The Capital Structure Dynamics of Swedish Firms over the Business Cycle

Leverage Cyclicality and Credit Supply Contractions

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Abstract

This paper focuses on the leverage dynamics of Swedish firms over the business cycle from 1987 to 2010, a period in which Sweden experienced two major recessions. Our two-part study finds evidence that Swedish firms have counter-cyclical target leverage. In contrast to previous international research, Swedish firms have a higher speed of adjustment towards target leverage in times of recession. Significant demand driven factors are found for financially constrained and unconstrained firms. The speed of adjustment becomes significantly higher for financially unconstrained firms during recession periods, indications which our case study supports.

Keywords: Swedish business cycle, leverage dynamics, credit supply constraints, target leverage

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1. **Introduction**

Swedish private firms increased their leverage significantly in a surge of expansion following the credit deregulation of 1985. Loosened credit handling together with a growth-oriented macro policy resulted in an asset pricing boom. External factors hitting the Swedish economy at this time lead investors to flee the market, causing market prices to plummet, resulting in the Swedish real estate crisis of 1990-1993 (Englund, 1999). Coming out of the real estate crisis Swedish banks were forced to absorb losses and open up their books to the public after introducing a bank resolution policy. This, combined with fiscal policies introduced to mitigate the effects of the crisis, allowed for a quick economic recovery (Jonung, L. 2009).

The following expansion period lasted until the global financial crisis of 2008-2009. How Swedish firms were able to handle the recent crisis raises questions regarding capital structure dynamics, having experienced two recessions and an extensive period of expansion. What drives Swedish firms' capital structure dynamics? Can the quality of the firms explain these differences? Do firms suffer from credit supply restraints and does it affect choice of financing sources?

International studies show that firms leverage ratios are counter-cyclical in civil law countries, such as Sweden (Halling, Yu and Zechner, 2012). Our intuition is that Swedish firms will have counter-cyclical leverage and that the main determinants of Swedish leverage dynamics will differ from previous studies on comparable countries due to the real estate crisis.

The choice of capital structure for firms has been the subject of numerous reports. The topic ranges from the unimportance of capital structure in the valuation of firms in efficient markets (Modigliani and Miller, 1958), to capital structure optimisation, bankruptcy risk and agency costs of financing. But only a handful of the reports investigate the business cycle's effect on capital structure dynamics.

The study is divided into two parts. The first section applies the theory and approach of Halling, Yu and Zechner's paper (2012) on leverage dynamics over the business cycle on 18 countries. To determine if any firm characteristics have an impact on capital structure dynamics, we regress the actual change in leverage from one year to another on certain key firm variables, such as sales, profitability and capital expenditures. Sub-sample analysis is also performed to document differences between financially constrained and unconstrained firms. Finally, tests are made to determine the cyclicality of and the speed of adjustment towards firms target leverage ratio.[1]

[1] A firm's target leverage is defined as the leverage ratio that optimises the capital structure according to trade-off theory. Further discussed in Fama, French (2002)

To analyse this we collect accounting and market data for all Swedish listed firms from 1987 to 2010, both active and now inactive firms. The structure of the data is in the form of a panel data set where we isolate the business cycle effect with dummy variables. Endogeneity issues occur when controlling for firm characteristics from the same period, i.e. omittance of explanatory variables and within-firm correlation with past and present errors has to be considered**.** These issues are controlled for using an econometric setup based on a GMM panel estimator applying lags. Industry differences are also accounted for in the regression analysis.

The second part of the study describes the supply and demand dynamics of financing that Swedish firms faces over business cycles. This is made in the form of a case study. A survey was sent out to almost all currently listed Swedish companies. The main discussion revolves around the financing dynamics between firms, credit institutions and the public market. Only a few studies has been made on the subject (see for example, Becker and Ivashina, 2011, Erel, Julio, Kim and Weisbach, 2011) making a single market study interesting for depth understanding. A US market study reveals large correlation between bank credit contractions and the issuance of public debt (corporate bonds) (Becker and Ivashina, 2011). To further observe and understand the capital structure dynamics over the business cycle explained by supply and demand effects of debt, we link this to the quantitative part of the study.

We are able to find significant results in sub-samples between the firm characteristics and estimated target leverage, such as tangibility and profitability. Both observed leverage and target leverage are counter-cyclical, consistent with what Halling, Yu and Zechner (2012) find in their study over 18 countries. However, our speed of adjustment (SOA) estimates deviate from their international study where SOA declines in recessions, when our results indicate that Swedish firms adjust towards target leverage at a more rapid pace. The case study show that firms on smaller marketplaces had more problems receiving bank credit during the global financial crisis, Large Cap firms having the least issues and First North having the most. Finally, we conclude that Swedish capital structure dynamics are significantly different both between constrained and unconstrained firms and compared to other countries.

Going forward, including all Scandinavian countries in a related study would be interesting to see similarities and differences in leverage dynamics between Sweden and comparable countries (in terms of equivalent banking system and state of economy). This would also increase the number of recession years and not unlikely the significance. The results presented in the study raises questions of how the relationship between Swedish firms and banks differ compared to an international setting, which would also be an interesting topic for further research.

The rest of the paper is organised in the following way; Section two presents previous research, section three and four describes data sources used and methodology applied. Section 5 presents our results and analysis and the conclusion is stated in section 6.

2. Previous research

2.1. Capital structure dynamics over the business cycle

The existence of market frictions gives rise to issues optimising the firm's capital structure, issues which, in academics consensus, are viewed as dynamic. One frequently used model is the dynamic trade-off theory. In the trade-off model, firms theoretically strive for a target leverage ratio that is dynamically optimised for each firm's conditions. At optimum, the benefit (e.g. tax reduction) and cost (e.g. bankruptcy risk) of adding on incremental debt are equal. Dividends are analogous according to the trade-off model's predictions. At target leverage, the value of the firm is maximised. By definition, this is the optimal capital structure if possible to reach without transaction costs. In general, transaction costs exist when acquiring capital. Hence, implied target leverage is only possible to reach in a theoretical perfect capital market (Fama and French, 2002).

The trade-off model can be compared to another theory, in which firms have no target leverage ratio, i.e. randomly select capital structure. There are two frequently discussed scenarios where the firm either decide on a random capital structure, keeping it fixed over time, or follows a random walk in leverage ratio. Although a well-discussed theory, prior research rejects this model (See for example Halling, Yu and Zechner, 2012).

The paper working as an outline for our quantitative regression study (Halling, Yu and Zechner, 2012) show that book and market target leverage ratios move counter-cyclically. However, for firms in common law countries a pro-cyclical behaviour is observed. Significant causality is found for profitability and capital expenditure and target leverage. Increased capital expenditures show significant positive increase on leverage ratios in times of recession, i.e. firm investments during recessions have a greater positive effect on target leverage. The same study indicates that profitability have a larger negative impact on target leverage in recessions; firms use retained earnings to avoid external financing when reinvesting. Furthermore, significant results are found for the counter-cyclicality of target leverage ratios. According to the study, firms move slower towards target leverage in times of recession, explained by a significantly lower speed of adjustment estimate. The reason for this is stated to be credit institutions' contractions in credit lending.

Financially constrained and unconstrained firms[2] have different leverage cyclicality behaviour (Korajczyk and Levy, 2003). Financially constrained firms tend to have a pro-cyclical leverage. These firms show less change in target leverage and choice of financing due to macro-economic effects than the unconstrained firms, which have a more counter-cyclical leverage pattern. Financially constrained firms keep a more stable leverage ratio than financially unconstrained firms. The latter group show strong counter-cyclical leverage ratio behaviour. (Levy and Hennessy, 2006)

2.2. Supply and demand effects on capital structure dynamics

The pecking order theory (Myers and Majluf, 1984) helps to describe the order of how firms choose their financing sources. Private information gives cause for managers to issue high-risk securities when it is the manager's opinion that the securities are over-priced. Investors are cognisant of this asymmetric information and therefore discount both new and outstanding securities, to account for this premium. Managers will be aware of the investor discounts, which might force managers to relinquish profitable investments if the financing was planned to come from the issuance of high-risk securities. Retained earnings will be the first choice of financing for managers since internal funding eliminates the issue of asymmetric information, for low-risk debt this problem is imperceptible. The agency and flotation costs incurred through the issuance of equity and high-risk debt will always exceed other factors determining optimal capital structure (Myers, 1984). Hence, the pecking order is as follows; retained earnings, low-risk debt (bank credit), high-risk debt (bonds) and lastly equity.

On the US market the difference in cyclicality between investment and non-investment graded borrowers has been observed (Erel, Julio, Kim, and Weisbach, 2011). Whilst non-investment grade borrowers show bias towards pro-cyclical capital raisings, investment grade borrowers are more counter-cyclical. This observation is consistent with the previous literature of financially constrained and unconstrained firms' cyclicality (Korajczyk, Levy, 2003, and Levy, Hennessy, 2006).

Empirical evidence on the US market show that in recessions, bank credit supply contractions lead to an increase in bond issuances (Becker and Ivashina, 2011). This concurs with the pecking order theory, moving from a preferred source of funding to the next in order (Myers and Majluf, 1984). The Becker and Ivashina paper (2011) focuses on the financially unconstrained firms that have the option of switching between bank credit and public bonds. They condition the sample on raising debt which eliminates the uncertainty regarding firms' choice to raise or not raise debt due to lack of refinancing demand.

[2] Definition of financially constrained firms – Firms lacking adequate cash for possible investments and faces high flotation costs when accessing financial markets. (Korajczyk and Levy, 2003)

Financially constrained firms, which cannot access the public bond market to the same extent, experience larger contractions in credit supply in times of recession (Gertler and Gilchrist, 1993).

The information asymmetry between managers and investors, as described by Myers and Majluf (1984), is also valid for the equity market timing theory. Inefficient capital markets create incentives for managers to issue equity instead of debt when they consider the current share price to be overvalued. However, when valuation is low, they choose to repurchase shares. Consequently, since business cycle effects often affect valuation, timing of equity issuances is important.

3. Data

Economic Cycle Research Institute (ECRI) – To control for business cycles we use ECRI's international cycle dates. They provide dates for when economies enter and exits recessions.[3] The Swedish economy was in recession between June 1990 – July 1993 and April 2008 – March 2009. The database holds a record from 1948 to 2010 for several economies.

Accounting and Market value data – Datastream – Worldscope – Annual firm accounting data was extracted using Worldscope. The extracted data holds records of all Swedish listed firms, both active and inactive, for the period 1987 to 2010.[4] This database also provides market data for firms at the end of each fiscal year. The sample period was chosen to include as many Swedish recession years as possible. Before 1987 only limited accounting and market data was available. Extending the sample period further than 1987, would reduce the quality of the data, hence we chose this time period.

Further miscellaneous data – Datastream – Worldscope – For instance industry indicator, firm name, number of employees and dividends per share are available and was merged into our dataset. Worldscope's group industry classification was used to group firms into different sectors, for the purpose of industry fixed effects analysis.

Case study data – The sample of the case study was all currently listed Swedish firms at the April 24, 2012 (the date the survey was sent out). The sample period ranges from January 2006 to December 2011. An e-mail survey was designed for the case study. E-mail addresses were

[3] The ECRI's explanatory factors for when an economy is in a recession are proprietary information. The ECRI data is widely accepted as a standard and is therefore used to define our recession periods.
[4] The dataset is constructed as an unbalanced panel dataset with the individual firms as the panel variable and the fiscal year as the time variable. The number of years of observations for each firm ranges from 1 to 23 years, with a mean of 7.31 years.

collected manually from the company websites. The survey was sent to the CFO's, CEO's or head of IR depending on listed responsibilities. Approximately 450 firms were contacted by e-mail and the response rate was 19.1 % (86 firms). The sample suffered fall-outs due to invalid e-mail addresses and declines to participate in the survey. For survey format, see appendix.

3.1. Possible selection bias

The case study sample is subject to potential selection bias. Since only currently listed firms are included, delisted firms active during the study period are eliminated, giving a survivorship bias. Given that the sample period only focuses on time in proximity of the recent global financial crisis, the Swedish crisis of 1990-1993 is excluded. Although relevant, information quality and accuracy of responses from current management would be significantly lower than for questions regarding the recent events of the global financial crisis.

Since the accounting data sample includes all active and inactive listed firms available in Worldscope we see no possible selection or survivorship bias in the regression analysis.

4. Methodology

The methodology will be presented in two sections treating the quantitative regression analysis and case-study separately.

4.1. Quantitative regression analysis – demand factors

First off, accounting data for Swedish listed firms, from the period between 1987 and 2010, was imported from Worldscope using Datastream. Market valuation, dividend per share and earnings per share was also extracted from Worldscope. A detailed summary of variable definitions is presented in the appendix.

The yearly firm accounting data was then reconfigured from Datastream's vector type of output, into a panel dataset. The firm ID (ISIN code) act as the panel variable and the fiscal year as the time variable, with accounting data observations for each firm-year. The data has been deflated to millions of Swedish kronor. In order to control for industry fixed effects in our regression analysis, identification data containing company name and Worldscope industry group classification was merged with the accounting data using ISIN-code.

Both financial and utility firms are dropped from the sample, in accordance with the methodology of Halling, Yu and Zechner (2012), since their choice of leverage structure is usually regulated and the dynamics of these are supposedly quite different from other industrial firms. We choose to define a firm's fiscal year to be in a recession if more than 6 months of it coincides with the ECRI defined recession period.[5]

Both market (ml) and book (bl) leverage ratios are used as the dependent variable in the regression analysis. Firm characteristics are controlled for as independent variables (for detailed definitions of all the variables, see appendix). Lagged leverage ratios are also controlled for in the regression, which are used to estimate the speed of adjustment in firms leverage dynamics.

To make all observations comparable and to ensure that the sample only consists of operational firms which are likely to be affected by the business cycle to some extent, observations are excluded if any of the following firm-year criteria are met (in line with Halling, Yu and Zechner, 2012).

(a) total assets < 0, (b) market cap < 0, (c) total debt > total assets, (d) assets market value < cash, (e) total assets < cash and (f) cash < 0. Furthermore, observations with (g) net sales < 0, (h)

[5] This definition is slightly different from Halling, Yu and Zechner where a firm year is defined as in a recession if the entire fiscal year overlaps with a recession. However, since the recession period is less than 1 year during 2008-2009, that definition would exclude this entire recession period and greatly lower the significance of our results.

net debt/assets book value < -1, and (i) net debt/assets market value < -1 are also dropped from our dataset. The reason for excluding (h) and (i) is that these firms holds a very large portion of cash in comparison to assets and are most likely not operational firms. To remove any distortion effects of existing outliers, the variables are winsorised at; market to book (95%), tangibility (99%) and profitability (99%).

We also control for differences within sub-samples of our dataset, more specifically firms considered to be financially constrained and unconstrained. In order to determine whether a firm is financially constrained or not we classify them by using two factors: size or dividend payout ratio.[6]

By using the logarithm of net sales across observed years, the median size for all firms is calculated, resulting in a distribution of firm-sizes. The largest 25% (Size 75) and smallest 25% (Size 25) are assigned the label financially unconstrained and constrained, respectively. The dividend proxy is calculated as the over-time median dividends/earnings ratio for all firms. Correspondingly, the largest 25% (Div 75) and smallest 25% (Div 25) are assigned the label financially unconstrained and constrained, respectively.[7]

4.2. Statistical methods

The starting-point of the study's econometric approach is that Swedish firms strive to optimise their capital structure in accordance with the trade-off theory. Since this is often seen as a dynamic problem, we modulate for changes in capital structure. The assumption, given that firms are not at their current target leverage ratio, is that they adjust gradually towards their target, never reaching it due to market frictions. Consequently, the econometric setup controls for this partial adjustment of firms' observed leverage ratio towards their target leverage ratio over time, a so called DPACS model – Dynamic Partial Adjustment Capital Structure model.[8] The model captures the business cycle effect on target leverage, the speed of adjustment towards this ratio and the significance for the selected independent firm characteristics affecting the partial movement.

[6] Categorisation of financially constrained and unconstrained firms according to Acharya, Almeida and Campello (2007). We use this definition in our quantitative regression analysis and not the recently mentioned one by Korajczyk and Levy, 2003.

[7] This classification of constrained and unconstrained firms indicates that the firms are permanently classified to belong in these sub-samples, i.e. they do not switch. A main reason for this is the use of lags in the statistical analysis and hence a continuous stream of firm observations is necessary for significant results.

[8] This is the same econometric setup model used in Halling, Yu and Zechner (2012). This model is based on Fama and French's (2002) partial adjustment model and estimates the dynamic partial adjustment capital structure model (DPACS-model). This model includes both year and firm fixed effects.

4.2.1. Target leverage estimation

To model target leverage ratios changing over time while controlling for business cycles we estimate a firm's target leverage to be **Target_lev**:

$$\mathbf{Target\_lev}_{j,i,t+1} = \sum_{state} (\beta_0^{state} + \beta^{state}\mathbf{X}_{j,i,t+1})\boldsymbol{BC}_{j,i,t+1}^{state}, state \in S \equiv \{rec, exp\}, \qquad (1)$$

The regressions are performed with book and market leverage ratios, i.e. $\mathbf{lev} \in \{bl, ml\}$**.** The $\boldsymbol{BC}_{j,i,t+1}^{rec}(\boldsymbol{BC}_{j,i,t+1}^{exp})$ act as an exogenously given indicator of the Swedish state of the economy at a specific time (t), i.e. a dummy variable with value 1 in times of recession (expansion), otherwise 0. Additionally, the effect of a number of firm and industry specific characteristics are controlled for and explained by the column vector $\mathbf{X}_{j,i,t}$.

$$\mathbf{X} = \begin{bmatrix} sales \\ market\ to\ book \\ profitability \\ tangibility \\ industry\ mean \\ capital\ expenditures \end{bmatrix} \quad (2)$$

This model enables capturing the direct and indirect effects of the business cycle, through changes in the intercept determined by the estimate of β_0^{state} and firm specific factors, respectively. Determining the indirect effect of firm and industry specifics is possible through the coefficient vectors β^{state}. Equation (1) can be redefined as:

$$\mathbf{Target\_lev}_{j,i,t+1} = \beta_0^{exp} + \beta^{exp}\mathbf{X}_{j,i,t+1} + \left[\left(\beta_0^{rec} - \beta_0^{exp}\right) + \left(\beta^{rec} - \beta^{exp}\right)\mathbf{X}_{j,i,t+1}\right]\boldsymbol{BC}_{j,i,t+1}^{rec} \quad (3)$$

4.2.2. Partial adjustment towards target

Since the target leverage ratio is unobserved, we cannot simply regress it on business cycle effects. Instead, we use the fact that transaction costs only allow firms to partially adjust towards target leverage. Therefore, the DPACS model also controls for cycle varying speed of adjustment towards target leverage.

$$\mathbf{lev}_{j,i,t+1} - \mathbf{lev}_{j,i,t} = \sum_{state} a^{state}\boldsymbol{BC}_{j,i,t+1}^{state}\left(\mathbf{Target\_lev}_{j,i,t+1} - \mathbf{lev}_{j,i,t}\right) + e_{j,i,t+1} \quad (4)$$

Using the definition of $\mathbf{Target\_lev}_{j,i,t+1}$ from equation (1), inserting it into equation (4) and rearranging it, a model estimating the leverage dynamics over the business cycle is established.

$$\mathbf{lev}_{j,i,t+1} = \sum_{state} \left[(1 - a^{state})\mathbf{lev}_{j,i,t} + a^{state}\beta_0^{state} + a^{state}\beta^{state}\mathbf{X}_{j,i,t+1}\right]\boldsymbol{BC}_{j,t+1}^{state} + e_{j,i,t+1} \quad (5)$$

The a^{state} variable represents the change in gap between the implied target and current leverage ratio over 1 year. This is also referred to as the speed of adjustment (SOA).

For robustness tests, a simplified model with the assumptions $\beta^{exp}a^{exp} = \beta^{\mathrm{rec}}a^{rec}$ is constructed. This model removes any differences for the firm fixed effects over the business cycle. It only focuses on the state of economy effect on the lagged leverage variables while allowing for constants to change.

$$\mathbf{lev}_{j,i,t+1} = \sum_{s}\left[(1 - a^{state})\mathbf{lev}_{j,i,t} + a^{state}\beta_0^{state}\right]\boldsymbol{BC}_{j,t+1}^{state} + a^{exp}\beta^{exp}\mathbf{X}_{j,i,t+1} + e_{j,i,t+1} \quad (6)$$

In the results section, equation (5) will be referred to as the DPACS model and equation (6) as the "Static coefficient DPACS" model.

4.2.3. GMM estimator

The regression analysis is performed using xtabond2, a system generalised method of moments (GMM) estimator used in STATA to handle dynamic panel datasets. The estimator works well for situations with small T (short time periods of observations) and large N (many firms). The regression is run while controlling for firm and industry fixed effects. A main issue with this regression analysis is the existence of endogeneity for the yearly firm characteristics being correlated with past and present errors. In xtabond2, instruments are constructed from the available data sample using lags, in order to improve the estimates for the endogenous firm characteristics.[9] We apply clustered standard errors to control for heteroskedasticity and autocorrelation (within-firm correlation).

[9] For more information on xtabond2 use and setup, see Roodman (2006).

4.3. Case study – Credit supply contractions over the global financial crisis

In order to study the access of capital for Swedish firms over the business cycle, a survey was designed and sent out to Swedish listed firms with questions regarding their financing activity. The aim was to determine access and preference of financing sources through the global financial crisis and what affected these choices. The questions were inspired by Servaes and Tufano's global capital structure survey (2005).[10]

To retrieve both quantitative and qualitative information, the survey was divided into two sections. The first part consisted of questions regarding the raising of capital, i.e. equity issuances, bond issuances and bank credit. The study time includes three periods; before the financial crisis (January 2006 – March 2008), during the financial crisis (April 2008 – March 2009) and after the financial crisis (April 2009 – December 2011). This time span includes both expansion and recession periods.

According to Becker and Ivashina (2011), difficulties raising bank credit and higher transaction costs shift firms financing from bank credit towards bonds. Therefore, qualitative questions were included to give an indication if the choice of financing was affected by credit supply contractions. Gertler and Gilchrist (1993) find that smaller firms suffer more from credit contractions. For that reason we sort the sample by marketplaces in order to observe differences between firms with different sizes.

In the analysis, we make the different time periods comparable by conditioning only to include firms raising debt, indicating that the firm is in need of external financing. This condition reveals access and preference for the different sources of financing over the business cycle.

[10] See appendix for survey format

5. Results

5.1. Summary statistics

Table 1 presents the summarised data for the Swedish firm characteristics. The table is divided into Panel A which displays characteristics when firms are in recessions, and Panel B for firms when they are in expansions. First off, in the full sample there are significant differences of firm characteristics between the two stages of the business cycle. The results indicate that both book and market leverage ratios are counter-cyclical. In other words, firms increase their leverage ratio during recessions.

There are also significant differences in firm characteristics between the sub-samples of financially constrained firms, defined after their dividend policy (Div 25) or their size (Size 25), and unconstrained firms identified as Div 75 and Size 75. In particular, constrained firms seem to have higher growth opportunities (determined by higher market to book ratios), be less profitable and have a lower level of tangibility than unconstrained firms. Constrained firms also have lower leverage ratios than unconstrained firms, across the entire business cycle. Consistent with the full sample, leverage ratios are counter-cyclical for constrained and unconstrained firms, true for both dividend and size sub-samples.

5.2. Tables and comments

For all the estimated coefficients in the following regression results, the presented coefficients have been adjusted to present the direct β^{state} impact and not the estimate of $a^{state}\beta_0^{state}$. This is to display the true impact of each firm characteristic on the target leverage ratio. The lagged leverage ratio estimate has been extracted to determine the speed of adjustment (SOA) estimate directly by subtracting the lagged leverage estimate from 1.

Coefficient estimates are displayed with their robust standard error (clustered by firm) given in parentheses. Significant differences in results for recession coefficients have been tested using post-estimation commands and are marked with ***, ** and *, representing 1%, 5% and 10% significance respectively.

Table 2 summarises the regression results made to ensure model robustness to be in line with further regressions. A simplified version of the DPACS model with no business cycle effect, in columns 2 and 3, and the Static Coefficient DPACS model, in column 4 and 5, are regressed and presented in table 2. The tests are made on the full sample and results are highly significant. The results display consistency for the two models and other regression results in table 3-5 are in line with these benchmark models. The speed of adjustment estimate in column 5 for recession

periods is significantly different from the expansion estimate. The recession constant has significantly higher positive impact on implied target leverage.

Table 3 presents the regression results from the DPACS model on the full sample, as seen in equation (5). We allow for business cycle effects not only to the lagged leverage ratios and constants but also for firm characteristics.

Significant difference in recession estimates can only be found for tangibility while using book leverage as the dependent variable. For the market leverage regression the speed of adjustment towards target leverage is significantly higher in recessions. For the market to book estimate, on the other hand, the negative impact increases during recessions. The recession coefficient indicates significantly higher target leverage in recession periods.

Table 4 tests for the same DPACS model as in table 3 but splits the regression into financially constrained and unconstrained firms, determined by their dividend policy or size. Panel A and B displays book and market leverage, respectively.

The SOA of financially unconstrained firms is significantly higher for book and market leverage while constrained firms only show little significance in changes of the SOA for market leverage during recessions. A stronger negative impact of capital expenditures and profitability on target leverage is observed for the sub-sample Div 75. Evidence is found for that market to book affect target leverage of constrained firms positively and negatively for unconstrained firms in times of recession.

Tables 5-8 are explained in section 5.3.4.

Table 9 provides further robustness tests where different firm characteristics are removed from the model to check for consistency and that the model still provides significant results when changing assumptions.

5.3. Implications and analysis

5.3.1. Firm characteristics over the business cycle

Running the regression on the full sample (as in table 3), allows us to estimate how Swedish firm characteristics affect the target leverage dynamics. Estimated firm characteristics shown in table 3 imply that in general, an increase in size, tangibility, industry mean and capital expenditures increases the target leverage. However, an increase in market to book and profitability show strong negative change to target leverage.

The firm characteristic variables that vary significantly over the business cycle are the ones that yield the most interesting results. These are the internal demand factors that have high explanatory power for changes in leverage dynamics across the business cycle of Swedish firms, marked with * for level of significance in tables.

One of the estimates with significant negative impact on target leverage during recessions is the market to book ratio. This observation is consistent over the full sample and across all sub-samples when regressing on market leverage (see table 4). The interpretation is that an increase in share prices and increase in growth opportunities will significantly lower a firm's target leverage in recessions. We do not find significant results for the book leverage regression. Therefore, we suspect that this effect is exaggerated due to the direct relationship in the variable definitions of the two ratios, implying that a market to book increase consequently lowers the target leverage.[11]

Furthermore, Halling, Yu and Zechner (2012) find evidence that both capital expenditure and profitability vary significantly over the business cycle for both financially constrained and unconstrained firms. They estimate profitability to have a large negative impact on target leverage while firms with more capital expenditure increase their target leverage during recessions.

Comparing their results with ours, we fail to find the same significant pattern for the full sample. Looking at different sub-samples, we find significance for one sub-sample, the financially unconstrained, based on dividends, Div 75, in which estimates are consistent with Halling, Yu and Zechner (2012). This indicates that Swedish financially unconstrained firms, based on their dividend payout ratio, are profitable and retain their earnings in times of recession which has a negative impact on their target leverage.

[11] Since market leverage includes market capitalisation of equity in the denominator and in the nominator of market to book, the ratios naturally move in opposite directions when market capitalisation of equity increase or decrease.

The higher capital expenditure estimate during recessions for the Div 75 sub-sample could be interpreted as firms that invest more positively affect their target leverage. This also indicates that this sub-sample uses debt funding to finance their capital expenditures to a greater extent in times of recession. This result confirms with the market timing of equity theory avoiding equity financing when costs are considered to be too high, for example in a recession.

For our sub-sample Size 25 we find significant positive influence for tangibility on target leverage during recessions. This positive impact could partly be explained by the fact that Sweden is a bank-oriented country rather than public market oriented. Financially constrained firms are required to have a higher level of collateral to receive bank credit, especially in times of recession when banks become more risk averse, hence the increased tangibility estimate in recessions (Antoniou, Guney and Paudyal, 2006).

Further sub-sample observations worth mentioning is the industry mean estimate of the unconstrained firms having a negative impact on target leverage for Div 75 while increasing for the Size 75 sub-sample during recessions. Significant difference is also found for the Size 75 sub-sample where an increase in sales positively affects target leverage, consistent with the findings in descriptive statistics.

5.3.2. Target leverage ratio response to the business cycle

Figures 1-3 graphically illustrates how target leverage estimates and observed leverage ratios move over the global financial crisis.[12] By using equation (3), the definition of target leverage, and the regressed estimates shown in tables 2-4, the implied target leverage can be calculated.

In **Figure 1** the implied target leverage ratios are presented, these are calculated on both book and market leverage estimates, showing the dynamics over both expansion and recession periods. Models included in Figure 1 are two versions of the DPACS model, one including full business cycle effects and a simplified version ignoring all business cycle effects. The static coefficient model and observed leverage are also included. Similar to the conclusions from descriptive statistics, observed leverage and estimated target leverage are shown to be counter-cyclical.

When removing all business cycle effects from the DPACS model, the target leverage estimates (labelled: No business cycle target leverage) are assumed to be the same regardless of the current state of the economy. Since the majority of observations correspond to years of expansion, the target leverage will be relatively low since there are more observed expansion

[12] The figures display the period 2006-2010 to include both recession and expansion periods through the global financial crisis. This time period corresponds to a large part of the survey sample period for improved comparability.

years, mitigating the recession effect. Allowing for business cycle differences in lagged leverage and constants (i.e. Static business cycle target leverage) significant results for counter-cyclical target leverage ratios are found. This is also consistent with the DPACS model, when allowing for full business cycle differences.

In **Figure 2**, target leverage estimates for financially constrained and unconstrained firms are illustrated. The dividend based approach indicates that target leverage estimates are counter-cyclical as in Figure 1. Constrained firms have higher target leverage ratios for both book and market leverage. Dividend payouts can be connected to firm profitability which is closely related to cash holdings. Via the definition of financial constraint, this implies that the constrained firms are more likely to be in need of external financing, thus explaining the more volatile target leverage ratio observed for the Div 25 sub-sample in Figure 2.

In **Figure 3** when target leverage estimates are based on size we observe counter-cyclical target leverage but have difficulties explaining the Size 75 target leverage estimate. This sub-sample is inconsistent with the rest of our observations for target leverage response to the business cycle. This is most likely due to the relatively high estimated expansion constant in Table 4, Panel B, but we are unable to determine why or find support for this observation in previous literature.

5.3.3. Speed of adjustment towards target leverage ratio

The DPACS model estimates partial adjustment towards target leverage. A high a^{state} estimate signifies rapid speed of adjustment (SOA) of observed book leverage towards the implied target leverage ratio. These SOA-estimates (calculated as: 1 – lagged leverage estimate) are presented in tables 2-4. When regressing on book leverage we only find significant differences in SOA-estimates for the unconstrained firms. While regressing on market leverage, all SOA-estimates are significantly different in recessions. All coefficient estimates but one indicates higher SOA during recessions.

The Swedish SOA-estimates actually increase during recessions while Halling, Yu and Zechner's (2012) international study show the opposite results. They claim stagnation of the financial markets decreases capital supply, which is an essential factor as to why the SOA decrease during recessions.

The financially constrained Div 25 sub-sample is the only deviating SOA observation when regressing on book leverage. Its speed of adjustment in expansion periods exceeds its level in recessions, which concurs with the intuition regarding the effects of transaction costs. Their financially more problematic situation could explain why the estimate differs from the rest of the results. This segment is most likely to be affected by credit contractions, not allowing them

the opportunity of a higher SOA. However, the difference in SOA for this estimate is not significant enough to support this explanation.

Concluding that SOA-estimates increase in times of recession, comparing sample segments, results suggest that financially unconstrained firms' SOA increase more, in relative terms, than constrained firms in times of recession. This is accurate across both panels in Table 4.

5.3.4. Case study – Credit supply contractions over the global financial crisis

A significant decline of having an expressed target leverage ratio is observed in the case study sample, from 67% in the Large Cap, 62% in Mid Cap, 26% in Small Cap and 0% in the First North and Aktietorget marketplaces (displayed in table 5). The frequency of an expressed target leverage ratio diminishes the smaller the firms get. This is consistent with a previous survey of the Swedish market.[13] The higher frequency of issuing equity by smaller firms could explain why they do not have expressed target leverage ratios. According to the pecking order theory equity is the last resort of financing. This indicates that the options of debt financing might be limited and that the focus on leverage ratios can therefore be considered redundant for smaller firms.

In table 6 the general tendencies of debt financing for the listed firms are illustrated. Bond issuances are most frequent for Large Cap firms. Smaller firms issue more equity compared to debt than larger firms. This distribution of equity issuances is consistent with the pecking order theory (Myers and Majluf, 1984) since smaller firms have larger problems raising debt in times of credit supply contractions (Gertler and Gilchrist, 1993). Consequently, this forces the smaller firms to turn to the public market through secondary offerings when experiencing inadequate internal funding.

The decrease in liquidity of the financial markets during the financial crisis might have some explanatory power as to why bond issuances diminished so significantly (see full sample in table 6). However, comparing the US and Swedish bond markets, Sweden, can be considered a bond market with low activity. This raises questions of the explanatory power of change from bank credit to bonds on the Swedish market. Going forward, we assume that the issuance of bonds have little explanatory power on the dynamics of credit supply contractions over the business cycle in Sweden. Therefore, our analysis is shifted towards the frequency of equity issuances and raising credit.

The survey included qualitative questions[14] regarding the factors of acquiring new financing. (See table 7). Observing firms' experience of acquiring debt financing during the global financial

[13] "Kartläggning av svenska icke-finansiella företags finansiering" – Swedish Riksbank, 2011
[14] On a scale from 1 to 7, 1 being "Not at all" and 7 representing "To a high degree", low being (1-3), moderate (4) and high (5-7)

crisis (April 2008 – March 2009), 65% of the full sample experienced a low level, 7% a moderate and 28% a high level of difficulty. The level of difficulty increased for smaller firms, where 83% of Large Cap, 68% of Mid Cap, 61% of Small Cap and 40% of First North experienced a low level of difficulty receiving bank credit.[15] These observations are conformable with the flight-to-quality theory (for empirical studies, see, Kashyap et al, 1993, Gertler and Gilchrist, 1993) where in market distress, smaller firms experience larger contractions in credit supply than larger, more stable firms. Comparing this to table 6, it should be noted that no decrease in credit lending to the smaller firms was noted. Comments extracted from the respondents suggested that rather than limiting smaller firms bank credit, the banks made it more expensive. Therefore, the only indicator of credit contractions is the level of difficulty raising credit experienced by the firms.

Question3 in table 6 indicate that the relatively higher transaction costs during the financial crisis had low impact on the choice of financing. 72% of the full sample considered the effect of the transaction costs to be low. Interestingly, Large Cap firms found this effect to have a larger impact (42% considered it to be at a high degree) than the other marketplaces (22-25%).

In table 8 we observe within-firm financing shifts to try to determine preference and access to debt financing. None of the firms, not issuing bonds but receiving bank credit before the financial crisis (January 2006 – March 2008) issued bonds during the financial crisis, however, 78% received additional bank credit. This indicates that there is no substantial shift from bank credit towards bonds in recessions in Sweden.

A study of the US market made by Becker and Ivashina (2011) found that bank credit compared to bonds is pro-cyclical, our case-study observations (see table 8) do not find support for this at all. The inability to explain credit contractions with changes in bond issuances indicate that the out-of-sample results presented by Becker and Ivashina (2011) are more consistent with our results and also with Gertler and Gilchrist, (1993).

[15] 71% of the Aktietorget sub-sample experienced a low level of difficulty receiving bank credit. However, more firms expressed to have had low difficulty raising bank credit than actually raised bank credit, giving this observation less significance than the rest of the sub-samples.

5.3.5. Robustness tests and significance issues

The possible problems with our DPACS model are, as mentioned earlier, the yearly firm characteristics being endogenous, causing our independent firm variables to be correlated with both present and past errors. Problems with autocorrelation also exist (known as within-firm correlation). In the GMM setup we can correct for these issues by creating lagged instrument variables and applying robust standard errors clustered by firm.

To control the robustness for our DPACS model we change the assumptions for it and see if it still remains effective. In Table 2 we apply a DPACS model with no business cycle effect and also the Static Coefficient DPACS model for robustness reasons. Results show estimates being significant and consistent with the DPACS model with full business cycle effects, as in table 3, indicating that our DPACS model is robust.

In order to check for multicollinearity between our independent firm characteristic variables we can run the DPACS model while removing certain firm characteristic variables at a time and look for changes in estimations and significance. Correlation tests in STATA show high correlation between sales and profitability, capital expenditures and tangibility and also between tangibility and industry mean. In Table 9 we present the results for these robustness tests. In regression (x) we remove market to book and profitability, (y) sales and tangibility and (z) capital expenditures and business cycle constants.

The three regressions all estimate significant results that are consistent, both in comparison to each other, and also for the full DPACS model estimates in table 3. This result suggests that our DPACS still remain robust and handles variability in assumptions while still presenting significant results. A potential sign for some multicollinearity issue can be seen in regression (y) where the significance of industry mean during recessions increases significantly when dropping tangibility. Nonetheless, we conclude that our DPACS model still manages to present robust results based on our extensive robustness test.

Regarding the case study, its results should be treated more as an indication, both in respect to the size of the sample and time comparability. We chose different time periods, both to facilitate for the respondents, which we suspected linked events to fiscal years rather than specific dates, and to capture as many responses as possible. We made the different periods comparable conditioning for firms raising debt. This gives us an indication on the preference and access of different sources of financing. Given that most of the respondents raising debt, raised credit, the best indication was found in the level of difficulty the firms experienced trying to raise credit. The significance of this data can be argued, but a strong trend was noted, giving a reasonable indication of the state of the Swedish credit supply over the global financial crisis.

5.3.6. Combined analysis

We do not observe the same clear pattern of firm characteristics driving the target leverage in recessions for the full sample as Halling, Yu and Zechner (2012) do. They estimate the impact of profitability and capital expenditures to be the main drivers of target leverage during recession periods. However, our significant firm characteristic variables vary across different sub-samples and do not provide us with a comprehensive picture for the full sample. Hence, we can only be sure of internal key drivers for Swedish leverage dynamics regarding sub-samples.

One of our main findings is the significantly higher SOA estimate in recession periods across almost the entire sample, most noticeable for the unconstrained firms. Intuitively, debt supply contractions and transaction costs should prevent firms from adjusting towards target leverage in recessions and previous studies on an international level report this. However, this paper's results suggest that any impact of increased transaction costs when acquiring debt during recession periods is not substantial enough to prevent Swedish firms from moving towards their target leverage at a faster pace. Lumpiness might also contribute to the increase of SOA in recessions, assuming that firms have a passive capital structure management until a triggering factor forces them to act, such as a recession. We also find indications in the case study supporting our SOA results even though they may seem contradicting. Such indications include that larger firms (could be compared to unconstrained firms based on sales) experiencing less difficulty receiving credit than smaller firms (could be compared to constrained based on sales) during the financial crisis (Table 7). This suggests that they can still access debt financing in recessions to a large extent and improve their speed of adjustment. This could also be partially explained by the flight to quality effects by credit institutions.

We find that our initial intuition of counter-cyclical leverage ratios for Swedish firms is confirmed. Additionally, evidence is found that both the main internal drivers of leverage dynamics and SOA estimates for the full sample are significantly different from the results of Halling, Yu and Zechner (2012).

6. Conclusion

In this study we determine Swedish firms' capital structure dynamics and the impact of the business cycle. Strong relationship between firm characteristics and firms' estimated target leverage dynamics can only be found for sub-samples of Swedish firms. Furthermore, we find that both the estimated target leverage and observed leverage ratios are counter-cyclical. This study finds evidence, contradicting previous international research, that the speed of adjustment (SOA) towards target leverage is in fact higher in times of recession. Our case study data indicates that Swedish firms are still able to raise bank credit during recessions. Although at a higher cost, it still validates the contradicting evidence of Swedish firm's higher SOA-estimates in recessions. We also see differences between financially constrained and unconstrained firms in their leverage dynamics. The case study show that smaller firms experienced larger difficulties raising bank credit than larger firms during the financial crisis. Within the boundaries of this research area, we find significant results indicating that Swedish firms have distinct leverage dynamics in comparison to previous international research.

6.1. Research going forward

The increasing Swedish SOA estimates in times of recession would be interesting to further research. A comparison between our study's result and a study including all Scandinavian countries, having similar economies and banking systems, examining the leverage dynamics could increase understanding of the general firm capital structure dynamics in Sweden and Scandinavia as a whole. Since Sweden only have experienced two recession periods between 1990 and 2010, the number of recession year observations becomes relatively small. Including more countries might improve the recession estimates and significance.

Another topic for further discussion could be the interaction of Swedish firms and Swedish banks in comparison to an international setting. Our results suggest that Swedish firms still access debt financing in times of recession and are able to adjust towards their target leverage indicated by higher SOA. This could possibly be explained by Sweden being a strongly bank oriented country with a currently less functioning public debt market, being no real substitution to credit borrowing at the moment. Hence, the relationships between Swedish firms and Swedish banks might institutionally be very different than on other markets, creating an interesting subject to study.

Appendix

Worldscope accounting data definitions[16]

- *long term debt* – Interest bearing financial obligations, excluding amounts due within one year (Worldscope variable = WC03251).
- *short term debt* – Portion of debt payable within one year including current portion of long term debt and sinking fund requirements of preferred stock or debentures (WC03051).
- *total debt* – The sum of long term debt and short term debt.
- *net sales* – Gross sales and other operating revenue less discounts, returns and allowances (WC01001).
- *cash & short term investments* – The sum of cash and short term investment (WC02001).
- *common equity* – Common stockholders' investment in a company (WC03501).
- *market capitalisation (market cap)* – The product of market price times number of shares outstanding (WC08001).
- *total assets* – The sum of total current assets, long term receivables, investment in unconsolidated subsidiaries, other investments, net property plant and equipment and other assets (WC02999)
- *assets market value – Total Assets* less *Common Equity* plus *Market Capitalisation of Equity*
- *EBITDA* – The earnings of a company before interest expense, income taxes and depreciation, depletion and amortisation (WC18198).
- *PPE* – Gross property, plant and equipment less accumulated reserves for depreciation, depletion and amortisation (WC02501).
- *capital expenditures* – Funds used to acquire fixed assets other than those associated with acquisitions (WC04601).
- *dividend per share* – Total dividends per share declared during the fiscal year (WC05101).
- *earnings per share* – Earnings divided by number of shares for the fiscal year (WC05201).
- *payout ratio – Dividend per Share* to *Earnings per Share* ratio.

[16] The Worldscope definitions are used to define the firm characteristics variables. These are also the same variable setup used in Halling, Yu and Zechner (2012) for comparability reasons.

Industry Characteristics

- *industry group classification* – We use Worldscope's industry group classification to split our firms into different sectors. In order to control for industry fixed effects.

Leverage ratios

- *ml – Total Debt* to *Assets' Market Value* ratio
- *bl – Total Debt* to *Total Assets ratio*

Independent variables for regression analysis

- *sales* – logarithm of *Net Sales*
- *market to book (mtb) – Assets' Market Value* ratio to *Total Assets*
- *profitability (profit) – EBITDA* to *Total Assets* ratio
- *tangibility (tang) – PPE* to *Total Assets* ratio
- *capital expenditure* (capex) – *Capital Expenditure* to *Total Assets* ratio
- *industry mean* (ind. mean) – Mean leverage ratio of an industry to which firms belong
- *rec* = 1 if more than 6 months of a firm's fiscal year matches the ECRI defined recession period and 0 otherwise.
- *exp* = 1 if *rec*= 0, *exp*= 0 if *rec*=1

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Survey format

The Firm has an **expressed target leverage ratio** (Total debt/Total assets): (Yes/No)

Before the financial crisis (January 2006 – March 2008) the Firm acquired new capital through:

- Loans from credit institutions: (Yes/No)
- Issuance of bonds (Yes/No)
- Issuance of new shares (Yes/No)
- The target leverage ratio was attained (Yes/No/No expressed target leverage ratio)

During the financial crisis (April 2008 – March 2009) the Firm acquired new capital through:

- Loans from credit institutions: (Yes/No)
- Issuance of bonds (Yes/No)
- Issuance of new shares (Yes/No)
- The target leverage ratio was attained (Yes/No/No expressed target leverage ratio)

After the financial crisis (April 2009 – December 2011) the Firm acquired new capital through:

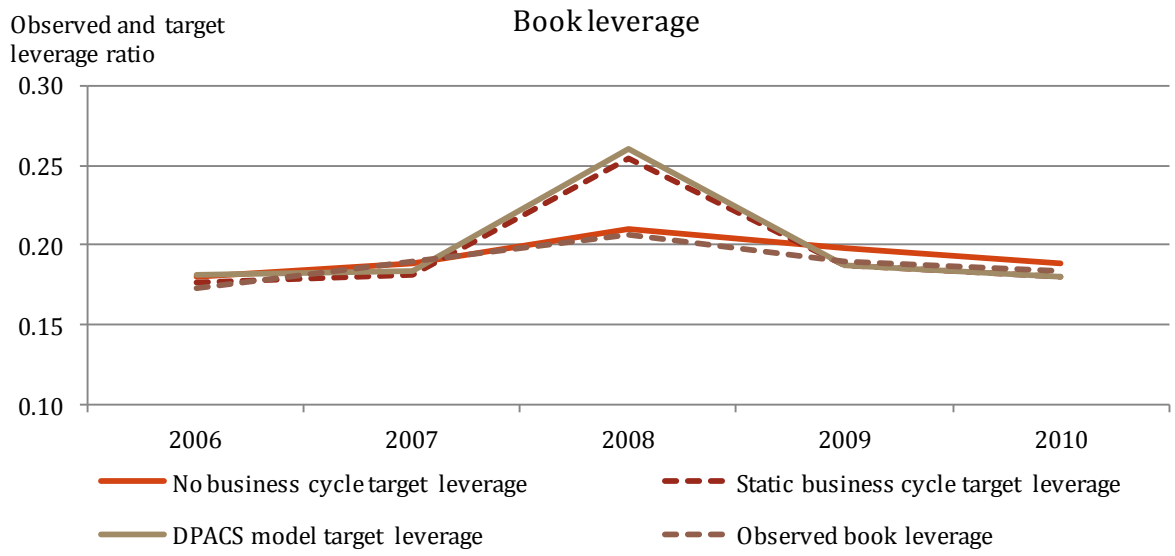
- Loans from credit institutions: (Yes/No)
- Issuance of bonds (Yes/No)
- Issuance of new shares (Yes/No)
- The target leverage ratio was attained (Yes/No/No expressed target leverage ratio)

On a scale from 1-7, where 1 = Not at all and 7 = To a high degree

- The Firm had difficulties receiving loans from credit institutions during the financial crisis (April 2008 - March 2009):
- Under-/over valuation of the share price affects the decision whether to issue shares or not:
- During the financial crisis the relatively high agency costs, when acquiring new capital, affected the choice of financing:

Figures

Figure 1: Cyclicality of leverage ratios over the business cycle – Separate target leverage models: Illustration of book and market estimates of target leverage focusing on the event of the global financial crisis. Observed leverage ratios are also displayed.



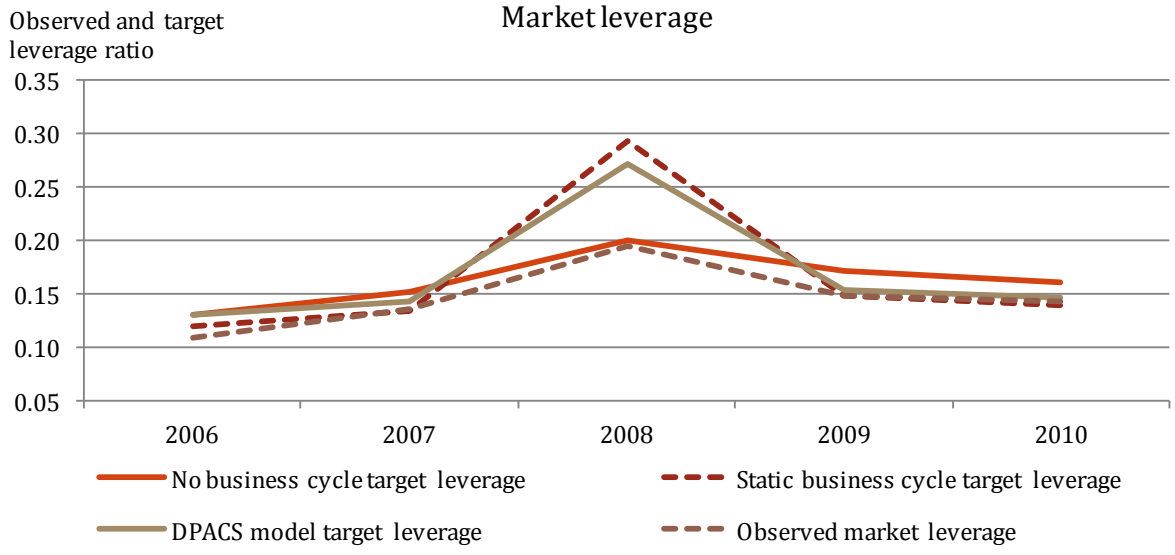
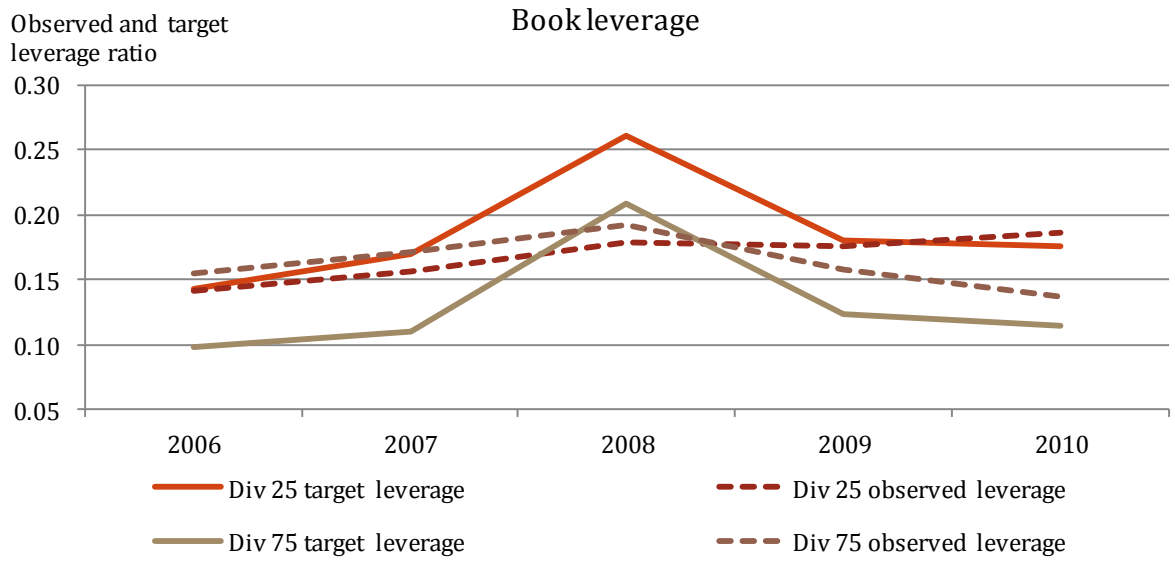


Figure 2: Cyclicality of leverage ratios over the business cycle – financially constrained and unconstrained firms – **dividend based**: Illustration of DPACS-estimates for target leverage ratios and observed leverage ratios.



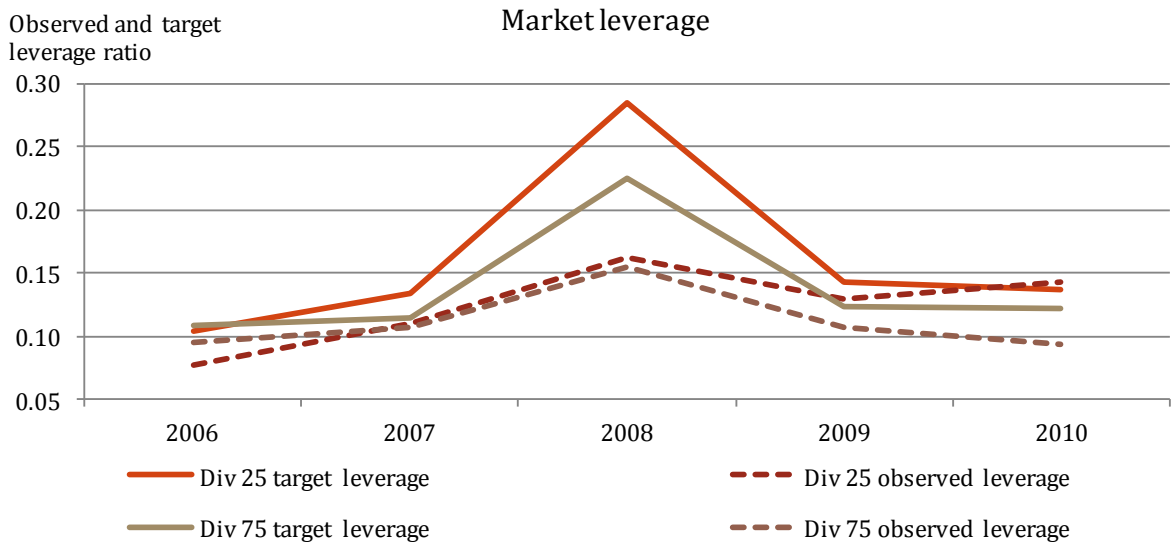
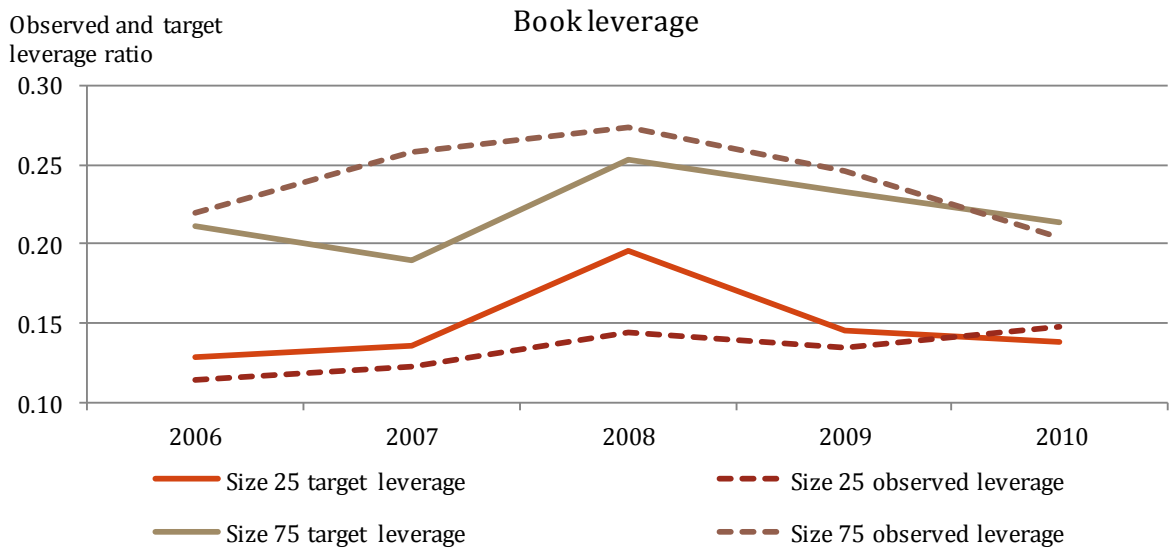
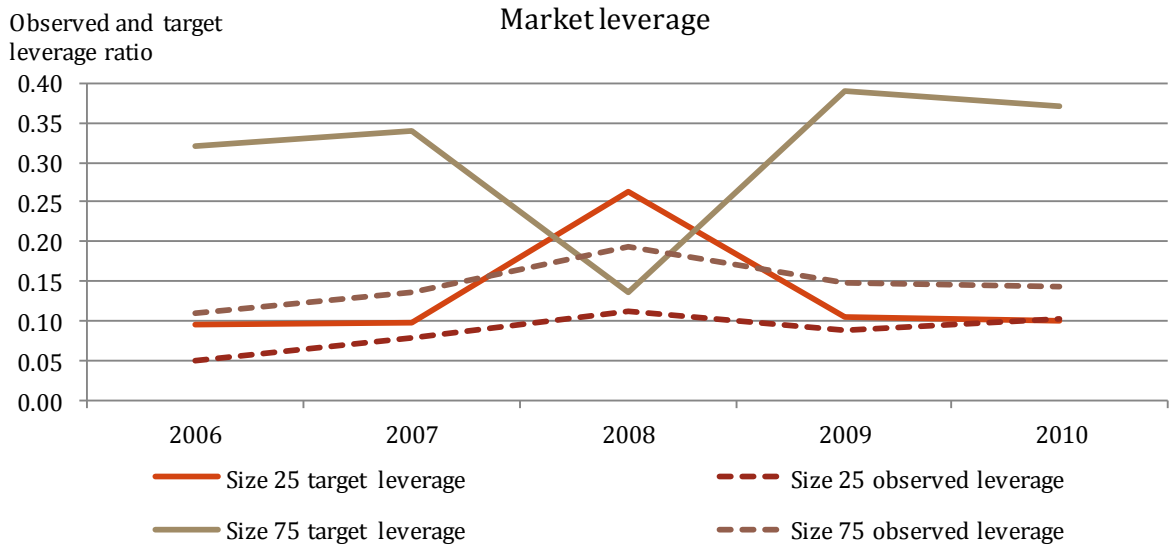


Figure 3: Cyclicality of leverage ratios over the business cycle – financially constrained and unconstrained firms – **based on size of sales**: The graphs illustrate DPACS-estimates for target leverage ratios and observed leverage ratios.





Tables

Table 1: **Summary statistics**: The table reports summary statistics of our firm independent variables of interest for the full sample and for all the different sub-samples of interest.

Panel A : Recession				Panel B: Expansion			
Variable	Mean	Std. Dev.	N	Variable	Mean	Std. Dev.	N
Full Sample							
bl	0.268	0.225	710	bl	0.211	0.200	4,778
ml	0.261	0.234	636	ml	0.164	0.183	4,169
sales	6.256	2.746	692	sales	6.089	2.713	4,681
mtb	1.350	0.838	636	mtb	1.885	1.164	4,169
profit	0.021	0.257	694	profit	0.034	0.261	4,672
tang	0.286	0.273	709	tang	0.243	0.257	4,772
capex	0.059	0.093	688	capex	0.058	0.088	4,573
Div 25							
bl	0.187	0.195	223	bl	0.162	0.189	1,516
ml	0.176	0.200	197	ml	0.112	0.160	1,251
sales	4.008	2.571	205	sales	3.964	2.610	1,426
mtb	1.562	1.100	197	mtb	2.209	1.354	1,251
profit	-0.166	0.356	213	profit	-0.137	0.349	1,457
tang	0.168	0.234	222	tang	0.156	0.225	1,512
capex	0.052	0.087	204	capex	0.052	0.101	1,371
Div 75							
bl	0.259	0.218	186	bl	0.206	0.193	1,245
ml	0.240	0.215	169	ml	0.157	0.169	1,111
sales	7.370	2.889	186	sales	7.256	2.615	1,240
mtb	1.301	0.561	169	mtb	1.833	1.029	1,111
profit	0.123	0.127	183	profit	0.139	0.143	1,221
tang	0.297	0.246	186	tang	0.278	0.255	1,243
capex	0.056	0.093	184	capex	0.059	0.089	1,221
Size 25							
bl	0.170	0.220	181	bl	0.129	0.183	1,184
ml	0.145	0.218	157	ml	0.080	0.140	983
sales	2.769	2.123	168	sales	2.622	2.013	1,118
mtb	1.834	1.228	157	mtb	2.464	1.473	983
profit	-0.197	0.404	171	profit	-0.184	0.380	1,118
tang	0.143	0.245	180	tang	0.113	0.200	1,178
capex	0.052	0.125	162	capex	0.040	0.092	1,047
Size 75							
bl	0.297	0.169	202	bl	0.256	0.160	1,195
ml	0.291	0.177	183	ml	0.190	0.146	1,079
sales	9.233	1.250	197	sales	9.233	1.283	1,172
mtb	1.261	0.704	183	mtb	1.669	0.871	1,079
profit	0.098	0.103	202	profit	0.137	0.089	1,186
tang	0.326	0.167	202	tang	0.305	0.194	1,195
capex	0.059	0.053	202	capex	0.061	0.057	1,182

Table 2: **Limited business cycle effects and robustness test**: Test results are displayed through a simplified DPACS model in columns 2 and 3 when removing all business cycle effect. Results are presented for the Static coefficient DPACS model (equation 6) in column 4 and 5, where only lagged leverage and the constants vary due to the business cycle. The lagged leverage ratio is presented in the form of the speed of adjustment (SOA) estimate by subtracting it from 1. The state dependent constants for column 4 and 5 are presented in the form of β^{state} and not as $a^{state}\beta^{state}$. Regressions are made using System GMM (STATA tool xtabond2). The lagged leverage variable is set to be predetermined. Firm characteristics are treated as endogenous, using lags II and III as instruments. Firm characteristics have yearly fixed effects which are set as exogenous variables in the level equation. Robust standard errors (clustered by firm) correct for heteroskedasticity and autocorrelation, values for these are given in the parentheses. ***, ** or * next to coefficients at times of recession (rec) indicates that the coefficient for this variable differs significantly from the expansion variable.

	Standard Dynamic Partial Adjustment Capital Structure Model - No BC		Static Coefficient Partial Adjustment Capital Structure Model	
	Book Lev.	Market Lev.	Book Lev.	Market Lev.
SOA	0.472	0.476		
	(0.000)	(0.000)		
SOA (exp)			0.476	0.423
			(0.057)	(0.045)
SOA (rec)			0.476	0.488***
			(0.053)	(0.040)
sales	0.015	0.010	0.016	0.014
	(0.003)	(0.003)	(0.004)	(0.003)
mtb	-0.010	-0.060	0.002	-0.036
	(0.005)	(0.004)	(0.006)	(0.004)
profit	-0.296	-0.215	-0.305	-0.263
	(0.035)	(0.027)	(0.035)	(0.025)
tang	0.219	0.167	0.208	0.180
	(0.049)	(0.042)	(0.048)	(0.040)
ind. mean	0.788	0.665	0.818	0.730
	(0.089)	(0.079)	(0.090)	(0.077)
capex	0.433	0.483	0.420	0.468
	(0.072)	(0.077)	(0.071)	(0.074)
cons	-0.097	0.052		
	(0.034)	(0.028)		
exp-cons			-0.138	-0.042
			(0.034)	(0.027)
rec-cons			-0.079	0.082***
			(0.033)	(0.026)
Firm Years	4,218	3,917	4,218	3,917
Number of Firms	579	547	579	547

Table 3: **Full sample DPACS model with firm characteristics varying over time**: This table presents results from the DPACS model seen in equation (5) where all coefficients are allowed to vary over the business cycle. The lagged leverage ratio is presented in the form of the speed of adjustment (SOA) estimate by subtracting it from 1. The state dependent constants are presented in the form of β^{state} and not as $a^{state}\beta^{state}$. Regressions are made using System GMM (STATA tool xtabond2). The lagged leverage variable is set to be predetermined. Firm characteristics are treated as endogenous, using lags II and III as instruments. Firm characteristics have yearly fixed effects which are set as exogenous variables in the level equation. Robust standard errors (clustered by firm) correct for heteroskedasticity and autocorrelation, values for these are given in the parentheses. ***, ** or * next to coefficients at times of recession (rec) indicates that the coefficient for this variable differs significantly from the expansion variable.

	Full Sample	
	Book Leverage	Market Leverage
SOA (exp)	0.360	0.359
	(0.048)	(0.041)
SOA (rec)	0.365	0.439***
	(0.045)	(0.038)
sales (exp)	0.017	0.008
	(0.002)	(0.002)
sales (rec)	0.015	0.003
	(0.003)	(0.004)
mtb (exp)	0.000	-0.033
	(0.005)	(0.004)
mtb (rec)	0.014	-0.088***
	(0.010)	(0.010)
profit (exp)	-0.324	-0.242
	(0.029)	(0.021)
profit (rec)	-0.347	-0.267
	(0.045)	(0.041)
tang (exp)	0.124	0.090
	(0.030)	(0.030)
tang (rec)	0.301*	0.149
	(0.044)	(0.045)
ind. mean (exp)	0.734	0.777
	(0.056)	(0.057)
ind. mean (rec)	0.679	0.626
	(0.078)	(0.082)
capex (exp)	0.707	0.660
	(0.068)	(0.091)
capex (rec)	0.336	0.591
	(0.146)	(0.173)
exp-cons	-0.115	-0.003
	(0.027)	(0.022)
rec-cons	-0.071	0.217**
	(0.039)	(0.042)
Firm Years	4,218	3,917
Number of Firms	579	547

Table 4: **DPACS model with firm characteristics varying over time - Constrained and Unconstrained firms:** This table presents results from the DPACS model seen in equation (5) where all coefficients are allowed to vary over the business cycle. The lagged leverage ratio is presented in the form of the speed of adjustment (SOA) estimate by subtracting it from 1. The state dependent constants are presented in the form of $\beta^{state}$and not as $a^{state}\beta^{state}$. Regressions are made using System GMM (STATA tool xtabond2). The lagged leverage variable is set to be predetermined. Firm characteristics are treated as endogenous, using lags II and III as instruments. Firm characteristics have yearly fixed effects which are set as exogenous variables in the level equation. Robust standard errors (clustered by firm) correct for heteroskedasticity and autocorrelation, values for these are given in the parentheses. ***, ** or * next to coefficients at times of recession (rec) indicates that the coefficient for this variable differs significantly from the expansion variable. Panel B – next page.

	Panel A: Book Leverage			
	Div 25	Div 75	Size 25	Size 75
SOA (exp)	0.515	0.249	0.347	0.218
	(0.085)	(0.041)	(0.067)	(0.036)
SOA (rec)	0.453	0.300**	0.355	0.270***
	(0.091)	(0.052)	(0.093)	(0.038)
sales (exp)	0.005	0.017	0.035	-0.005
	(0.004)	(0.002)	(0.004)	(0.004)
sales (rec)	0.009	0.018	0.049	0.022
	(0.011)	(0.003)	(0.011)	(0.005)
mtb (exp)	-0.030	-0.009	-0.004	0.061
	(0.007)	(0.005)	(0.007)	(0.005)
mtb (rec)	0.044*	-0.028	0.046	0.017
	(0.021)	(0.025)	(0.019)	(0.012)
profit (exp)	-0.155	-0.354	-0.250	-1.678
	(0.041)	(0.031)	(0.030)	(0.054)
profit (rec)	-0.039	-0.744***	-0.313	-0.834
	(0.079)	(0.056)	(0.055)	(0.097)
tang (exp)	0.148	0.102	0.110	-0.068
	(0.063)	(0.039)	(0.057)	(0.023)
tang (rec)	0.201	0.236	0.618*	0.124
	(0.127)	(0.073)	(0.114)	(0.043)
ind. mean (exp)	0.578	0.829	0.763	0.320
	(0.135)	(0.053)	(0.115)	(0.067)
ind. mean (rec)	0.683	-0.038*	0.609	0.482*
	(0.224)	(0.102)	(0.260)	(0.062)
capex (exp)	0.320	0.355	0.434	1.722
	(0.113)	(0.144)	(0.106)	(0.118)
capex (rec)	0.213	1.589*	-1.127	1.579
	(0.390)	(0.171)	(0.379)	(0.142)
exp-cons	0.050	-0.104	-0.156	0.264
	(0.044)	(0.026)	(0.035)	(0.048)
rec-cons	-0.025	0.113	-0.232	-0.089
	(0.092)	(0.062)	(0.091)	(0.053)
Firm Years	1,126	1,168	852	1,182
Number of Firms	240	131	189	101

Table 4 (continued)

	Panel B: Market Leverage			
	Div 25	Div 75	Size 25	Size 75
SOA (exp)	0.325	0.245	0.220	0.222
	(0.087)	(0.045)	(0.069)	(0.042)
SOA (rec)	0.406**	0.354***	0.316*	0.379***
	(0.085)	(0.057)	(0.101)	(0.047)
sales (exp)	0.011	0.008	0.028	-0.017
	(0.004)	(0.002)	(0.004)	(0.004)
sales (rec)	-0.012	0.003	-0.001	0.036***
	(0.010)	(0.004)	(0.013)	(0.006)
mtb (exp)	-0.049	-0.042	-0.021	-0.034
	(0.006)	(0.003)	(0.004)	(0.005)
mtb (rec)	-0.064	-0.123*	-0.080	-0.073**
	(0.023)	(0.022)	(0.016)	(0.009)
profit (exp)	-0.204	-0.163	-0.239	-1.140
	(0.026)	(0.025)	(0.019)	(0.048)
profit (rec)	0.085*	-0.327*	-0.298	-0.296
	(0.062)	(0.043)	(0.042)	(0.095)
tang (exp)	-0.066	0.079	-0.188	-0.038
	(0.042)	(0.039)	(0.035)	(0.020)
tang (rec)	-0.056	0.262	0.237	0.039
	(0.109)	(0.078)	(0.104)	(0.055)
ind. mean (exp)	0.918	0.861	1.032	0.136
	(0.105)	(0.060)	(0.104)	(0.045)
ind. mean (rec)	0.667	-0.170**	0.695	0.364*
	(0.207)	(0.112)	(0.216)	(0.081)
capex (exp)	0.886	-0.086	1.043	1.794
	(0.079)	(0.174)	(0.064)	(0.108)
capex (rec)	0.950	1.365*	0.122	1.562
	(0.427)	(0.193)	(0.438)	(0.147)
exp-cons	0.014	0.016	-0.114	0.453
	(0.030)	(0.021)	(0.024)	(0.044)
rec-cons	0.318*	0.334	0.226	-0.110*
	(0.091)	(0.068)	(0.076)	(0.078)
Firm Years	1,011	1,103	772	1,130
Number of Firms	218	126	174	99

Table 5: **The occurrence of expressed target leverage (Total Debt to Total Assets):** Table summarising the occurrence of expressed target leverage in the case study sample. The table presents the distribution of responses over the different marketplaces.

	Target leverage ratio					
	Full Sample	Large Cap	Mid Cap	Small Cap	First North	Aktietorget
Yes	36%	67%	62%	26%	0%	0%
No	64%	33%	38%	74%	100%	100%
N	87	12	26	27	13	9

Table 6: **Summary statistics of the case study sample***:* Table summarising the data collected from the case study survey. The sample displays the results for each marketplace over the three time-periods of the survey; Before the financial crisis (January 2006 - March 2008), During (April 2008 - March 2009) and After (April 2009 - December 2011). % indicates the percentage relative to firms raising debt in each period. Firms issuing bonds receiving no bank loan do not state whether the specific firm chose not to increase its bank credit or was denied further bank credit.

	Before	During	After
Full Sample			
Number of firms	84	84	86
Number of firms acquiring new capital	71	56	66
Number of firms raising debt	59	46	53
Only raising debt (%)	66%	83%	72%
Receiving bank credit (%)	95%	98%	98%
Issuing bonds (%)	20%	11%	25%
Issuing bonds receiving no new bank loan (%)	5%	2%	2%
Issuing equity (%)	54%	39%	55%
Large Cap			
Number of firms	15	13	13
Number of firms acquiring new capital	15	12	11
Number of firms raising debt	15	11	11
Only raising debt (%)	67%	91%	91%
Receiving bank credit (%)	80%	91%	91%
Issuing bonds (%)	53%	36%	73%
Issuing bonds receiving no new bank loan (%)	20%	9%	9%
Issuing equity (%)	20%	18%	9%
Mid Cap			
Number of firms	24	24	24
Number of firms acquiring new capital	21	18	19
Number of firms raising debt	20	17	17
Only raising debt (%)	65%	76%	76%
Receiving bank credit (%)	95%	100%	100%
Issuing bonds (%)	10%	6%	18%
Issuing bonds receiving no new bank loan (%)	5%	0%	0%
Issuing equity (%)	40%	29%	41%
Small Cap			
Number of firms	26	25	26
Number of firms acquiring new capital	20	15	18
Number of firms raising debt	18	13	17
Only raising debt (%)	78%	92%	65%
Receiving bank credit (%)	94%	100%	100%
Issuing bonds (%)	6%	0%	0%
Issuing bonds receiving no new bank loan (%)	6%	0%	0%
Issuing equity (%)	33%	23%	41%
First North			
Number of firms	13	13	13
Number of firms acquiring new capital	11	7	11
Number of firms raising debt	6	4	5
Only raising debt (%)	17%	75%	60%
Receiving bank credit (%)	100%	100%	100%
Issuing bonds (%)	17%	0%	20%
Issuing bonds receiving no new bank loan (%)	0%	0%	0%
Issuing equity (%)	167%	100%	160%
Aktietorget			
Number of firms	8	9	10
Number of firms acquiring new capital	6	4	7
Number of firms raising debt	2	1	3
Only raising debt (%)	50%	0%	33%
Receiving bank credit (%)	100%	100%	100%
Issuing bonds (%)	0%	0%	33%
Issuing bonds receiving no new bank loan (%)	0%	0%	0%
Issuing equity (%)	250%	400%	200%

Table 7: **Qualitative survey questions**: Table displaying the distribution of sample firms' experience of bank credit supply during the financial crisis, importance of share price valuation in decisions regarding equity issues and transaction costs effect on choice of financing sources. Differences in sample size for the different questions are due to firm-specific factors not making the question applicable. Questions answered on a scale from 1-7 where 1 = Not at all and 7 = To a high degree.

	Level of difficulty receiving credit during the financial crisis (April 2008 - March 2009)							
	Not at all			Moderate			To a high degree	
	1	2	3	4	5	6	7	N
Full Sample	50%	9%	5%	7%	9%	7%	12%	74
Large Cap	67%	17%	0%	0%	8%	8%	0%	12
Mid Cap	45%	14%	9%	5%	9%	9%	9%	22
Small Cap	43%	9%	9%	4%	13%	9%	13%	23
First North	40%	0%	0%	30%	10%	0%	20%	10
Aktietorget	71%	0%	0%	0%	0%	0%	29%	7
	The valuation of the share price affects the decision whether to issue equity or not							
Full Sample	29%	4%	6%	15%	11%	13%	22%	72
Large Cap	33%	17%	0%	17%	0%	0%	33%	6
Mid Cap	43%	0%	5%	10%	24%	14%	5%	21
Small Cap	26%	9%	0%	17%	0%	17%	30%	23
First North	17%	0%	8%	17%	17%	17%	25%	12
Aktietorget	20%	0%	20%	20%	10%	0%	30%	10
	Relatively higher transaction costs during the financial crisis (April 2008 - March 2009) affected the choice of financing							
Full Sample	49%	17%	6%	3%	12%	4%	10%	78
Large Cap	33%	8%	17%	0%	17%	0%	25%	12
Mid Cap	48%	22%	9%	0%	9%	4%	9%	23
Small Cap	61%	13%	4%	0%	13%	0%	9%	23
First North	42%	17%	0%	17%	8%	8%	8%	12
Aktietorget	50%	25%	0%	0%	13%	13%	0%	8

Table 8: **Within-firm debt financing shifts**: Conditioning on within-firm shifts across periods on firms receiving bank credit. Comparing the three periods, Before (January 2006 – March 2008), During (April 2008 – March 2009) and After (April 2009 – December 2011) the financial crisis, the Before period signifies the percentage of firms receiving debt during the financial crisis which received bank credit before April 2008.

		Receiving bank credit during next period	Receiving bank credit not issuing bonds during next period	Issuing bonds during next period	Receiving bank credit and issuing bonds during next period	Issuing bonds not receiving bank credit during next period	Not raising any debt during next period	N
					Full Sample			
Before	Firms receiving bank credit, not issuing bonds	78%	78%	0%	0%	0%	23%	40
	Firms receiving bank credit	77%	73%	6%	4%	2%	21%	48
During	Firms receiving bank credit, not issuing bonds	95%	78%	16%	16%	0%	5%	37
	Firms receiving bank credit	93%	73%	23%	20%	3%	5%	40
					Large Cap			
Before	Firms receiving bank credit, not issuing bonds	100%	100%	0%	0%	0%	0%	5
	Firms receiving bank credit	83%	67%	25%	17%	8%	8%	12
During	Firms receiving bank credit, not issuing bonds	88%	38%	50%	50%	0%	13%	8
	Firms receiving bank credit	90%	30%	60%	60%	0%	10%	10
					Mid Cap			
Before	Firms receiving bank credit, not issuing bonds	78%	78%	0%	0%	0%	22%	18
	Firms receiving bank credit	79%	79%	0%	0%	0%	21%	19
During	Firms receiving bank credit, not issuing bonds	100%	88%	13%	13%	0%	0%	16
	Firms receiving bank credit	94%	82%	18%	12%	6%	0%	17
					Small Cap			
Before	Firms receiving bank credit, not issuing bonds	71%	71%	0%	0%	0%	29%	17
	Firms receiving bank credit	71%	71%	0%	0%	0%	29%	17
During	Firms receiving bank credit, not issuing bonds	92%	92%	0%	0%	0%	8%	13
	Firms receiving bank credit	92%	92%	0%	0%	0%	8%	13
					First North			
Before	Firms receiving bank credit, not issuing bonds	80%	80%	0%	0%	0%	20%	5
	Firms receiving bank credit	67%	67%	0%	0%	0%	33%	6
During	Firms receiving bank credit, not issuing bonds	75%	75%	0%	0%	0%	25%	4
	Firms receiving bank credit	75%	75%	0%	0%	0%	25%	4
					Aktietorget			
Before	Firms receiving bank credit, not issuing bonds	50%	50%	0%	0%	0%	50%	2
	Firms receiving bank credit	50%	50%	0%	0%	0%	50%	2
During	Firms receiving bank credit, not issuing bonds	100%	100%	0%	0%	0%	0%	1
	Firms receiving bank credit	100%	100%	0%	0%	0%	0%	1

Table 9: **Robustness test of firm characteristics:** This table presents robustness results from the DPACS model, we exclude certain firm characteristics at each regression to check the model for robustness. The lagged leverage ratio is presented in the form of the speed of adjustment (SOA) estimate by subtracting it from 1. The state dependent constants are presented in the form of $\beta^{state}$and not as $a^{state}\beta^{state}$. Regressions are made using System GMM (STATA tool xtabond2). The lagged leverage variable is set to be predetermined. Firm characteristics are treated as endogenous, using lags II and III as instruments. Firm characteristics have yearly fixed effects which are set as exogenous variables in the level equation. Robust standard errors (clustered by firm) correct for heteroskedasticity and autocorrelation, values for these are given in the parentheses. ***, ** or * next to coefficients at times of recession (rec) indicates that the coefficient for this variable differs significantly from the expansion variable.

Robustness test of firm characteristics						
	x (book)	x (market)	y (book)	y (market)	z (book)	z (market)
SOA (exp)	0.328	0.297	0.298	0.317	0.348	0.418
	(0.048)	(0.042)	(0.039)	(0.033)	(0.050)	(0.043)
SOA (rec)	0.339	0.378***	0.298	0.401***	0.368	0.498***
	(0.044)	(0.038)	(0.037)	(0.031)	(0.048)	(0.041)
sales (exp)	0.005	0.000			0.009	0.009
	(0.002)	(0.001)			(0.001)	(0.001)
sales (rec)	0.002	-0.015			0.012	0.021***
	(0.003)	(0.005)			(0.002)	(0.002)
mtb (exp)			-0.022	-0.045	-0.014	-0.029
			(0.004)	(0.003)	(0.003)	(0.002)
mtb (rec)			-0.007	-0.099	-0.005	-0.038*
			(0.009)	(0.008)	(0.007)	(0.005)
profit (exp)			-0.206	-0.186	-0.227	-0.200
			(0.021)	(0.013)	(0.024)	(0.016)
profit (rec)			-0.278	-0.241	-0.321	-0.331**
			(0.040)	(0.039)	(0.053)	(0.043)
tang (exp)	0.087	0.062			0.217	0.186
	(0.029)	(0.029)			(0.025)	(0.025)
tang (rec)	0.311**	0.203			0.354*	0.251
	(0.041)	(0.042)			(0.033)	(0.043)
ind. mean (exp)	0.696	0.824	0.739	0.825	0.610	0.733
	(0.056)	(0.055)	(0.046)	(0.046)	(0.049)	(0.060)
ind. mean (rec)	0.754	0.527	0.982**	0.771*	0.544	0.707
	(0.087)	(0.092)	(0.054)	(0.066)	(0.066)	(0.083)
capex (exp)	0.826	0.800	1.000	0.911		
	(0.067)	(0.103)	(0.061)	(0.069)		
capex (rec)	0.120	0.418	1.315	0.971		
	(0.125)	(0.182)	(0.099)	(0.138)		
exp-cons	-0.037	-0.035	0.044	0.069		
	(0.015)	(0.013)	(0.011)	(0.008)		
rec-cons	0.004	0.251**	0.031	0.254		
	(0.035)	(0.044)	(0.018)	(0.019)		
Firm Years	4,537	3,955	4,265	3,950	3,950	3,987
Number of Firms	597	549	590	557	557	561