | (0.90) | (−2.18) | (−4.84)|               |
| $R^2$            | 0.29   | 0.23    | 0.33  | 0.29          |
| $N$              | 1832   | 1833    | 745   | 4376          |

|                  |        |         |       |               |
| $debt_{cap}$     |        |         |       |               |
| $d_t^*$          | 0.22** | 0.07    | 0.16  | 0.14***       |
| $(5.17)$         | (1.47) | (0.82)  | (4.90)|               |
| $d_{t-1}$        | −0.29**| −0.16** | −0.38*| −0.28**       |
| $(−8.75)$        | $(−8.82)$| $(−1.83)$| $(−17.18)$|               |
| $size_t$         | 0.01** | −0.001  | −0.01 | 0.01**        |
| $(3.16)$         | (−0.46)| (0.50)  | (3.53)|               |
| $dist_t$         | 0.38** | 0.18**  | 1.02  | 0.24*         |
| $(7.22)$         | (3.59) | (1.37)  | (4.36)|               |
| $growth_t$       | 0.01   | 0.01    | 0.03  | 0.01          |
| $(0.99)$         | (1.44) | (0.79)  | (0.85)|               |
| constant          | −0.13**| 0.02    | −0.20 | −0.06**       |
| $(−3.50)$         | (0.53) | $(−1.33)$| $(−3.10)$|               |
| $R^2$            | 0.25   | 0.14    | 0.20  | 0.20          |
| $N$              | 1806   | 1723    | 727   | 4360          |

To a certain extent, the results differ again depending on the definition of leverage. For our broad leverage definition $debt_{tlc}$, the average slopes on the target leverage $d_t^*$ are significantly positive for France, Germany, and the UK. Also, it seems that with a coefficient of 23% French firms adjust their capital structure at the highest speed. They are followed by British corporations, which have a coefficient of 19%. We do not find evidence of mean-reverting leverage for Italian
firms. As predicted by the partial adjustment model, the average slopes on lagged leverage \( d_{t-1} \) are negative. As to the control variables, larger firms seem to adjust much faster, except in Germany where the relationship is not significant. Furthermore, a larger absolute distance between target and current leverage has a positive effect on the speed of adjustment for all the firms in our sample. This finding supports the view that firms react once the gap between the current debt ratio and the target has reached a certain level. Finally, expected growth does not seem to be an important determinant of the speed of adjustment to the target capital structure.

For our second debt definition \( \text{debt}_\text{cap} \), the results are similar. There are, however, two exceptions. We no longer find any evidence for the existence of adjustment costs in Germany, and the control variables size and distance to target leverage are no longer statistically significant for Italian companies.

Given that changes in the financial structure are costly, we do not expect all adjustments to take place within a single year. More likely, the adjustment processes are spread out over a longer time period. To see this, we investigate the debt adjustments that take place over the past two, three, and four years: we estimate the adjustment model as given by (3) for \( j = 2, 3, 4 \). That is, we take the difference between the current debt ratio and its \( j \)th lag as the dependent variable. Similarly, we include the \( j \)th lag as a covariate, as well as the same firm-specific controls as before. Table 7 reports the results. In order to save space, we only report the estimates for the target and lagged debt ratios. Also, the estimates for the firm-specific control variables and the constant are similar to those for the one-year adjustments.

The main results for capital structure adjustments over two-, three- and four-year periods are the following: the coefficients of the target leverage ratio \( d_t^* \) increase with the length of the adjustment period, and this holds across countries and debt ratios, except for Italy. Whereas the coefficients of the lagged debt ratios were at most 23% for the one-year adjustments, those for the debt adjustments over two and more years are significantly higher in most cases. This observation of increasing target leverage coefficients over the length of the adjustment period suggests that firms are getting closer to their target leverage when they have an adjustment period over several years. Similarly, it means that capital structure adjustments need time and usually spread out over longer time periods. Finally, note that in comparison to the results from the one-year adjustment behavior, the average slopes on the target and the lagged debt ratios are much closer to each other in absolute terms, which is desirable given the model specification.

As mentioned earlier, it is likely that the debt adjustment processes are influenced by the country-specific institutional and market characteristics. It is possible, for instance, that firms in countries with larger stock markets, such as France and the UK, have better access to capital that allows them to adjust faster. Similarly, the rather slow long-term debt adjustment of German firms might have to do with the fact that financial intermediaries are relatively important. Even though our preliminary findings reveal some potentially interesting observations, they only provide indirect evidence in this matter. In order to further investigate these issues, we now want to include the characteristics of financial markets, the legal system and the economic environment, as discussed in subsection 2.2., as additional explanatory variables in our adjustment model. This is the subject of the next two subsections.

5.3 Effects of Institution- and Market-specific Characteristics on Debt Adjustments

The analysis of market- and institutions-specific effects on corporate capital structure adjustments represents the most direct test of our hypotheses as formulated in Section 2. For this purpose,
Table 7. Capital structure adjustments across countries over two, three and four years

|                | France          | Germany          | Italy           | United Kingdom  |
|----------------|-----------------|------------------|-----------------|-----------------|
| \((\text{debt}_t - \text{debt}_{t-j})\) | \(j = 2\)       | \(j = 3\)       | \(j = 4\)       | \(j = 2\)       |
|                | \(j = 3\)       | \(j = 4\)       | \(j = 4\)       | \(j = 4\)       |
| \(d_t^*\)     | 0.40**          | 0.48**          | 0.59**          | 0.32**          |
|                | (9.50)          | (9.31)          | (7.48)          | (6.48)          |
| \(d_{t-j}\)   | -0.43**         | -0.48**         | -0.54**         | -0.34**         |
|                | (1321)          | (-20.67)        | (-28.05)        | (-9.66)         |
| \(R^2\)       | 0.37            | 0.40            | 0.45            | 0.31            |
| \(N\)         | 1643            | 1470            | 1316            | 1655            |

|                | France          | Germany          | Italy           | United Kingdom  |
|----------------|-----------------|------------------|-----------------|-----------------|
|                | \(j = 3\)       | \(j = 4\)       | \(j = 4\)       | \(j = 4\)       |
| \(d_t^*\)     | 0.70**          | 0.92**          | 0.51**          | 0.92**          |
|                | (10.90)         | (10.77)         | (5.65)          | (6.35)          |
| \(d_{t-j}\)   | -0.52**         | -0.62**         | -0.29**         | -0.37**         |
|                | (-12.08)        | (-13.64)        | (-15.19)        | (-17.24)        |
| \(R^2\)       | 0.34            | 0.38            | 0.45            | 0.21            |
| \(N\)         | 1617            | 1445            | 1295            | 1542            |

Table 7 reports means of the estimates from yearly OLS regressions for each year from 1988 to 2002 of the change in leverage from year \((t-j)\) to \(t\) on the optimal debt level denoted by \(d_t^*\), the lagged debt level \(d_{t-j}\), size (ln of total assets), the absolute distance between the current and optimal debt level \((\text{dist})\), and the market to book ratio \((\text{growth})\). Only the coefficients of the optimal and the lagged level are shown. Constant included. The dependent leverage variables are defined as follows: \(\text{debt}_{-\text{tlc}}\) is the broad debt ratio and defined as ratio of total loan capital over total assets; \(\text{debt}_{-\text{cap}}\) is the employed capital ratio and defined as ratio of total loan capital to the sum of total debt and equity, including preference shares; \(t\)-statistics for the means are in brackets and are defined as the mean divided by its standard error, which is the time-series standard deviation of the regression coefficient divided by \((21 - j)^{1/2}\). Standard errors are corrected for heteroscedasticity. **, *, and (*) denotes statistical significance at the 10%, 5%, and 1% level. The regression \(R^2\) are adjusted for degrees of freedom. \(N\) refers to the total number of observations over all the years.
we estimate the adjustment model as given by (3) for the complete sample while including the country-specific characteristics on institutions and markets. We again control for firm-specific characteristics such as size, distance to the optimal debt ratio and expected growth. Given that the country-specific variables are not independent of each other, we include each characteristic separately in order to isolate the specific effects and to avoid multicollinearity.

Table 8 shows the results for the three sets of explanatory variables. In order to save space, we again only report the estimates for the country-specific characteristic under consideration as well as the target and lagged debt ratios. The upper part of Table 8 refers to the impact of the financial market developments, namely the size of stock markets and the size of financial intermediaries, on capital structure adjustments. The results support our first hypothesis of larger stock markets having a positive effect on the speed of adjustment. This finding also explains the higher adjustment coefficient for firms in France and the UK, which are the countries with the most highly developed stock markets. Interestingly, the positive impact of stock market development on capital structure adjustments seems to be slightly stronger for the three and four-year adjustments of the employed capital debt ratio $\text{debt}_\text{cap}$.

In contrast to the importance of stock markets, financial intermediaries have a negative impact on the pace of capital structure adjustment, with an even stronger effect on $\text{debt}_\text{cap}$. Again, this effect becomes stronger with the length of the adjustment period. As mentioned earlier, the effect of financial intermediaries on the extent of capital structure adjustments is a priori undetermined. Even though financial intermediaries are expected to facilitate access to capital, the long-term character of the relationship between lender and borrower and therefore the firms’ stronger dependence on banks, for instance, may well lower flexibility with respect to their capital structure adjustments.\(^{16}\)

Our second set of country-specific variables refers to the legal system. As formulated by our second hypothesis, a more efficient legal system as well as better protection of shareholders and creditors are expected to speed up the capital structure adjustment process. The middle part of Table 8 shows the corresponding results. While the efficiency of the legal system and better protection of creditors do not seem to have any significant effect on the adjustment behavior, the extent of shareholder rights has a positive and highly significant effect on the adjustment behaviour. These results provide partial support for our second hypothesis. Apparently, not all dimensions of the legal environment considered seem to matter for debt adjustments.

Let us finally look at the impact of economic factors such as GDP per capita growth rate and inflation rate on corporate capital structure adjustments. As is reported in the lower part of Table 8, the estimation results are at least partly consistent with our hypotheses. As predicted by the theoretical model of Hackbarth et al. (2004), a higher growth rate of GDP per capita has a positive impact on the capital structure adjustments, even though the results are only significant debt adjustments over four years. A higher inflation rate has a positive and significant impact on the speed of financial structure adjustment as well. The same holds for $\text{debt}_\text{cap}$, for which the impact of economic characteristics is even stronger. We interpret these results as support for our third and to a lesser extent also for our fourth hypotheses. Most importantly, our results provide further empirical evidence that macroeconomic factors matter for capital structure decisions of firms. So far, only a small number of empirical studies investigating this issue have been conducted.\(^{17}\)

As to the coefficients of the control variables, the results confirm our earlier findings that firm size as well as the distance between current and target leverage have a positive effect on the adjustment of the leverage measures, while expected growth does not seem to affect the capital structure adjustments considered.
Table 8. The effects of financial market, legal and economic characteristics on capital structure adjustments

\[
(debt_t - debt_{t-j}) = \begin{pmatrix} \text{debt}_{t-1} c \\ \text{debt}_{t-2} c \\ \text{debt}_{t-3} c \\ \text{debt}_{t-4} c \end{pmatrix}
\]

| Panel A | Financial market characteristics | Legal characteristics |
|---------|---------------------------------|-----------------------|
| \(d_t \) | 0.15** 0.29** 0.39** 0.46** | 0.16** 0.32** 0.41** 0.49** |
| \(d_{t-j} \) | -0.24** -0.37** -0.45** -0.51** | -0.24** -0.37** -0.45** -0.51** |
| size_stockmarket_t | 0.01** 0.01** 0.01** 0.01** | 0.01** 0.01** 0.01** 0.01** |
| size_fin.intermed_t | -0.01* -0.01* 0.02* -0.03** | 0.02* 0.03** 0.05** 0.08** |
| R² | 0.20 0.28 0.32 0.37 | 0.20 0.28 0.33 0.38 |
| N | 7697 6953 6254 5605 | 7543 6792 6114 5485 |

Financial market characteristics:
- **(debt_t - debt_{t-j})**
  - \(d_t \)
  - \(d_{t-j} \)
  - \(size_{stockmarket_t} \)
  - \(size_{fin.intermed_t} \)
  - \(R² \)
  - \(N \)

Legal characteristics:
- **(debt_t - debt_{t-j})**
  - \(d_t \)
  - \(d_{t-j} \)
  - \(legal_{efficiency_t} \)
  - \(R² \)
  - \(N \)
|                | $d_t^*$  | 0.17** | 0.33** | 0.43** | 0.50** | 0.11** | 0.28** | 0.41** | 0.51** |
|----------------|----------|--------|--------|--------|--------|--------|--------|--------|--------|
|                |          | (11.56) | (14.67) | (17.26) | (1782) | (7.60) | (16.82) | (19.31) | (17.47) |
|                | $d_{t-j}$ | -0.25** | -0.38** | -0.45** | -0.51** | -0.23** | -0.36** | -0.46** | -0.53** |
|                |          | (-23.40) | (-25.42) | (-28.97) | (-29.30) | (-18.58) | (-24.78) | (-29.18) | (-33.20) |
| $creditor_{rgt_t}$ | -0.001  | -0.001  | -0.001  | -0.001  | -0.002  | -0.002  | -0.002  | -0.001  | -0.001  |
| $R^2$          |          | 0.19    | 0.29    | 0.33    | 0.37    | 0.16    | 0.25    | 0.30    | 0.33    |
| $d_t^*$        | 0.14**   | 0.28**  | 0.38**  | 0.46**  | 0.10**  | 0.27**  | 0.40**  | 0.50**  |        |
|                |          | (7.99)  | (11.25) | (13.78) | (16.17) | (6.33)  | (44.75) | (17.74) | (16.61) |
|                | $d_{t-j}$ | -0.24** | -0.37** | -0.45** | -0.51** | -0.22** | -0.35** | -0.44** | -0.51** |
|                |          | (-20.92) | (-22.86) | (-25.64) | (-28.30) | (-14.73) | (-19.26) | (-22.51) | (-29.09) |
| $shareholder_{rgt_t}$ | 0.003** | 0.003** | 0.004** | 0.01**  | 0.004** | 0.01**  | 0.01**  | 0.01**  |        |
|                |          | (5.03)  | (5.26)  | (6.05)  | (7.40)  | (3.49)  | (3.78)  | (4.36)  | (4.99)  |
| $R^2$          |          | 0.19    | 0.28    | 0.33    | 0.37    | 0.19    | 0.24    | 0.29    | 0.33    |
| $N$            | 8786     | 7968    | 7208    | 6495    | 8616    | 7792    | 7052    | 6361    |        |

**Panel B**

|                | $d_t^*$  | 0.15** | 0.30** | 0.40** | 0.48** | 0.10** | 0.27** | 0.41** | 0.51** |
|----------------|----------|--------|--------|--------|--------|--------|--------|--------|--------|
|                |          | (9.37)  | (13.40) | (15.66) | (17.63) | (6.19)  | (15.24) | (18.14) | (17.20) |
|                | $d_{t-j}$ | -0.25** | -0.38** | -0.45** | -0.51** | -0.22** | -0.36** | -0.45** | -0.52** |
|                |          | (-21.99) | (-24.34) | (-27.39) | (-29.25) | (-16.63) | (-22.59) | (-25.77) | (-30.77) |
| $gdpgrowth_{jt}$ | 0.07    | 0.05    | 0.29    | 0.45(*)& | 0.39    | 0.05    | 0.45    | 0.70(*)& |
|                |          | (0.32)  | (0.17)  | (1.11)  | (1.79)  | (1.12)  | (0.10)  | (1.02)  | (1.92)  |
| $R^2$          |          | 0.20    | 0.29    | 0.33    | 0.37    | 0.23    | 0.25    | 0.33    | 0.33    |

(continued).
Table 8. Continued

|                | debt_tlc |       |       |       |       |       |       |       |       |       |       |
|----------------|----------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
|                | j = 1    | j = 2 | j = 3 | j = 4 | j = 1 | j = 2 | j = 3 | j = 4 | j = 1 | j = 2 | j = 3 | j = 4 |
| (debt_t - debt_t−j) |          |       |       |       |       |       |       |       |       |       |       |       |
| d_t           | 0.16**   | 0.29**| 0.39**| 0.47**| 0.11**| 0.28**| 0.40**| 0.51**|       |       |       |       |
|               | (9.67)   | (11.03)| (13.91)| (18.06)| 7.09  | (16.58)| (18.09)| (16.42)|       |       |       |       |
| d_t−j         | −0.25**  | −0.38**| −0.46**| −0.51**| −0.22**| −0.36**| −0.45**| −0.52**| (−18.16)| (−22.14)| (−25.92)| (−33.32)|
|               | (−25.12) | (−25.52)| (−29.69)| (−31.45)| (−18.16)| (−22.14)| (−25.92)| (−33.32)|       |       |       |       |
| inf_t         | 0.29**   | 0.33* | 0.33* | 0.24* | 0.52**| 0.91**| 1.02**| 0.96* |       |       |       |       |
|               | (3.11)   | (2.34) | (2.14) | (1.89) | (3.23) | (3.40) | (3.39) | (3.03) |       |       |       |       |
| R^2           | 0.20     | 0.29  | 0.33  | 0.37  | 0.19  | 0.25  | 0.30  | 0.33  |       |       |       |       |
| N             | 8786     | 7968  | 7208  | 6495  | 8616  | 7792  | 7052  | 6361  |       |       |       |       |

Table 8 reports means of the estimates from yearly OLS regressions for each year from 1988 to 2001 of the change in leverage from year (t−j) to t on the optimal debt level denoted by d_t^*, the lagged debt level d_t−j, size (ln of total assets), the absolute distance between the current and optimal debt level (dist), the market to book ratio (growth), and financial markets, legal and economic characteristics (included separately). The financial market characteristics are the size of stock markets (size_stockmarket) defined as ratio of the value of listed shares over GDP, and the size of financial intermediaries (size_fin.intermed) defined as ratio of domestic assets of deposit banks over GDP respectively. The legal characteristics are the efficiency of the legal system (legal_efficiency), an indicator for the protection of creditors (creditor_rgt), and an indicator for the protection of shareholders (shareholder_rgt). The economic characteristics are the annual growth rate of the GDP per capita expressed in % (gdpc_chg) and the inflation rate as measured by the annual change in consumer prices and expressed in % (inf). Constant included. The dependent leverage variables are defined as follows: debt_tlc is the broad debt ratio and defined as ratio of total loan capital over total assets; debt_cap is the employed capital ratio and defined as ratio of total loan capital to the sum of total debt and equity, including preference shares; t-statistics for the means are in brackets and are defined as the mean divided by its standard error, which is the time-series standard deviation of the regression coefficient divided by (20−j)^1/2. Standard errors are corrected for heteroscedasticity. **, *, and * denotes statistical significance at the 10%, 5%, and 1% level. The regression R^2 are adjusted for degrees of freedom. N refers to the total number of observations over all the years.
6. Robustness Tests

To ensure that our main findings do not depend on the specific setting, we run different robustness checks. First, we apply a different estimation method that controls for the potential inference problem caused by autocorrelation of the residuals. Instead of using averages of yearly estimates, we estimate the model with pooled OLS regressions where we correct the standard errors for autocorrelations. The results are very similar to our earlier findings, in terms of size of coefficients as well as significance level.

Second, we check whether our main results also hold when measuring the debt ratios in terms of market values instead of book values. As mentioned earlier, it is debatable whether leverage should be measured as the ratio of the book or the market value of debt and equity. Besides the fact that market values of debt are generally not available, the strongest argument in favor of book values is that they better reflect the decisions under the control of the management. Nonetheless, we compute the debt ratios in terms of market values by replacing the book value of equity by the market value of equity. Without reporting the results, we conclude that they confirm the earlier findings with respect to the test of our main hypotheses, with the exception of some results for our third debt ratio $debt\_cap$. For the latter, we find no evidence for the positive impact of a more developed legal system on the speed of adjustment.

Finally, we omit each country from the results in turn to see whether any one of them has a disproportionate influence on our results. The only difference that emerges refers to the effect of financial intermediaries. The negative effect of financial intermediaries on the speed of capital structure adjustments disappears when excluding the German corporations. Given that financial intermediaries are by far the most important in Germany, this result is not really surprising. It also shows how important it is to include German firms in this type of analysis.

7. Conclusions

The main purpose of this study was to investigate the effects of institution- and market-specific characteristics on capital structure dynamics of firms. Even though it is generally acknowledged that the institutional environment may affect firm behaviour and financial decisions in particular, only a few studies have actually investigated these issues. Most importantly, there is no empirical evidence on how institutions influence the way firms restructure their capital structure over time. It is important to understand these processes because financial structure adjustments involve costs. These costs are, at least partly, due to market imperfections, which are also strongly related to characteristics of institutions and markets. This paper is a first attempt to close this gap.

We use a sample of 837 firms from France, Germany, Italy and the UK for which we have data over the period from 1982 to 2002. Using a partial adjustment model, we investigate the effects of country-specific characteristics such as the development of financial markets, the legal system and the macroeconomic environment on firms’ capital structure adjustments. We consider different definitions of leverage and also look at the debt adjustment over a period of up to five years. Overall, our results provide evidence that more developed financial markets and better protection of shareholders have a positive effect on the speed at which firms adjust their capital structure towards the target. Also, higher economic growth and a higher inflation rate positively affect the speed of adjustment to the optimal capital structure.

Even though our results reveal some potentially interesting patterns, they also raise further questions. Besides the country-specific factors considered, other important mechanisms in which European countries differ widely may well play a role in explaining firms’ capital structure
dynamics. Ownership concentration, for instance, affects management’s incentives to optimize their capital structure. According to Barca and Becht (2001), blockholdings are by no means uniform across Europe. While British firms clearly have the most dispersed ownership, Continental European corporations are generally more concentrated, but there is still a lot of heterogeneity among them. Similarly, a well functioning market for corporate control is also expected to affect firm behavior with respect to financial structure choice. Finally, it is widely believed that financial markets in the UK are short-term oriented compared to Continental Europe, also leading to different investment patterns and corporate financial structures due to a shorter time-horizon of investments. As Marsh (1998) argues, however, no reliable evidence exists to support this claim, and any such differences between the two regions may be due to other factors such as different compensation systems or more flexible labor markets for executives. Even though these issues are important, they are clearly outside the scope of this paper and might be addressed in future work.

Acknowledgements

I would like to thank Wolfgang Drobetz, Kenneth French, Mike Gerfin, Bronwyn H. Hall, Ammon Levy, Claudio Loderer, Anthony Mowers, Heather Murray, Klaus Neusser, Kevin Walsh, two anonymous referees and conference participants of the 1st International Conference on Corporate Governance Developments and New Tools of Governance, Birmingham, 2002, and the Annual Congress of the European Economic Association, Venice, 2002 for helpful suggestions and comments. Parts of this research were undertaken while the author was a visiting scholar at the Haas School of Business, University of California Berkeley. All errors are the responsibility of the author. Financial support from the Swiss National Science Foundation is acknowledged

Notes

1 Rajan and Zingales (1995) investigate firm- and institution-specific capital structure determinants in major industrialized countries and Demirguc-Kunt and Maksimovic (1999) look at developed and developing countries. Both find significant impacts of institutions on firms’ financial structure choice. Booth et al. (2001) look at capital structure decisions of firms in ten developing countries and find that institutional differences do not seem to be important. Giannetti (2003) provides evidence that institutional characteristics such as legal rules and financial development play an important role in determining the corporate finance decisions of predominantly unlisted companies from several European countries.

2 Existing empirical work on dynamic capital structure decisions include Fischer et al. (1989), Yang et al. (2001), Bevan and Danbolt (2001, 2002), De Miguel and Pindado (2001), Lööf (2003, 2004), Banerjee et al. (2004), Drobetz and Fix (2005), Gaud et al. (2005) and Drobetz and Wanzenried (2005).

3 Studies that include several measures of both book and market values are Titman and Wessels (1988) or Rajan and Zingales (1995).

4 The choice of the market- and institution-specific variables is based on Demirguc-Kunt and Maksimovic (1999).

5 Besides their effect on the speed of adjustment, these country-specific characteristics are also expected to affect the level of debt and the mix between long- and short-term debt. Given that the main focus of our paper is on capital structure dynamics, we do not address these issues here. See Demirguc-Kunt and Maksimovic (1999) and Giannetti (2003) for studies that look at the impact of institutions on debt levels.

6 Both indicators go back to Demirguc-Kunt and Maksimovic (1999), where they are described in detail. They are based on classifications generated by La Porta et al. (1998).

7 According to Harris and Raviv (1991), there is a consensus that a firm’s leverage increases with fixed assets, investment opportunities and firm size, and decreases with non-debt taxshields, volatility, advertising expenditures, the probability of bankruptcy, profitability and the uniqueness of the product as measured by the amount of R&D expenses. See also Bradley et al. (1984) and Banjeree et al. (2000). We do not have sufficient information on firms’ advertising and R&D expenses as well as on their bankruptcy probability. Therefore, we only consider a subset of those variables.
8 See Bevan and Danbolt (2002), and Rajan and Zingales (1995). Titman and Wessels (1988) use the capital expenditure over total assets, the growth of total assets measured by the percentage change in total assets as well as the research and development expenses over sales to measure a firm’s growth opportunities. Note that the growth of total assets is rather a measure for historic growth rates and therefore not a very good measure for a firm’s growth opportunities.
9 An investigation for US companies by Showalter (1999) equally includes investment tax credit as a non-debt taxshield. While this seems reasonable for the US, at least until 1987, it is not widely used in European countries, which the Datastream data equally reflect. We therefore do not include this item in our data.
10 The composition of the index may change slightly over the years. The basic list of the firms in our data is based on the composition of the index in 2002.
11 The comparison of accounting data of different countries requires their accounting rules to be similar. As Ball (1995) mentions, there are differences between the Anglo-Saxon common law tradition and the Continental European tradition with respect to the importance of public disclosures, and these may affect the reported profits. While we cannot really control for these differences, our firm data are all taken from a single source, which mitigate this problem of comparability.
12 The database is downloadable under www.worldbank.org/research/projects/finstructure/database.htm. See also Beck et al. (1999) for a description of the data.
13 See http://devdata.worldbank.org/dataonline/.
14 Studies that use this framework include, Fama and French (2002) and Shyam-Sunder and Myers (1999).
15 Given that not all country-specific variables vary over time, we do not add the time subscript. In our estimations, however, we include the year-specific values of time period $t$ whenever yearly data are available. We also checked the results with the lagged values included, and they do not significantly differ. Given that an endogeneity problem is unlikely, we report the results from the current country-specific variables.
16 Financial market data are only available up to 2001. This explains the smaller number of observations for the regression results compared to the ones with the legal and economic characteristics.
17 See Korajczyk and Levy (2003) or Drobetz and Wanzenried (2005).

References

Ball, R. (1995) Making accounting more international, *Journal of Applied Corporate Finance*, 8, pp. 19–29.
Banjeree S., Heshmati, A. and Wihlborg, C. (2004) The dynamics of capital structure, in: M. Bagella, L. Becchetti, I. Hasan and W. C. Hunter (Eds) *Monetary Integration, Markets and Regulation, Research in Banking and Finance*, Vol. 4 (Elsevier JA).
Barca, F. and Becht, M. (2001) *The Control of Corporate Europe* (Oxford: Oxford University Press).
Beck, T., Demirgüç-Kunt, A. and Levine, R. (1999) A new database on financial development and structure. Working Paper no. 2146, Series Domestic finance. Saving, financial systems, stock markets. World Bank.
Bevan, A. A. and Danbolt, J. (2001) Dynamics in the determinants of capital structure in the UK, Working paper 2000/9.
Bevan, A. A. and Danbolt, J. (2002) Capital structure and its determinants in the UK – a decomposition analysis, *Applied Financial Economics*, 12, pp. 159–170.
Booth L., Aivazian, V., Demirgüç-Kunt, A. and Maksimovic, V. (2001) Capital structure in developing countries, *Journal of Finance*, 56, pp. 87–130.
Bowman, R. (1980) The importance of a market value measurement of debt in assessing leverage, *Journal of Accounting Research*, 18, pp. 242–254.
Bradley, M., Jarrell, G. A. and Kim, E. H. (1984) On the existence of an optimal capital structure: theory and evidence, *Journal of Finance*, 39, pp. 857–878.
De Miguel, A. and Pindado, J. (2001) Determinants of the capital structure: new evidence from Spanish data, *Journal of Corporate Finance*, 7, pp. 77–99.
Demirgüç-Kunt, A. and Maksimovic, V. (1999) Institutions, financial markets, and firm debt maturity, *Journal of Financial Economics*, 54, pp. 295–336.
Diamond, D. W. (1984) Financial intermediation and delegated monitoring, *Review of Economic Studies*, 51, pp. 393–414.
Diamond, D. W. (1991) Debt maturity and liquidity risk, *Quarterly Journal of Economics*, 106, pp. 709–737.
Drobetz, W. and Fix, R. (2005) What are the determinants of the capital structure? Some evidence for Switzerland, *Swiss Journal of Economics and Statistics*, 151, pp. 71–111.
Drobetz, W. and Wanzenried, G. (2005) What determines the speed of adjustment to the target capital structure? *Applied Financial Economics*, forthcoming.
Fama, E. F. and French, K. R. (2002) Testing trade-off and pecking order predictions about dividends and debt, *Review of Financial Studies*, 15, pp. 1–33.
Fama, E. F. and MacBeth, J. D. (1973) Risk, return, and equilibrium: empirical tests, *Journal of Political Economy*, 81, pp. 607–636.

Fischer, E. O., Heinkel, R. and Zechner, J. (1989) Dynamic capital structure choice: theory and tests, *Journal of Finance*, 43(5), pp. 19–40.

Gaud, P., Jani, E., Hoesli, M. and Bender, A. (2005) The capital structure of Swiss companies: an empirical analysis using dynamic panel data, *European Financial Management*, 11, pp. 51–69.

Gianetti, M. (2003) Do better institutions mitigate agency problems? Evidence from corporate finance choices, *Journal of Financial and Quantitative Analysis*, 38, pp. 185–212.

Grossman, S. J. (1976) On the efficiency of competitive stock markets where traders have diverse information, *Journal of Finance*, 31, pp. 573–585.

Grossman, S. J. and Stiglitz, J. E. (1980) On the impossibility of informationally efficient markets, *American Economic Review*, 70, pp. 393–408.

Hackbarth, D., Miao, J. and Morellec, E. (2004) Capital structure, credit risk, and macroeconomic conditions. Working Paper, University of Rochester.

Harris, M. and Raviv, A. (1991) The theory of capital structure, *Journal of Finance*, 46, pp. 297–355.

Heshmati, A. (2001) The dynamics of capital structure: evidence from Swedish micro and small firms, *Research in Banking and Finance*, 2, pp. 199–241.

Jensen, M. and Meckling, W. (1976) Theory of the firm: managerial behavior, agency costs and ownership structure, *Journal of Financial Economics*, 3, pp. 305–360.

Korajczyk, R. A. and Levy, A. (2003) Capital structure choice: macroeconomic conditions and financial constraints, *Journal of Financial Economics*, 68, pp. 75–109.

La Porta, R., Lopez-de-Silvanes, F., Schleifer, A. and Vishny, R. (1998) Law and finance, *Journal of Political Economy*, 106, pp. 1113–1155.

Lööf, H. (2003) Dynamic optimal capital structure and technical change, ZEW Discussion Paper No. 03-06.

Lööf, H. (2004) Dynamic optimal capital structure and technical change. Working Paper Series in Economics and Institutions of Innovation 23, Royal Institute of Technology, CESIS-Centre of Excellence for Science and Innovation Studies.

Marsh, P. (1998) Myths surrounding short-termism, in: G. Bickerstaffe (Ed.) *Financial Times. Mastering Finance: The Complete Finance Companion* (London: Pitman Publishing).

Mills, G. T. (1996) The impact of inflation on capital budgeting and working capital, *Journal of Financial and Strategic Decisions*, 9, pp. 79–87.

Myers, S. C. and Mailuf, N. S. (1984) Corporate financing and investment decisions when firms have information that investors do not have, *Journal of Financial Economics*, 13, pp. 187–221.

Phillips, G. M. (1995) Increased debt and industry product markets. An empirical analysis, *Journal of Financial Economics*, 37, pp. 189–238.

Rajan, R. G. (1992) Insiders and outsiders: the choice between informed and arm’s length debt, *Journal of Finance*, 47, pp. 1367–1400.

Rajan, R. G. and Zingales, L. (1995) What do we know about capital structure? Some evidence from international data, *Journal of Finance*, 50, pp. 1421–1460.

Rajan, R. G. and Zingales, L. (2001) Financial systems, industrial structure and growth, *Oxford Review of Economic Policy*, 17, pp. 467–482.

Showalter, D. (1999) Strategic debt: evidence in manufacturing, *International Journal of Industrial Organization*, 17, pp. 319–333.

Shyam-Sunder, L. and Myers, S. C. (1999) Testing static tradeoff against pecking order models of capital structure, *Journal of Financial Economics*, 51, pp. 219–244.

Thies, C. and Klock, M. (1992) Determinants of capital structure, *Review of Financial Economics*, 1, pp. 40–52.

Titman, S. and Wessels, R. (1988) The determinants of capital structure choice, *Journal of Finance*, 43, pp. 1–19.

Yang, J., Davis, G. C. and Leatham, D. J. (2001) Impact of interest rate swaps on corporate capital structure: an empirical investigation, *Applied Financial Economics*, 11, pp. 75–81.