Lucerne University of
Applied Sciences and Arts
HOCHSCHULE
LUZERN
Wirtschaft

IFZ Working Paper Series ISSN 1662-520X

IFZ Working Paper No. 0025/2014
June 2014

Capital Structure Inertia and Product Market Competition

Authors:

André F. Gygax
Department of Finance
University of Melbourne
Mail: agygax@unimelb.edu.au

Gabrielle Wanzenried
Institute of Financial Services Zug IFZ
Lucerne University of Applied Sciences and Arts
Mail: gabrielle.wanzenried@hslu.ch

Xia Wu
Department of Finance
University of Melbourne
Mail: xiawmel@hotmail.com

Abstract:

Based on a sample of US non-financial and non-utility firms over fiscal years from 1990 to 2010, this paper empirically examines how capital structure inertia differs across industries and to what extend such differences can be explained by product market competition. We find that firms in more competitive industries tend to be more inert with their capital structure decisions. This result could be explained by the disciplinary effect of debt, which serves as a substitute to product market competition. When product market competition is low, managers are more active with regard to capital structure decisions, especially debt use to constrain the free cash flow problem. In addition, we explore the explanatory power of transaction costs, which is a common explanation for capital structure inertia. Our results show that large firms are more inert than small firms. This provides evidence that transaction costs, at least, do not play a critical role in explaining capital structure inertia.

Key Words: Capital structure inertia; Product market competition; Competition measures
JEL Classification: G32; G24; G13; G14

Capital Structure Inertia and Product Market Competition

ANDRÉ F. GYGAX GABRIELLE WANZENRIED XIA WU*

December 10, 2013

ABSTRACT

Based on a sample of US non-financial and non-utility firms over fiscal years from 1990 to 2010, this paper empirically examines how capital structure inertia differs across industries and to what extend such differences can be explained by product market competition. We find that firms in more competitive industries tend to be more inert with their capital structure decisions. This result could be explained by the disciplinary effect of debt, which serves as a substitute to product market competition. When product market competition is low, managers are more active with regard to capital structure decisions, especially debt use to constrain the free cash flow problem. In addition, we explore the explanatory power of transaction costs, which is a common explanation for capital structure inertia. Our results show that large firms are more inert than small firms. This provides evidence that transaction costs, at least, do not play a critical role in explaining capital structure inertia.

Keywords: Capital structure inertia; Product market competition; Competition measures

JEL Classification Codes: G32; G24; G13; G14

Acknowledgements: We thank Engelbert Dockner, Neal Galpin, Hayne Leland, Lyndon Moor, Joshua Shemesh, Patrick Verwijmeren and Josef Zechner for helpful discussion and suggestions. Any errors are our own.

*) Gygax: Department of Finance, the University of Melbourne, and Visiting Research Scholar at WU Vienna University of Economics and Business; agygax@unimelb.edu.au. Wanzenried: Institute of Financial Services Zug, Lucerne University of Applied Sciences and Arts, and Visiting Research Scholar at the Haas School of Business, University of California at Berkeley; gabrielle.wanzenried@hslu.ch. Wu: Department of Finance, the University of Melbourne; xiawmel@hotmail.com.

Capital Structure Inertia and Product Market Competition

ABSTRACT

Based on a sample of US non-financial and non-utility firms over fiscal years from 1990 to 2010, this paper empirically examines how capital structure inertia differs across industries and to what extend such differences can be explained by product market competition. We find that firms in more competitive industries tend to be more inert with their capital structure decisions. This result could be explained by the disciplinary effect of debt, which serves as a substitute to product market competition. When product market competition is low, managers are more active with regard to capital structure decisions, especially debt use to constrain the free cash flow problem. In addition, we explore the explanatory power of transaction costs, which is a common explanation for capital structure inertia. Our results show that large firms are more inert than small firms. This provides evidence that transaction costs, at least, do not play a critical role in explaining capital structure inertia.

Keywords: Capital structure inertia; Product market competition; Competition measures

JEL Classification Codes: G32; G24; G13; G14

1. Introduction

There has been abundant literature investigating corporate capital structure decisions made by managers. Contrary to the well established trade-off theory, a great deal of the literature has found strong empirical evidence that firms do not always adjust their capital structure to an optimal level, weighing the benefits of tax and the costs of bankruptcy. Instead, firms tend to follow a passive strategy. Theories that envisage passive capital structure behavior include the pecking order theory, the market timing theory and the inertia theory. This paper mainly focuses on the inertia theory and tries to investigate the underlying reasons for inert capital structure decisions at an industry level.

The inertia theory of capital structure is first proposed by Welch (2004), who contends that capital structure is primarily determined exogenously by raw stock returns. He discovers that U.S. firms do little to counter the influence of stock price fluctuations on their capital structures. As a consequence, leverage ratios move closely with changes in stock prices. For instance, when the share price appreciates, a firm's bankruptcy risk decreases. According to the trade-off theory, we would expect a firm to increase its leverage in order to capture the additional tax benefits of debt. However, when a firm is inert, its debt ratio would decrease as a result of increasing equity value.

While Welch (2004) proposes a neat approach for measuring the firms' capital structure inertia behavior, he does not look into the reasons why firms are inert. Wanzenried (2003) tries to explain firms' capital structure inertia via executive compensation structure based on data specifically on US manufacturing industries. She finds that firms tend to adjust their capital structure more actively when executives are provided with stronger incentives in their compensation contracts. Her study also suggests that firms with inert capital structure tend to underperform those firms who actively manage their capital structure. Combined, these findings combined are supportive of the "agency cost" view of managerial behavior.

One of the limitations of Wanzenried (2003)'s study is that she restricts her sample to the manufacturing industry only. Therefore, this paper fills the gap by investigating capital structure inertia heterogeneity across eight sectors based on the Global Industry Classification Standard (GICS). Using a sample of US non-financial and non-utility firms over the period from 1990 to 2010, this paper examines how capital structure inertia differs across industries and to what extend such difference can be explained by product market competition. In addition, this paper explores what role transaction costs play in explaining capital structure inertia.

Firstly, following the inertia definitions in Welch (2004) we test if capital structure inertia exists in all industries. Using System Generalized Methods of Moment (System GMM) regressions, we find capital structure inertia is prevalent in all industries. System GMM is employed to address econometric problems in panel data with few time periods and many observations. Our study spans over 21 years and uses 72,011 firm-year observations in total. The approach also helps to address and correct for several problems in our sample, including independent variables not being strictly exogenous, heteroskedasticity and autocorrelation.

Next, we investigate the impact of product market competition on capital structure inertia behavior. To date, product market competition is commonly recognized in the literature as an effective mechanism to reduce managerial slack and inefficiency, thus resolving agency conflicts between shareholders and managers (e.g. Hart (1983), Shleifer and Vishny (1997), Jagannathan and Srinivasan (1999) and Allen and Gale (2000)). Assuming the "agency cost" view prevails in explaining capital structure inertia, product market competition, as a counterforce to agency problems, may help to explain inertia behavior at an industry level.

We find that firms in more competitive industries to be more inert. This result is consistent with Kovenock and Phillips (1995) who show that firms in highly concentrated industries are more likely to recapitalize and increase debt financing. They argue that debt plays a critical role in highly concentrated industries, where agency costs are not significantly reduced by product-market competition. Hence, our finding could be explained by the disciplinary effect of debt, which serves as a substitute to product market competition. When product market competition is low, managers are more active with regard to capital structure decisions, especially debt use to constrain the free cash flow problem.

We then examine if transaction costs play a role in explaining capital structure inertia. To do so, we partition our sample based on size. If transaction costs matter, then we would see small firms to be more inert as they face relatively high transaction cost compared to large firms. Surprisingly, our results show that medium size and large firms are more inert than small firms. This suggests that transaction costs, at least, do not play a critical role in capital structure inertia behavior.

Our paper makes the following contributions. First, we demonstrate that capital structure inertia is a key factor in explaining actual debt ratios at the industry sector level. The relationship is strong despite the fact that some sectors lead or lag the overall economy. Second, our results illustrate that various product market competition measures are able to explain capital structure inertia. However, the relatively new and theoretically best grounded Boone (2008) indicator empirically does not work well in correctly identifying competition levels. This result is consistent with simulation studies performed by Schiersch and Schmidt-Ehmcke (2010). Third, our results are in line with the theoretical predictions in Dockner, Mæland and Miltersen (2012) who endogenize the firm's cash flow process used by Goldstein, Ju and Leland (2001). They predict that optimal financing decision vary for firms participating in highly competitive or highly concentrated markets. This argument was initially put forward by Kovenock and Phillips (1995). Our empirical evidence indicates that firms in more competitive industries are more inert with their capital structure decisions compared to firms in highly concentrated industries. Third, our size result stands in contrast to Fischer, Heinkel and Zechner (1989) who show that relatively small recapitalization costs affect a firm's debt ratio over time. We would expect that recapitalization costs play a bigger role for smaller firms because of higher fixed costs by the financial intermediary. A possible explanation could be that smaller firms interact with different financial intermediaries when compared to medium or large size firms. These intermediaries could have different proportions of fixed and variable costs.

The remainder of the paper is organized as follows. Section 2 reviews the relevant capital structure literature. Section 3 outlines our empirical methodology. In Section 4 we discuss our data and present summary statistics. In Section 5 we present and discuss our results. Section 6 concludes the paper.

2. Related Literature

Since Modigliani and Miller's irrelevance proposition in 1958 (Modigliani and Miller (1958)), there has been abundant literature that investigate corporate capital structure decisions. By relaxing the assumptions in Modigliani and Miller's proposition and allowing for capital market imperfections, the well-known trade off model is established. It postulates that firms actively pursue an optimal capital structure by weighing the benefits against the costs of holding debt (Kim, Mauer and Sherman (1998)). Graham and Harvey (2001) show that indeed, 81% of firms target an optimal debt ratio or range when making financing decisions. According to this view, when firms are perturbed from the optimal leverage, they would actively rebalance it back to the optimum. However, the empirical evidence is rather mixed. This has led academics to question whether firms in fact engage in a dynamic rebalancing of capital structures. There have been three additional theories of capital structure that assume no deliberately targeted leverage ratio:

(1) the pecking order theory by Myers and Majluf (1984); (2) the market timing theory by Baker and Wurgler; and (3) the inertia theory by Welch (2004), which is the focus of this study.

Welch (2004) contends that capital structure is primarily determined exogenously by raw stock returns, but not based on those well-established theories discussed above. He discovers U.S. firms do little to counter the influence of stock price fluctuations on their capital structures. In other words, firms are inert with regard to their capital structure decisions and equity price shocks could cast a long-lasting and significant effect on firms' leverage ratios. As a consequence, leverage ratios move closely with changes in stock prices. For instance, when share price appreciates, a firm's bankruptcy risk decrease. According to the trade-off theory, we would expect a firm to increase its leverage in order to capture the additional tax benefits of debt. However, when a firm is inert, its debt ratio would decrease as a result of increasing equity value.

As our paper tries to empirically investigate the underlying reasons for inert capital structure decisions at an industry level, a review of the relevant arguments is necessary. To date, there have been two major views in literature to explain why firms are inert with regard to their capital structure decisions, the "Adjustment Cost" view and the "Agency Cost" view.

The "Adjustment (Transaction) Cost" View

With zero adjustment costs, the trade-off theory implies that firms should always stay at the optimal leverage. However, imperfections in capital markets may prevent an instantaneous adjustment of the actual leverage to the desired level. Myers (1984) pointed out if adjustment costs are large, then firms can take extended excursions away from their target. The speed with which firms reverse deviations from target debt ratios depends on the costs of making such adjustments. Much of the existing literature emphasizes the connection between adjustment costs and observed capital structure (Fischer, Heinkel and Zechner (1989), Baker and Wurgler (2002), Mauer and Triantis (1994), Titman and Tsyplakov (2007), Leary and Roberts (2005)).

The evidence on the impact of transaction costs on capital structure is mixed in the literature. Transaction costs consist of variable and fixed costs. Due to the fixed component, smaller firms are likely to face relatively higher transaction costs than larger firms. Consequently, if transaction costs could explain capital structure inertia, we would expect smaller firms to adjust their capital structure less frequently. However, Graham and Harvey (2001) find little evidence that transaction costs matter for debt issuance, especially for small firms. In addition, in a survey response presented in their paper, queried executives apparently care little about transaction costs. Furthermore, Welch (2004) shows that financial transaction costs may only explain a minor part of the inertia behavior based on back of-the-envelope computations.

On the other hand, Leary and Roberts (2005) provide supporting evidence on the role of transaction cost in capital structure inertia. They re-examine Baker and Wurgler (2002) and Welch (2004) and attribute the persistence revealed by their empirical tests to adjustment costs, as opposed to indifference toward capital structure. Specifically, they find that the effect of Baker and Wurgler's market timing variable on leverage greatly attenuates as adjustment costs decrease, illustrating that adjustment costs seem to determine the speed at which firms respond to leverage shocks.

The "Agency Cost" View

Capital structure plays a critical role in determining firm value, when the perfect market assumptions in Modigliani and Miller (1958) are relaxed. When managers are sluggish in making capital structure decisions, it may be an indication that they put in little effort in maximizing firm value, instead putting their own interests ahead. This is known as the agency problem associated with managerial behavior. The “Agency Cost” view is raised by Wanzenried (2003), whose study is built upon Welch (2004)’s. While Welch proposes a neat approach for measuring the firms’ capital structure inertia behavior, he does not look into the reasons for why firms are inert. Wanzenried (2003) tries to fill this gap by explaining firms’ capital structure inertia via executive compensation structure based on data specifically on manufacturing industries. The role of agency conflicts in capital structure choice is further examined by Morellec, Nikolov and Schurhoff (2012). Based on a dynamic trade-off model, their estimates reveal agency costs vary significantly across firms and are correlated with commonly adopted proxies for corporate governance. They show that internal and external corporate governance mechanisms cast a tremendous impact on the value of control and firms’ financing decisions. Accordingly, they conclude that part of the heterogeneity in capital structures can be partly explained by the variation in agency costs across firms.

Chou, Chang and Huang (2012) go one step further and examine the effect of corporate governance in the debt adjustment speed. This enables them to differentiate two distinct agency motives (disciplinary and takeover defense) of leverage adjustment. Following Jensen (1986), one can infer that when making financing decisions, self-interested managers, pursuing their own benefits, may fail to promptly adjust toward target leverage, even though this would result in the maximization of shareholders’ wealth. To address this agency problem debt and the pressure to service regular interest payments could serve as a disciplinary device to constrain managers from wasting the firm’s free cash flow (Morellec et al. (2012)). In contrast, entrenched managers could increase debt levels to maximize their personal benefits even though this behavior is detrimental to firm value (Berger, Ofek and Yermack (1997)). According to Chou et al. (2012), for overlevered firms with weak governance the benefits of debt as an M&A defense tool outweigh the disciplinary costs of debt. In contrast, for underlevered firms with weak governance the disciplinary costs of increasing debt significantly outweigh the benefits of increasing takeover defense measures. Overall, their findings support the agency view of capital structure inertia.

By studying capital structure inertia heterogeneity across industries we can relate such heterogeneity to product market competition. Assuming the "agency cost" view prevails in explaining capital structure inertia, product market competition, as a counterforce to agency problems, may help to explain inertia behavior at an industry level. To date, product market competition is commonly recognized in the literature as an effective mechanism to reduce managerial slack and inefficiency, thus resolving agency conflicts between shareholders and manager (e.g. Hart (1983), Shleifer and Vishny (1997), Jagannathan and Srinivasan (1999) and Allen and Gale (2000)). Kovenock and Phillips (1995) show that firms in highly concentrated industries are more likely to recapitalize and increase debt financing. They attribute this finding to the disciplinary effect of debt. They argue that debt plays a critical role in highly concentrated industries, where agency costs are not significantly reduced by product-market competition. Chou, Ng and Wang (2008) show that firms with weaker corporate governance structures are likely to be in more competitive industries. Giroud and Mueller (2009) find that the impact of strong internal governance on firm performance is large and significant in non-competitive industries, while minor and insignificant in competitive industries. Tian and Twite (2011) document a substitution effect between product market competition and corporate governance.

In addition, we presume business conditions may also play a role. The profound impact of macroeconomic environment on corporate financing decisions is widely documented in the literature (e.g., Hackbarth, Miao, and Morellec (2006)). In recessions, managers are likely to care more about efficiency in order to prevent potential liquidation of the firm and to protect their job security. Therefore, we expect managers to be less sluggish in managing leverage in downturns.

3. Empirical model

In this section, we outline the empirical setup to investigate capital structure inertia of firms. In particular, we are interested in the effect of product market competition on how firms adjust their capital structure.

3.1. The basic model of capital structure inertia

Based on Welch (2004), we consider the following model for measuring capital structure inertia. Let the actual or current debt ratio adr_{it} of firm i in year t be defined as the ratio of d_{it} as sum of long-term debt and current liabilities over the sum of d_{it} plus the market value of equity e_{it}, i.e.,

$$adr_{it} = \frac{d_{it}}{d_{it} + e_{it}} * 100 \quad (1)$$

When firm i neither issues nor retires debt or equity, i.e., when it does not optimize its capital structure, the firm's stock valuation is the main determinant of its debt ratio. This behavior is captured by the inert debt ratio $idr_{it-1,it}$ as given by (2), where $r_{it-1,it}$ is the external stock return from period (t-1) to t. $idr_{it-1,it}$ is the debt ratio that will result if the firm does nothing. By construction, the inert debt ratio moves with changes in equity value but is not affected by managers' capital structure choice.

$$idr_{it-1,it} = \frac{d_{it-1}}{d_{it-1} + e_{it-1}(1 + r_{it-1,it})} * 100 \quad (2)$$

We estimate the model as given by (3) where the current debt ratio adr_{it} is a function of its lagged value adr_{it-1} and the inert debt ratio $idr_{it-1,it}$, i.e.,

$$adr_{it} = \alpha_0 + \alpha_1 adr_{it-1} + \alpha_2 idr_{it-1,it} + X_{it}\beta + \eta_i + \gamma_t + u_{it}$$

with i=1, …, N and t=1, …, T (3)

where i is the firm index and t is the time index. The inclusion of the lagged debt ratio as explanatory variable allows for endogenous persistence. X_{it} refers to a vector of standard capital structure determinants taken from empirical capital structure studies and discussed in subsection 3.2. η_i depicts the unobservable firm-specific effect and takes into account possible heterogeneity for which we do not control. γ_t stands for the time-specific effects[1], and u_{it} is the remainder disturbance, with $u_{it} \approx IID(0,\sigma_u^2)$ independent of each other and among themselves.

The setup given by (3) allows us to decompose the firm's conduct into a readjustment behavior, which is returning to its previous debt ratio, and into an inert behavior. In the case when the firm completely readjusts to its former debt ratio, we expect α_1 to be greater than or equal to one, and α_2 to be less or equal to zero. On the other hand, when firms are completely inert, α_2 is equal to one and α_1 is zero. Accordingly, the smaller α_1 and the larger α_2, the more inert the firms are.

3.2. Capital structure determinants

The typical capital structure determinants as represented by the vector X_{it} in equation (3) include a firm's collateral value of debt, firm size, non-debt tax shields, profitability, growth opportunities, uniqueness, tax shields, volatility and debt constraints. The variables are defined as follows.

1. *Collateral value of debt (cvd)*: This variable is constructed by using the total amount of fixed assets over total assets. We expect the coefficient to be positive as firms with more fixed assets have a better ability to secure debt with a more favorable term. This is because tangible fixed assets are easier for lenders to assess value compared to intangible assets.

[1] The time-specific effects may capture factors like macroeconomic variables or other conditions which affect all firms in the same way.

2. *Firm size (size)*: This variable is measured by the logarithm of total assets. The sign of this coefficient is unclear. On one hand, larger firms with more diversified operations and portfolios face a lower probability of bankruptcy. As demonstrated by Titman and Wessels (1988), direct bankruptcy costs, which are fixed, constitute a smaller portion of firm value when the firm is larger. Consequently, large firms could raise external capital at lower costs than smaller firms. This implies a positive impact of a firm's size on its debt level. On the other hand, however, Rajan and Zingales (1995) argue that larger firms may have less incentive to raise external capital as there is less information asymmetry. This suggests a negative sign for the coefficient.
3. *Non-debt tax shields (ndts)*: This variable is measured by the ratio of depreciation and amortizations plus investment tax credits over total assets. According to Modigliani and Miller (1958), interest tax deductions strongly encourage the use of debt. However, this only holds on the premise that the firm has sufficient taxable income. The tax advantage of debt diminishes when other forms of tax deductions, such as depreciation and amortizations, are available. Therefore, the amount of such Non-debt tax shields cast a negative impact on the level of leverage a firm undertakes.
4. *Profitability (prof)*: In the literature, the commonly used measures for profitability are the ratio of earnings before interest and taxes (EBIT) over total assets and the ratio of EBIT over sales. However, the measure has a high correlation with another variable (*uniq*) in our regression, creating co-linearity problem. Therefore, we adopt the second measure, which is EBIT over sales.

   The effect of profitability on leverage is mixed. As predicted by the pecking-order theory, firms prefer internal to external financing as it is less costly (Myers and Majluf (1984)). In other words, firms would always use retained earnings first. Therefore, more profitable firm, with less need to use external finance, tends to have lower debt levels. This argument indicates a negative relationship between profitability and leverage. However, as pointed out by Jensen (1986), when there is asymmetric information about the quality of the firms, the more profitable companies tend to issue more debt in order to signal their quality to the market, suggesting a positive relationship.

5. *Growth (grth)*: This variable is measured by the relative change of total assets from the previous year to the current. The sign for this coefficient is unclear. One can argue that growth companies at the start-up phase may have limited debt capacity without many tangible assets, implying a negative sign. Alternatively, as predicted by pecking order theory, firms would only use equity as a last resort. Growth companies, compared to mature companies, have more need for external finance as internal funds can hardly be retained. In that sense, growth companies are more likely to take debt to fund investments, implying a positive sign.
6. *Uniqueness (uniq)*: This variable is measured by the ration of research & development expenses over total sales. Following Titman and Wessels (1988), the uniqueness of a firm may affect its capital structure. A more unique firm is expected to have a lower leverage.
7. *Tax shields (ts)*: We approximate this variable as the ratio of paid income taxes over total assets. As predicted by the standard trade-off theory, firms weigh the benefits of tax savings and costs of bankruptcy to determine the amount of debt used. The more tax deduction from interest payments, the more likely firms are to use debt. Thus a positive sign is expected.
8. *Volatility (vol)*: Volatility is measured by the standard deviation of the rate of return on the company's stock. The more volatile a firm's equity return is, the higher is the probability of bankruptcy. Therefore, more volatile firms tend to have less debt, suggesting a negative sign.

9. *Debt constraints (dc)*: This variable is calculated by the ratio of interest payments over EBIT. It aims to measure the extent to which firms have capacity and flexibility to adjust its capital structure. A negative sign is expected.

A summary of the specification for all variables can be found in Table 1.

[Please insert Table 1 here]

3.3. Explaining capital structure inertia by product market competition

Our main interest of the paper is to explore the effect of product market competition on capital structure inertia. As outlined by Kovenock and Phillips (1995), firms in highly concentrated industries are more likely to recapitalize and increase debt financing. This also means that firms in less competitive industries are expected to be less inert with respect to their capital structure decisions.

In order to capture the impact of product market competition on capital structure inertia, we interact the inert debt ratio $idr_{it-1,it}$ with the indicator $comp_{it}$ capturing the intensity of product market competition in industry j in year t. According to standard interaction analysis (Jaccard, and Turrisi, 2003), we also include the main effect of competition into our equation, which is given by (4).[2]

$$adr_{it} = \alpha_0 + \alpha_1 adr_{it-1} + \alpha_2 idr_{it-1,it} + \alpha_3 comp_{jt} + \alpha_4 comp_{jt} * idr_{it-1,it} + X_{it}\beta + \eta_i + \gamma_t + u_{it}$$

with i=1, …, N and t=1, …, T and $j=1, ..., J$ (4)

[2] Note that the inclusion of an additional interaction effect between the lagged debt ratio and the competition indicator would be desirable from a theoretical point of view. However, it is not possible in our model due to multicollinearity problems in the data.

Our main hypothesis is as follows: We expect higher product market competition to be associated with more capital structure inertia, i.e., the coefficient α_4 is expected to be negative.

There exists a large empirical literature on measuring the intensity of competition in an industry. Common measures of competition include the concentration ratio of an industry, industry profits, price-cost margins or import penetration. We use two of those common indicators to measure the intensity of product market competition, namely the Herfindahl-Hirschman index and the price-cost margin.

As Boone (2008) outlines, these concentration measures capture the notion of increased competition if competition is intensified by a reduction of entry costs only, but not if competition increases as a result of more aggressive interaction between firms. In order to allow for this possibility as well, we use a third competition indicator developed by Boone (2008) and which is based on the relationship between performance and efficiency, as approximated by profits and marginal costs.

Finally, we apply principal component analysis on these three competition indicators in order to generate a fourth measure, which we also use in our analysis. We generate the indicators on the two-digit industry classification level for our main results, and use the indicators on the four-digit industry classification level in our robustness tests. Our competition measures are defined as follows:

a) **Herfindahl-Hirschman Index (HHI):** HHI is commonly used to approximate the extent of industry competition (Pepall et al., 2008). It is defined as the sum of squares of the markets shares (expressed in percentages in term of sales) of the top 50 firms (or summed over all the firms if there are fewer than 50) within a particular industry, i.e.,

$$HHI_{jt} = \sum_{i=1}^{N_j} (MS_{it})^2 \quad (5)$$

where j=1,2,…,m indexes the sector, i=1,2,…,n indexes firm i a sector, t=1,…,T refers to the year, and MS_{it} denotes the market share of firm i in its respective sector.

As the HHI measures the extent of concentration in an industry, there is an inverse relationship between the index itself and the extent of market competition (Giroud and Mueller (2009)), i.e., a higher HHI implies less competition.

b) **Price-Cost Margin (*pc-margin*):** Our second competition measure is the price-cost margin, which is frequently used as a proxy for the Lerner index (Lerner, 1934; Lindenberg and Ross, 1981; Domowitz et al., 1986). It is defined as the price-cost margin (defined as sales minus costs of goods sold) scaled by sales, averaged over all the firms in the industry. Besides unweighted values, we also generate sales-weighted measures which we use in our robustness tests. Similar to the HHI, there is an inverse relationship between the index itself and the extent of competition, i.e., higher price-cost margins go together with less competition.

$$pc - margin_{jt} = \frac{1}{N_j} \sum_{n=1}^{N_j} \frac{sales_{it} - costs\ of\ goods\ sold_{it}}{sales_{it}} \quad (6)$$

c) **Boone-Indicator (*bi*):** Boone (2008) proposes a competition indicator based on relative profits, which is defined as profit of an efficient firm relative to the profit of an inefficient firm. The basic idea is to relate efficiency differences between firms to profit differences. The more competitive an industry is, the more raises the profit of an efficient firm relative to a less efficient firm. As such, higher competition goes together with higher relative profits

(Boone 2008), and it always moves in the same direction of competition. Also, it captures the notion of a higher competition going together with more firms, but it also encompasses the case of increased competition resulting from a more aggressive behavior of the firms in an industry.

The relation between the relative profits of firm *i* and its relative costs can be represented as follows, i.e.,

$$\frac{\pi_{it}}{\overline{\pi}_t} = a + b\frac{c_{it}}{\overline{c}_t} \quad \text{with } i = 1, \ldots, n \text{ and } t = 1, \ldots, T \qquad (7)$$

where $\pi_{it}=(p_{it}-c_{it})x_{it}$ defines the profit of firm *i*, excluding possible fixed costs, producing output level x_{it} at marginal cost c_{it} and selling at price p_{it} in period *t* in a certain market or industry. $\overline{\pi}_{it}$ and $\overline{c}_{it}$, which are used to normalize firm *i*'s profits and marginal costs, stand for the profits and marginal costs of the most efficient firm.

The coefficient *b* measures the intensity of competition. It is typically negative since firms with higher relative marginal costs have also relatively lower profits. As competition increases, a given efficiency gain is better rewarded in the sense that relative profits increase more.

d) **Indicator based on principal component analysis (princ. comp. indicators):**

Given that the indicators outlined above all measure different dimensions of competition, we try to combine this information into a single indicator using principle component analysis, where all three competition indicators as outlined under a) to c) are used. As Giri (2004) outlines, the purpose of principal component analysis is to reduce the dimensionality in the data with a little loss of information as possible in the total variation these variables are explaining. Applying the Kaiser criterion we retain two factors (principal components).[3] Four our main results, we use the first component (pc^1) as an alternative competition indicator as it explains the largest possible amount of variation in the original data. In addition, we use the second principal component in our robustness tests.

3.4. GMM as estimation method

Given the dynamic nature of our model, least squares estimation methods produce biased and inconsistent estimates (see Baltagi, 2001). Therefore, we use techniques for dynamic panel estimation that are able to deal with the biases and inconsistencies of our estimates.

Another challenge with the estimation of capital structure models refers to the endogeneity problem. For example, firms being more profitable tend to have lower debt ratios, given that they are able to pay back debt from their earnings. However, the causality could also go in the opposite direction, i.e., firms are more profitable because they have less debt and have lower due to interest payments. Following García-Herrero et al. (2009), we address these problems by employing the Generalized Method of Moments (GMM). Finally, our model includes a lagged dependent variable, which leads to inconsistent estimates when applying OLS estimates.

The Difference and System generalized method of moments (GMM) estimators are developed by Holtz-Eakin, Newey, and Rosen (1988), Arellano and Bond (1991), Arellano and Bover (1995), and Blundell and Bond (1998). They have become increasingly popular to address econometric problems in panel data with few time periods and many individuals. At the same time, they also corrects for situations where independent variables are not strictly exogenous, i.e. independent variables are correlated with past or current realizations of the error term. In

[3] We can retain only factors with eigenvalues greater than 1. In essence this implies that unless a factor extracts at least as much as the equivalent of one original variable we will drop it.

addition, they solve heteroskedasticity and autocorrelation problems within individuals and take into account of the fixed effects.

Arellano-Bond estimation makes transformation to all regressors, usually by differencing, and uses the Generalized Method of Moments (Hansen 1982). Therefore, it is called Difference GMM. The Arellano-Bover/Blundell-Bond estimation augments Arellano-Bond estimation by incorporating an additional assumption, i.e. the first differences of instrument variables are not correlated with the fixed effects. It is known as System GMM which considerably improves efficiency in estimation by allowing the use of more instruments (Roodman (2009)).

Despite its many advantages, System GMM can cause severe problems if instruments are not dealt with great care. First, since the number of elements in the estimated variance matrix of the moments is quadratic in the instrument count, a finite sample may lack sufficient information to estimate such a large matrix well. While this does not compromise consistency, it can weaken the Hansen test to the point where it generates implausibly good p-values (Bowsher (2002)). Moreover, a large instrument collection can over fit endogenous variables. This bias is present in all instrumental variable regressions and is more severe as the number of instrument increases (Roodman (2009)).

As pointed out by Ruud (2000), there seems to be little guidance from the literature on the optimal number of instruments. Windmeijer (2005) reports that cutting the instrument count from 28 to 13 reduced the average bias in the two-step estimate of the parameter of interest by 40%, based on simulation of Difference GMM on an 8*100 panel. Roodman (2009) produces similar results from simulations of panels of various dimensions. In his further study, Roodman (2009) evaluates the evidence on instrument proliferation, and proposes simple ways to control it. He suggests that results should be aggressively tested for sensitivity to declinations in the number of instruments. Moreover, he argues that specification tests that merely ‘exceed conventional significance levels' of 0.05 or 0.10 may not imply significant results as those levels are not appropriate when trying to rule out specification problems, especially if the test is undersized.

4. Data

4.1. Sample

We construct our sample based on US listed firms for the financial years from 1990 to 2010. Accounting data are obtained from the COMPUSTAT and stock returns are obtained from the CRSP Database. Firms are required to have available information for all the variables needed in the study in the corresponding financial year. As finance and utility industries are subject to heavy regulation and their capital structures are likely to be determined in ways beyond the purpose of this study, they are excluded from our sample. Our final sample consists of 72,011 firm-year observations. All variables have been trimmed at the 1st and 99th percentiles. This helps to reduce the impact of extreme values by eliminating values beyond the cut-off point. Table 2 reports the number of observations and firms for each sector. Based on the Global Industry Classification Standard (GICS) classification by MSCI and Standard & Poor's, we study eight sectors, including energy (10), materials (15), industrials (20), consumer discretionary (25), consumer staples (30), health care (35), information technology (45) and telecommunication services (50). Information technology and Consumer Discretions are the two largest sectors, holding about 25% respectively 20% of the firms and observations in our sample. Telecommunication Services represent the smallest sector, with 3.25% of the firms and 2.65% of the observations in our sample.

[Please insert Table 2 here]

4.2. Summary Statistics

The summary statistics of all the variables in our regression analyses are shown in Table 3. Our sample represents 9’415 firms over the time period from 1990 to 2010. On average, US firms fund 22% of their assets with debt. However, the median debt to asset ratio is only 15%, suggesting that leverage spread is positively skewed. Figure 1 plots the actual and the inert debt ratio over the sample time period. Clearly, the two debt ratios move closely together. Looking at the development over time, we observe a rather sharp drop in the debt ratio at the beginning of our sample period, starting from an average debt level of about 33% in 1990. From 1997 onwards, debt levels start to rise again, resulting in another local peak around the year 2000, with an average current debt ratio of about 28%. Afterwards, leverage of the firms in our sample starts to fall again, reaching the lowest level around the year 2006 with about 16%. Afterwards, we again observe an increase in debt ratios to almost 29% in 2008, before they start to fall again.

[Please insert Figure 1 here]

[Please insert Table 3 here]

There exists also a large heterogeneity across sectors. Table 4 reports mean values for our dependent and independent variables by sector. As to the debt level, firms in the sector Telecommunication Services exhibit the highest leverage ratio with 31%, closely followed by companies in the sectors Materials and Consumer Discretions, which have an average debt ratio of 28%. The least leveraged firms in our sample can be found in the sector Information Technology, where the average current debt ratio amounts to 12% only.

[Please insert Table 4 here]

As to the capital structure determinants, we also observe some differences across sectors, at least for certain variables. For instance, the fixed asset ratio, as captured by the variable cvd_{it}, ranges from 74% in the Energy sector to the lowest average value of 35% for the Information technology sector, reflecting the different capital intensities for the different sectors. Interestingly, profitability, defined as EBIT over total assets, amounts to a low 2% on average, with a negative value of -3% for the Health Care sector, but the highest value with 7% for the Consumer Staples sector. Another variable with a large variance across sectors is the firm's uniqueness $uniq_{it}$, as defined as R&D expenses relative to sales. The Health Care sector with 31% and to a lesser extent also in the Information Technology sector with 19%, the R&D intensity is rather high, reflecting the innovative character of their business. Finally, we also report large inter-sectoral difference for the variable debt constraints, defined as the share of interest payment relative to the EBIT. The Telecom Services sector is characterized by the relative debt payments of 37%, and it is followed by the second highest value of 26% in the sector Consumer Discretionary. These figures reflect the high debt levels which persist in these sectors.

Looking at our competition indicators, note that larger values are expected to go together with less competition. The two traditional competition indicator HHI and price-cost margin as well as the indicator based on the first principal component point out to the lowest intensity of competition in the sector Energy. According to the Boone indicator and to certain extent also to the price-cost margin, the Information Technology sector is also characterized by rather low competition intensity. The sector Telecommunication Services is also rather concentrated, and given our implicit assumption of concentrated markets being less competitive, also by a lower intensity of competition.

Table 5 reports the correlations among dependent and independent variables. Expectedly, high correlations among the actual debt ratio adr_{it}, its lagged value and the inert debt ratio $idr_{t+1,i}$ are observed. Correlations between the capital structure determinants exist, but do not seem to cause serious problems of multicollinearity. We also checked this with the appropriate tests when running our regressions as reported later on.

[Please insert Table 5 here]

5. Results

5.1. Does capital structure inertia exist?

In a first step, we investigate the extent of capital structure inertia and the importance of the standard capital structure determinants without considering competition issues. Also, we are interested in how these factors differ across sectors, and for this purpose we estimate the model for the entire sample and then also for each sector. Table 6 reports the results for our basic model as given by equation (3).

[Please insert Table 6 here]

As outlined above, we use the system GMM estimator and report the relevant test statistics at the bottom of Table 6. The GMM estimator is consistent in case there is no second-order autocorrelation in the first-differenced idiosyncratic errors. To test for second order autocorrelation, z_2 is reported, denoted by AB test AR(2). It follows an N (0, 1) distribution under the null hypothesis. The Wald statistic, which is distributed as χ^2, tests for the joint significance of the included explanatory variables. Finally, the Hansen test of over-identifying restrictions is asymptotically distributed as χ^2 under the null of instrument validity. It jointly tests for the model specification and the validity of the instruments. The same instruments are employed for all the regressions. The use of these instruments gives us satisfactory results for z2 and Wald statistic for Sargan and Hansen tests, suggesting no second order autocorrelation and the validity of instruments.

Our estimation results have stable coefficients. The Wald test indicates fine goodness of fit for the estimated model and the Hansen test shows no evidence of over-identifying restrictions. The equations indicate that a negative first-order autocorrelation is present. However, this does not imply that the estimates are inconsistent. Inconsistency would be implied if second-order autocorrelation was present (Arellano and Bond, 1991). The value test for the second-order autocorrelation (AR 2 errors), however, implies that the moment conditions of the model are valid.

Looking at the estimation results for the full sample, which can be found in the column labeled as *All*, we notice that the lagged debt ratio and the inert debt ratio both have significant coefficients, but the coefficient of the inert debt ratio is roughly 8 times larger than the coefficient of the lagged debt ratio. This implies that we observe some persistence of the dependent variable, but the inert debt ratio plays a more prominent role and is able to explain a large part of the variation in the actual debt ratio. As to the standard capital structure determinants as included in our model, there are only three factors which seem to be relevant to explain a firm's leverage, namely the collateral value of debt, as captured by the fixed assets relative to total assets, and the two tax shield variables. The coefficients carry the expected signs as predicted by capital structure theories. Interestingly, the other classical capital structure determinants do not seem to matter. While the relative importance of the inert debt ratio and the negligent role of the lagged debt ratio is consistent with Welch's (2004) results, the lack of significant coefficients for 7 out of 10 capital structure determinants is not. We conclude that the inert debt ratio is the most important factor that determines a firm's debt level.

Let us now consider the results for the different sectors. The strong effect of the inert debt ratio and the rather weak impact of the lagged debt ratio are confirmed. Also, the coefficient of fixed assets ratio is significant at the 1% for all the sectors considered except for the Materials sector. The parameters are ranging from 0.181 for the Health sector at the upper end to 0.027 at the lower end for the Materials sector. Unsurprisingly, the collateral value of debt is most important for firms in the Energy sector, where large amount of infrastructure investments are necessary. For all the other capital structure determinants, the coefficients are not consistently significant across all sectors. Similar to the results for the full sample, the tax shields are important for four out of eight sectors considered. Also, the non-debt tax shields play a certain role for five out of the eight sectors. The coefficient of the size variable is positive and significant for the sectors Energy, Materials and Health Care, but the small coefficients point out to economically not very important effects. Finally, the macro-economic variables have some explanatory power for most of the sectors, with a positive effect of the inflation rate and a negative effect of the unemployment rate on the current debt level. Overall, we conclude that the inert debt ratio is the most important capital structure determinant in our model, and this result holds for the full sample as well as for the individual sectors in our sample.

5.2. Product market competition and capital structure inertia

Next we look at the effect of product market competition and how it interacts with firms' capital structure inertia behavior. As outlined in subsection 3.4., our main interest focuses on the coefficient α_4 in equation (4), which is the coefficient of the inert debt ratio interacted with the proxy for product market competition. Phillips and Kovenock (1995) show that firms in highly concentrated industries are more likely to recapitalize and increase debt financing. They attribute such finding to the disciplinary effect of debt. They argue that debt plays a critical role in highly concentrated industries, where agency costs are not significantly reduced by product-market competition. There are a number of further studies providing evidence for a substitution effect between product market competition and corporate governance (e.g., Chou, Ng and Wang (2008), Giroud and Mueller (2009), Tian and Twite (2011)). We thus argue that debt, as one of the corporate governance mechanisms due to its disciplinary effects, can serve as a substitute to product market competition. When product market competition is low, managers are more active (and less inert) with regard to capital structure decisions, especially debt use to constrain the free cash flow problem. Therefore, a negative correlation between the competition indicator and IDR is observed.

Given that all our four competition indicators are defined such that a higher value means a lower intensity of competition, we expect α_4 in equation (4) to be negative. If this is the case, capital structure inertia, as approximated by the coefficient of the inert debt ratio, is smaller in sectors with less intensive product market competition, i.e., firms in less competitive industries or sectors are more likely to adjust their capital structure, while firms in more competitive industries seem to be more inert with respect to their capital structure choice.

The results are reported in Table 7, where each column contains the estimates for one of our four competition indicators. Note that the competition indicators are generated at the 2-digit industry level, based on the GICS sector classification. In our robustness tests, we consider the competition indicators generated at the 4-digit level as well. Note that industry dummies are included in all the regressions as well, but not reported in the table.

[Please insert Table 7 here]

Looking at the estimation results in general, we observe that both the lagged current debt ratio as well as the inert debt ratio are statistically significant at the 1% level, but the effect of the inert debt ratio is economically much more important and the main determinant of firms' leverage ratio. As to the standard firm-specific capital structure determinants included in our model, the fixed assets ratio as captured by the variable cvd_{it} as well as the tax shields ts_{it} seem to be the most important factors to determine leverage. The signs of coefficients stand in line with our expectations, i.e., a positive coefficient for cvd_{it} and a negative coefficient for the tax shield variable ts_{it}. Except for the coefficient of the non-debt tax shield variable in column (1), all the other firm-specific capital structure determinants do not seem to affect the firm's current debt ratio in a significant way. Finally, the macroeconomic variables have a rather strong impact on debt levels as well, with inflation having a positive effect, and the unemployment rate having a negative impact on the current debt ratio. These results are consistent with our expectations and they confirm our findings from the regressions without included competition effects as reported in Table 5. Also, the significance and the magnitude of the coefficients for the capital structure determinants do not change much with the inclusion of the competition variable, which indicate stable relationships between debt levels and the standard capital structure determinants and that the effect of competition interacts with the firms' inertia behavior. To better understand the interaction between the inert debt ratio and the competition measures we include an interaction term in all for specifications. Three competition measures and the corresponding interaction terms are statistically significant. The exception is the Boone indicator. This comes not as such a surprise as already the summary statistics in Tables 2 and 3 show that the values for the Boone indicator are very different compared to both the Herfindahl index and the price-cost margin. The latter two are always positive whereas the former is always negative. In contrast, the first principal component is both positive and negative. Including the competition variables in the model increases the coefficient of the inert debt ratio for the first two models in columns (1) and (2) models and reduces it for the third model in column (3) and has no effect when using the model with the principal component in column (4).

Let us now consider the effect of our competition indicators on capital structure inertia, which is the main focus of the paper. For three of our four competition indicators, the coefficient of the interaction effect between the inert debt ratio and the competition indicator, α_4, is negative and statistically significant at the 5% or the 10% level, respectively. Looking at the results for the Herfindahl index, which can be found in column (1) of Table 7, the coefficient of the interaction term is -2.49 and statistically significant at the 10% level. This means that the extent of capital structure inertia, as measured by the coefficient of the inert debt ratio is lower, is reduced in GICS sectors with a higher Herfindahl index and therefore with a lower level of competition. Similarly, the coefficient on the interaction term between the inert debt ratio and product market competition is negative for the price-cost margin and for the 1st principal component. In both cases, the interaction terms are significant at the 5% level. In absolute terms, the coefficients are smaller compared to the one from the HHI, but this has to do with the fact that the competition measures are defined differently and cannot be directly compared with each other in terms of their absolute level. We do not find any significant effect of competition on inertia when competition is measured by the Boone indicator, which is an interesting result as well. The Boone indicator is a new competition indicator and differs fundamentally from the other more standard competition measures. Note that the level of competition, which we also included in our model, has a significant impact as well, where higher levels of competition seem to have a negative impact on the absolute debt level.

To conclude, our results provide empirical evidence for lower capital structure inertia in less competitive industries. This result stands nicely in line with the predictions of Phillips and Kovenock (1995) and provides further insights for a better understanding of firms' capital structure decisions.

5.3. Do transaction costs matter?

In the presence of transaction costs, firms may fail to make an immediate adjustment to the optimal leverage level. Myers (1984) pointed out if adjustment costs are large, then firms can take extended excursions away from their target. The speed with which firms reverse deviations from target debt ratios depends on the costs of making such adjustments. The evidence on the impact of transaction costs on capital structure is mixed in the literature. Transaction costs consist of variable and fixed costs. Due to the fixed component, smaller firms are likely to face relatively higher transaction costs than larger firms. Consequently, if transaction costs could explain capital structure inertia, we would expect smaller firms to adjust their capital structure less frequently.

We examine the role of transaction costs for capital structure inertia by splitting up the sample into three subsamples, small, medium and large. To form the three groups we sort all firm observations in each year by size. Note that the three groups are not equal in size because of our threshold scores. One concern is that firms move up or down one or two groups. Our analysis shows (not reported) that only a small percentage of our firms changes their size group. We then run regression (1) using System GMM for all three subsamples. Table 8 shows medium (column 2; IDR=0.765) and large firms (column 3; IDR=0.753) are actually more inert than small firms (column 1; IDR=0.588). However, the Hansen test statistic for the small group and the large group is highly significant and as such those two models are overidentified. Therefore, we create two dummy variables for small firms and large firms (relative to the medium sized firms). We then estimate the full sample and the test Hansen test statistic is no longer problematic. To understand the effect of size on IDR we include an interaction term for both the small and the large size dummy variable. The small-size interaction dummy is -0.130 and significant at the one percent level. It supports the earlier result that smaller firms are less inert. The large-firm interaction dummy is 0.129 and significant at the 5 percent level. It shows that large firms are more inert than both small and medium sized firms. Our results suggest that transaction costs, at least, do not play a critical role in capital structure inertia behavior. This result stands in contrast to Fischer et al. (1989) who find that relatively small transaction or recapitalization costs affect the ratio of debt over time. A possible interpretation could be that smaller firms source their financing through different financial intermediaries who have different fixed and variable cost structure compared to those intermediaries who mostly serve medium and large customers and transactions.

[Please insert Table 8 here]

6. Conclusion

This paper investigates the underlying reasons for inert capital structure decisions at an industry level. Using a sample of US non-financial and non-utility firms over the fiscal financial years from 1990 to 2010, this paper examines how capital structure inertia differs across industries and to what extend such difference can be explained by product market competition. In addition, we explore the explanatory power of transaction costs, which is a common explanation for capital structure inertia. Our results show that firms in more competitive industries tend to be more inert with their capital structure decisions. This result could be explained by the disciplinary effect of debt, which serves as a substitute to product market competition. When product market competition is low, managers are more active with regard to capital structure decisions, especially debt use to constrain the free cash flow problem. Our findings also have implications for the various stakeholders in firms. Shareholders, for example, should be aware that the board and the top executives of firms in very competitive sectors might neglect the management of the firm's capital structure. Finally, we also explore the explanatory power of transaction costs, which are a common explanation for capital structure inertia. Our results show that large firms are actually more inert than small firms. This provides evidence that transaction costs, at least, do not play a critical role in explaining capital structure inertia.

References

Allen, F. and Gale, D., 2000, 'Corporate governance and competition', *Cambridge University Press*, Cambridge, 23-94.

Baker, M. and Wurgler, J., 2002, ‘Market timing and capital structure’, *The Journal of Finance* 57, 1–30.

Baltagi, B.H., 2001. Econometric Analysis of Panel Data, 2nd ed. John Wiley & Sons, Chichester.

Berger, P. G., Ofek, E. and Yermack, D. L., 1997, ‘Managerial entrenchment and capital structure decisions’, *The Journal of Finance* 52, 1411-1438.

Jan Boone, 2008. "A New Way to Measure Competition," *Economic Journal* 118, 1245-1261.

Bowsher, C.G., 2002, ‘On testing over identifying restrictions in dynamic panel data models’, *Economics Letters* 77, 211-220.

Chou, R. K., Chang, Y. K. and Huang, T. H., 2012, ‘Corporate Governance and the Dynamics of Capital Structure: New Evidence’, working paper National Chengchi University.

Chou, W., Ng, L. and Wang, Q., 2008, ‘Product Market Competition and Corporate Governance’, working paper Georgia Institute of Technology.

Dockner, E., Mæland, J., and Miltersen K. R., 2012, ‘Interaction between Dynamic Financing and Growth Options: The Impact of Industry Structures, working paper Vienna University of Economics and Business, Norwegian School of Economics and Business Administration and Copenhagen Business School.

Domowitz, I., Hubbard, R., and Petersen, B., 1986, ‘Business cycles and the relationship between concentration and price-cost margins’, *RAND Journal of Economics* 17, 1–17.

Fischer, E., Heinkel, R. and Zechner, J., 1989, ‘Dynamic capital structure choice: theory and tests’, *The Journal of Finance* 44, 19-40.

Giroud, X. and Mueller H. M., 2011, ‘Corporate Governance, Product Market Competition, and Equity Prices’, *The Journal of Finance* 66, 563-600.

Giri, N. C., 2004. Multivariate statistical analysis. New York: Marcel Dekker Inc.

Goldstein, R., Ju, N. and Leland, H., 2001. ‘An EBIT-Based Model of Dynamic Capital Structure’, *Journal of Business* 74(4), 483-512.

Graham, J. R. and Harvey, C. R., 2001, ‘The theory and practice of corporate finance: Evidence from the field’, *Journal of Financial Economics* 60, 186–243.

Hackbarth, D., Miao, J. and Morellec, E., 2006, ‘Capital Structure, Credit Risk and Macroeconomic Conditions’, *Journal of Financial Economics* 82, 519–550.

Hart, O. D., 1983, ‘The market mechanism as an incentive scheme’, *Bell Journal of Economics*, 14, 366-382.

Jaccard, J., and Turrisi, R., 2003, Interaction Effects in Multiple Regressions, *Sage Publications*, Quantitative Applications in the Social Sciences, vol. 72.

Jagannathan, R. and Srinivasan, S. B., 1999, 'Does product market competition reduce agency costs?', *North American Journal of Economics and Finance* 10, 387-399.

Jensen, M. C., 1986, 'Agency costs of free cash flow, corporate finance and takeovers', *American Economic Review* 76, 323–329.

Kim, C. S., Mauer, D. and Sherman, A., 1998. 'The Determinants of Corporate Liquidity: Theory and Evidence', *Journal of Financial and Quantitative Analysis* 33, 335-359.

Kovenock, D. and Phillips, G., 1995, 'Capital Structure and Product-Market Rivalry: How Do We Reconcile Theory and Evidence?', *The American Economic Review* 85, 403–408.

Leary, M. T. and Roberts, M. R., 2005, 'Do Firms Rebalance Their Capital Structures?', *The Journal of Finance*, 60, 2575-2619.

Lerner, A., 1934, 'The concept of monopoly and the measurement of monopoly power', *Review of Economic Studies* 1, 157–175.

Lindenberg, E., and Ross, S., 1981, 'Tobin's q ratio and industrial organization', *Journal of Business* 54, 1–32

Mauer, D. and Triantis, A., 1994, 'Interactions of corporate financing and investment decisions: a dynamic framework', *The Journal of Finance* 49, 1253–1277.

Modigliani, F. and Miller, M., 1958, 'The Cost of Capital, Corporation Finance and the Theory of Investment', *American Economic Review* 48, 261–297.

Morellec, E., Nikolov, B. and Schurhoff, N., 2012, 'Corporate Governance and Capital Structure Dynamics', *The Journal of Finance* 67, 803–848.

Myers, S. C., 1984, 'The capital structure puzzle', *The Journal of Finance*, vol.39, pp.575–592.

Myers, S. C. and Majluf, N., 1984, 'Corporate Financing and Investment Decisions when Firms have Information that Investors do not have', *Journal of Financial Economics* 13, 187-221.

Pepall, L. R., Richards, D. J., and Norman, G. 2008, 'Industrial Organization: Contemporary Theory and Empirical Applications, 4th edition, Wiley-Blackwell-Publishing, Malden.

Rajan, R. G. and Zingales, L., 1995, 'What Do We Know about Capital Structure? Some Evidence from International Data', *Journal of Finance, American Finance Association* 50, 1421-60.

Roodman, D., 2009, 'A Note on the Theme of Too Many Instruments', *Oxford Bulletin of Economics and Statistics* 71, 135-158.

Roodman, D., 2009, ‘How to do xtabond2: An introduction to difference and system GMM in Stata’, *Stata Journal, Stata Corp LP* 9, 86-136.

Ruud, P. A., 2000, ‘Classical Econometrics’, New York: Oxford University Press.

Schiersch, A. and J. Schmidt-Ehmcke, 2010, ‘Empiricism meets Theory – Is the Boone-Indicator Applicable’, Discussion Paper 1030, DIW Berlin.

Shleifer, A. and Vishny, R.W., 1997, ‘A survey of corporate governance’, *The Journal of Finance* 52, 737-783.

Showalter, D. M., 1995, ‘Oligopoly and financial structure’, *American Economic Review* 85, 647-653.

Tian, G. Y and Twite, G., 2011, ‘Corporate governance, external market discipline and firm productivity’, *Journal of Corporate Finance* 17, 403-417.

Tittman S. and Wessels R., 1988, ‘The Determinants of Capital Structure Choice’, *The Journal of Finance* 43, 1-19.

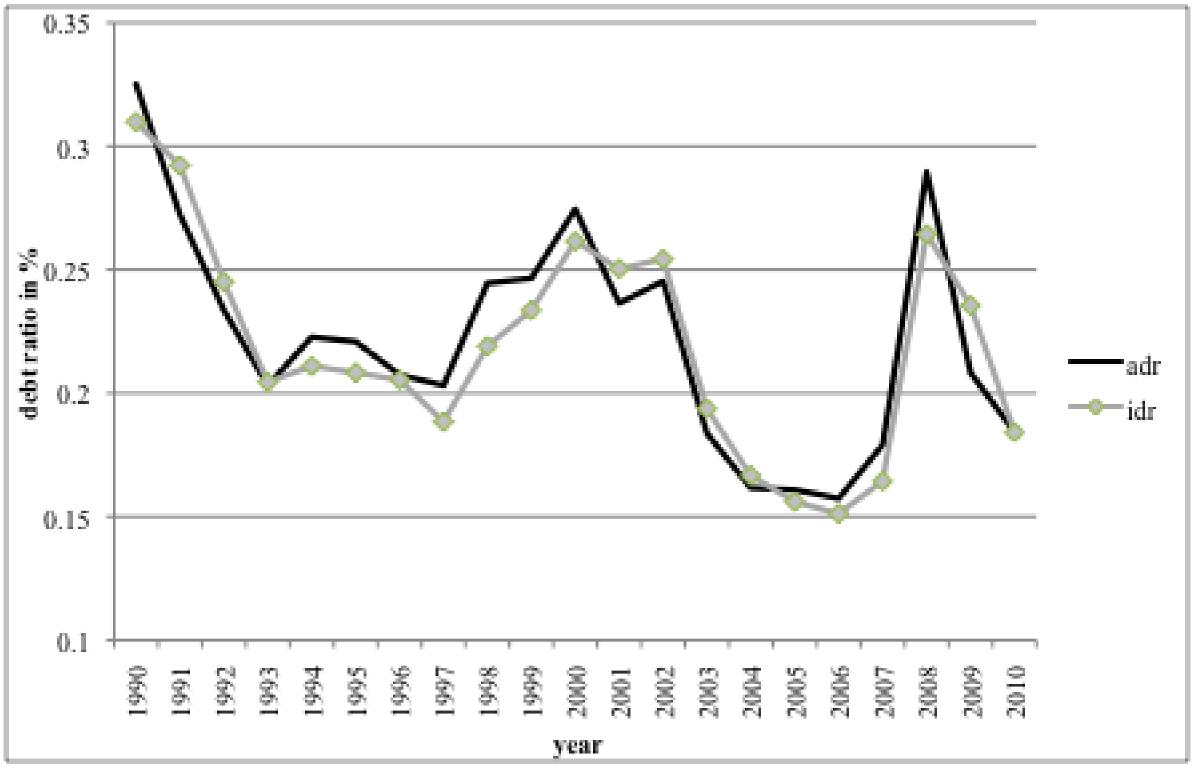
Titman, S. and Tsyplakov, S., 2007, ‘A dynamic model of optimal capital structure’, *Review of Finance* 11, 401-451.

Wanzenried, G., 2003, ‘Capital Structure Inertia and CEO Compensation’, working paper University of California at Berkeley.

Welch, I., 2004, ‘Capital structure and stock returns’, *Journal of Political Economy* 112, 106–131.

Windmeijer, F., 2005, ‘A finite sample correction for the variance of linear efficient two-step GMM estimators’, *Journal of Econometrics* 126, 25-51.

FIGURE 1—DEBT LEVELS OVER TIME



Notes: The figure shows the actual and the inert debt ratio over time. Accounting data are obtained from the Compustat database, while stock price data are obtained from the CRSP database. Firms are required to have available information for all the variables needed in the corresponding financial year. Financial and Utility (GICS 40 and 55) firms are excluded. All variables have been trimmed at the 1st and 99th percentiles. This helps to reduce the impact of extreme values by eliminating values beyond the cut-off point. Variable definitions are provided in the Table 1.

TABLE 1—DEFINITION OF VARIABLES

Variable		Description	Expected effect
Dependent			
actual debt ratio	adr_{it}	$\frac{(\text{long-term debt} + \text{current liabilities})}{(\text{long-term debt} + \text{current liabilities} + \text{market value of equity})}$	
Independent			
Lagged debt ratios			
actual debt ratio from prior period	adr_{it-1}		
inert debt ratio	$idr_{it-1,it}$	$idr_{it-1,it} = \frac{d_{it-1}}{d_{it-1} + e_{it-1}(1 + r_{it-1,it})} * 100$	
Firm-specific capital structure determinants			
collateral value of debt	cvd_{it}	$\frac{(\text{fixed assets})}{(\text{total assets})}$	+
firm size	$size_{it}$	$\log(\text{total assets})$	+/-
non-debt tax shields	$ndts_{it}$	$\frac{(\text{depreciation and amortization} + \text{investment tax credits})}{(\text{total assets})}$	-
profitability	$prof_{it}$	$\frac{(\text{EBIT})}{(\text{total assets})}$	+/-
growth	$grth_{it}$	$\frac{(\text{book value of equity})}{(\text{market value of equity})}$	+/-
uniqueness	$uniq_{it}$	$\frac{(\text{research \& development expenses})}{(\text{total sales})}$	-
tax shields	ts_{it}	$\frac{(\text{paid income taxes})}{(\text{total sales})}$	+
volatility	vol_{it}	standard deviation of the rate of return on the stock	-
debt constraints	dc_{it}	$\frac{(\text{interest payments})}{(\text{EBIT})}$	-
Macro-economic capital structure determinants			
Inflation rate	inf_t		+
Unemployment rate	une_t		-
Measures of product market competition			
HHI	HHI_{jt}	$HHI_{jt} = \sum_{i=1}^{N_j} (MS_{it})^2$	
Price-cost margin	$pcmargin_{jt}$	$pc - margin_{jt} = \frac{1}{N_j} \sum_{n=1}^{N_j} \frac{sales_{it} - costs\ of\ goods\ sold_{it}}{sales_{it}}$	
Boone indicator	bi_{jt}	See subsection 3.3 c)	
1st principal component	pc^1_{jt}	First principal component based on all three competition indicators	

Notes: Accounting data are obtained from the Compustat database, while stock price data are obtained from CRSP database. Firms are required to have available information for all the variables needed in the corresponding financial year. Financial and Utility firms are excluded. All variables have been trimmed at the 1st and 99th percentiles. This helps to reduce the impact of extreme values by eliminating values beyond the cut-off point.

TABLE 2—NUMBER OF FIRMS AND OBSERVATIONS BY SECTOR

Industry	Number of firms	in %	Number of firm-year observations	in %
Energy	713	7.57	5,606	7.78
Materials	669	7.11	5,616	7.80
Industrials	1,649	17.51	13,710	19.04
Consumer Discretions	2,021	21.47	15,569	21.62
Consumer Staples	499	5.30	4,510	6.26
Health Care	1,124	11.94	7,175	9.96
Information Technology	2,434	25.85	17,918	24.88
Telecommunication Services	306	3.25	1,907	2.65
Total	9,415	100	72,011	100

Notes: This table details the number of firms and observations for each sector. Sector classifications are based on the Global Industry Classification Standard (GICS), where 10=Energy, 15=Materials, 20=Industrials, 25=Consumer Discretionary, 30= Consumer Staples, 35= Health Care, 45=Information Technology, 50=Telecommunication Services.

TABLE 3—SUMMARY STATISTICS FOR ENTIRE SAMPLE

Variable	Mean	Median	Std. dev.	Min	Max
adr_{it}	0.22	0.02	0.23	0.00	1.00
adr_{it-1}	0.22	0.02	0.23	0.00	1.00
$idr_{it-1,it}$	0.22	0.14	0.24	0.00	1.00
cvd_{it}	0.49	0.48	0.24	0.00	1.00
$size_{it}$	5.41	5.28	2.19	-1.95	12.79
$ndts_{it}$	0.05	0.04	0.06	0.00	3.51
$prof_{it}$	0.02	0.07	0.28	-9.30	8.71
$grth_{it}$	0.59	0.49	1.66	-87.58	74.51
$uniq_{it}$	0.10	0.00	0.85	-0.01	67.28
ts_{it}	0.02	0.01	0.03	-0.56	0.77
vol_{it}	0.16	0.13	0.17	0.00	18.41
dc_{it}	0.18	0.04	3.67	-92.61	198.00
inf_{it}	0.03	0.03	0.01	0.00	0.04
une_{it}	0.06	0.06	0.01	0.04	0.10
HHI_{jt}	0.03	0.02	0.01	0.01	0.09
$pcmargin_{jt}$	2.42	2.18	0.93	1.17	9.84
bi_{jt}	-1.04	-1.02	0.29	-1.83	-0.61
pc^{1}_{jt}	-0.03	-0.21	1.34	-2.54	6.90
Number of firm-year observations	72,011	72,011	72,011	72,011	72,011

Notes: This table reports summary statistics of our main regression variables. Accounting data are obtained from the Compustat database, while stock price data are obtained from the CRSP database. Firms are required to have available information for all the variables needed in the corresponding financial year. Excluded are the two GICS sectors Financials (40) and Utilities (55). All variables have been trimmed at the 1st and 99th percentiles. This helps to reduce the impact of extreme values by eliminating values beyond the cut-off point. Variable definitions are provided in Table 1.

TABLE 4—SUMMARY STATISTICS BY GICS SECTOR

GICS Sector Variable	10	15	20	25	30	35	45	50
adr_{it}	0.273	0.282	0.260	0.276	0.257	0.158	0.116	0.313
adr_{it-1}	0.268	0.280	0.258	0.265	0.254	0.152	0.112	0.301
$idr_{it-1,it}$	0.265	0.283	0.260	0.273	0.257	0.156	0.119	0.309
cvd_{it}	0.736	0.616	0.486	0.505	0.550	0.433	0.349	0.714
$size_{it}$	6.192	6.286	5.387	5.515	5.868	4.604	4.835	7.186
$ndts_{it}$	0.076	0.051	0.046	0.049	0.044	0.045	0.056	0.086
$prof_{it}$	0.049	0.054	0.047	0.053	0.071	-0.030	-0.041	0.012
$grth_{it}$	0.599	0.704	0.677	0.644	0.552	0.430	0.529	0.296
$uniq_{it}$	0.025	0.023	0.043	0.019	0.019	0.308	0.187	0.051
ts_{it}	0.011	0.016	0.020	0.022	0.025	0.018	0.014	0.013
vol_{it}	0.146	0.135	0.145	0.155	0.130	0.174	0.200	0.163
dc_{it}	0.309	0.289	0.177	0.255	0.117	0.107	0.083	0.367
HHI_{jt}	0.054	0.016	0.022	0.023	0.039	0.023	0.025	0.054
$pcmargin_{jt}$	3.817	1.829	1.763	2.061	1.725	2.402	3.185	2.183
bi_{jt}	-0.934	-1.133	-1.310	-1.083	-1.597	-0.942	-0.710	-1.107
pc^1_{jt}	1.790	-0.884	-1.234	-0.468	-1.630	0.125	1.304	0.136
Number of firm-year observations	5,606	5,616	13,710	15,569	4,510	7,175	17,918	1,907

Notes: This table reports the mean values for all regression variables. Accounting data are obtained from the Compustat database, while stock price data are obtained from the CRSP database. Firms are required to have available information for all the variables needed in the corresponding financial year. The GICS sectors included are Energy (10), Materials (15), Industrials (20), Consumer Discretionary (25), Consumer Staples (30), Health Care (35), Information Technology (45) and Telecommunication Services (50). Excluded are the two GICS sectors Financials (40) and Utilities (55). All variables have been trimmed at the 1st and 99th percentiles. This helps to reduce the impact of extreme values by eliminating values beyond the cut-off point. Variable definitions are provided in Table 1.

TABLE 5—CORRELATIONS

	adr_{it-1}	$idr_{it-1,it}$	cvd_{it}	$size_{it}$	$ndts_{it}$	$prof_{it}$	$grth_{it}$	$uniq_{it}$	ts_{it}	vol_{it}	dc_{it}	inf_{it}	une_{it}	HHI_{jt}	$pc\text{-}margin_{jt}$	bi_{jt}
$idr_{it-1,it}$	0.91***															
cvd_{it}	0.32***	0.32***														
$size_{it}$	0.14***	0.13***	0.38***													
$ndts_{it}$	0.06***	0.08***	0.19***	-0.09***												
$prof_{it}$	0.03***	-0.02***	0.06***	0.30***	-0.38***											
$grth_{it}$	-0.01***	0.02***	-0.01	-0.02***	-0.08***	0.03***										
$uniq_{it}$	-0.08***	-0.07***	-0.08***	-0.08***	0.02***	-0.21***	-0.01***									
ts_{it}	-0.24***	-0.25***	-0.09***	0.11***	-0.08***	0.31***	-0.05***	-0.05***								
vol_{it}	0.07***	0.06***	-0.09***	-0.28***	-0.10***	-0.23***	-0.04***	0.06***	-0.15***							
dc_{it}	0.06***	0.05***	0.03***	0.02***	-0.001	0.01**	0.02***	-0.01	-0.01***	-0.002						
inf_{it}	-0.02***	0.02***	-0.02***	-0.09***	0.001	0.01**	0.002	0.004	0.05***	-0.03***	-0.001					
une_{it}	0.07***	0.01***	0.01***	0.04***	-0.02***	0.03***	-0.01	-0.01**	-0.03***	-0.02***	0.01	-0.38***				
HHI_{jt}	0.08***	0.05***	0.20***	0.05***	0.09***	0.04***	-0.02***	-0.03***	-0.02***	-0.03***	0.02***	0.10***	0.20***			
$pcmargin_{jt}$	-0.15	-0.15***	-0.03***	-0.04***	0.09***	-0.07***	-0.01	0.03***	-0.01***	0.05***	-0.01	-0.08***	0.06***	0.25***		
bi_{jt}	-0.23***	-0.22***	-0.17***	-0.06***	0.05***	-0.10***	-0.02***	0.06***	-0.08***	0.08***	-0.01***	-0.09***	-0.002	-0.03***	0.70***	
pc^{1}_{jt}	-0.19***	-0.22***	-0.17***	-0.06***	0.05***	-0.09***	-0.02***	0.06***	-0.08***	0.06***	-0.01*	-0.07***	0.07***	0.30***	0.94***	0.88***

Notes: This table reports pairwise correlations coefficients among the explanatory variables of our panel regression models. Accounting data are obtained from the Compustat database, while stock prices are obtained from the CRSP database. Firms are required to have available information for all the variables needed in the corresponding financial year. Financial and Utility (GICS 40 and GICS 55) firms are excluded. All variables have been trimmed at the 1st and 99th percentiles. This helps to reduce the impact of extreme values by eliminating values beyond the cut-off point.

TABLE 6—CAPITAL STRUCTURE DETERMINANTS ACROSS GICS INDUSTRY SECTORS

Dependent variable adr_{it}	All (1)	Energy (2)	Materials (3)	Industrials (4)	Cons. Discr. (5)	Cons. Staples (6)	Health Care (7)	IT (8)	Telecom (9)
adr_{it-1}	0.090***	-0.081	0.080**	0.090**	-0.418*	0.177***	0.105**	0.104	0.088
	(0.028)	(0.091)	(0.038)	(0.037)	(0.228)	(0.057)	(0.042)	(0.122)	(0.054)
$idr_{it-1,it}$	0.738***	0.829***	0.689***	0.760***	1.269***	0.624***	0.594***	0.678***	0.747***
	(0.020)	(0.065)	(0.041)	(0.035)	(0.246)	(0.058)	(0.045)	(0.066)	(0.071)
cvd_{it}	0.100***	0.120***	0.027	0.116***	0.090***	0.092***	0.181***	0.085***	0.097***
	(0.008)	(0.027)	(0.022)	(0.012)	(0.023)	(0.022)	(0.019)	(0.015)	(0.036)
$size_{it}$	0.002	0.004***	0.005**	0.001	0.010	-0.003	0.009*	0.002	0.007
	(0.001)	(0.002)	(0.003)	(0.003)	(0.007)	(0.006)	(0.005)	(0.002)	(0.007)
$ndts_{it}$	-0.153**	0.002	-0.253**	-0.413***	-1.079*	-0.329	-0.567***	-0.057	-0.439**
	(0.062)	(0.088)	(0.127)	(0.153)	(0.611)	(0.274)	(0.216)	(0.089)	(0.191)
$prof_{it}$	0.010	0.057	-0.128	0.019	-0.404	0.151	-0.120	0.002	-0.134
	(0.039)	(0.073)	(0.101)	(0.109)	(0.316)	(0.215)	(0.084)	(0.042)	(0.227)
$grth_{it}$	-0.019*	-0.002	-0.001	0.002	0.009	-0.010	-0.015	-0.012*	-0.007
	(0.011)	(0.014)	(0.002)	(0.006)	(0.010)	(0.028)	(0.012)	(0.007)	(0.007)
$uniq_{it}$	-0.000	-0.002**	-0.027	-0.001	-0.034	0.005	0.002	-0.001	-0.033
	(0.001)	(0.001)	(0.024)	(0.001)	(0.042)	(0.022)	(0.002)	(0.001)	(0.050)
ts_{it}	-0.362***	-0.464***	-0.363***	-0.358**	0.480	-0.622	-0.155	-0.168**	-0.567
	(0.083)	(0.113)	(0.140)	(0.173)	(0.454)	(0.407)	(0.170)	(0.080)	(0.419)
vol_{it}	-0.004	0.043	-0.034	0.002	0.021	0.004	-0.003	-0.010	0.035*
	(0.007)	(0.058)	(0.025)	(0.021)	(0.031)	(0.007)	(0.010)	(0.024)	(0.020)
dc_{it}	-0.038	0.019	0.010	-0.031	-0.005	-0.010	-0.017	-0.040	0.003
	(0.031)	(0.032)	(0.012)	(0.027)	(0.014)	(0.010)	(0.016)	(0.025)	(0.003)
inf_t	0.617***	0.386	0.838***	0.219	-0.360	0.587***	0.468**	0.867***	0.859**
	(0.103)	(0.264)	(0.205)	(0.173)	(0.448)	(0.218)	(0.201)	(0.173)	(0.400)
une_t	-0.550***	-0.541***	-0.844***	-0.801***	-0.072	-0.588***	-0.474***	-0.064	0.197
	(0.062)	(0.201)	(0.113)	(0.099)	(0.213)	(0.131)	(0.137)	(0.195)	(0.352)
Constant	0.026**	-0.026	0.069***	0.047***	0.008	0.062**	0.022	-0.014	-0.051
	(0.012)	(0.033)	(0.020)	(0.012)	(0.018)	(0.030)	(0.032)	(0.018)	(0.065)
Nb. of obs.	72,011	5,606	5,616	13,710	15,569	4,510	7,175	17,918	1,907
Nb. of firms	9,415	713	669	1,649	2,021	499	1,124	2,434	306
F-test	1056.06***	137.92***	143.13***	404.06***	419.28 ***	88.17***	172.12***	89.19***	129.75***
AB test AR(1) (p-val.)	-1.95 (0.051)	-1.91 (0.056)	-5.38 (0.00)	-2.38 (0.018)	-7.99 (0.00)	-6.43 (0.00)	-6.26 (0.00)	-2.49 (0.013)	-6.76 (0.00)
AB test AR(2) (p-val.)	-1.07 (0.283)	0.42 (0.673)	-0.56 (0.575)	-0.04 (0.972)	-0.35 (0.724)	-0.83 (0.406)	0.74 (0.461)	0.09 (0.926)	0.61 (0.542)
Hansen test (p-val.)	8.75 (0.188)	3.51 (0.743)	7.18 (0.304)	9.61 (0.142)	9.72 (0.137)	8.83 (0.183)	8.86 (0.182)	4.87 (0.561)	8.72 (0.190)

Notes: This table presents the GMM regression results based on equation (1) for the fiscal years from 1990 to 2010. The same instruments are employed for all the regressions. For all models except (5) and (9) these instruments are *adr* and *idr* lagged at 1, *uniq* lagged at 1, *dc* and *grth* lagged at 3, and *prof* lagged at 4. For models (5) and (9) *uniq*, *prof*, *dc* and *grth* lagged at 7. Columns (2) to (9) display the results for each of the eight sectors, respectively, while column (1) displays the results for the entire sample. T-statistics significant at the 10%, 5% and 1% are marked with *, ** and ***, respectively.

TABLE 7—CAPITAL STRUCTURE INERTIA AND PRODUCT MARKET COMPETITION

Variables	HHI (2-digit) (1)	Price-Cost Margin (2-digit) (2)	BW-Indicator (2-digit) (3)	1st Principal Component (2-digit) (4)
adr_{it-1}	0.112***	0.088***	0.088***	0.086***
	(0.031)	(0.027)	(0.026)	(0.027)
$idr_{it-1,it}$	0.782***	0.800***	0.695***	0.735***
	(0.044)	(0.037)	(0.041)	(0.021)
cvd_{it}	0.090***	0.094***	0.094***	0.095***
	(0.008)	(0.007)	(0.007)	(0.008)
$size_{it}$	0.004*	0.002	0.003	0.002
	(0.002)	(0.002)	(0.002)	(0.001)
$ndts_{it}$	-0.242**	-0.157**	-0.163**	-0.136**
	(0.098)	(0.071)	(0.071)	(0.069)
$prof_{it}$	-0.054	-0.001	0.004	0.013
	(0.068)	(0.047)	(0.048)	(0.046)
$grth_{it}$	-0.017	-0.018*	-0.018	-0.019*
	(0.011)	(0.011)	(0.011)	(0.011)
$uniq_{it}$	-0.016	-0.001	-0.005	0.000
	(0.013)	(0.009)	(0.01209)	(0.013)
ts_{it}	-0.276**	-0.358***	-0.359***	-0.372***
	(0.127)	(0.086)	(0.086)	(0.083)
vol_{it}	-0.005	-0.002	-0.002	-0.002
	(0.007)	(0.007)	(0.007)	(0.007)
dc_{it}	-0.028	-0.035	-0.034	-0.035
	(0.024)	(0.029)	(0.029)	(0.030)
inf_{t}	0.639***	0.619***	0.616***	0.612***
	(0.083)	(0.100)	(0.097)	(0.101)
une_{t}	-0.565***	-0.540***	-0.541***	-0.548***
	(0.058)	(0.061)	(0.058)	(0.062)
⋮	⋮	⋮	⋮	⋮

-continued-

Notes: This table presents the GMM regression results based on equation (1) for the fiscal years from 1990 to 2010. The same instruments are employed for all the regressions. These instruments are *adr* and *idr* lagged at 1, *uniq* lagged at 1, *dc* and *grth* lagged at 3, and *prof* lagged at 4 for models (2) to (4), whereas for model (1), *uniq*, *prof*, *dc* and *grth* lagged at 7. Columns 1-4 display the results for each of the four competition indicators. Industry sector dummies are included in the regression but not shown in the table. Robust standard errors are shown in parentheses. T-statistics significant at the 10%, 5% and 1% level are marked with *, ** and ***, respectively.

TABLE 7—CAPITAL STRUCTURE INERTIA AND PRODUCT MARKET COMPETITION – *CONTINUED*

Variables	HHI (2-digit) (1)	Price-Cost Margin (2-digit) (2)	BW-Indicator (2-digit) (3)	1st Principal Component (2-digit) (4)
HHI_{jt}	0.719*	-	-	-
	(0.384)			
$idr_{it-1,it}$ x HHI_{jt}	-2.485*	-	-	-
	(1.464)			
$pcmargin_{jt}$	-	0.006**	-	-
		(0.002)		
$idr_{it-1,it}$ x $pcmargin_{jt}$	-	-0.028**	-	-
		(0.012)		
bi_{jt}	-	-	0.013	-
			(0.011)	
$idr_{it-1,it}$ x bi_{jt}	-	-	-0.036	-
			(0.041)	
pc^{1}_{jt}	-	-	-	0.005**
				(0.002)
$idr_{it-1,it}$ x pc^{1}_{jt}	-	-	-	-0.020**
				(0.010)
Constant	-0.003	0.000	0.028	0.014
	(0.020)	(0.013)	(0.017)	(0.011)
Nb. of obs.	72,011	72,011	72,011	72,011
Nb. of firms	9,415	9,415	9,415	9,415
F-test	1338.26 ***	1010.77***	1056.21***	1015.39 ***
AB test AR(1) (p-val.)	-2.46 (0.014)	-2.01 (0.044)	-2.02 (0.044)	-2.00 (0.045)
AB test AR(2) (p-val.)	-0.88 (0.38)	-1.04 (0.299)	-1.01 (0.314)	-1.04 (0.300)
Hansen test (p-val.)	10.15 (0.18)	10.07 (0.184)	10.18 (0.178)	10.51 (0.161)

Notes: This table presents the GMM regression results based on equation (1) for the fiscal years from 1990 to 2010. The same instruments are employed for all the regressions. These instruments are *adr* and *idr* lagged at 1, *uniq* lagged at 1, *dc* and *grth* lagged at 3, and *prof* lagged at 4 for models (2) to (4), whereas for model (1), *uniq*, *prof*, *dc* and *grth* lagged at 7. Columns 1-4 display the results for each of the four competition indicators. Industry sector dummies are included in the regression but not shown in the table. Robust standard errors are shown in parentheses. T-statistics significant at the 10%, 5% and 1% level are marked with *, ** and ***, respectively.

TABLE 8—CAPITAL STRUCTURE INERTIA BY SIZE

Variables	Small Firms (1)	Medium-sized Firms (2)	Large Firms (3)	All Firms with Size Dummies (4)
adr_{it-1}	0.117***	0.030	0.056**	0.090***
	(0.026)	(0.021)	(0.024)	(0.025)
$idr_{it-1,it}$	0.588***	0.765***	0.753***	0.747***
	(0.022)	(0.036)	(0.034)	(0.026)
cvd_{it}	0.091***	0.112***	0.075***	0.095***
	(0.007)	(0.012)	(0.008)	(0.006)
$size_{it}$	0.015***	0.010***	0.001	0.001
	(0.003)	(0.002)	(0.001)	(0.002)
small size dummy				0.008
				(0.007)
$idr_{it-1,it}$ x *small size dummy*$_{jt}$				-0.130***
				(0.030)
large size dummy				-0.031**
				(0.014)
$idr_{it-1,it}$ x *large size dummy*$_{jt}$				0.129**
				(0.052)
$ndts_{it}$	0.076	-0.483***	-0.379***	-0.214***
	(0.057)	(0.168)	(0.155)	(0.071)
$prof_{it}$	-0.024	-0.205	-0.188	-0.032
	(0.027)	(0.157)	(0.216)	(0.042)
$grth_{it}$	-0.003	-0.020***	-0.001	-0.023**
	(0.006)	(0.006)	(0.002)	(0.012)
$uniq_{it}$	-0.000	-0.001	-0.004	0.001
	(0.001)	(0.001)	(0.020)	(0.001)
ts_{it}	-0.166***	-0.075	-0.200	-0.268***
	(0.052)	(0.209)	(0.252)	(0.076)
vol_{it}	-0.003	-0.005	-0.069***	-0.010
	(0.005)	(0.029)	(0.019)	(0.007)
dc_{it}	-0.020	-0.003	0.012	-0.037*
	(0.014)	(0.010)	(0.008)	(0.023)
⋮	⋮	⋮	⋮	⋮

-continued-

Notes: This table presents the GMM regression results based on equation (1) for the fiscal years from 1990 to 2010. The same instruments are employed for all the regressions. These instruments are *adr* and *idr* lagged at 1, *uniq* lagged at 1, *dc* and *grth* lagged at 3, and *prof* lagged at 4. Columns (1) to (3) display the results for each of the three size groups individually. Column (4) displays the results for the full sample using size dummies and interaction terms. Industry sector dummies are included in the regression but not shown in the table. Robust standard errors are shown in parentheses. T-statistics significant at the 10%, 5% and 1% level are marked with *, ** and ***, respectively.

TABLE 8— CAPITAL STRUCTURE INERTIA BY SIZE – *CONTINUED*

Variables	Small Firms (1)	Medium-sized Firms (2)	Large Firms (3)	All Firms with Size Dummies (4)
inf_t	0.932***	0.614***	0.544***	0.593***
	(0.145)	(0.128)	(0.111)	(0.097)
une_t	-0.444***	-0.628***	-0.455***	-0.542***
	(0.082)	(0.072)	(0.055)	(0.062)
Firm-year observations	22,493	23,930	25,588	72,011
Nb. of firms	4,345	4,642	3,287	9,415
F-test	241.04 ***	930.02***	1224.71***	943.38 ***
AB test AR(1) (p-val.)	-4.42 (0.000)	-17.66 (0.000)	-8.44 (0.000)	-2.67 (0.008)
AB test AR(2) (p-val.)	0.79 (0.43)	0.370 (0.709)	0.160 (0.870)	-1.34 (0.179)
Hansen test (p-val.)	18.99 (0.00)	9.47 (0.149)	19.13 (0.004)	13.15 (0.107)

Notes: This table presents the GMM regression results based on equation (1) for the fiscal years from 1990 to 2010. The same instruments are employed for all the regressions. These instruments are *adr* and *idr* lagged at 1, *uniq* lagged at 1, *dc* and *grth* lagged at 3, and *prof* lagged at 4. Columns (1) to (3) display the results for each of the three size groups individually. Column (4) displays the results for the full sample using size dummies and interaction terms. Industry sector dummies are included in the regression but not shown in the table. Robust standard errors are shown in parentheses. T-statistics significant at the 10%, 5% and 1% level are marked with *, ** and ***, respectively.