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Abstract

This paper analyzes capital structure determinants of UK and continental European firms. Besides considering firmspecific characteristics, it investigates the impact of different corporate governance related institution- and marketspecific aspects on the capital structure choice. The dynamic framework allows to analyze short- and longterm adjustments and to relate them to firm- and systemspecific characteristics. Our data contain balance sheet and profit&loss account data of 167 European firms from 1988 to 1998. From our panel data regressions we find significant differences in the capital structure choice between the firms of the considered corporate governance systems.

JEL Classification: G32, C23, D21

Key Words: Capital structure, Corporate governance, Panel data, Dynamic analysis

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1 Introduction

How do firms choose their capital structure, i.e., 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 the performance of the firms? Even though these and other questions have challenged economists for quite a long time, the picture is far from being complete. More research is needed, for instance, to understand the dynamic behavior of capital structure decisions and how a firm's institutional as well as its macroeconomic environment affect these choices.

The aims of our paper are twofold. First, it investigates the impact of different institutional and market characteristics, which are reflected in the corporate governance system, on firms' capital structure decisions. We look at two main corporate governance systems, namely the relation-based system, which predominates in continental Europe, and the Anglo-American corporate governance system as applied in the United Kingdom. Second, it analyzes this issue within a dynamic context, i.e., it takes into account the adjustment processes over time.

Most of the empirical literature on firms' capital structure analyzes this issue within a static framework. The common approach is to use OLS cross-section regressions, where the firm's observed debt ratio is regressed on a set of explanatory variables. We have good reasons to believe that the capital structure choice has to be analyzed within a dynamic context. Typically, firms restructure their capital structure over time, as a response to fluctuations of the determining variables. Static capital structure models are not able to take these adjustments into account. Furthermore, the optimal capital structure, as explained by capital structure theories, does not necessarily coincide with the observed capital structure, which is commonly used as data input in the empirical studies. The optimal and the observed capital structure may differ due to the existence of adjustment costs, for instance.

Existing work on dynamic capital structure decisions include the following papers. Fischer et al. (1989) develop a model of dynamic capital structure choice in the presence of recapitalization costs. As any debt ratio within a certain interval can be optimal, and similar firms could well have different leverage ratios at any point in time, they use the debt ratio range of firms instead of debt ratio observations to measure the firm's capital structure, which they relate to firm-specific characteristics. They use quarterly

data from a sample of 999 US firms over the period from 1977 to 1985. Their results from the dynamic analysis support the static capital structure theories.

Banerjee et al. (2000) use a dynamic adjustment model. In contrast to the standard capital structure literature, they do not assume the observed capital structure to be the optimal one. They use panel data from 426 US and 122 UK firms from 1989, respectively 1990 to 1996. Besides identifying the determinants of the optimal capital structure, they estimate the speed of adjustment to the optimal capital structure.

Yang et al. (2001) investigate the effects of interest rate swaps on corporate capital structure decisions. Based on the dynamic capital structure model of Fischer (1989), they estimate a seemingly unrelated regression model where the optimal debt ratio range is explained by corporate tax rate, firm size, volatility of assets, bankruptcy costs and the use of swap use. They use a rather small sample of 22 firms of two different industries, which are split up in two groups depending on their use of swap instruments. The time period covers the years from 1985 to 1995, and the firms are all from the US market.

Bevan and Danbolt (2001) analyze capital structure determinants of 1054 listed UK companies over the years from 1991 to 1997. The firms' indebtedness, which is represented by a variety of long and short-term debt components, is explained by four standard key corporate characteristics, namely growth opportunities, company size, profitability and tangibility of the firms. They use pooled OLS as well as fixed-effects panel estimations and also show that the pooled OLS, which is commonly used in capital structure studies, does not provide consistent results.

Miguel and Pindado (2001) use data from 133 Spanish firms over the years 1990 to 1997 to study the impact of firm-specific as well as institutional characteristics on capital structure decisions. They use a target adjustment model which explains a firm's debt level in terms of its previous debt level as well as its target debt level. Besides empirically evaluating different capital structure theories, they compare their results with former work on US firms, which are found to face higher transaction costs than Spanish companies.

Our data contains balance sheet and profit&loss account data from 167 continental European and British firms over the years 1989 to 1998. In addition, we have countryspecific data on the development of financial markets, the legal system and on the

economic environment. In a first step, we use a static fixed-effects panel data model to explain the firms' observed debt ratio by a set of firmspecific explanatory variables. In a second step, we use the results from the static model to estimate a dynamic adjustment model which allows the observed debt ratio to differ from the optimal debt ratio. Such a setup captures the existence of adjustment costs, which we analyze with respect to firmspecific factors and as well as characteristics of the financial institutions, the legal and the economic environment of the considered firms.

The results of our study are that the firms from both corporate governance systems differ with respect to their capital structure determinants. Also, British firms seem to face lower costs to adjust their capital structure in the short run. We explain these differences by some key characteristics of the underlying corporate governance systems. Finally, we realize about the importance of specifying the capital structure choice within a dynamic context since the characteristics of the adjustment processes have additional explanatory power.

The new aspects of our paper are as follows: First, we explicitly compare the capital structure determinants of firms belonging to two different corporate governance systems. Most other papers on firms' capital structure choice look at firms of a single system only.[1] Second, our sample includes firms from several continental European countries. This geographic region is rarely the subject of this kind of studies, which mainly focus on US or UK firms only. Third, our dynamic approach identifies additional aspects, related to the adjustment processes and reflected in the corporate governance systems, which may determine a firm's capital structure.

The paper is structured as follows: Section 2 describes the firmspecific capital structure determinants as well as the institution- and marketspecific characteristics included in the analysis. Section 3 describes the data, and section 4 specifies the model. The analysis is in section 5. Section 6 concludes. The tables and some additional statistics are relegated to the appendix.

[1] Rajan and Zingales (1995) look at the determinants of capital structure choice of the USA, Japan, Germany, France, Italy, United Kingdom and Canada. Besides using a static setup, they do not explicitly focus on the corporate goverance dimensions.

2 Capital structure of firms

2.1 Measure of capital structure and its determinants

We measure the capital structure of a firm by the ratio of its total loan capital repayable in more than one year over the total value of its asset (*debt_book*).[2]

We explain the firm's capital structure by a set of firmspecific variables as outlined below. This procedure mainly reflects the standard approach in the literature.[3] We assume the firm's investment decisions as exogenous and independent of its capital structure, which is in the spirit of the traditional finance literature.

In addition to the firmspecific variables, we consider market- and institutionspecific aspects. These capital structure determinants attempt to capture the effects of the firm's environment on its capital structure choice. Firms must credibly commit to investors to respect contracts in order to get outside financing. The types of contracts do not only depend on the firm characteristics, but also on the institutions in the economy which facilitate monitoring and enforcement of financial contracts. These aspects directly affect the way firms choose and restructure their financial structure, which is the central focus of this paper. Also, these mechanisms may differ between the two considered corporate governance systems. In what follows, we consider characteristics of the financial institutions, the legal system as well as macroeconomic variables.[4]

2.2 Firmspecific capital structure determinants

Fixed assets Firms with important fixed assets may obtain more favorable conditions to secure debt. First, it is easier for the lender to assess the value of tangible assets compared to intangibles. Besides this problem of asymmetric information, there is a higher probability of intangible assets to loose value in case of a discovery, i.e., it

[2] Unfortunately, our data does not allow us to include market values of debt or other forms of external capital. Studies which inlcude several measures of both book and market values are Tittman and Wessels (1988) or Rajan and Zingales (1995).

[3] According to Harris and Raviv (1991), there exists a consensus that a firm's leverage increases with fixed assets, investment opportunities and firm size, and it decreases with nondebt tax shields, volatility, advertising expenditures, the probability of bankruptcy, profitability and the uniqueness of the product. See also Bradley, Jarrel and Kim (1984) and Banjerjee et al. (2000). Our limited data does not allow us to include all these variables.

[4] The choice of the market- and institutionspecific variables is based on Demrigüç-Kunt&Maksimovic (1999).

may be easier to sell machinery than to obtain money for goodwill (Jensen&Mecklin 1976). We use the total amount of fixed assets over total assets (fix) to measure the importance of fixed assets of the firm, and expect a positive relationship between the importance of fixed assets and leverage.

Size of firm 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) outline, 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 ($size$) by logarithm of its total assets.

Non-debt tax shields According to Modigliani and Miller (1958), interest tax shields 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 like depreciation increase, which has a potentially negative effect on leverage.[5] We build the ratio of depreciation for the year over total assets ($shield$) to capture the importance of non debt tax shields.

Profitability 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 they should, therefore, 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 the firms, the more profitable companies may signal their quality to the market with higher debt issue. We use the ratio of earnings before interest and taxes (EBIT) over total assets to measure the profitability ($profit$) of the firm.

[5] An investigation for US companies by Showalter (1999) equally includes investment tax credit as a non-debt tax shield. 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.

Expected growth According to Titman and Wessels (1988), equitycontrolled firms have a tendency to invest suboptimally to expropriate wealth from bondholders in favor 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, we expect firms with higher expected growth opportunities to have lower long-term debt levels. We measure the growth potential of the firm (*growth*) by the relative change of total assets from the previous to the current year.[6]

2.3 Corporate governance, markets and institutions

According to Shleifer and Vishny (1997), corporate governance deals with the ways in which suppliers of finance to corporations assure themselves of getting a return on their investment. An interesting question is to what extent firms' capital structure decisions are affected by the characteristics of the different corporate governance systems. As Van den Berghe (2002) outlines, important dimensions of a corporate governance system refer to the role of capital markets in the national economy, ownership structure and control, the board system and the priorities of the firm and its role in society. Even though each country has its own corporate governance system, which is defined by the countryspecific institutional, legal and cultural context, there are some substantial similarities in some major corporate governance dimensions between certain countries.

It is widely held that the Anglo-American corporate governance system, which is also called the market-based model or outsider system, significantly differs from the relation-based or insider system. While United Kingdom is dominated by the market-based model, the relation-based model is most widespread in continental Europe. This fact allows us to split up our sample in companies from continental Europe and in companies from United Kingdom.

Note that the corporate governancespecific sample split-up in continental European and British firms coincides with classification of the legal tradition. While all continental European countries' legislations are based on the civil law, United Kingom is a common law country. As Watson (1974) argues, the common law provides individual

[6] We tried to include the firm's uniqueness defined as R&D expenses over sales as well. However, it did not lead to significant results and would have decreased the number of observations due to missing data for all the years.

investors better protection than the civil law. The effect of some of these dimensions are captured by the legal variables included in our analysis.

We capture the differences between the systems by three sets of countryspecific variables as outlined below. These refer to the development of the financial markets, the characteristics of the legal system and economic indicators. Besides these quantifiable aspects, there are other important dimension of the corporate governance systems which may affect the firms' financial structure choice. Due to the lack of adequate data, we briefly describe these aspects and discuss their potential implications afterwards.

Size and activity of stock markets In countries with developed stock markets, firms have better opportunities for diversification, i.e., they have incentives to switch from long-term debt to equity. In addition, stock markets reveal information about firms, which is useful to creditors and makes lending to publicly traded companies less risky (Grossman, 1976; Grossman&Stiglitz, 1980). Accordingly, the existence of active stock markets increases the ability of firms to obtain long-term credit. Also, in more liquid stock markets investors have more incentives to become informed, which facilitates external monitoring of firms (Demrigüc-Kunt&Maksimovic, 1999).

We expect larger and more liquid stock market to have a positive effect on the leverage of firms as well as on the frequency with which capital structure decisions are taken. We use the stock market capitalization relative to GDP to measure the size of stock markets. The activity or liquidity of stock markets is approximated by the ratio of stock market value traded over GDP. Higher values of this turnover ratio indicate a higher level of liquidity.

Financial intermediaries A main activity of financial intermediaries, such as central banks, deposit money banks and other financial institutions, is to monitor borrowers. According to Diamond (1984), these institutions have economies of scale in information acquisition. Also, they have greater incentives to use the collected information to discipline borrowers than do small investors, who are affected by the free-rider problem. Overall, a developed banking sector is expected to facilitate access to external finance, especially also for smaller firms.

Larger financial intermediaries are expected to have a positive effect on firms' lever-

age, and especially also on small firms. We measure the importance of financial intermediaries by the ratio of domestic assets of deposit banks to GDP.

The efficiency of the legal system The efficiency of the legal system indicates the extent to which laws are implemented. In case a system is inefficient, firms are likely to use more short term debt. According to Diamond (1991, 1993) 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.

We expect the higher efficiency of the legal system to have a positive effect on the the firm's leverage. 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 We use two indicators for creditor and shareholder rights.[7] The indicator for creditor rights is based on whether a country's bankruptcy laws (i) prohibits an automatic stay on assets (ii) does not allow borrowers to unilaterally seek bankruptcy protection (iii) assures secured creditors the right to collateral and (iv) does not grant the managers tenure pending resolution of bankruptcy. The indicator of shareholder rights is based on (i) whether 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 decisionmaking within the firm.

We expect a better protection of creditors and shareholders to have a positive impact on both the level of debt and its frequency or speed of adjustment.

[7]Both indicators go back to Demrigüç-Kunt&Maksimovic (1999), where they are described in detail. They are based on classifications generated by La Porta, Lopez-de-Silvanes, Shleifer and Vishny (1998).

Growth rate in GDP per capita The growth rate of the GDP per capita is an indicator of the financing needs of the firms. For the individual firm it proxies the investment opportunity set faced by firms and its effect on the optimal financing of projects (Demrigüç-Kunt&Maksimovic, 1999).

The more an economy grows, the more do the firms need capital to finance their investments. Hence, we expect again a positive influence of the growth rate of GDP per capita on the firms' leverage as well as on the speed of adjustment.

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 informs about the stability of value of the currency in long-term contracts. As Demirgüc-Kunt and Maskimovic (1999) outline, higher and/or more variable inflation rates make it costly for investors and firms to contract. Accordingly, we expect a higher inflation rate to have a negative impact on the firms' leverage and also on the speed of capital structure adjustments.

Other dimensions of corporate governance systems[8] A higher ownership concentration usually provides managers with stronger incentives to maximize firm value. Also, it better allows inside owners to capture private benefits at the expense of minority or outside owners. In the UK system, ownership of companies is widely dispersed among a large number of institutions or individuals. Most of the quoted equity is hold by institutions, but no institution owns very much of a company. In continental Europe, ownership is much more concentrated.[9] Companies raise most of their external finance from banks which have close long-term relationships with them. In countries like France and Germany, large bank and intercorporate shareholdings are widespread. Whereas institutional ownership plays a significant role in both systems, it is highly dispersed in the UK and much more concentrated on the continent. To the extent that debt issue can be used as an alternative mechanism for disciplining the managers,[10] we

[8] The description of the corporate governance characteristics is, if not stated otherwise, taken from chapter 23 (Corporate Ownership and Control in the UK, Germany and France) of Chew (1997).

[9] The median of the largest voting block for non-financial companies listed on official markets in the 1990ies is as follows: A: 52.0; B: 56.0; E: 57.0; F: 20.0; I: 54.5; NL: 43.5; UK: 9.9 (Barca and Becht, p. 19, 2001) .

[10] See, e.g., Jensen and Meckling (1976).

expect debt levels to be higher in the market-based system.

The time horizon of investment is closely related to the ownership structure of firms. Since dispersed shareholders have more limited ability to commit compared to concentrated owners, they tend to achieve value maximization in the short run, possibly at the expense of profitable long-term investments. Due to the higher flexibility of this system, however, dispersed ownership may also lead to a more efficient allocation of resources. The UK financial markets may be considered short-term.. In the continental system, the stocks are more generally held by permanent owners, who aim at perpetuation of the enterprise and building up the corporate position rather than maximizing period-by-period profits. Due to the greater ownership concentration, there is a higher investor participation. As a consequence, these firms have a higher willingness to invest in long-term capabilities. The shorter the time horizon of investments, the more do we expect changes in firms' capital structures.

A well functioning market for corporate control may deter managers from running the firm below its performance potential since that would make the firm vulnerable to takeover (Manne, 1965). The United Kingdom is characterized by a more active market for corporate control, i.e., there exist a much higher numbers of mergers and especially also hostile takeovers compared to most continental European countries. Where corporate control is restricted, control by banks is usually more important. We expect a more active market for corporate control to provide stronger incentives for high firm performance. Accordingly, firms in the market-based system may at any time be closer to their optimal capital structure.

3 Sample description

3.1 Sample selection

We have yearly balance sheet as well as P&L account data from 167 European firms, which all belong to the Dow Jones Stoxx Indexes.[11] The countries include Austria, Belgium, Denmark, Finland, France, Italy, the Netherlands, Spain, Switzerland and

[11] The Dow Jones STOXX indexes encompass the 600 largest companies - by market capitalisation - in Europe. For further information see http://www.stoxx.com.

the United Kingdom.[12] All the data is taken from Datastream.[13] The time period covers the years from 1988 until 1998, so a total of 11 years. For some firms the records encompass a shorter time period. We set the minimum length to 6 years, which seems to be a reasonable duration for debt adjustments. The total number of observations is 1337. All the data is reported on December 31st of the corresponding year and expressed in Euro.[14] The companies belong to various industries.[15] We systematically exclude firms from the banking and insurance industry since one of their core activities refers to debt management.

The information on institutions and markets is countryspecific and comes from different sources. Data on the development of financial institutions are taken from 'A New Database on Financial Development and Structure' from the World Bank.[16] The time period covers the years from 1988 to 1997. The legal data are taken from Demrigüç-Kunt&Maksimovic (1999) and La Porta, Lopez-de-Silanes and Shleifer (1998) and are average values over the years 1980-1991. We do not have any information about Denmark. Since these characteristics remain rather stable over the years, the lack of yearly data does not represent a very serious problem. The economic data, for which we have values over the entire time period, are OECD data.[17]

3.2 Variable definitions and data description

3.2.1 Firm-specific variables

The following series form the basis for constructing our variables:

Total loan capital(TLC, Datastream var. no. 321): All loans repayable in more than one year. Loans from group companies and associates are included.

[12] See Table A.1. in the appendix for the number of firms per country.

[13] The comparison of accounting data of different countries requires their accounting rules to be similar. As Ball (1995) outlines, there exist differences between the Anglo-Saxon common law tradition and the continental European tradition with respect to the importance of public disclosures, which 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.

[14] Denmark, Sweden and United Kingdom belong to the European Union (EU), but not to the European Monetary Union. Switzerland does not belong to the EU and thus not to the EMU. We used yearly synthetic exchange rates to convert the figures.

[15] See appendix for the industry classification.

[16] The database is downloadable under
http:\\worldbank.org\research\projects\finstructure\database.htmin.
See also Beck et al. (1999) for a description of the data.

[17] The data can be downloaded from the OECD webpage www.oecd.org.

Total assets (TA, Datastream var. no. 392): All the assets employed by the company, such as fixed assets, intangible assets, investments and current assets.[18]
Total fixed assets (TFA, Datastream var. no. 330): Total of gross land and buildings, plant and machinery, construction in progress and other fixed assets.
Depreciation(DEP, Datastream var. no. 136): Provisions for amounts written off and depreciation of fixed assets and assets leased in.
EBIT (EBT, Datastream var. no. 1300): Earnings before interest and taxes.[19]
Total sales(SAL, Datastream var. no. 104): Amount of sales of goods and services to third parties, relating to the normal activities of the company. Does usually not include value added tax or any other taxes relating directly to turnover, and is net of trade discounts.

We use the above described series to construct the variables for our regression analysis as outlined in table 3.1. In what follows, T_i, $t = 1, .., T_i$, equals the firm-specific number of reported years and $i = 1, .., N$ is the firm index. Note that we do not need to deflate the data since the variables used in the regressions are ratios.[20]

[Table 3.1. about here]

Table 3.2. shows some descriptive statistics of the firmspecific variables, for the complete sample as well as the two subsamples. We also test whether the means of the two subsamples differ significantly from each other. The last column of table 3.2. contains the test statistic of the one-sided means difference test. Whenever the test statistic is negative, the mean of the UK subsample exceeds the one from the CONT subsample. On average, firms finance 16% of their assets with some form of external long term capital. British firms have a slightly higher leverage than the ones from continental Europe. This observation can be explained by the more developed financial markets as well as the higher efficiency of the legal system in United Kingdom. Also, companies from the United Kingdom tend to have a higher fixed asset ratio[21] but lower non-debt tax shields. The latter might have to do with different tax laws concerning

[18] Assets leased out are exluded. This explains why FIX may exceed 1 in a few cases.
[19] Given that tax laws differ among countries, it seems important to use a profit measure that is not biased by country specific institutional settings.
[20] The size of the firm is an exception. By taking the logarithm of sales, however, the problem of inflation seems less severe.
[21] Fixed assets do not include leased out assets, which explains ratios exceeding 1.

depreciation policies for instance. As to profitability, UK firms in our sample are significantly more profitable. We do not find any significant differences between the two subsamples as to size and expected growth of the companies.

[Table 3.2. about here]

3.2.2 Institutional and market characteristics

Table 3.3. contains the definitions of the countryspecific variables of institutions and markets. The size and the liquidity of the stock markets and the size of the financial intermediaries describe the development of the financial institutions. The efficiency of the legal environment and the creditor and shareholder rights capture the legal system. Finally, the growth rate of the GDP per capita and the inflation rate reflect development and stability of the economic environment.

[Table 3.3. about here]

Table 3.4. reports the means of the institution- and marketspecific characteristics. The values for the subsample CONT are the unweighted mean of the continental European countries. For completeness, we also report the means of the individual countries. In United Kingdom, most of the largest companies are quoted on the stock markets. Accordingly, the average stock market capitalization over the considered period is large and even exceeds one, while the value is much smaller for all other countries except Switzerland. Similarly, the liquidity of the stock market is also higher in United Kingdom compared to most other countries. The importance of financial intermediaries, which is approximated by their size, is higher in UK than in the considered European continental countries except in Austria and Switzerland. From the legal system variables we observe that UK has a more efficient legal system than the sample average of the European continental countries. Also, the creditor and shareholder protection is clearly superior. Finally, UK has a slightly larger growth rate of GDP per capital but also a clearly higher inflation rate than the continental European average.

[Table 3.4. about here]

4 Methodology

4.1 The static model

In a first step, we estimate a fixed-effects panel data model given by (1), i.e.,

$$d_{it} = X_{it-1}\beta + \gamma_t + \eta_i + u_{it} \tag{1}$$

with $i = 1, .., 167$, and $t = 1, ..T_i$.

The vector X_{it-1} represents the firmspecific explanatory variables as outlined in section 2. We include the lags of these variables to reduce the problem of endogeneity and to capture inertia in the expectation process. γ_t stands for the timespecific effects,[22] which we do not report in the table. η_i depicts the unobservable firmspecific effect, with $E(u_{it} \mid x_{it}, \eta_i) = 0, t = 1, 2, ..., T_i$. It takes into account possible heterogeneity for which we do not explicitly control.[23] Finally, u_{it} is the remainder disturbance, with $u_{it} \sim IID(0, \sigma_u^2)$ independent of each other and among themselves. In addition to the panel data specification, we estimate the model with pooled OLS, which we also use to investigate the impact of the institutional and market characteristics. Due to the existence of panel-level heteroscedasticity, we compute robust variance estimates. To allow for industry heterogeneity, we also include industry dummies.[24] We use the log of debt as left hand side variable, which we depict by d_{it}.[25]

4.2 The adjustment model

The static model specification assumes the observed debt ratio d_{it} being equal to the optimal debt ratio, denoted by d_{it}^*, in each period, i.e., $d_{it} = d_{it}^*$. When the firm faces costs to adjust its capital structure, this assumption is not appropriate. In what follows, we allow for the existence of adjustment costs[26] which implies that a firm's current debt

[22] The timespecific effects may capture factors like macroeconomic variables or other conditions which affect all the firms in the same way.

[23] The fixed effects model specification allows η_i and x_{it} to be correlated, i.e., $E(\eta_i \mid x_{it})$ can be any function of x_{it}. The random effects specificiation, in contrast, requires $E(\eta_i \mid x_{it}) = E(\eta_i) = 0$. A Hausman test provided evidence against the assumption of the random effects model.

[24] See, e.g., Phillips (1995).

[25] We choose the log specification because it generally leads to a better fit. Also, the theory does not tell us whether there is a linear or non-linear relationship between the variables. When using the log specification, the coefficients have to be interpreted as percentages and no longer as elasticities.

[26] Adjustment costs can be any form of transaction costs.

ratio does not always have to correspond to its optimal one.

In each time period there is a partial adjustment of the gap between the actual and the desired or optimal value of the debt ratio, i.e.,

$$d_{it} - d_{it-j} = \alpha_j(d^*_{it} - d_{it-j}) \tag{2}$$

where j refers to the year since the last adjustment, with $j = 1, .., 4$. The adjustment coefficient α_j represents the extent to which the gap between the desired and the current value is narrowed from period $t - j$ to period t. If $\alpha_j = 1$, the entire adjustment is made within j periods, and the firm reaches its target debt ratio in period t. If $\alpha < 1$, however, the firm does not adjust completely from year $t - j$ to year t, and finally for $\alpha > 1$ there is an overadjustment in the sense that the firm makes more adjustments than necessary to reach the target value. We can interpret the adjustment coefficient α as speed with which the firm adjusts its capital structure, where a higher value of α goes together with a higher speed of adjustment.

We assume the optimal debt ratio d^*_{it} to be determined according to (3), where d^*_{it} corresponds to the fitted values of estimating (1), i.e.,

$$d^*_{it} = \hat{d}_{it} = X_{it-1}\,\hat{\beta} + \hat{\gamma}_t + \hat{\eta}_i \tag{3}$$

Rearranging (1) and (2), we can estimate the following equation

$$\triangle\, d_{itj} = \alpha_0 + \alpha_j(d^*_{it} - d_{it-j}) + \gamma_t + w_{itj} \tag{4}$$

where $\triangle\, d_{itj}$ is the difference between the debt ratio in $t-j$ and t, γ_t is the timespecific effect and w_{itj} is again the error term with $w_{itj} \sim IID(0, \sigma^2_w)$ independent of each other and among themselves.

4.2.1 Explaining the speed of adjustment

The adjustment coefficient α_j may itself be a function of firm-, respectively countryspecific factors. To take such effects into account, we expand the model by transforming the adjustment parameter α_j into a function of firm- and countryspecific characteristics, i.e.,

$$\begin{aligned} \Delta\, d_{itj} &= \alpha_0 + \alpha_j(z_{itk})(d^*_{it} - d_{it-j}) + \gamma_t + w_{itj} \\ &= \alpha_0 + \alpha_{j1}(d^*_{it} - d_{it-j}) + \alpha_{j2} z_{itk}(d^*_{it} - d_{it-j}) + \gamma_t + w_{itj} \end{aligned} \tag{5}$$

where $\alpha_j(z_{itk}) = \alpha_{j1} + \alpha_{j2} z_{itk}$. z_{itk} captures the firm-, respectively countryspecific characteristic k, γ_t is the timespecific effects and w_{itj} is again the error term with usual properties.

The coefficient α_{j2}, which is the coefficient of the interaction term $(z_{itk})(d^*_{it} - d_{it-j})$, indicates the extent to which the firm- or countryspecific characteristics affect the speed of adjustment from period $t-j$ to t. z_{itk} is a dummy variable and takes the value 1 if the firm, respectively the country from which the firm originates, has the characteristic k and zero else. The construction of the dummy variable z_{itk} is outlined in (6) for the firmspecific characteristic size. In a given period t, a firm is considered as a large firm whenever its size is larger than the average size of all firms in the same period.

$$\begin{aligned} z_{itsize} &= 1 \text{ if } SIZE_{it} > \frac{\sum_{i=1}^{N} SIZE_{it}}{N} \\ &= 0 \text{ else} \end{aligned} \tag{6}$$

Analogical to size, we consider profitability and expected growth of the firms as potential firm characteristics to affect the speed of adjustment coefficient α_j. As to the countryspecific aspects, we investigate the effect of all of the considered institutional and market characteristics.

5 Results

5.1 The static model

Table 5.1. shows the results from estimating equation (1). When looking at the estimates for the complete sample, all the coefficients carry the expected signs, but only size and profitability are significant. As to the two subsamples, we observe that the model provides a better fit for the British companies. Whereas size is the only

significant variable for the CONT subsample, we report significant results for the fixed asset ratio, size and profitability of UK companies. One-sided difference tests for the estimated parameters in the two subsamples reveal that the effects of fixed assets, non-debt tax shields as well as profitability are significantly stronger for UK firms. These differences may be some evidence that companies in United Kingdom depend much more on financial markets, where asymmetric information may be more relevant also due to the more dispersed ownership structure, for instance.

[insert Table 5.1. about here]

Table 5.2. reports the results from the pooled OLS regressions. These estimates do not include fixed effects, which leads to more significant results. All coefficients carry the expected sign, and they are all significant except the ones of size and expected growth in the UK subsample. As to the differences between the two subsamples, the results are similar to the fixed effects estimations, except that the differences become even stronger. The inclusion of industry effects[27] does not alter our results, only expected growth looses its significance. Overall, we observe the determinants included in our capital structure model to affect the firms from both corporate governance systems in different ways.

[insert Table 5.2. about here]

To see the impact of the institutional and market characteristics, we include them as additional explanatory variables in (1) and report the results of the pooled OLS estimation[28] in Table 5.3. As excepted, the size of the stock markets has a positive effect on firms' leverage, while the size of the financial intermediaries has a negative impact, which requires further investigation. The more efficient the legal system, the higher is the firms' debt ratio, and a better protection of creditors and shareholders seems to have a negative impact. While the first finding matches our expectations, the latter result is rather puzzling and might have to do with the fact that the legal tradition affects financial structure through its effect on institutions (Demirgüc-Kunt and Maksimovic 1999). We do not find any significant effects for the economic variables.

[27] See Table A.1. in the appendix for the industry classification.

[28] As some characteristics do not vary over time, we cannot estimate the panel data model. Also, a sample split-up is not possible due to insufficient variation in the UK data.

[insert Table 5.3. about here]

5.2 The adjustment model

5.2.1 Exogenous adjustment costs

The results from estimating the adjustment model as given by (4) are in Table 5.4. The one-year adjustment coefficients are all smaller than one. Accordingly, the firms do not adjust completely from period $t-1$ to period t, which is evidence for adjustment costs. Looking at the two subsamples, we observe the UK firms having a significantly higher coefficient than continental European companies. We interpret this as British firms having a higher speed of short-term adjustment of their capital structure. This might be due to the larger size and higher liquidity of the stock markets in UK, where firms can more easily adjust their financial structure. This is also consistent with their shorter time horizon of investments. In addition, this fact may reflect the more active market for corporate control in the UK, where there is a higher pressure for firm performance, and where the companies might less afford deviating from their optimal capital structure. The lower speed of short-term adjustment of the continental European firms is reflected also in their significantly larger two-, three- and four-year adjustment coefficients.

[insert Table 5.4. about here]

To see how well the model fits, we plot the yearspecific gap between the actual and the estimated debt level ($d_{it} - \hat{d}_{it}$) in Figure 5.1. While the model systematically underestimates the debt ratio for British firms, the picture is less homogenous for continental Europe, where we have positive and negative deviations. This pattern may reflect the fact that the CONT subsamples contains firms from different countries. Even though the gaps seem to be larger during the second half of the period, a regression of the gap against time does not reveal any significant results.

[insert Figure 5.1. about here]

5.2.2 Explaining the speed of adjustment

In order to better understand the adjustment behavior, we are going to explain the adjustment process by selected characteristics of the firms as well as the variables describing the institutions and markets. Table 5.5. shows the short and longer run effects of firmspecific characteristics on the adjustment parameter α. The size of the firm has a positive impact on the speed with which a firm adjusts to its optimal capital structure. The effect becomes stronger, the longer the period of adjustment. However, it only holds for continental European firms, whereas size does not seem to matter in this respect for British companies. Profitability only affects the speed of two and more year adjustments, and this effects exists again for continental European firms only. As to expected growth of the firms, it has a positive effect on the continental European companies, but firms with higher expected growth seem to have a lower speed of adjustment in United Kingdom. The latter finding is somehow puzzling, and we do not have a really good explanation. Overall, these findings suggest that smaller and lower growing firms may have more restricted access to external capital in continental Europe, while these firm characteristics matter less in the more liquid UK markets.

[insert Table 5.5. about here]

To confirm our findings, we analyze the effect of the institution- and marketspecific characteristics on the speed of capital structure adjustment. A sample split-up is not feasible anymore due to insufficient variation in the UK data. We can still investigate some differences between the two subsamples since the UK markets strongly differ from the continental European ones with respect to certain characteristics.

Table 5.6. reports the results for the financial institution variables. Both size and liquidity of the stock markets have a positive effect on the speed of short-term adjustment, and a negative effect in the longer run. Given the fact that the UK stock markets are substantially larger and more liquid than the average of the continental European ones, we can explain at least one part of the higher speed of short-term and the lower speed of longer term adjustment of the UK companies by the size and the liquidity of the stock markets. As to the size of financial intermediaries, the results suggest that firms tend to adjust their capital structure less quickly when financial intermediaries are more important. Financial intermediaries include banks, and it is

possible that companies with stronger dependence on banks are more inert.

To investigate the effect of the legal characteristics, we cannot estimate a fixed-effects model since the variables do not vary over time. Instead, we run OLS regressions. Neither the efficiency of the legal system, nor the protection of creditors and shareholders affect the speed of adjustment in our sample. Apparently, the law seems to have an effect on the absolute level of debt, but not on its adjustment behavior over time.

The analysis for the economic variables is in Table 5.7. Higher economic growth leads the firms to speed up their capital structure adjustments, and the effect tends to increase with the length of the adjustment period. This finding is not surprising and reflects the fact that firms are more dynamic if their environment is dynamic as well. As to inflation, we report a negative influence on the speed of adjustment, which, however, is only significant for the second, third and fourth year adjustments. Since UK has a much higher inflation rate than most continental European countries, this finding might be another source of explanation for the lower longer term speed of adjustment of UK companies.

[insert Table 5.6. about here]

[insert Table 5.7. about here]

6 Conclusions

This paper analyzes capital structure decisions of firms over the period from 1988 to 1998. Besides looking at firmspecific factors, we focus on how specific characteristics of the markets and institutions, which are also reflected in the underlying corporate governance system, affect this choice. Our data from European firms allow us to analyze this issue both for the relation-based model, which predominates in continental Europe, as well as for the market-based system governing British firms. We consider these issues within a dynamic framework in order to take into account the adjustment processes taking place over time.

Our results suggest that there exist significant differences between the two corporate governance systems with respect to the capital structure decisions of firms. UK firms

seem to depend more on the financial markets, which are also more developed than in most other countries in the sample. Also, we observe the British companies in our sample to adjust their financial structure with a higher speed compared to the continental European ones, who obviously face higher adjustment costs. Some of the differences can be explained by the market- and institutionspecific environment. The size and the liquidity of stockmarkets as well as the stability of the economic environment seem to be important determinants of the adjustment behavior over time.

Unfortunately, our data does not allow us to look at several and more refined definitions of a firms' debt ratio. There may exist significant differences between short- and long-term debt and also between different types of creditors, for instance. An inclusion of more firms from additional European countries would be desirable as well. Even though these data limitations exist, they do not invalidate our results.

More work remains to be done in this field. Besides the mentioned limitations, further research should take into account additional firmspecific characteristics which reflect the organizational structure of the firms. Also, a more elaborated treatment of the macroeconomic environment might be fruitful for a better understanding of the adjustment processes over time.

7 Appendix

7.1 Variable definitions and descriptive statistics

name of variable	definition	description
$debt_{it}$	$\frac{TLC_{it}}{TA_{it}}$	debt ratio
d_{it}	$\log(debt_{it})$	log of the debt ratio
fix_{it}	$\frac{TFA_{it}}{TA_{it}}$	fixed asset ratio
$size_{it}$	$\ln[TA_{it}]$	size of the firm measured by total assets
$shield_{it}$	$\frac{DEP_{it}}{TA_{it}}$	non-debt tax shield
$profit_{it}$	$\frac{EBT_{it}}{TA_{it}}$	profitability
$growth_{it}$	$\frac{TA_{it}-TA_{it-1}}{TA_{it-1}}$	expected growth

Table 3.1. Definition of firmspecific variables; i=firm index, t=time index

variable	mean all firms (std.dev.)	mean CONT (std.dev.)	mean UK (std.dev.)	t-stat. of one-sided means diff.test
debt	0.158 (0.152)	0.151 (0.110)	0.167 (0.189)	-2.094*
d	−2.233 (1.079)	−2.256 (1.088)	−2.203 (1.069)	-1.083
fix	0.600 (0.305)	0.586 (0.295)	0.614 (0.314)	-1.927*
size	14.650 (1.207)	14.648 (1.212)	14.653 (1.202)	-0.090
shield	0.040 (0.025)	0.043 (0.027)	0.037 (0.023)	4.778**
profit	0.107 (0.084)	0.095 (0.094)	0.120 (0.068)	-6.362**
growth	0.130 (0.411)	0.139 (0.494)	0.118 (0.287)	1.078

Table 3.2. Summary statistics of firmspecific variables
one-sided means-diff. test: ∗∗ sign. at 1% level; ∗ sign. at 5% level, (∗) sign. at 10% level

name of variable	definition	description
$size\_sm_{mt}$	$\frac{value\ of\ listed\ shares}{GDP}$	size of stock markets
liq_sm_{mt}	$\frac{stock\ market\ value\ traded}{GDP}$	liquidity of stock markets
$size\_fi_{mt}$	$\frac{domestic\ assets\ of\ deposit\ banks}{GDP}$	size of financial intermediaries
eff_law_m	$\in (0; 10)$	efficiency of the legal system
$cred\_right_m$	$\in (0; 4)$	creditor rights
$shareh\_right_m$	$\in (0; 5)$	shareholder rights
$gdppc\_grate_{mt}$		growth rate of gdp per capita
inf_rate_{mt}		inflation rate

Table 3.3. Definition of institution- and marketspecific variables; m=country index; t=time index

country	*size_sm*	*liq_sm*	*size_fi*	*eff_law*	*cred_right*	*shareh_right*	*gdppc_grate*	inf *_rate*
Austria	0.12	0.07	1.25	9.50	3.10	2.00	2.04	2.51
Belgium	0.36	0.05	1.07	9.50	2.10	0.00	2.03	2.25
Denmark	0.33	0.14	0.51	-	-	-	1.55	2.54
Finland	0.29	0.11	0.79	10.00	1.00	2.00	1.65	2.94
France	0.32	0.15	1.01	8.00	0.10	2.00	1.63	2.27
Italy	0.17	0.07	0.72	6.75	2.20	0.00	1.62	4.66
Netherlands	0.65	0.40	1.10	10.00	2.00	2.00	2.30	2.20
Spain	0.29	0.20	0.95	6.25	2.20	2.00	2.65	4.68
Switzerland	0.94	0.23	1.74	10.00	1.50	1.00	0.72	2.52
Continental Europe	0.38	0.19	0.99	8.32	1.14	1.45	1.71	2.77
UK	1.08	0.55	1.13	10.00	4.00	4.00	1.88	4.38

Table 3.4. Means of yearly institution- and marketspecific variables
Values for Continental Europe are unweighted averages of all continental European Countries in the sample; the legal variables are timeinvariant

7.2 Results

7.2.1 The static model

d_t	exp. sign	*all* (std.error)	*CONT* (std.error)	*UK* (std.error)	sig. of diff.
fix_{t-1}	+	0.232 (0.236)	−0.243 (0.329)	0.691* (0.347)	*
$size_{t-1}$	+/-	0.599** (0.087)	0.598** (0.120)	0.611** (0.131)	
$shield_{t-1}$	-	−1.686 (2.696)	−0.818 (3.440)	−3.465 (4.309)	**
$profit_{t-1}$	+/-	−1.073* (0.488)	−0.201 (0.729)	−1.525* (0.691)	**
$growth_{t-1}$	-	0.060 (0.081)	0.099 (0.115)	0.025 (0.117)	
const.		−10.840** (1.301)	−10.731** (1.772)	−11.113** (1.985)	**
time effects		√	√	√	
N		1337	665	672	
F		8.45**	4.54**	5.06**	
$R^2 within$		0.09	0.10	0.10	
$R^2 betw.$		0.11	0.09	0.16	
$R^2 overall$		0.09	0.08	0.11	

Table 5.1. Fixed effects estimations static model
** 1%, * 5%, (*) 10% significance level; standard errors in brackets;
significance of difference based on one-sided two-sample tests of equality of coefficients

d_t	all (std.error)	$CONT$ (std.error)	UK (std.error)	sig. of diff.	all (std.error)	$CONT$ (std.error)	UK (std.error)	sig. of diff.
fix_{t-1}	1.183^{**} (0.110)	1.014^{**} (0.162)	1.448^{**} (0.186)	*	1.212^{**} (0.119)	0.993^{**} (0.178)	1.733^{**} (0.199)	*
$size_{t-1}$	0.135^{**} (0.024)	0.193^{**} (0.033)	0.035 (0.035)		0.170^{**} (0.026)	0.219^{**} (0.031)	0.048 (0.036)	
$shield_{t-1}$	-8.852^{**} (1.242)	-7.222^{**} (1.528)	-10.468^{**} (2.622)	**	-9.778^{**} (1.281)	-7.864^{**} (1.549)	-15.552^{**} (2.633)	**
$profit_{t-1}$	-2.066^{**} (0.446)	-0.917^{*} (0.371)	-4.868^{**} (0.765)	**	-2.031^{**} (0.449)	-0.880^{*} (0.400)	-4.588^{**} (0.739)	**
$growth_{t-1}$	0.180^{*} (0.109)	$0.258^{(*)}$ (0.142)	0.127 (0.166)		0.161 (0.106)	0.191 (0.149)	0.030 (0.166)	
$const.$	-4.287^{**} (0.374)	-5.205^{**} (0.512)	-2.570^{**} (0.529)	**	−4.631 (0.387)	-5.402^{**} (0.488)	-2.579^{**} (0.560)	**
time eff.	√	√	√		√	√	√	
ind. eff.	-	-	-		√	√	√	
N	1337	665	672		1337	665	672	
F	23.65^{**}	12.93^{**}	11.29		18.22^{**}	11.93^{**}	9.96^{**}	
R^2	0.17	0.16	0.25		0.25	0.21	0.33	

Table 5.2. Pooled OLS estimations static model without and with industry effects
** 1%, * 5%, (*) 10% significance level; robsut standard errors in brackets;
significance of difference based on one-sided two-sample tests of equality of coefficients

d_t	*all* (std.error)	*all* (std.error)
fix_{t-1}	1.399^{**} (0.115)	1.375^{**} (0.119)
$size_{t-1}$	0.132^{**} (0.026)	0.157 (0.028)
$shield_{t-1}$	-10.859^{**} (1.409)	-11.999^{**} (1.464)
$profit_{t-1}$	-2.167^{**} (0.458)	-2.159^{**} (0.463)
$growth_{t-1}$	0.176 (0.112)	0.156 (0.110)
$size\_sm_{t-1}$	1.356^{*} (0.566)	1.215^{*} (0.580)
liq_sm_{t-1}	-0.030 (0.279)	-0.018 (0.273)
$size\_fm_{t-1}$	-1.505^{**} (0.405)	-1.472^{**} (0.417)
eff_law_{t-1}	0.241^{**} (0.072)	0.250^{**} (0.071)
$cred\_right_{t-1}$	-0.294^{**} (0.072)	-0.293^{**} (0.075)
$shareh\_right_{t-1}$	-0.176^{**} (0.061)	-0.160^{**} (0.062)
$gdppc\_grate_{t-1}$	-0.001 (0.036)	0.005 (0.037)
inf_rate_{t-1}	0.057 (0.037)	0.055 (0.037)
const.	-4.950^{**} (0.924)	-5.214^{**} (0.927)
time eff.	$\surd$	$\surd$
industry eff.	$-$	$\surd$
N	1237	1237
F	16.29^{**}	13.42^{**}
R^2	0.22	0.24

Table 5.3. Pooled OLS estimations static model with institutional and market characteristics; without and with industry effects

$**$ 1%, $*$ 5%, $(*)$ 10% significance level; robsut standard errors in brackets; significance of difference based on one-sided two-sample tests of equality of coefficients

7.2.2 The adjustment model

Exogenous adjustment costs

$\Delta\ d_{tj}$	all firms (std. error)	CONT (std. error)	UK (std. error)	sign. of diff.
$(d_t^* - d_{t-1})$	0.477** (0.026)	0.456** (0.006)	0.483** (0.035)	**
N	1331	663	668	
F	39.70**	19.31**	21.96**	
$R^2 wi, btw, oa$	0.23, 0.01, 0.07	0.24, 0.00, 0.07	0.25, 0.02, 0.08	
$(d_t^* - d_{t-2})$	0.786** (0.029)	0.884** (0.044)	0.715** (0.038)	**
N	1327	661	666	
F	96.24**	54.73**	45.23**	
$R^2 wi, btw, oa$	0.40, 0.04, 0.13	0.44, 0.02, 0.12	0.38, 0.08, 0.15	
$(d_t^* - d_{t-3})$	1.011** (0.032)	1.212** (0.050)	0.891** (0.043)	**
N	1180	594	586	
F	142.83**	88.12**	64.23**	
$R^2 wi, btw, oa$	0.50, 0.07, 0.17	0.55, 0.05, 0.162	0.47, 0.11, 0.19	
$(d_{it}^* - d_{it-4})$	1.110** (0.035)	1.311** (0.054)	0.983** (0.046)	**
N	1034	524	510	
F	167.00**	100.19**	77.35**	
$R^2 wi, btw, oa$	0.54, 0.11, 0.20	0.58, 0.06, 0.18	0.52, 0.18, 0.23	

Table 5.4. Fixed-effects adjustment model with j=1,..,4

** 1%, * 5%, (*) 10% significance level; standard.errors in brackets. d_t^* estimated with FE; time dummies and constant included.

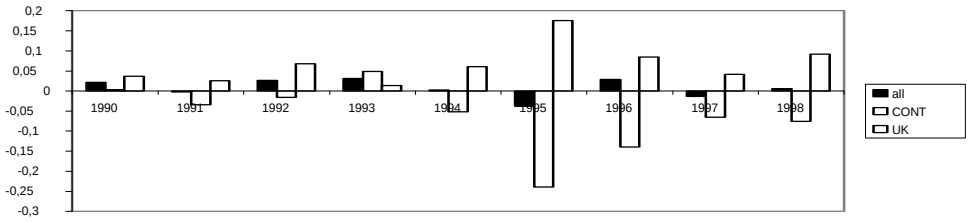

Figure 5.1. □a□ anal□sis□di□erence between $d_{\square t}$ and $\hat{d}_{\square t}$

Explaining the speed of adjustment

$\triangle\ d_{tj}$	all firms (std. error)	CONT (std. error)	UK (std. error)	sign. of diff.
$z_{size}(d_t^* - d_{t-1})$	0.072 (0.046)	0.249^{**} (0.062)	-0.104 (0.066)	**
$z_{size}(d_t^* - d_{t-2})$	0.178^{**} (0.050)	0.276^{**} (0.066)	0.063 (0.074)	**
$z_{size}(d_t^* - d_{t-3})$	0.244^{**} (0.051)	0.306^{**} (0.068)	0.190^{*} (0.075)	**
$z_{size}(d_t^* - d_{t-4})$	0.168^{**} (0.053)	0.323^{**} (0.074)	0.026 (0.075)	**
$z_{profit}(d_t^* - d_{t-1})$	0.084^{*} (0.037)	0.083 (0.056)	0.084 (0.052)	**
$z_{profit}(d_t^* - d_{t-2})$	0.097^{*} (0.042)	0.200^{**} (0.065)	0.072 (0.058)	**
$z_{profit}(d_t^* - d_{t-3})$	0.146^{**} (0.049)	0.334^{**} (0.070)	0.071 (0.069)	**
$z_{profit}(d_t^* - d_{t-4})$	0.179^{**} (0.053)	0.299^{**} (0.077)	$0.138^{(*)}$ (0.072)	**
$z_{growth}(d_t^* - d_{t-1})$	0.035 (0.028)	0.125^{**} (0.037)	-0.044 (0.041)	**
$z_{growth}(d_t^* - d_{t-2})$	0.004 (0.032)	0.102^{*} (0.043)	-0.093^{*} (0.046)	**
$z_{growth}(d_t^* - d_{t-3})$	0.000 (0.034)	0.110^{*} (0.046)	-0.115^{*} (0.049)	**
$z_{growth}(d_t^* - d_{t-4})$	0.005 (0.036)	$0.100^{(*)}$ (0.052)	-0.118^{*} (0.050)	**

Table 5.5. FE estimation of interactionparameters as function of firmspecific characteristics
** 1%, * 5%, (*) 10% significance level; standard.errors in brackets; time dummies and constant included.

$\triangle\ d_{tj}$	all firms (std. error)
$z_{size\_sm}(d_t^* - d_{t-1})$	0.112^{**} (0.040)
$z_{size\_sm}(d_t^* - d_{t-2})$	-0.050 (0.044)
$z_{size\_sm}(d_t^* - d_{t-3})$	$-0.085^{(*)}$ (0.047)
$z_{size\_sm}(d_t^* - d_{t-4})$	-0.123^{**} (0.047)
$z_{liq\_sm}(d_t^* - d_{t-1})$	0.122^{**} (0.038)
$z_{liq\_sm}(d_t^* - d_{t-2})$	-0.049 (0.042)
$z_{liq\_sm}(d_t^* - d_{t-3})$	$-0.075^{(*)}$ (0.045)
$z_{liq\_sm}(d_t^* - d_{t-4})$	-0.114^{*} (0.045)
$z_{size\_fi}(d_t^* - d_{t-1})$	0.029 (0.041)
$z_{size\_fi}(d_t^* - d_{t-2})$	-0.142^{**} (0.044)
$z_{size\_fi}(d_t^* - d_{t-3})$	-0.145^{**} (0.047)
$z_{size\_fi}(d_t^* - d_{t-4})$	-0.179^{**} (0.047)

Table 5.6. FE estimation of interactionparameters as function of financial institution characteristics
** 1%, * 5%, (*) 10% significance level; standard.errors in brackets; time dummies and constant included

$\triangle\ d_{tj}$	all firms (std. error)
$z_{gdppc\_grate}(d_t^* - d_{t-1})$	0.075^{**} (0.027)
$z_{gdppc\_grate}(d_t^* - d_{t-2})$	0.058^{**} (0.031)
$z_{gdppc\_grate}(d_t^* - d_{t-3})$	0.108^{**} (0.034)
$z_{gdppc\_grate}(d_t^* - d_{t-4})$	0.109^{**} (0.036)
$z_{\text{inf}\_rate}(d_t^* - d_{t-1})$	-0.056 (0.035)
$z_{\text{inf}\_rate}(d_t^* - d_{t-2})$	-0.110^{**} (0.039)
$z_{\text{inf}\_rate}(d_t^* - d_{t-3})$	-0.173^{**} (0.043)
$z_{\text{inf}\_rate}(d_t^* - d_{t-4})$	-0.137^{**} (0.046)

Table 5.7. FE estimation of interactionparameters as function of economic characteristics
** 1%, * 5%, (*) 10% significance level; standard.errors in brackets; time dummies and constant included

7.3 Country list and industry classification

country	number of firms
Austria	4
Belgium	9
Denmark	11
Finland	5
France	39
Italy	11
Netherlands	8
Spain	8
Switzerland	9
United Kingdom	79
total	167

Table A.1. Country list

industry	number of firms complete sample	number of firms subsample $CONT$	number of firms subsample UK
$CHEM$	22	12	10
CON	25	13	12
ENG	27	15	12
$FOOD$	20	11	9
$SERV$	46	22	24
$UTIL$	17	7	10
DIV	10	8	2
total	167	88	79

Table A.2. Industry classification

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