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Growth Opportunities as Determinants of the Partial Adjustment toward Target Debt Ratio Evidence for the Chilean Case

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Abstract

This paper studies the partial adjustment process to the optimal debt ratio of Chilean firms through the dynamic trade-off theory. We use a sample of 196 quoted Chilean firms for the years 1995 to 2005. The existence of growth opportunities involves the potential agency problems of asset substitution and underinvestment. Thus, the first hypothesis is that those firms *with* growth opportunities will have a slower adjustment to the target debt ratio than those firms *without* growth opportunities. Additionally, due the characteristics of the institutional environment in Chile, the second hypothesis expects a direct relationship between the growth opportunities and the debt level, appositively to the results observed in the previous literature in common-law countries. The key findings are, first, that the firms follow optimal long-term debt ratios according to the trade-off theory arguments. Second, the Chilean financial system and the characteristics of the institutional environment dominated by the civil-law foster a positive relationship between the future growth opportunities and the leverage, opposing to the fact observed empirically in market oriented common-law countries. Third, firms *with* growth opportunities experience higher adjustment cost to the target debt ratio than firms *without* growth opportunities. That means that the agency costs that the growth opportunities entail are asymmetrically distributed between these two groups of firms.

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Target debt ratio

Theoretical arguments

Since Modigliani and Miller presented their irrelevance proposition about the capital structure in (1958), a huge stream of researches has shown evidence about how firms should finance their operations. Modigliani and Miller (1958) concluded that the investment decision is the only factor which determines the firm value.

There are several theories that explain the firm financing decisions. Myers (1984a, 1984b) and Myers and Majluf (1984) throughout the pecking order theory say that the asymmetries of information between managers and investors leads to the later to undervalue the firm's issuance of new shares. Therefore, managers will prefer internal financing to debt financing. Thus, the issuance of new common stocks is used as lastly resource of funds for financing the firm's portfolio of investment (S. Myers, 1984a). Under the pecking order postulates, the observed leverage of firms reflects the historical profitability and the need for additional investment funds at some point in time, without any mention of a target leverage as such (De Haas and Peeters, 2006).

Other competing theory for explaining the firm capital structure is the market timing hypothesis (Baker and Wurgler, 2002). According to this theory the firm's capital structure reflects the accumulative ability to sell overpriced equity shares. That is that managers try to issue the new shares when the firm's market to book value is high. The market timing hypothesis concludes that managers take advantage of the asymmetric information in the markets to benefit current shareholder at expenses of the new incoming shareholders. As in the pecking order theory, the market timing hypothesis ascertains that firms do not move reverting to a mean target debt ratio.

Despite of the previous theories, the trade-off hypothesis of corporate financing is built on the concept that firms follow up a target capital structure that balances the costs and benefits of debt (S. Myers, 1977). On one hand, increasing the leverage means that the firm can profit more from debt tax shields, which at the end of the day will increase the firm value. This argument underlies on the Modigliani and Miller's (1963) Proposition I under corporate taxes. On the other hand, however, higher leverage leads to higher direct and indirect costs of financial distress, diminishing the firm value. Direct costs include the legal and administrative costs of liquidation or reorganization. Meanwhile the indirect costs involve the agency costs of debt that are specially related to periods of high bankruptcy risk, such as the asset substitution and the underinvestment problems (Jensen and Meckling, 1976; S. Myers, 1977; Stulz, 1990). The rational behind the trade-off theory bring up to the intuition that firms follow an optimal/target capital structure. It is that firms revert to a target debt ratio. In this case, the potential bankruptcy costs leads the firms to hold low debt ratios, while the tax shields motivate the managers to issue more debt in order to take advantage of the tax deductibility on the interest payments (Fama and French, 2002;

Modigliani and Miller, 1963).[1] One of the most important costs of debt financing is the potential of conflicts between stockholders and bondholders over the investment and financing policies of a firm. Starting with the seminal work of Jensen and Meckling (1976) and Smith and Warner (1979), it has been argued that the suboptimal incentive effects of debt financing can be controlled by short-term debt and restrictive covenants. The use of these contracting mechanisms is argued to be more important for high growth firms, since these firms are more likely to face stockholder-bondholder conflicts.

The static version of the trade-off theory is not completely useful determining the target debt ratio. It is because the debt ratio is adjusted in a dynamic way (Fama and French, 2002). Moreover, a static analysis is not able to explain the dynamic nature of the capital structure. In that sense, dynamic trade-off theory provides the underlying framework of the final model used in this work, as we assume that a firm dynamically adjusts its capital structure to a specific, but moving target. Thus, the current capital structure of a firm at a certain time does not necessarily equal its target capital structure (Drobetz and Wanzenried, 2006; Frank and Goyal, 2003). Briefly, a static model might explain poorly some differences between companies in a cross-section sample of data due to the fact that the actual and the optimal/target leverage ratio can differ (Strebulaev, 2007). The deviations of the optimal leverage have been widely recognized as elements that can cause problems in the interpretation of the results of static models (S. Myers, 1984a).

Lev (1969) has been one of the firsts in estimating a financial ratio adjustment process. Empirically, there are several works focused on the determinants of an optimal capital structure based on a dynamic model. For instance, Flannery and Rangan (2006) estimate a speed of adjustment of 34%, suggesting that economically a typical firm will get a half-life for the influence of a shock of about 1.7 years.[2] Lemmon, Roberts and Zender (2008) estimate this speed as 25% of the target debt level annually. Similarly, Huang and Ritter (2007) say that the speed of adjustment is about 23% and Fama and French (2002) suggest that this is about 7-18%; meanwhile Welch (2004) says that it is practically zero. Ozkan (2001) evidenced that firms in the UK have long-term target leverage ratios and they adjust to the target ratio relatively fast (>50%), implying that the cost of being away from their target ratios and the cost of adjustment are equally important for firms. The estimates reported by Lööf (2004) ranged between 8% and 65% in his sample. All these works base their conclusions on the firm-based determinants of capital structure. Despite of the fact the speed of adjustment has been estimated in many papers, with many different results, it must be recognized that this field in the study of corporate financial decisions is not a settled issue (FrankandGoyal, 2008), but perhaps one of the most important decision in capital structure. In fact, in a survey of American firms, Graham and Harvey (2001) find that 71% of CFOs have a target range for a debt-equity ratio and a further 10%

[1]Despite of the aforementioned arguments, De Haas and Peters (2006) argue that the trade-off and pecking order theories are not mutually exclusive. They report that Netherlands firms follow the pecking order theory to reach their target debt.

[2]The calculation of the number of years is as follow: $\log(0.5)/\log(1-0.34)\approx 1.7$ years.

have a definite target ratio, which appears to be consistent with the trade-off theory of capital structure.

Perhaps, one of the most recent and interesting works in this context has been done by De Haas and Peeters (2006). Particularly, De Haas and Peeters (2006) support their argument not just on the traditional intrinsic fundamentals, but on the institutional framework where firms operate as well. The authors find that during the economic transition process lived by Eastern Europe countries, firms generally increased their leverage, lowering the gap between the actual and the target leverage. Moreover, they find that banking system development has in general enabled firms to get closer to their target leverage, and those asymmetries of information between firms and banks are still relatively large.

Since the objective of this paper is the study of the target debt ration for firms with different levels of growth opportunities, we will pay special attention to this determinant as compared with the other determinants of the capital structure. As Jensen and Meckling (1976) and later Myers (1977) argued, whenever firms have risky debt and managers behave to maximize equity value rather than total firm value, managers have incentives to under and over-invest in future growth opportunities. The loss in the firm's value due to those suboptimal investment decisions represents a significant component of the agency costs of debt. As shown by Myers (1977), the underinvestment problem arises when managers do not undertake some profitable projects –those with positive net present value–. Thus, for minimizing the expected costs of future underinvestment problems, firms with valuable growth opportunities should have relatively low target debt ratios, and since that, a slower adjustment velocity. Moreover, bondholders will anticipate the cost of growth opportunities requiring a higher cost of debt financing (Billett, King, & Mauer, 2007). It is therefore in the firm's interest to mitigate potential conflicts over the exercise of future growth options. This leads to the prediction that firms with more growth opportunities should have higher adjustment costs towards their target debt ratio and therefore a slower adjustment toward optimal capital structure.[3]

A large literature in finance empirically examines the relations between capital structure and growth opportunities. For example, Ranjan and Zingales (1995) find that leverage is negatively related to growth opportunities, while Barclay and Smith (1995) find that debt maturity is negatively related to growth opportunities. Barclay et al. (2003) and Johnson (2003) use a model where the leverage and the debt maturity are jointly determinant endogenous variables. For instance, Hackbarth et al. (2007) and Hovakimian et al. (2004) find that firms with high market-to-book ratio –usually used as a proxy for growth opportunities– have low target debt ratios and, therefore, are more likely to issue equity and less likely to issue debt. Titman and Wessels (1988) argue that firms in growing industries usually have higher agency costs since they have more flexibility in undertaking future investments. Ozkan (2001) suggests

[3]Oppositely to our hypothesis Lööf (2004) assumes that the larger the growth opportunities are, the faster adjustment towards optimal capital structure is, since a growing firm may find it easier to change its capital structure by choosing among several alternative sources of financing.

that although growth opportunities are capital assets which add value to the firm, they cannot be collateralized and do not generate current income. They are in fact intangible in nature and valuable as long as the firm is alive. Their value will fall abruptly if the firm faces financial distress, which suggests that expected bankruptcy costs for firms with growth opportunities will be higher (S. Myers, 1984a).

Thus, firms which account with growth opportunities will face a higher cost of debt and higher agency costs, and since that a higher adjustment cost to the target debt ratio. Therefore, the first hypothesis is that those firms *with* growth opportunities will have a slower adjustment to the target debt ratio than those firms *without* growth opportunities.

Challenging the previous reasoning, Levine et al. (2000), La Porta et al. (1997; 2000), and Barth et al. (2004) point out that the financial decisions can be explained not just with the arguments of the trade-off theory, the pecking order or the market timing theory; but with the arguments associated to the institutional environment where the firm operates. Thus, the traditional theories can be harmonized with the institutional across-countries' characteristics (Bancel and Mittoo, 2004; Vasiliou and Daskalakis, 2009). In the same way, Utrero (2007) argues that including the institutional variables into the analytical models significantly improves understanding of the decisions made on the firm capital structure.[4]

In this context, Dewatripont and Tirole (1994) point out those companies with concentrated ownership structure should issue more credit banks in those institutional contexts where hostile takeovers are less effective, than in the countries where the market supervision is highly efficient. The authors also agree that in bank based financial systems the intermediate debt (private debt) and the concentrated ownership structure are complementary elements of corporate governance. In this kind of institutional environments dominated by the civil-law doctrine there are less efficient and developed capital markets that pursue the financing through private bank debt and internal capital markets between related parties; instead of getting the funds directly from the financial markets (R La Porta et al., 1997; López, 2005; Memmel and Raupach, 2007; Modigliani and Perotti, 1997; Shleifer and Vishny, 1997). This fact lets to say that companies in those countries might reach their objective/target debt ratio more quickly because of the lower adjustment costs that their institutional environments involve. These adjustment costs are the renegotiation costs, market frictions, administrative costs, and the cost of debt issuance, which are usually higher in public debt than in the private/bank one.

From an empirical point of view, Thakor (1996) shows that the presence of the banking in the countries whose legal doctrine is based on the civil-law would

[4]For instance, Ranjan and Zingales (1995) do not thoroughly investigate the effects of the institutional characteristics in capital structure decisions of the G-7 countries, however they point out that the differences that they find in capital structure determination among countries might exist partly due to differences in tax codes, bankruptcy laws, the state of development of bond markets and patterns of ownership, suggesting that future research should focus on analyzing the relation between institutional characteristics and capital structure determination.

facilitate the access to bank financing by companies, and therefore would reduce the adjustment costs of the optimal debt ratio. Similarly, Miguel and Pindado (2001) show that the adjustment ratio is relatively fast for Spanish firms where the legal regime is based on the continental civil-law, whose main characteristic is the flexibility in the bank debt financing. This finding is supported as well by Gaud et al. (2005) arguing that the adjustment cost toward the target debt ratio are particularly lower in Spain and in the UK because the role played by the banking in financing corporations. Thus, the advantages of private debt observed in some countries together with the close relationship with some particular bank, the capacity of banking to exercise corporate control, the lower costs of renegotiation and the flexibility of private debt, and at the same time, greater capacity of the banks to know the real financial situation of the companies which they finance, allow the firms to reach the target debt ratio in a more dynamic and rapid way. Therefore, firms operating in bank-based oriented countries will face lower adjustment costs relative to firms operating in market-based oriented countries (Booth, Aivazian, Demirgüç-Kunt, & Maksimovic, 2001; Rajan and Zingales, 1995; Utrero, 2007).

According to La Porta et al. (1998) Chile is considered to belong among the so called civil-law legal system. They emphasize that the legal system plays a key role for the availability of external financing. Legal structures with little investor and creditor protection exacerbate information asymmetries and contracting costs (Vasiliou and Daskalakis, 2009). Thus, we would expect that firms belonging to civil-law system are expected to induce severe information asymmetries mostly when the firm has high growth options.

In the Chilean scenario, private debt plays an important role funding firms' operations, and as an efficient corporate governance mechanisms (López, 2009; Saona and Vallelado, 2005, 2010). Another important characteristic in financing firms in Chile is that around the 70% of non-financial listed companies belong to one of approximately 50 conglomerates, which control about 91% of the total assets of non-financial companies listed in the Stock Exchange in Chile (Lefort and Walker, 2000). Therefore, those two elements, the banking financing on one hand, and the ownership structure with related parties financing on the other, diminish the adjustment costs to the target debt ratio. Moreover, those two elements as well represent efficient mechanisms of corporate governance which would help to reduce the agency costs associated to the growth opportunities.

Thus, the second hypothesis is that due the characteristics of the institutional environment in Chile, it can be expected a direct relationship between the growth opportunities and the debt level, appositively to the results observed in the previous literature in common-law countries.

Baseline model, variables and methodology

Model for the target debt ratio

In this section, it is discussed the empirical model to contrast the determinants of debt with the conceptual framework of the dynamic trade-off theory. According to the trade-off hypothesis, in a certain period, under conditions of perfect and frictionless

capital markets, the long-term debt ratio of a firm ($LTDTA_{i,t}$) should be equal to the target long-term debt ratio in the same period ($LTDTA^{*}_{i,t}$), or in other words, $LTDTA_{i,t} = LTDTA^{*}_{i,t}$. However, in the absence of perfect capital markets, an adjustment process should exist, where

$$LTDTA_{i,t} - LTDTA_{i,t-1} = \lambda_{i,t}(LTDTA^{*}_{i,t} - LTDTA_{i,t-1}) \quad (1)$$

In this equation $\lambda_{i,t}$ corresponds to the speed of adjustment to the target debt ratio. In the dynamic trade-off theory, this coefficient of adjustment is close to 1, $\lambda_{i,t} \approx 1$. If this coefficient equals 1, then the contemporary debt ratio equals the target debt ratio in the current period, achieving the expectations immediately and completely. If it is seen that $\lambda_{i,t} < 1$, then a partial adjustment exists between the debt ratio of the period $t-1$ to the period t (Antoniou, Guney, & Paudyal, 2008).

The target long-term debt ratio of the firm can be obtained from its fundamentals as:

$$LTDTA^{*}_{i,t} = \beta_0 + \sum_{j=1}^{n} \beta_j X_{j,i,t} + \varepsilon_{i,t}. \quad (2)$$

Where the vector $X_{j,i,t}$ involves the j explicative factors of the target debt, for the i firms, during the t periods. Therefore, substituting (2) into (1) and reordering the terms in function of $LTDTA_{i,t}$, the following model of dynamic trade-off arises:

$$LTDTA_{i,t} = \lambda_{i,t} \cdot \beta_0 + (1-\lambda_{i,t}) \cdot LTDTA_{i,t-1} + \lambda_{i,t} \cdot \left(\sum_{j=1}^{n} \beta_j X_{j,i,t} \right) + v_{i,t}. \quad (3)$$

With $v_{i,t} = \varepsilon_{i,t} - (1-\lambda_{i,t}) \cdot \varepsilon_{i,t-1}$

The parameter corresponding to the lagged dependent variable $1-\lambda_{i,t}$, equals the adjustment costs to the target debt ratio. In practice, once an estimation of $\lambda_{i,t}$ is obtained through the dependent variable $LTDTA_{i,t-1}$, the β_j can be estimated dividing each coefficient of vector $X_{j,i,t}$ by $\lambda_{i,t}$. The speed of adjustment to the desired optimal debt ratio, $\lambda_{i,t}$, can be interpreted as the expected percentage by which the gap between the past and the target leverage closes in one period. The common way to understand the speed of adjustment is to translate it to half-life. Half-life is the time that it takes a firm to adjust back one-half the distance to its target leverage after one unit shock to the error term (Iliev and Welch, 2010). The higher this coefficient, the closer to the optimal debt ratio the firm will be.

Variables used in the empirical model

This section describes a set of variables which the literature suggests as determinants of the firms' target debt. Here is described briefly the expect relationship between

these variables and the firm's target capital structure. It is explained as well how the variables are rationalized and defined.

The dependent variable in the model is the debt ratio (LTDTA). It has been computed as the quotient of the total long-term debt in book value over total assets in book value (Fama and French, 2002; Flannery and Rangan, 2006; A. Hovakimian, 2005; A Hovakimian, Opler, & Titman, 2001; Rajan and Zingales, 1995). Following De Haas and Peeters (2006), it should be noted that market values of debt ratios turn out to be excessively volatile, leading to severe measurement problems. Moreover, comparable studies such as Hovakimian et al. (2001) and Roberts (2002) find that the choice between market and book values does not influence the results significantly, on one hand; while Browman (1980) shows that the correlation between the book and market values of debt is very large, on the other hand.

The independent variables include the growth opportunities (Q) which are measured as the market value to book value of assets. This ratio is the usual approximation to Tobin's Q which uses the cost of the reposition of assets instead of market values. The Q ratio is defined as the book value of assets minus common equity, and plus the stock market capitalization, and then everything divided by total assets (Aivazian, Ge, & Qiu, 2005; Andrés de, López, Rodríguez, & Vallelado, 2005; Danbolt, Hirst, & Jones, 2002; Johnson, 1997a, 1997b; Lang, Ofek, & Stulz, 1996; Miguel and Pindado, 2001; Ozkan and Ozkan, 2004; Rajan and Zingales, 1995). Nevertheless, as discussed below, the results are generally robust to alternative proxies for growth opportunities. Following Billet et al. (2007), the alternative approximations for growth opportunities are i) a backward-looking measure of sales growth (Q1) computed as S_t/S_{t-1} and ii) a measure which proxies growth opportunities with a forward-looking measure of sales growth (Q2) computed as S_{t+1}/S_t. Chung and Pruitt (1994) have compared the values of Q obtained by the method of Lindenberg and Ross (1981) with the market to book ratio, obtaining that at least 96,6% of the variability of Tobin's Q is explained by the market to book ratio. Moreover, Billett et al. (2007) argue that the market to book ratio is the best proxy for growth opportunities, showing that it has the highest correlation with a firm's actual investment opportunities, reflects the information in other proxies, and is least affected by confounding factors. Regarding the arguments given in the theoretical part above, a negative relationship between the growth opportunities and the debt ratio has been widely observed in common-law countries, due the agency costs originated by these growth opportunities. However, once we consider the institutional factors and the behavior of banking financing in Chile, the expected relationship would be the opposite.

Furthermore, it has been mentioned that the adjustment speed for those firms which account with growth opportunities will be lower than for the other group of firms without growth opportunities. The rationale behind this hypothesis is that agency costs of debt are higher for fast-growing firms, as shareholder have more flexibility to choose investments and thus to expropriate wealth form banks and bondholders (Titman and Wessels, 1988).

The deficit of funds or need for external financing (DEF) is the second independent variable. It correspond to the variation of fixed assets between the

contemporary year and the previous year, plus the variation of the working capital between the contemporary year and the previous year, minus the cash flow of the current period, and then all divided by the total assets (Shyam-Sunder and Myers, 1999). The higher the deficit of funds, the higher the debt level for financing firm's operations. Therefore, it is expected a positive relationship between the deficit of funds and the long-term debt ratio, with a higher cost of capital.

The firm size has been computed according to the book value of their assets. For the econometric analysis, the logarithmic transformation has been used since it is the usual solution when working with variables which do not have negative values and high variability (LNTAB). Large firms tend to be more diversified, have more bargaining power and a lower risk of inefficient liquidation –bankruptcy costs– (Ozkan and Ozkan, 2004; Titman and Wessels, 1988). Then, the cost of debt would be lower for large firms. We have also used the logarithmic transformation of fixed assets (LNFA) as an alternative proxy for company size.

The firm's profitability has been measured thought the return on assets (ROA) as the earnings before taxes over total assets. Firm's profitability has been considered as a positive signal about the firm's current investment portfolio (Wald, 1999). Thus, it should be expected a positive relationship between debt and profitability.

Following Flannery and Rangan (2006) it has been included the fixed assets as a proportion of the total assets (FATA) as a measure of tangibility of its assets and the debt capacity of the firm. This variable should show a positive relationship with debt level.

Finally, the probability of bankruptcy has been estimated by the value of the Altman's Z-Score (Z).[5] This variable should have a negative relationship with the firm's leverage. To reduce the effects of outliers all ratios/variables are windsorized at the first and ninety-nine percentile. In other words, all observations more extreme than these bounds are set to the respective level.

Methodology of data analysis

The empirical analysis is performed with an unbalanced panel data of Chilean non-financial firms. The period of analysis goes from 1995 to the year 2005. The source of information has been obtained from the FECU Data Base (*Ficha Estadistica Codificada Uniforme*). The unbalanced panel data contains a total of 2,532 firm-year observations with a total of 196 firms, and an average of 9.6 annual observations per firm. Financial firms were excluded from the sample because their capital structures are likely to be significantly different from the capital structure of other firms into the sample. Firms with missing values of relevant variables were also excluded.

Panel data is the most suitable tool when the sample is a combination of cross-sectional and time series data. The advantages of using panel data in the analysis are: i) the easy control of the individual heterogeneity of the observations (Andrés de and

[5] Altman's Z-score is determined according to the following equation (Altman, 1968): Z = 1.2 (turnover fund/total asset) + 1.4 (retained earnings/total asset) + 3.3 (profit before interests and taxes/total asset) + 0.6 (equity at market value/total liabilities) + 1.0 (revenues/total asset).

Vallelado, 2008; Baltagi, 1995; Himmelberg, Hubbard, & Palia, 1999; López, 2005), for instance, the competitive advantages and strategies, managerial quality, business strategy, etc. and ii) it allows to control the endogeneity problem (Bond, 2002), given that some of the independent variables –eg. growth opportunities and the deficit of funds– might be determined simultaneously with the dependent variable. Therefore, it is needed an econometric model which can deal with endogeneity and with the presence of unobservable fixed effects that are associated with each firm and correlated with the rest of the explanatory variables. Furthermore, panel data contains broader informative contents, higher variability, less colinearity in between the variables, more grades of freedom, and more efficiency (Arellano and Bover, 1990). Finally, Arellano and Bover (1990) argue that panel data analysis allows to evaluate the dynamicity of the adjustments and are better in the identification and measurement of that effects which are not observable neither with the cross sectional analysis or the time series analysis.

When the unobserved effect is correlated with independent variables, pooled OLS models produce estimations that are biases and inconsistent. This econometric issue might be controlled using either the first difference or the fixed effects (with-in) estimations. Then, if the strict exogeneity condition fails, which means that the first difference and the fixed effects (with-in) estimations are inconsistent and have different probability limits, the general approach for estimating models like that is to use a transformation to eliminate the unobservable effects and instruments to deal with endogeneity (Wooldrigde, 2002).

The system estimator of equations is estimated by the generalized method of moments (GMM), using the exogenous variables as instruments in the moment conditions. Note that other instrumental variables techniques, such as two-stage least square (2SLS), are special cases of GMM. However, Billett et al. (2007) observe that GMM estimates are more efficient than 2SLS estimates when regression errors are heteroskedastic and/or autocorrelated, and that GMM estimates coincide with 2SLS estimates otherwise. Thus, GMM ensures that the standard errors of the regressors are heteroskedasticity and autocorrelation consistent (Blundell and Bond, 1998). The instruments involved in system estimator with GMM, specially the lagged values –in our case the dependent variable $LTDTA_{t-1}$– frequently involve weak instrument for the prediction of changes in the financial structure. The existence of weak instruments can lead to a poor asymptotic precision in finite samples (Alonso-Borrego and Arellano, 1999). Therefore, in the dynamic model it will also be necessary to use an estimator that lessens this problem, substituting the specification in difference with the original regressions specified in levels like the system estimator (Blundell and Bond, 1998; Huang and Ritter, 2007). In the models, instruments are performed for those variables that are potentially endogenous (growth opportunities and deficit of funds).

To asses the validity of the instruments, a Sargan test for the null hypothesis that the overidentifying restrictions are valid is conducted. The Sargan test indicates whether the instruments are independent from residuals. The AR1 and AR2 statistics measure first- and second-order serial correlation. It would be expected first-order serial correlation due it is used the first-difference transformations. However, this

correlation does not invalidate the results. The Wald-test of joint significance for all the dependent variables is computed as well as the Windmeijer's (2000) adjustment for small samples in order to improve the robustness in all the results.

Results

Descriptive statistics

This part describes the average situation of a company in the sample. In table 1, Panel A, for one average Chilean quoted firm, the 28.1% of the total debt is issued at more than one year. For the period of analysis, it can be seen that the proxies for growth opportunities (Q, Q1, and Q2) are higher than one. It means that the average firm has growth opportunities. However, the rate of return on assets is about 3.9%.

Panel B in table 1 displays the correlation coefficient in between the main variables. The table shows a positive correlation between all the independent variables under study and the long-term debt.[6]

Multivariate regression analysis

The explicative analysis is developed in three parts. In the first part it is estimated the regression model with the equation (3), according to the arguments of the dynamic trade-off theory. The dependent variable is the long-term debt over total assets in book values, and the independent variables are the growth opportunities (Q), the deficit of funds (DEF), the profitability (ROA), the debt capacity (FATA), the firm size (LNTAB and LNFA), and the bankruptcy risk (Z). Instruments are used for the growth opportunities and the deficit of funds because they are endogenously determined. With the results displayed in table 2 it is studied the adjustment velocity to the target debt ratio.

The second part of the multivariate regression analysis goes further in the study. In this case it is compared the extent to which the existence of growth opportunities determines the adjustment velocity to the target debt ratio. Under this scenario the sample is separated into two groups. The first group includes firms which account *with* growth opportunities (Q>1), while the second group just considers the firms *without* growth opportunities (Q<1). The results of this analysis are displayed in table 3, Panel A. Afterwards, in order to test the first hypothesis; a test of mean difference between the adjustment costs toward target debt ratio is performed in Panel B. Finally, in the third part a robustness analysis is applied considering the two alternative measures of growth opportunities (Q1 and Q2).

i. Main Variables and the Adjustment Speed to the Target Debt Ratio

Before starting with the interpretation of the main results, it is necessary to point out the validity of the instruments used in the estimations. In this case, the Hansen test of overidentification of restrictions tests the joint validity of growth opportunities and

[6]Notice that the higher the Z-Score, the lower the probability of bankruptcy. Therefore, *a priori* there exist a positive correlation between the probability of bankruptcy and the debt levels.

the deficit of funds as chosen instruments. It is accepted the null hypothesis that the models are properly identified. Moreover, it has been tested that the error term does not present problems of second order correlation and that the variables are jointly significant according to the Wald test.

The results displayed in the table 2 show a positive relationship between the growth opportunities and the long-term debt for the Chilean companies for each of the four regressions. This result is opposite to those found in the previous empirical works done for common-law countries (Barclay et al., 2003; Barclay and Smith, 1995; Denis and Mihov, 2003; Elyasiani, Guo, & Tang, 2002; S. Myers, 2000; Ozkan, 2002). Therefore, the results seem to show that the asset substitution and underinvestment problems originated by growth opportunities do not affect the firm's financing capacity. In other words, the agency problems of growth options are overcame (or better solved) in Chile through other than the firm-specific factors. In this case, the characteristics of the institutional setting in Chile and the development of its capital markets have reinforced the Chilean corporate governance mechanisms. This higher efficiency in the corporate governance has ameliorated the agency problems caused by growth opportunities. For instance, in Chile can be identified two important corporate governance mechanisms: i) the patterns of ownership structure of its firms, and ii) the role of banking in controlling the firms' performance (Saona, 2009). And each one of these mechanisms has its own direct implications in the firms' financing decisions.

In one hand, related with the ownership structure, Lefort and Walker (2007) highlight the efficiency of economic groups in emerging economies, and specifically in Chile. As a matter of fact, one of the most characteristic aspects of Chilean ownership structures is the widespread use of pyramids as an effective way to exercise control over a wide variety of productive assets. Economic groups in Chile tend to control several companies operating in different sectors of the economy, managing them in a coordinated way through formal and informal mechanisms (Lefort and Walker, 2007). Ever more, it has been argued that economic groups could be an efficient way for firms to deal with imperfect markets, establishing, for instance, internal capital markets that offset for the lack of more developed and liquid formal markets (Azofra, Saona, & Vallelado, 2004). Besides, Saona and Vallelado (2005) show that the agency conflicts controlled with highly concentrated ownership structures in Chile ease the issuance of bank debt. Therefore, a concentrated ownership structure (and pyramidal) can exercise a better control of managerial performance, avoiding the agency problems of growth opportunities and allowing firms to finance their operations with loans coming from the related parties. In this case, firms will be charged with a lower cost of capital than when they face high agency problems.

In the other hand, the positive relationship between growth opportunities and long-term debt for Chilean firms is supported as well by the important role played by financial intermediaries in financing firms. As a consequence of the banking crisis at the beginning of the 80s, the country adopted much more sophisticated norms of banking regulation. Banks are strictly prohibited from making loans to related parties, they cannot be shareholders in those firms that they finance to, they must match assets

and liabilities in foreign currencies, and regulators evaluate the quality of their portfolio periodically (Agosin and Pastén, 2003). Norms for classifying assets as non-performing have been tightened, banks must make adequate provisions for bad loans, and regulators have the authority to force banks to increase their reserves when they consider that asset quality has deteriorated. In this case, the potential problems of asymmetric information between the firm and the bank are reduced throughout the banking supervision.

Thus, the conjunction of both efficient mechanisms of corporate governance, the ownership structure in one hand and the banking supervision in the other, foster the funding of growth opportunities with external sources of funds like debt. Those arguments support the second proposed hypothesis about the positive relationship between the growth opportunities and the long-term debt.

Results in table 2 show as well a positive and statistically significant relationship between the deficit of funds and the long-term debt. It seems to be that firms with high deficit of funds are closer to the insolvency in the short run. In this case, those firms will prefer that their debt matures latter, because the firm is not able to generate funds in the short-term to afford the debt payment. In other words, firms prefer to defer the risk from the short term to the long run.

We observe a positive relationship between the profitability (ROA) and the long-term debt. The asymmetric information theory says that the most profitable firms can announce their ability to generate funds by issuing higher levels of debt. In this case, firms with higher return on assets disclosure their capacity to generate more cash in-flows, and doing so, their potential for serving the debt. Those results place the argument that the Chilean non-financial firms do not follow the pecking order theory. We see under these conditions that firms even experiencing positive net incomes and cash flows do not finance their activities with internal funds but with external sources.

It is also observed in table 2 that the bigger companies (LNTAB) experience higher levels of debt. Notice that this result does not change when the model is estimated by including the natural logarithm of fixed assets as an alternative measure for the size variable (LNFA). This positive relationship implies that this kind of firms have less intrinsic asymmetric problems in their fixed assets than in their intangible assets (Andrés de et al., 2005; Frank and Goyal, 2008; Gaud et al., 2005; Ozkan, 2001). It has been well recognized in the previous theoretical and empirical literature that the fixed assets are a proxy of the collateral offered in new credits (Johnson, 1997b; Ozkan, 2002; Titman and Wessels, 1988). Since these big firms are usually more diversified and have more cash flows, they can afford higher levels of debt. Additionally, for larger firms, fixed and direct bankruptcy costs constitute a smaller portion of firm value, leading to a relatively low cost of debt (Titman and Wessels, 1988).

Furthermore, opposing to what was expected, results confirm a positive relationship between the long-term debt level and the bankruptcy risk (Z-Score). That is, that companies which find themselves near bankruptcy prefer long-term debt, thus deferring the risk of bankruptcy from short to long term. This fact could imply a problem of asset substitution. Under these conditions, firms which are closer to the bankruptcy will accept investment projects with higher risk than that when the loan

was borrowed. In this case, if the investment project is successful, the current shareholders will earn a higher yield than the expected. Opposing, if the investment project fails, the current shareholders will limit their potential losses up to the amount invested in the company –their shares in the firm's common equity–. So, through this practice shareholders would be transferring the marginal investment risk to the creditors, whose in the worst scenario could lose all the funds invested in the company –the loans–. Finally, the debt capacity of the firm (FATA) offers a clear direct relationship with the long-term debt.

Following with the analysis, it is estimated the adjustment velocity for the models as $\lambda_{i,t}$, where $1-\lambda_{i,t}$ is the adjustment cost to the target debt ratio, and it corresponds to the coefficient of the lagged dependent-variable, $LTDTA_{t-1}$. According to the results, firms adjust to their target capital structure in a 31.4% yearly. This was computed as the average number of the four columns in table 2. It suggests that Chilean firms adjust half of the effect toward their debt ratio in about 1.84 years.[7]

Flannery and Rangan (2006) following to Fama and MacBeth (1973) find that the adjustment speed for US firms is 13.3%, which means that US firms take about 4.88 years to close half of the gap between firm's current and desired leverage ratios. This slow adjustment for the US firms is consistent with the hypothesis that other considerations offset the cost of deviation from optimal leverage. With such a low estimated adjustment speed, convergence toward a long-term target does not seem to explain the variation in the firms' long-term debt ratios.

However, Flannery and Rangan (2006) estimate again the adjustment speed to the optimal leverage for their sample but this time through a panel data model. With this correction to their model they get a prominent difference in comparison with their previous findings. In this case, they observe that the adjustment speed reaches a 34%, implying that the typical firm closes half of the leverage gap in approximately 1.7 years (see footnote number 2). This more rapid adjustment speed might reflect either the addition of firm fixed effect to the target specification, or the panel regression constraint that the slope coefficients remain constant over time. The results indicate that the adjustment speed for the Chilean firms is not such as different to that seen for the US firms, using a panel data model.

The factors that explain this behavior for Chilean firms come from the institutional environment. Specifically, the Chilean capital markets are characterized by a high market capitalization and low turnover (Larraín, 2001). In terms of Agosin and Pastén (2003) the Chilean capital markets are typical of those that can be found in middle income countries: a small and largely illiquid stock market, an embryonic bond market, and a well developed banking sector. A large proportion of investment, especially for large corporations –which are the once included in our sample–, is financed with retained earnings, related parties loans or through financial intermediaries. It means that the bank debt supports a considerable proportion of firm's operations. In that sense, bank debt fosters a relationship of mutual confidence

[7] The estimation of the number of years is as follow: $\log(0.5)/\log(1-0.314)\approx 1.84$ years.

between the bank and the firm (James, 1987), avoiding loss of competitiveness (Anderson and Makhija, 1999; Berger and Udell, 2002). Those elements reduce the renegotiation cost of bank debt, making it more flexible, in comparison with the public debt (James and Smith, 2000). Therefore, in the context of Chilean firms, the adjustment toward target debt ratio will involve lower adjustment costs, allowing firms to achieve relatively quickly their target ratios.

ii. The Adjustment Speed toward Target Leverage and the Growth Opportunities

In this section the previous analysis is widen by considering how the growth opportunities help to explain the difference in between the current observed leverage and the target one. It can be seen that the core results observed previously remain unchanged. In table 3, Panel A, have been included the results for those firms that account with growth opportunities (Q>1) and those firms without growth opportunities (Q<1) separately. The first group is compounded for 799 observations, while the second one is compounded for 1,537 firm-year observations.

The deficit of fund (DEF) evidences a positive relationship with the long-term debt. In this case, the higher the deficit of funds, the higher the debt level in the books. Even more, those firms with more profitable assets (ROA) tend to use more debt. The asymmetric information theory says that the more profitable firms could tend to use more debt. This fact can be explained for a number of reasons. For instance, *ceteris paribus*, higher profitability implies potentially higher tax savings from debt, lower probability of bankruptcy, and potentially higher overinvestment, all of which imply a higher target debt ratio (A. Hovakimian et al., 2004). Beside this fact, firms with high profitability can issue more debt, disclosing to the security markets and direct competitors their higher capability for generating internal funds for serving the debt.

In table 3 is observed, as expected, a positive and statistically significant relationship between the debt capacity (FATA) and the debt level. Firms with higher proportion of fixed assets on their total assets have more chances to offer collateral on debt. The same happens with the company size (LNTAB and LNFA). The asymmetric information theory postulates that the larger firms are more transparent, which makes easier the access to the debt markets, regardless whether the firms have or not growth options in perspective.

Once the sample has been divided in between firms *with* and *without* growth opportunities the results seem to show that the bankruptcy risk is negatively correlated with the long-term debt level, oppositely to the expected relation.

If we focus on the adjustment velocity to the target debt ratio for firms *with* and those *without* growth opportunities, in table 3 we observe that this velocity varies between these two groups of firms. The main observed result is that firms that account *with* growth opportunities have a lower velocity of adjustment to the target long-term leverage. Thus, firms *with* growth opportunities faces higher adjustment costs of debt.

Traditionally, the previous literature argues a negative relationship between the growth opportunities and the debt level (Houston and James, 1996; Johnson, 1997a, 2003). Those findings have been tested basically for US companies. As discussed

above, this fact does not find place into the Chilean scenario (see table 2). The particular characteristics in the Chilean financial systems dominated by banks help firms to issue debt despite of the existence of growth opportunities.

However, through the results shown in table 3 the asymmetric information problems and the agency costs are not perfectly controlled –or minimized– in the case of the Chilean firms. The moral hazard problem figured out by Myers (1977) says that the underinvestment problem can be abridged by issuing short-term debt. Moreover, due growth opportunities are intangible, they provide a limited collateral value o liquidation value (Harris and Raviv, 1990; Shleifer and Vishny, 1994; Williamson, 1988). That is that firms *with* growth opportunities have more asymmetric problems and face more agency costs than firms *without* growth opportunities. Firms *with* growth opportunities will have more difficulties every time when they need to bargain the contractual covenants on their debt. Those arguments support our first hypothesis which says that firms *with* growth opportunities will have a slower adjustment to the target debt ratio, due the higher adjustment costs, than those firms *without* growth opportunities.

In fact, the average adjustment velocity toward target leverage for firms which account *with* growth opportunities is 55% (a firm would take about 0.87 years to achieve half of the gap toward its target long-term leverage) relative to the 69.2% for firms *without* growth options (in this case, a firm would take just 0.59 years to achieve half of the shock between its desired and current debt ratio).

At the very bottom of table 3, in Panel B, a mean difference test between the adjustment costs to the target debt ratios was estimated. The adjustment cost $1-\lambda_{i,t}$ corresponds to the coefficient of the lagged dependent variable $LTDTA_{t-1}$. In this case the hypothesis we tested was that the adjustment costs toward long-term leverage is higher for firms *with* growth options than for firms *without* growth opportunities. This test is performed for each of the four pairs of regressions displayed in table 3, Panel A. The test evidenced that the adjustment costs toward long-term debt is statistically significant higher for firms which account *with* growth opportunities that for firms *without* them in every single case recorded in the table.

iii. Robustness of the Results

A number of experiments are conducted to examine the robustness of the results obtained in this paper. Due that the critical variable under analysis is the proxy for growth opportunities, we reestimated the results displayed in tables 2 and 3 considering two alternative measures for growth options: the backward- and the forward-looking measure of sales growth according Billet et al. (2007).

Table 4 replicates the results obtained above in table 2 but using the Q1 variable (backward-looking of sales growth) and Q2 (forward-looking of sales growth). The first four columns included the variable Q1, while the last four columns recorded the regression results with variable Q2. In general terms, all the fundamental variables hold the same results as described in table 2. Once again, the alternative measures of growth options report very similar results to those reported using Q variable. What is worth noticed is that the average adjustment velocity obtained considering the backward-looking proxy of sales growth is 46.3%, relative to the average speed of

41.5% estimated once the forward-looking measure is applied. Thus, *a priori* we can conclude that the alternative measures of growth options are all of them consistent determinants of long-term debt ratios, as long as they report also very similar adjustment velocities.

Results in table 3 are also replicated in tables 5 and 6, considering the two alternative measures of growth options, Q1 and Q2, respectively. The distinction among firms *with* and *without* growth opportunities was based on whether the variable took a number higher than the unit (*with growth opportunities)* or lower than the unit *(without growth opportunities).* The results using the new definitions are quite similar to those reported in table 3. We still observe that the adjustment costs toward long-term leverage are higher for firms with more agency and asymmetric problems –we mean for those firms *with* growth options–, relative to the adjustment costs for firms *without* growth options. It is evidenced that this result is statistically significant in each couple of regressions displayed in Panels B in the tables 5 and 6.

We also carried out the panel estimations with an alternative specification of the leverage variable. We replaced our basic measure of leverage (defined as the ratio of long-term debt over total assets) with the ratio or long-term debt over total debt. The results using this definition of the dependent variable were also very similar to those reported above. For space saving reasons, these results are not included in the paper but are available upon request to the author.

Conclusions

This paper presents a study about the adjustment process to the target debt ratio of quoted Chilean firms. The arguments of the dynamic trade-off theory are adopted for modeling the analysis. We used a sample with 2,532 firm year observations ranged from 1995 to 2005. The methodology used has been the panel data with GMM system estimator which controls for the simultaneity problem with properly chosen instruments and for the heterogeneity problem.

The first conclusion is that Chilean firms follow a target long-term debt ratio according to the arguments of the dynamic trade-off theory. The cost of debt, taxation standards, bargaining costs, and market frictions embodied in the institutional characteristics and legal regime in Chile determine the adjustment costs to the target ratio. Specifically, companies follow a partial adjustment, achieving in average a 31.4% of their target long-term debt level annually. This means that a typical Chilean firm adjusts half of the difference among its desired and current leverage in about 1.84 years.

Secondly, the typical characteristics of the Chilean financial system foster a positive relationship between the growth opportunities and the long-term debt. This relation has been widely studied in other institutional contexts such as the US or other Anglo-Saxon countries reporting a negative relationship between these variables, however. It seems that private creditors represented basically by banks, the concentrated models of ownership structures widespread used in Chile, as long as the efficient supervisory work performed by the institutions, make up an efficient mechanism of corporate governance which reduces the potential agency problems

caused by the growth opportunities. Therefore, in the Chilean context, the asset substitution and the underinvestment problems generated by the future growth options are better controlled. This situation then allows firms to finance their future growth opportunities with long-term debt.

Finally, it is concluded that the Chilean firms *with* more growth opportunities feces higher adjustment costs to their optimal debt ratio than those firms *without* growth opportunities. It means that the agency costs of growth opportunities are asymmetrically distributed in these two groups of firms. Therefore, for those firms *with* growth opportunities the adjustment speed toward target debt ratio will be lower that for the other group of firms *without* growth opportunities. Thus, the asymmetric information problems associated with the future growth options make more difficult to achieve the optimal capital structure. So, those firms which do not account with growth opportunities take advantage of this higher financial flexibility in order to reach their optimal capital structure.

Table1: Descriptive statistics.

Panel A

Variable	Mean	Std. Dev.	Minimun	Maximun
LTDTA	0.281	0.294	0.000	0.998
Q	1.025	0.842	0.000	6.761
Q1	1.114	0.793	0.000	14.882
Q2	1.088	0.894	0.000	19.879
DEF	-0.080	0.208	-0.983	0.927
ROA	0.039	0.179	-2.786	0.461
FATA	0.446	0.303	0.000	0.998
LNTAB	17.186	1.962	9.707	22.094
LNFA	15.398	3.367	0.000	21.262
Z	4.314	9.945	-57.068	90.329
Obs.	2,532			

Panel B

Variables	LTDTA	Q	Q1	Q2	DEF	ROA	FATA	LNTAB	LNFA	Z
LTDTA	1.000									
Q	0.031	1.000								
Q1	0.012	0.002	1.000							
Q2	0.029	0.015	-0.029	1.000						
DEF	0.046	-0.142	0.192	-0.063	1.000					
ROA	0.016	0.085	0.079	0.032	-0.340	1.000				
FATA	0.220	0.027	-0.003	0.020	0.022	-0.077	1.000			
LNTAB	0.237	0.073	-0.035	-0.060	0.020	0.151	-0.307	1.000		

LNFA	0.252	0.143	-0.024	-0.011	-0.008	0.092	0.376	0.521	1.000	
Z	-0.189	0.209	0.007	-0.010	-0.157	0.342	-0.141	0.061	-0.116	1.000

The table in its Panel A displays the fundamental statistics for the variables used in our sample: long-term debt over total assets (LTDTA), the growth opportunities (Q, Q1, and Q2), the deficit of funds (DEF), the return on assets (ROA), the size of the company (LNTAB, LNFA), debt capacity of the firm (FATA), the Altman's Z Score as the probability of bankruptcy. Panel B includes the correlation matrix between the variables used in the analysis.

Table2: Adjustment velocity to the target debt ratio.

	Coeff. *St. Dev.*		*Coeff.* *St. Dev.*		*Coeff.* *St. Dev.*		*Coeff.* *St. Dev.*	
Const	-0.1019	***	-0.2487	***	0.0065	***	0.0046	*
	0.0062		0.0509		0.0018		0.0025	
$LTDTA_{t-1}$	0.7004	***	0.6501	***	0.6963	***	0.6980	***
	0.0009		0.0183		0.0011		0.0015	
Q	0.0077	***	0.0074	***	0.0042	***	0.0015	***
	0.0002		0.0026		0.0003		0.0005	
DEF	0.0753	***	0.0203	*	0.0568	***	0.0666	***
	0.0008		0.0122		0.0016		0.0013	
ROA	0.0005		0.0462	***	0.0260	***	0.0141	***
	0.0013		0.0100		0.0012		0.0012	
FATA			0.0683	***	0.0076	***		
			0.0156		0.0025			
LNTA	0.0102	***	0.0172	***				
	0.0003		0.0029					
LNFA					0.0052	***	0.0051	***
					0.0002		0.0002	
Z	0.0008	***	0.0002		0.0006	***	0.0010	***
	0.0000		0.0004		0.0000		0.0001	
Adj. Velocity	*0.2996*		*0.3499*		*0.3037*		*0.3020*	
Obs.	2,532		2,532		2,532		2,532	
Hansen	268.12		273.33		236.61		182.65	
Wald	202.00	***	190.31	***	323.00	***	248860.41	***
AR1	-7.2100	***	-7.2000	***	-7.2100	***	-7.2300	***
AR2	1.0600		0.9500		1.0400		1.0500	

The table displays the dynamic models of the capital structure. The adjustment velocity toward target debt ratio is calculated as the unit minus the coefficient of the dependent variable legged one period. The dependent variable is the long-term debt over total assets (LTDTA), while the independent variables are: the one period lagged long-term debt over total assets ($LTDTA_{t-1}$), the growth opportunities (Q), the return on assets (ROA), the size of the company (LNTAB, LNAF), the firm's debt capacity (FATA), the Altman's Z Score as the probability of bankruptcy, and deficit of funds (DEF). Statistical significance: *** at the 1 percent level, ** at the 5 percent level, and * at the 10 percent level.

Table3: The growth opportunities and the adjustment velocity to the target debt ratio.

Panel A

	With Q *Coeff.* *St. Dev.*		*Without Q* *Coeff.* *St. Dev.*		*With Q* *Coeff.* *St. Dev.*		*Without Q* *Coeff.* *St. Dev.*		*Whit Q* *Coeff.* *St. Dev.*		*Without Q* *Coeff.* *St. Dev.*		*Whit Q* *Coeff.* *St. Dev.*		*Without Q* *Coeff.* *St. Dev.*	
Const.	-0.8535	***	-0.2583	***	-0.8900	***	-0.4734	***	-0.0732	*	-0.0212		-0.0757	*	-0.0206	
	0.1619		0.0918		0.1862		0.1005		0.0423		0.0261		0.0420		0.0255	
$LTDTA_{t-1}$	0.3735	***	0.3166	***	0.3321	***	0.2756	***	0.5508	***	0.3203	***	0.5444	***	0.3205	***
	0.0369		0.0303		0.0343		0.0276		0.0403		0.0276		0.0391		0.0276	
DEF	0.0961	***	0.0409	*	0.0689	***	0.0080		0.0677	***	0.0049		0.0626	***	0.0046	
	0.0233		0.0181		0.0209		0.0195		0.0204		0.0196		0.0190		0.0190	
ROA	0.0582	**	0.0480		0.0307		0.0728	***	0.0185		0.0973	***	0.0223		0.0963	***
	0.0282		0.0229		0.0267		0.0243		0.0247		0.0321		0.0240		0.0317	
FATA					0.1318	**	0.1696	***	0.0275		-0.0030					
					0.0441		0.0298		0.0420		0.0370					
LNAB	0.0597	***	0.0257	***	0.0627	***	0.0327	***								
	0.0097		0.0056		0.0106		0.0059									
LNFA									0.0118	***	0.0116	***	0.0128	***	0.0115	***
									0.0034		0.0024		0.0030		0.0019	
Z	0.0009		0.0050	***	0.0006		0.0042	***	0.0020	***	0.0045	***	0.0018	***	0.0046	***
	0.0007		0.0010		0.0009		0.0010		0.0007		0.0011		0.0006		0.0011	
Adj. Velocity	*0.6265*		*0.6834*		*0.6679*		*0.7244*		*0.4492*		*0.6797*		*0.4556*		*0.6795*	
Obs.	799		1537		799		1537		799		1537		799		1537	
Hansen	70.64		103.50		71.36		71.36		70.90		99.52		71.38		99.54	
Wald	116.96	***	57.76	***	35.47	***	35.47	***	63.91	***	99.52	***	76.78	***	48.72	***
R1	-3.7900	***	-5.2700	***	-3.62	***	-3.6200	***	-3.92	***	-5.4200	***	-3.9500	***	-5.4200	***
R2	-0.1700		0.8900		-0.3800		-0.3800		-0.0200		0.6500		-0.0200		0.6500	
Panel B																
	With Q		*Without Q*		*With Q*		*Without Q*		*With Q*		*Without Q*		*With Q*		*Without Q*	
Adj. Cost	*0.3735*		*0.3166*		*0.3321*		*0.2756*		*0.5508*		*0.3203*		*0.5444*		*0.3205*	
St. Dev.	0.0369		0.0303		0.0343		0.0276		0.0403		0.0276		0.0391		0.0276	
Ha: Diff. Adj. Cost>0	0.0569				0.0564				0.2305				0.2238			
T-Student	1.7416	*			1.8793	*			7.0837	***			6.9992	***		

Panel A of the table displays the regression models of the adjustment to the target debt ratio considering the firms with and without growth opportunities. In this case

the regressions of table 2 are repeated again but just considering if the firms account with growth opportunities (Q>1) or not (Q<1). The discriminatory variable of growth opportunities corresponds to the market value over book value of assets. The adjustment velocity toward target debt ratio is calculated as the unit minus the coefficient of the dependent variable legged one period. The dependent variable is the long-term debt over total asset (LTDTA), and the independent variables are: the one period lagged long-term debt over total assets ($LTDTA_{t-1}$) the deficit of funds (DEF), the return on assets (ROA), the firm's debt capacity (FATA), the size of the company (LNTAB, LNAF), and the probability of bankruptcy measured with the Altman's Z Score. Statistical significance: *** at the 1 percent level, ** at the 5 percent level, and * at the 10 percent level.

Panel B describes the tests of whether the adjustment cost toward target debt ratio of firms *with* growth opportunities are higher than the adjustment costs for firms *without* growth opportunities. Statistical significance: *** at the 1 percent level, ** at the 5 percent level, and * at the 10 percent level.

Table4: Robustness test for the adjustment velocity to the target debt ratio.

	Coeff. *St. Dev.*		*Coeff.* *St. Dev.*		*Coeff.* *St. Dev.*		*Coeff.* *St. Dev.*		*Coeff.* *St. Dev.*		*Coeff.* *St. Dev.*		*Coeff.* *St. Dev.*		*Coeff.* *St. Dev.*	
Const	-0.1710	***	-0.3196	***	-0.1002	***	-0.0852	***	0.0309	***	-0.1990	***	-0.0343	***	-0.0684	***
	0.0065		0.0113		0.0031		0.0021		0.0073		0.0039		0.0013		0.0015	
$LTDTA_{t-1}$	0.5512	***	0.5123	***	0.5469	***	0.5390	***	0.6058	***	0.5648	***	0.5819	***	0.5862	***
	0.0017		0.0005		0.0003		0.0008		0.0002		0.0007		0.0007		0.0005	
Q1	0.0017	***	0.0020	***	0.0009	***	0.0004	***								
	0.0001		0.0001		0.0001		0.0000									
Q2									0.0080	***	0.0100	***	0.0087	***	0.0085	***
									0.0001		0.0001		0.0001		0.0001	
DEF	0.0231	***	0.0169	***	0.0295	***	0.0331	***	0.0384	***	0.0350	***	0.0428	***	0.0363	***
	0.0007		0.0008		0.0020		0.0012		0.0007		0.0014		0.0008		0.0007	
ROA	0.0706	***	0.0440	***	0.0557	***	0.0374	***	0.0222	***	0.0432	***	0.0345	***	0.0261	***
	0.0033		0.0015		0.0033		0.0022		0.0008		0.0014		0.0025		0.0007	
FATA			0.0966	***	0.0475	***					0.1200	***	0.0485	***		
			0.0032		0.0027						0.0024		0.0018			
LNAB	0.0167	***	0.0236	***					0.0042	***	0.0150	***				
	0.0004		0.0006						0.0004		0.0002					
LNFA					0.0156	***	0.0136	***					0.0079	***	0.0115	***
					0.0002		0.0001						0.0001		0.0001	
Z	0.0027	***	0.0018	***	0.0026	***	0.0022	***	0.0002	***	0.0004	***	0.0002	***	0.0001	***
	0.0000		0.0000		0.0001		0.0001		0.0000		0.0000		0.0000		0.0000	
Adj. Velocity	*0.4488*		*0.4877*		*0.4531*		*0.4610*		*0.3942*		*0.4352*		*0.4181*		*0.4138*	
Obs.	1950		1950		1950		1950		1787		1787		1787		1787	
Hansen	169.41		168.27		167.47		166.52		158.97		152.90		160.17		159.63	
Wald	336733.99	***	11600.00	***	12000.00	***	408113.27	***	55600.00	***	424427.15	***	689047.31	***	12900.00	***
AR1	174.0000	***	-6.5000	***	-6.5700	***	-6.5300	***	-6.5700	***	-6.5000	***	-6.5400	***	-6.5600	***
AR2	1.3000		1.1500		1.3300		1.2800		1.3300		1.2200		1.2900		1.3100	

The table displays the tests of robustness applied to the dynamic models of the capital structure. The adjustment velocity toward target debt ratio is calculated as the unit minus the coefficient of the dependent variable legged one period. The robustness

tests are based on the two alternative measures of the growth opportunities: i) the backward-looking measure of sales growth (Q1) computed as S_t/S_{t-1} and ii) the forward-looking measure of sales growth (Q2) computed as S_{t+1}/S_t, where S are the sales. The dependent variable is the long-term debt over total assets (LTDTA), while the independent variables are: the one period lagged long-term debt over total assets ($LTDTA_{t-1}$), the growth opportunities (Q1, Q2), the return on assets (ROA), the size of the company (LNTAB, LNAF), the firm's debt capacity (FATA), the Altman's Z Score as the probability of bankruptcy, and deficit of funds (DEF). Statistical significance: *** at the 1 percent level, ** at the 5 percent level, and * at the 10 percent level.

Table5: Robustness test for the analysis of the growth opportunities and the adjustment velocity to the target debt ratio.

Panel A

	With Q1 *Coeff.* *St. Dev.*		*Without Q1* *Coeff.* *St. Dev.*		*With Q1* *Coeff.* *St. Dev.*		*Without Q1* *Coeff.* *St. Dev.*		*With Q1* *Coeff.* *St. Dev.*		*Without Q1* *Coeff.* *St. Dev.*		*With Q1* *Coeff.* *St. Dev.*		*Without Q1* *Coeff.* *St. Dev.*	
Const	-0.3711	***	-0.2942	***	-0.3840	***	-0.4284	***	0.0523	***	0.0291	***	0.0821	***	0.0255	***
	0.0788		0.0585		0.0796		0.0670		0.0163		0.0098		0.0194		0.0086	
$LTDTA_{t-1}$	0.5066	***	0.1560	***	0.5006	***	0.0926	***	0.5390	***	0.1329	***	0.5255	***	0.1493	***
	0.0174		0.0078		0.0173		0.0084		0.0192		0.0106		0.0191		0.0085	
DEF	0.0684	***	-0.0125		0.0631	***	0.0241	***	0.0617	***	-0.0507		0.0481	***	0.0472	***
	0.0152		0.0082		0.0151		0.0066		0.0157		0.0053		0.0146		0.0052	
ROA	0.0021		-0.0290		0.0002		0.0143	***	0.0205		0.0085		0.0062		-0.0008	
	0.0198		0.0055		0.0184		0.0047		0.0335		0.0075		0.0297		0.0060	
FATA					0.0386	*	0.2038	***	0.0744	**	0.0973	***				
					0.0221		0.0174		0.0322		0.0235					
LNAB	0.0281	***	0.0291	***	0.0280	***	0.0331	***								
	0.0046		0.0037		0.0046		0.0043									
LNFA									0.0056	***	0.0090	***	0.0015		0.0113	***
									0.0017		0.0006		0.0013		0.0005	
Z	0.0006		0.0005	**	0.0006		0.0008	***	0.0005		0.0008	***	0.0001		0.0007	***
	0.0007		0.0002		0.0007		0.0003		0.0008		0.0003		0.0008		0.0002	
Adj. Velocity	*0.4934*		*0.8440*		*0.4994*		*0.9074*		*0.4610*		*0.8671*		*0.4745*		*0.8507*	
Obs.	1492		844		1492		844		1492		844		1492		844	
Hansen	117.44		101.45		115.44		100.87		113.01		101.32		114.27		99.20	
Wald	199.39	***	120.94	***	167.63	***	159.54	***	175.13	***	197.71	***	193.74	***	218.00	***
R1	-5.4900	***	-3.3900	**	-5.4900	***	-3.2200	**	-5.4800	***	-3.3800	**	-5.5100	***	-3.4100	***
R2	0.8500		-0.3400		0.8000		-0.6300		0.9200		-0.4000		0.9100		-0.3100	
Panel B																
	With Q1		*Without Q1*		*With Q1*		*Without Q1*		*With Q1*		*Without Q1*		*With Q1*		*Without Q1*	
Adj. Cost	0.5066		0.1560		0.5006		0.0926		0.5390		0.1329		0.5255		0.1493	
St. Dev.	0.0174		0.0078		0.0173		0.0084		0.0192		0.0106		0.0191		0.0085	
Ha: Diff. Adj. Cost>0	0.3506				0.4080				0.4061				0.3762			
T-Student	23.9169	***			27.7799	***			24.4338	***			23.4158	***		

Panel A of the table displays the robustness tests for the regression models of the adjustment to the target debt ratio considering the firms with and without growth

opportunities. In this case the regressions of table 3 are repeated again but just considering if the firms account with growth opportunities or not. The robustness tests are based on the alternative measure of the growth opportunities as the backward-looking measure of sales growth (Q1) computed as S_t/S_{t-1}. Firms with growth opportunities are those with a Q1>1, while firms without growth opportunities are those with Q1<1. The dependent variable is the long-term debt over total asset (LTDTA), and the independent variables are: the one period lagged long-term debt over total assets ($LTDTA_{t-1}$), the deficit of funds (DEF), the return on assets (ROA), the firm's debt capacity (FATA), the size of the company (LNTAB, LNAF), and the probability of bankruptcy measured with the Altman's Z Score. Statistical significance: *** at the 1 percent level, ** at the 5 percent level, and * at the 10 percent level.

Panel B describes the tests of whether the adjustment cost toward target debt ratio of firms *with* growth opportunities are higher than the adjustment costs for firms *without* growth opportunities. Statistical significance: *** at the 1 percent level, ** at the 5 percent level, and * at the 10 percent level.

Table6: Robustness test for the analysis of the growth opportunities and the adjustment velocity to the target debt ratio.

Panel A

	With Q2 Coeff. St. Dev.		*Without Q2 Coeff. St. Dev.*		*With Q2 Coeff. St. Dev.*		*Without Q2 Coeff. St. Dev.*		*With Q2 Coeff. St. Dev.*		*Without Q2 Coeff. St. Dev.*		*With Q2 Coeff. St. Dev.*		*Without Q2 Coeff. St. Dev.*	
Const	-0.2678	***	0.4209	**	-0.6894	***	0.1403	**	-0.0133		0.1155	***	-0.0212		-0.0332	
	0.0933		0.1623		0.1175		0.0673		0.0341		0.0247		0.0310		0.0202	
$LTDTA_{t-1}$	0.4544	***	0.4082	***	0.3689	***	0.3210	***	0.3967	***	0.3192	***	0.3923	***	0.3607	***
	0.0270		0.0213		0.0233		0.0212		0.0279		0.0206		0.0275		0.0212	
DEF	-0.0022		0.1426	***	0.0402	**	0.0639	***	-0.0480		0.0672	***	-0.0475		0.1252	***
	0.0186		0.0117		0.0184		0.0165		0.0190		0.0163		0.0189		0.0160	
ROA	0.0551	**	0.1087	***	0.0404	**	0.0980	***	0.0489	*	0.0985	***	0.0446	*	0.1030	***
	0.0247		0.0261		0.0186		0.0253		0.0277		0.0255		0.0268		0.0239	
FATA					0.2008	***	0.2391	***	0.0230		0.2826	***				
					0.0286		0.0199		0.0377		0.0354					
LNAB	0.0240	***	-0.0154		0.0462	***	-0.0036									
	0.0055		0.0094		0.0067		0.0043									
LNFA									0.0106	***	-0.0037		0.0118	***	0.0133	***
									0.0030		0.0025		0.0021		0.0014	
Z	0.0023	***	-0.0004		0.0022	***	-0.0007		-0.0015		-0.0006		0.0014	*	-0.0006	
	0.0007		0.0005		0.0008		0.0007		0.0008		0.0006		0.0008		0.0006	
Adj. Velocity	*0.5456*		*0.5918*		*0.6311*		*0.6790*		*0.6033*		*0.6808*		*0.6077*		*0.6393*	
Obs.	1550		786		1550		786		1550		786		1550		786	
Hansen	120.67		106.40		113.66		105.73		117.57		105.17		118.65		106.91	
Wald	63.25	***	171.37	***	58.08	***	340.99	***	59.31	***	342.49	***	72.20	***	504.21	***
R1	-5.5200	***	-4.4000	***	-5.4600	***	-4.2900	***	-5.5300	***	-4.3000	***	-5.5300	***	-4.3900	***
R2	-0.3700		1.1500		-0.8300		0.2000		-0.4900		0.1700		-0.5000		0.9000	
Panel B																
	With Q2		*Without Q2*		*With Q2*		*Without Q2*		*With Q2*		*Without Q2*		*With Q2*		*Without Q2*	
Adj. Cost	*0.4544*		*0.4082*		*0.3689*		*0.3210*		*0.3967*		*0.3192*		*0.3923*		*0.3607*	
St. Dev.	0.0270		0.0213		0.0233		0.0212		0.0279		0.0206		0.0275		0.0212	

Ha: Diff. Adj. Cost>0	0.0462				0.0479				0.0775				0.0315			
T-Student	1.8292	*			2.1178	**			3.0176	***			1.2357			

Panel A of the table displays the robustness tests for the regression models of the adjustment to the target debt ratio considering the firms with and without growth opportunities. In this case the regressions of table 3 are repeated again but just considering if the firms account with growth opportunities or not. The robustness tests are based on the alternative measure of the growth opportunities as the forward-looking measure of sales growth (Q2) computed as S_{t+1}/S_t. Firms with growth opportunities are those with a Q2>1, while firms without growth opportunities are those with Q2<1. The dependent variable is the long-term debt over total asset (LTDTA), and the independent variables are: the one period lagged long-term debt over total assets ($LTDTA_{t-1}$), the deficit of funds (DEF), the return on assets (ROA), the firm's debt capacity (FATA), the size of the company (LNTAB, LNAF), and the probability of bankruptcy measured with the Altman's Z Score. Statistical significance: *** at the 1 percent level, ** at the 5 percent level, and * at the 10 percent level.

Panel B describes the tests of whether the adjustment cost toward target debt ratio of firms *with* growth opportunities are higher than the adjustment costs for firms *without* growth opportunities. Statistical significance: *** at the 1 percent level, ** at the 5 percent level, and * at the 10 percent level.

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