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The effect of institutional ownership on the capital structure of Swedish firms

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ABSTRACT

This paper examines the effect of institutional ownership on the capital structure of 325 Swedish companies between 1998 and 2012. We find that firms increase leverage as institutional ownership rises. This effect is more pronounced for firms with low market capitalization and those affected by adverse selection. Furthermore, increased institutional ownership is found to lead to a higher propensity to issue debt, however there is no evidence that it becomes cheaper. Finally, there is also reverse causality, i.e. debt influences institutional ownership, which suggests the existence of a capital structure clientele effect. We establish that institutional investors have heterogeneous preferences, which implies there may be different effects on capital structure depending on the type and horizon of the investor.

Keywords: Institutional Investors, Capital Structure, Sweden

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Introduction

The primary goal of our research is to find an effect of institutional ownership on the capital structure of Swedish firms. Through access to superior information and recourses we expect institutional investors to alleviate agency and information asymmetry problems. In order to investigate this we constructed a dataset consisting of 325 Swedish firms listed on three different stock exchanges, namely OMXS, Aktietorget and First North. Due to limitations on data availability we focus on the years 1998 to 2012 and retrieve capital structure data from Serrano and ownership information from SIS Ägarservice. The latter database also provides information about institutional investors and their holdings in Sweden.

Our basic regression is leverage on institutional holdings using various determinants of leverage as controls. In this setup we found no significance for an effect of ownership on capital structure. The same result holds when changes in ownership were considered. After dividing our sample into quintiles based on firm market capitalization we found a positive impact of institutional ownership on leverage for the smallest quintile.

In order to overcome inherited endogeneity we constructed an instrumental variable (IV) of hypothetical trades based on mutual fund outflows. The IV was significant and for one measure of leverage we found a positive effect of institutional ownership.

We proceeded with a difference-in-differences estimation using inclusion in the OMXS 30 index as an exogenous shock to institutional holdings. The test led to a small t-statistic, which is due to having only 17 firms in the sample and the high variation between firms within both treatment and control groups, whereas the difference in the outcome is minor.

We obtain interesting results when checking for effects of ownership on leverage in an adverse selection and agency setting. In particular, we find smaller Swedish companies with high growth perspectives more likely to increase their leverage as a result of increased institutional ownership. To ensure the validity of our results we further test how institutional ownership affects the propensity of firms to issue debt or

equity. We indeed find that higher institutional ownership decreases the probability of issuing equity and increases the likelihood of debt issuance in the following year.

Literature Review and Hypothesis Development

The OECD describes institutional investors as legally independent bodies, major collectors of savings and suppliers of funds to financial markets[1]. The Columbia University School of Law defines seven different types of investors that fit the category institutional, namely private pension funds, state and local retirement funds, mutual funds, life insurance companies, property and casualty insurance companies, non-pension fund money managed by banks and foundation and endowment funds[2]. According to the United States (US) government, however, a corporation with assets worth at least $10 million, a private person with more than $2 million in assets and a governmental body can also be considered as institutional investors[3]. Going by the academic literature the most common types of institutions are mutual funds, pension funds, asset management firms, insurance companies and banks. These are the ones we take into account in our research.

As far as the importance of institutional investors for equity markets is concerned, Europe has always been lagging behind the US. There, institutional investors have played a major role for decades, with their ownership comprising as much as 10% of all traded US equity as early as in 1970 (Aghion et al., 2009). With a total equity share of ca. 70% of the largest 1,000 companies in 2009, the US is nowadays by far the largest market for institutional investors[4]. In recent years Europe has almost caught up though and today institutional investors are also the dominant players in the European equity market, and Sweden is no exception. The traditional Swedish firm throughout the 18th and 19th century was predominantly owned by its founder and her descendants (Isaksson and Skog, 1994). Gradually, other wealthy individuals joined and invested in equity but still in the early 1960s more than 70% of

[1] "Institutional Investors Statistical Yearbook 2003", OECD
[2] Institutional Investor Project, Columbia University School of Law, Institutional Investors and Capital Markets, 1991
[3] 13 CFR 108.50 (Title 13 - Business Credit And Assistance; Chapter I - Small Business Administration; Part 108 - New Markets Venture Capital ("NMVC") Program; Subpart B - Definition Of Terms Used In This Part 108), U.S. Code of Federal Regulations
[4] "The 2010 Institutional Investor Report: Trends in Asset Allocation and Portfolio Composition" (New York: Conference Board, 2010)

Swedish equity ownership was attributed to private investors (Berglöf, 1993). With €606 billions Sweden became the 8th largest European market for institutional investment in 2012[5]. The major targets for institutions are the financial, industrial and consumer goods sectors with 25.5%, 20.9% and 13.7% of invested funds respectively[6].

A substantial amount of research has been done on institutional investors and the implications their increased ownership in the global public equity market has for companies in particular and the financial world in general. A major focus here lies on the broad topic of corporate governance and whether institutional ownership has a positive or negative impact on it. Chung and Zhang (2011) find that an increase in corporate shares owned by institutions is related to a higher quality of corporate governance. The logic behind this is that disciplinary pressure imposed through better corporate governance acts as a substitute for debt (Jensen, 1986).

Furthermore, particular attention was also directed towards the influence of institutions on the dividend level of a company, a topic that matters for tax purposes and that is closely related to an investor's tax preference. It was found that institutional investors prefer dividend-paying stocks, but lean towards low dividend yields, compared to firms predominantly owned by individual investors who rather invest in high dividend-paying stocks (Grinstein and Michaely, 2005). The latter also prefer dividends over share repurchases, which on the other hand is preferred by large investors (Jain, 2007). The obvious influence of dividends on institutional investors and vice versa was supported by a study, which stressed the existence of a tax clientele effect related to dividends (Perez-Gonzales, 2003). This effect, which can also be called an ownership clientele effect, induces managers to adapt their dividend payouts according to the tax preference of its major owners and it is the difference in taxes between institutions and other investors that matter rather than the absolute tax rate (Allen et al., 2002). If ownership is comprised predominantly by institutions, a firm tends to pay relatively high dividends since they usually benefit from tax advantages over individual investors (Redding, 1997).

[5] "European Institutional Investors", PwC
[6] FactSet Research Systems

Generally, most of the research concerning institutional investors deals with the US. In regard to Sweden the availability of academic literature is rather limited. Taking only pension funds into consideration one study found that an increase in ownership correlates with better firm valuation (Gianneti and Laeven, 2007). With regards to dividend yields a study by Wållgren (2006) shows that in case of Sweden institutional investors are more likely to invest in dividend paying firms, reflecting the aforementioned study about the US, but there was no evidence found for preference of a certain level of dividend yields.

Although the relationship between institutional investors and capital structure has been investigated in academia before, there is no study concerning Sweden. One of the most recent and prominent studies about the effects of institutional ownership on a company's level of debt was conducted by Michaely and Vincent (2012). In their study about the United States they found that a higher share of institutional ownership negatively correlates with the level of debt in a firm's capital structure and that this change is due to issuance of new equity rather than a reduction of the amount of debt.

In our study we want to find out if the same also holds for Sweden and further investigate the issue in how far institutional ownership might have an effect on the cost of debt. Our assumptions are that a rise in institutional ownership negatively correlates with a firm's cost of debt and its leverage ratio. In order to build our case we will employ a framework comparable to the one used by Michaely and Vincent (2012) who investigate the impact of institutional holdings on the capital structure with respect to the US equity market, which is quite different from the one we find in Sweden. Whereas the US and Sweden are both defined by having well established and liquid market based financial systems, the case for the US is much more pronounced (Demirguc-Kunt and Levine, 2000). The Swedish corporate world is still heavily dependent on bank borrowing rather than market borrowing, which is more common in the US. In 2012 Swedish non-financial corporate bonds amounted to SEK 230 billion, which was a substantial increase of SEK 40 billion over the previous year, strengthening a recent trend towards more market borrowing[7]. Nonetheless,

[7] "The Swedish Financial Market 2013", Sveriges Riksbank, 2003.

with a few exceptions of large multinationals the regular small and medium sized companies primarily still rely on banks for their debt financing. The Swedish banking landscape is quite concentrated and dominated by four major banks, which have a combined lending share of 75%[4]. According to the Swedish central bank total lending to non-financial Swedish firms amounted to SEK 1155 billion in 2012. This heavier reliance on banks in Sweden compared to the US might be a factor when analyzing institutional influence on capital structure and cost of debt.

Institutional investors can exert considerable influence on the firms they are invested in and the way in which they structure their capital. There are three different factors, which play a role for institutional investors, namely monitoring, asymmetric information and tax advantages (Michaely and Vincent, 2012).

Monitoring is a control mechanism, which is predominantly pursued by large shareholders. Small private investors in a diffusely held company usually have no major interest in active monitoring because the costs associated with it would greatly outweigh the benefits (Grossman and Hart, 1980). Shleifer and Vishny (1986) find that only large shareholders such as institutional investors have the means and incentives to monitor a company effectively with the goal of safeguarding their investments. The decision to engage in monitoring also creates the so-called free-rider problem. This problem occurs when smaller investors do not commit any resources to monitor the management but rather trust the larger investor to do so and hence benefit from the resulting better corporate governance free of cost. The fact that an institutional investor is usually a substantial shareholder though does not automatically make it good at monitoring the firm it is invested in. As Kahn and Winton (1998) point out, there is a choice institutional investors face, namely between exerting effort to monitor for a shared gain or rather trade for a private gain and thus simply act as a trader looking for a short-term equity gain. Should a company decide to engage in monitoring though, there are two ways in which it can be done, either actively or passively. The two can be described as the direct and indirect way of monitoring. The former describes an investor who is involved in collecting information and who is trying to influence the management in its decision making process. A form of more direct intervention is to voice the shareholders' concern e.g. via proxy contests. In a formal model by Admati et al. (1992) it was

found that active monitoring takes place when the expected benefits are greater than the expected costs. Demsetz's (1983) "active monitoring hypothesis" claiming that large shareholders are monitoring the management better than small shareholders was supported by evidence of antitakeover charter amendments by institutions having a positive effect on a firm's shareholder wealth (Agrawal and Mandelker, 1990).

In contrast to this time and money consuming form of monitoring, investors have also the opportunity to do the "Wall Street Walk" as Admati and Pfleiderer (2009) call it. The "Wall Street Walk" describes the act of selling the shares in a company rather than becoming active and involved in changing matters for the better. Parrino et al. (2003) investigated aggregated institutional ownership and found that the investors' share of ownership and the number of institutional investors decline significantly prior to a forced CEO turnover. This shows that voicing a threat of exit in response to disappointment about a company's performance is a valid tool to use for institutional investors. The ensuing decline in stock price in consequence of this divestment should be a serious matter of concern for any firm since it will drive up its cost of capital. Recent trends, however, show that active monitoring is on the rise and becoming more popular with institutional investors despite related cost of time and money (Palmiter, 2002). In case of the US, Palmiter also finds that shareholder activism, carried by institutional investors, leads to a change for the better in case of corporate governance.

Another relevant study regarding monitoring investigates how crucial the stability of institutional investment is. More precisely, in which way does it matter if an investor is short-term or long-term oriented as far as monitoring is concerned? Gaspar et al. (2005) conclude that short-term investors, which frequently enter and exit stock positions, only have little influence on the management of a company. Based on these findings, Chen et al. (2007) depict conclusive evidence that long-term oriented institutions focus on active monitoring in order to influence corporate decision making rather than simply trading for profit. This also applies to the size of investment in a company, the more an institution invests the more it is inclined to monitor.

Having assessed the importance of monitoring by institutional investors, it is crucial to find out how a change in institutional holdings relates to capital structure. That is, how is the level of debt or equity affected by a change in ownership. Monitoring by institutional investors can reduce a conflict of interest between management and shareholders, which in turn reduces the cost of equity (Michaely and Vincent, 2012). In this case debt and institutional investment work as substitutes. Another reason for a substitution effect between institutional ownership and debt is the active role of institutions in information-gathering and trading, both of which lead to a reduction of adverse selection (Myers and Majluf, 1984). According to their pecking order theory firms that want to invest first of all use retained earnings, then issue debt and only when there is no other financing available, new equity issuance becomes an option. The logic behind this is that firms only have incentives to issue equity when their firm is overvalued. Otherwise issuing equity would dilute firm value. Outside investors with inferior information taking this into account are thus not willing to pay the fair price for a stock. When a large well-informed institutional investor raises its share in the firm other investors follow, driving the stock price up and therefore making equity more attractive as a means of financing. Although more monitoring and a less pronounced adverse selection problem lead us to expect a lower debt to equity ratio, institutional investment might nevertheless have an ambivalent effect because institutional ownership not only makes equity more attractive but can also lead to lower interest rates on debt, which would lead debt to go up.

The mitigation of friction by institutional investors can also affect the cost of debt. Bhojraj and Sengubta (2003) find higher institutional ownership associated with a significant drop in yields and better bond ratings. Both factors should lead to a reduction in the interest rate, making debt financing more attractive. Their line of reasoning is that corporate governance mechanisms, which are positively influenced by institutions, have the potential to reduce conflict between different stakeholders, especially between the management and providers of capital, both from the debt and equity side. This will potentially reduce expropriation by managers and generally induce them to have a long-term horizon. This in turn enables firms to build better relationships with their debt holders and as a consequence gives them access to lower interest rates. We expect this argument to hold since the Swedish debt market is characterized by bank lending and is dominated by only four banks. In this case

the relationship to those major banks should carry weight in defining interest rates. However, more important than the sheer extent of institutional ownership in a firm for its cost of debt is the stability of ownership. Elyasiani et al. (2007) argue that continuous and stable institutional ownership in a firm lets managers become more long-term oriented and therefore enables them to build a better reputation in the debt market. This effect is found to be more pronounced for firms subject to problems of asymmetric information. Institutional investors can potentially mitigate asymmetric information by influencing management to improve reporting and release information in a timely manner. Ajinkya et al. (1999) support this idea by finding evidence that corporate disclosure improves with institutional ownership.

Beside monitoring and asymmetric information taxes can have an influence on institutional holdings and influence a firm. According to the famous work by Modigliani and Miller (1958), under the assumption of perfect and frictionless capital markets, the capital structure of a firm does not matter for its valuation. Only when taxes enter the equation debt financing becomes more attractive due to the debt tax shield. This is also the reason why ownership matters since different tax rates may apply to different types of shareholders. When it comes to institutional investors it was already mentioned earlier that dividend-paying firms are preferred over non-dividend paying firms but another study also states that dividend payouts decrease in years when dividends are more tax disadvantaged than capital gains (Perez-Gonzales, 2003). This strengthens the image that a tax clientele effect is existent. Kim et al. (1979) link the influence of taxes on capital structures to the existence of a leverage clientele effect. They find a significant relationship between a firm's capital structure policies and investors' tax rates, stating that highly levered firms are attractive to investors with low personal tax rates, while firms with little leverage appeal to highly taxed investors. Although the actual impact was less pronounced than expected it nonetheless clearly contradicts Merton Miller's proposition of capital structure irrelevance (Miller, 1977).

Hypothesis

Unlike in the model assumed by Modigliani and Miller, capital markets are in reality not perfect. Adverse selection adds friction to the market and can give investors

incentives and latitude to use these for their benefit. We want to investigate if institutional investors have an effect on a firm's capital structure and if that is the case, find out if this relationship is causal or whether it is the other way round and leverage effects institutional investment.

In line with the findings by Grier and Zychowicz (1994), we assume debt levels in a company to decrease with an increasing share of institutional ownership. The reason is that due to monitoring and gathering information adverse selection costs of equity can be mitigated. This will make equity relatively more attractive than debt, therefore decreasing the leverage ratio.

One of the reasons why we could see the opposite effect in the debt ratio is that higher institutional ownership may lead to improved shareholder rights and stronger shareholder influence. This in turn enables investors to mandate management to introduce more debt in order to lower management discretion (Michaely and Vincent, 2012). A similar proposition is made by Friend and Lang (1988), who suggest that one large owner has greater influence on management than small and dispersed owners, enabling her to demand more debt in order to motivate managers who are in danger of engaging in perquisite consumption.

Data & Methodology

Data

We retrieved firm specific financial information from the Serrano database. Its data comes mostly from the Swedish Companies Registration Office (Bolagsverket), comprising historic data on a yearly basis based on the financial statements by Swedish firms. Additionally, Serrano contains general company data form Statistics Sweden (SCB) and group data from PAR's group register. For access to ownership information we turned to SIS Ägarservice, whose database reports the top 200 largest shareholders of Swedish listed companies in the time span between 1999 and 2014. However, since Serrano only reports observations for up to 2012 the time frame for our research is set between the years 1999 and 2012.

SIS allows data requests only on a year per year basis for one firm at a time, so we had to manually select and download each firm-year observation in order to build up our sample. A list of institutional investors was also obtained from SIS but we had to constantly keep updating it as we populated the sample since the provided list was insufficient, lacking many institutional investors. Our initial list contained 491 firms from which we excluded financial, insurance and real estate firms due governmental regulation, which imposes strict capital structure requirements. After matching with Serrano our panel consisted of 325 firms and 2602 observations, i.e. about 8 observations for each firm. With this sample we cover on average 49% market capitalization of listed Swedish firms between 1999 and 2012.

Daily share prices, book value per share, outstanding number of shares and trading volume were obtained from Datastream. We downloaded the Swedish repo rate from the homepage of Sveriges Riksbank, historical OMXS30 returns from Yahoo Finance and OMXS30 constituents for the years of interest were partially obtained through Bloomberg with another part kindly offered at our disposal by the NASDAQ Help Service.

Variables

For the ownership information we constructed four variables: “io” for institutional holdings, which is defined as the accumulated percentage of total outstanding shares owned by institutions for a given firm; “TOP3_io” only takes the three biggest institutional investors into account, measured the same way as “io”; “DC” stands for dual class shares and shows if actual voting rights are different from the voting rights implied by owned percentage of a firm’s market cap; “TC” is the total captured ownership.

Table I

This table shows the summary statistics for our entire sample of 325 firms divided into two subsamples, one going from 1999 until 2005 and the other reaching from 2006 until 2012.

Variable name	Mean		
	Total sample	1999 - 2005	2006 - 2012
Leverage (Total Liabilities / Total Assets)	0.33	0.3	0.34
Size (ln (Total Assets))	12.73	12.92	12.66
Profitability (EBITDA / Total Assets)	0.09	0.11	0.08
Tangibility (Total fixed assets / Total Assets)	0.61	0.59	0.62
Collateral ((Tangible fixed assets + Inventories) / Total	0.29	0.3	0.29
Market Capitalization (in mil. SEK)	9,412	8,613	9,782
M-t-B	3.63	3.54	3.68
Institutional Holdings, %	31.44	28.4	32.61
Top3 Institutional Holdings, %	20.92	18.39	21.89
Total Ownership Captured, %	72.2	67.58	73.97
Sample size (in nr. of observations)	2213 - 2602	684 - 722	1511 - 1880

Data Limitations

SIS reports the data rounded to 1 decimal point, which implies that some precision is lost. Although this is probably not critical it still might have some effect on the unbiasedness of the estimates. Furthermore, this database captures ownership information somewhat randomly as for instance in a given year the database might report the ownership composition of only 30% of a firm's capitalization whilst in the preceding and the forthcoming years 60% of the ownership is reported.

Also the institutional investors list has some limitations. First of all, we were only able to obtain the 500 biggest institutional investors in Sweden as of December 28th 2012. Therefore many smaller investors and some investors from prior years were not captured. While building our sample we constantly had to modify the list of institutional investors to account for this. However, it was only possible to match them by names since no identity numbers were provided. Although we did our utmost and added investors to the list to the best of our knowledge to make it as extensive as possible, there is a chance that institutional holding variables can be flawed to some extent due to the imperfections in the existent data.

For most of the methods employed, the sample size varied considerably as there were natural limitations to the data availability, as e.g. in some cases price

information was missing. In addition to these limitations the use of lagged variables further decreased the number of observations. For instance, in case of the instrumental variable estimation, the sample size decreased to 706 observations.

Results

When building our first hypothesis, stating that institutional holdings have an influence on a firm's capital structure, we mentioned that by e.g. by monitoring large investors have the ability to mitigate problems such as adverse selection. As a result of this we expected the leverage ratio to decrease.

The core of our multivariate regression is leverage (*lev*) on the independent variable institutional ownership (*io*). We consider eight different definitions of leverage, which are briefly summarized in the following:

1) $\frac{Total\ Liabilities}{Total\ Assets}$

- Total Liabilities: total current liabilities + total non-current liabilities
- Total Assets: total amount of all of the business's assets (fixed assets and current assets)

2) $\frac{Total\ Debt}{Total\ Assets}$

- Total Debt: total liabilities (as above) – untaxed reserves
- Total Assets: as above

3) $\frac{Total\ Debt}{Total\ Debt + Total\ Equity}$

- Total Debt: as above
- Total Equity
  - Share capital
  - Share premium reserve
  - Revaluation reserve
  - Other restricted equity
  - Accumulated profit or loss
  - Profit/Loss for the year

4) $\frac{Adjusted\ Total\ Liabilites}{Adjusted\ Equity}$

- Adjusted Total Liabilities: current + non-current liabilities + provisions + deferred tax liability
- Adjusted Equity: Total equity + untaxed reserves - deferred tax liabilities

5) $$\frac{Total\ Current + Non{-}Current\ Liabilities\ to\ Credit\ Institutions}{Total\ Assets}$$

- Liabilities to Credit Unions: a credit institution is the lender, or liabilities run in relation to bonds or convertibles issued
- Total Assets: as above

6) $$\frac{Current\ and\ Non{-}Current\ Liabilites\ to\ Group\ Companies\ and\ Credit\ Institutions}{Total\ Debt + Total\ Equity}$$

- Liabilities to Group Companies: liabilities to group companies and associated companies
- Total Debt and Total Equity: as above

7) $$\frac{Current\ and\ Non{-}Current\ Liabilites\ to\ Group\ Companies\ and\ Credit\ Institutions}{Current\ and\ Non{-}Current\ Liabilites\ to\ Group\ Companies\ and\ Credit\ Institutions + Total\ Equity}$$

8) $$\frac{Total\ Assets - Book\ Equity}{Total\ Assets}$$

- Total Assets: as above
- Book Equity: total share capital (the nominal value of all of the business's shares)

When running regressions with all of those eight definitions of leverage only the first two, total liabilities / total assets and total debt / total assets proved to give meaningful results. The former is the broadest definition of leverage and proved to be the best fit in for models. Therefore we use this definition for all the regressions presented throughout this paper.

Our main independent variable of interest, institutional ownership, constitutes all institutional holdings of the 200 largest shareholders of a firm in accumulation as a share of a firm's total equity (in percent with values between 0 and 100). All additional independent variables are chosen according to prior literature on this topic (Michaely and Vincent (2012), Frank and Goyal (2009) and Zychowicz (1994)) and are summarized below:

- Size (logarithm of total assets controls for the firm size)
- Profitability (EBITDA / total assets; EBITDA consists of: net profit/net loss – taxes – interest paid – depreciation & amortization)

- Collateral ((tangible fixed assets + inventories) / total assets)
- Tangibility (total fixed assets / total assets)
- Market-to-Book (share price / (book value / nr. of shares))
- Growth (simple growth in total assets between time t-1 and t)

Initially we also included more control variables in our regression. Yet variables we imagined to explain changes in leverage better and which were used in prior studies, such as in the one by Michaely and Vincent (2012), proved to make our model worse and were consequently dropped from the regression. Those additional control variables were:

- Initial firm leverage (leverage ratio of first year firm observation)
- Industry leverage (mean industry leverage ratio)
- Annual market return (as a percentage change of the Swedish OMX Index at year-end)
- Annual adjusted return (actual annual firm return in excess of the predicted CAPM return based on its beta)
- Dividends (dummy variable indicating with a 1 whether a firm does pay or with a 0 when it does not pay dividends)
- OMXS (dummy variable indicating with a 1 whether a firm is one of the 30 members comprising the index of the 30 largest publicly traded Swedish firms, or with a 0 when it is not)

Initial firm leverage was included in our regression based on the assumption that leverage is persistent over time, as it was found by Lemmon et al. (2008). However, based on our regression we do not find this to be the case in Sweden. Only when we regress leverage on *io* and *initial leverage* without any other control variables, we obtain significant results. When regressed together with the significant control variables from Table II the significance of *initial leverage* disappears, which means that its effect on leverage is well captured by the rest of the control variables.
Another control variable we included earlier is industry leverage. Here we established two configurations, one gives an industry leverage ratio over time and

the other a mean ratio by industry for each year. Yet neither measure proved to have any significance.

In case of the annual market return we imagined this to be a good regressor for leverage because Miller (1977) argues that debt ratio variations reflect the cyclicality of the economy and that they tend to fall during upswings. One reason is that equity simply becomes more attractive because new share issues fetch higher prices and therefore equity gets relatively cheaper in comparison to debt.

Following Michaely and Vincent (2012) we also introduced adjusted return as a control variable. Using the CAPM model we predicted a firm's annual return based on its firm-specific beta and excess market return and then deducted it from its actual achieved return. The intuition for this instrument is to control for market timing effects since Alti and Sulaeman (2012) found that firms issue equity after abnormally high returns only when there is institutional demand. This implies that firms changing their capital structure might simply time the market rather than alter their leverage due to friction reductions caused by institutional owners.

Furthermore, we also thought dividends to be a good control variable since if a firm pays dividends it is at a higher risk of potentially lacking enough funds to cover debt obligations. A study by Emamalizadeh et al. (2013) supports this assumption.

Finally, we added a dummy variable indicating whether a firm is member of the OMXS 30 or not. The general idea is that a firm, which is part of the most important stock index of a country, is simply more "visible" and thought of when making investment decisions. Therefore it will also attract more investments, in particular from institutions, since many of them deal in ETFs or may even be bound to only invest in large cap firms due to risk policies (think of pension funds for instance). Indeed we found a positive impact of OMXS 30 membership when regressed *io* on this dummy variables. The coefficient of ca. 22.9 is highly significant at the 1% level. This means a firm listed in the OMXS 30 has on average an institutional ownership share that is 22.9% higher in absolute terms than if it were not a member. A regression of leverage on OMXS 30 membership without including *io* as a regressor leads actually to a very high significance of a negative OMXS coefficient. This is a

hint that being a large cap firm in the OMXS gives a firm a lower leverage ratio on average. When we include further controls this variable becomes obsolete since its effect is captured by other variables it is correlated with.

Effect of institutional ownership on leverage

In order to find the direction of causality between ownership and leverage we regress *lev* (time t) on lagged *io* (time t-1). Of course there are several other tools to address the issue of reverse causality, which we will evaluate later on in this paper. In Table II we present our regression results with the explanatory variable coefficients and significance levels. The bottom of the table shows the number of observations and the value for R-squared. In order to account for the possibility of the error term to be correlated within firms we also show the regression results with clustered standard errors at the firm level. Underneath we indicate whether we include firm and year fixed effects or not. In the bottom row we show if we normalized the coefficients in order to make the coefficients' impact comparable.

TABLE II

This table shows the basic setup with the regression of leverage on institutional ownership between 1998 and 2012. All explanatory variables are lagged by 1 year. Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1

VARIABLES	*lev (t)*	*lev (t)*	*lev (t)*	*lev (t)*	*lev (t)*
io (t-1)	0.000523**	0.000523	0.000201	0.000201	0.0117**
	(0.000265)	(0.000499)	(0.000745)	(0.000480)	(0.0112)
size (t-1)	0.0258***	0.0258***	0.0529***	0.0529***	0.0564***
	(0.00295)	(0.00631)	(0.0144)	(0.00829)	(0.0138)
profitability (t-1)	-0.0572***	-0.0572**	-0.0606***	-0.0606***	-0.0262**
	(0.0195)	(0.0226)	(0.0147)	(0.0114)	(0.0103)
collateral (t-1)	0.283***	0.283***	0.146***	0.146***	0.0691***
	(0.0241)	(0.0451)	(0.0425)	(0.0333)	(0.0110)
tangibility (t-1)	0.169***	0.169***	0.130***	0.130***	0.0488***
	(0.0203)	(0.0386)	(0.0432)	(0.0290)	(0.0111)
market-to-book (t-1)	0.00207**	0.00207*	0.000920	0.000920	0.0186*
	(0.00101)	(0.00118)	(0.000713)	(0.000697)	(0.0106)
growth (∆t)	2.71e-09**	2.71e-09**	1.72e-09	1.72e-09	0.00899**
	(1.27e-09)	(1.13e-09)	(1.15e-09)	(1.12e-09)	(0.00375)
Observations	1,903	1,903	1,903	1,903	1,903
R-squared	0.169	0.169	0.736	0.736	0.169
Clustering	no	yes	yes	no	no
Firm Fixed Effects	no	no	yes	yes	no
Year Fixed Effects	yes	yes	yes	yes	yes
Standardization	no	no	no	no	yes

In column 3 we see the regression results with firm fixed effects in order to account for firm related omitted variables. Our independent variable *io* is slightly positive but insignificant. In column 2 we see the same regression without firm fixed effects. Although the explanatory power increases *io* still stays insignificant. When we additionally do not cluster by firms the regressor *io* becomes significant at the 5% level (column 1). Clustering the standard errors by firms decreases the standard deviation substantially, which in turn lowers the significance of the explanatory variables. Finally, when leaving clustering out and adding back firm fixed effects, the significance of *io* becomes insignificant again (column 4).

Coming back to the results presented in column 1, in practice an *io* coefficient of 0.00523 means that an absolute increase in institutional ownership of 1% leads the leverage ratio on average to go up only marginally by 0.0523%. This result also holds when considering only the top three institutional holdings, a variable, which could also be considered as a measure of ownership concentration. All other control variables (without considering firm fixed effects because otherwise market-to-book and growth become insignificant) prove to be significant and thus contribute to a better fit of the model. Overall, we arrive at an R-squared of 16.9% without and 73.6% with firm fixed effects respectively.

In order to make our regression results in column 1 more comparable and find out which regression coefficient has the strongest impact on leverage we standardized all variables with a mean of zero and a standard deviation of one. In column 5 it can be seen that *size*, *collateral* and *tangibility* have a much stronger effect on *lev* with a magnitude of between 4 and 6 times the effect of *io*. Whereas the impact of the *market-to-book* ratio is comparable to *io*, *growth* is just half as influential on leverage as *io*. *Profitability* is the only negative coefficient among the independent variables, meaning that if a firm becomes more profitable it will have a negative impact on the leverage ratio.

Of course these results have to be considered with great caution since the only significance in our independent variable *io* is achieved without considering fixed effects, thus not considering the possibility of having an omitted variable bias, which is likely the case since the R-squared is relatively low without firm fixed effects.

Effect of institutional ownership on leverage by firm size

The economic intuition that increased interest of institutional investors leads to a relatively lower cost of equity can be supported by our findings in Table III. There we present how the impact of institutional investors depends on the size of a firm. In order to investigate this we created five dummy variables, each representing a fifth of the number of firms in our sample. In this case firm size is defined as market capitalization (the mean of each quintile can be found in Appendix, Table X). The capitalization of the highest quintile is almost 1000 times the one of the lowest quintile of the firms.

Table III

This table shows the same setup as before but now institutional ownership is divided into 5 equally large quintiles based on market capitalization, where mrktcap1 comprises the smallest 20% of all firms and mrktcap5 the largest 20%. Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1

VARIABLES	*lev (t)*	*lev (t)*	*lev (t)*	*lev (t)*	*lev (t)*
*io * mrktcap1 (t-1)*	0.00379***	0.00379***	0.00200*	0.00200**	0.0317***
	(0.000652)	(0.00103)	(0.00112)	(0.000843)	(0.00545)
*io * mrktcap 2 (t-1)*	0.000591	0.000591	-5.47e-05	-5.47e-05	0.00681
	(0.000422)	(0.000690)	(0.000728)	(0.000547)	(0.00487)
*io * mrktcap 3 (t-1)*	0.000307	0.000307	0.000418	0.000418	0.00488
	(0.000343)	(0.000601)	(0.000743)	(0.000486)	(0.00545)
*io * mrktcap4 (t-1)*	0.000263	0.000263	0.000271	0.000271	0.00522
	(0.000308)	(0.000530)	(0.000762)	(0.000484)	(0.00610)
*io * mrktcap 5 (t-1)*	-0.00119***	-0.00119	0.000151	0.000151	-0.0263***
	(0.000401)	(0.000752)	(0.000921)	(0.000578)	(0.00885)
size (t-1)	0.0433***	0.0433***	0.0561***	0.0561***	0.0948***
	(0.00389)	(0.00687)	(0.0143)	(0.00852)	(0.00850)
profitability (t-1)	-0.0554***	-0.0554***	-0.0600***	-0.0600***	-0.0253***
	(0.0176)	(0.0205)	(0.0139)	(0.0110)	(0.00803)
collateral (t-1)	0.277***	0.277***	0.147***	0.147***	0.0677***
	(0.0238)	(0.0445)	(0.0430)	(0.0333)	(0.00582)
tangibles (t-1)	0.157***	0.157***	0.123***	0.123***	0.0451***
	(0.0204)	(0.0379)	(0.0435)	(0.0290)	(0.00587)
market-to-book (t-1)	0.00243**	0.00243**	0.000959	0.000959	0.0219**
	(0.00106)	(0.00122)	(0.000734)	(0.000711)	(0.00955)
growth (⊿t)	2.83e-09**	2.83e-09**	1.74e-09	1.74e-09	0.00939**
	(1.24e-09)	(1.23e-09)	(1.16e-09)	(1.13e-09)	(0.00412)
Observations	1,903	1,903	1,903	1,903	1,903
R-squared	0.188	0.188	0.738	0.738	0.188
Clustering	no	yes	yes	no	no
Firm Fixed Effects	no	no	yes	yes	no
Year Fixed Effects	yes	yes	yes	yes	yes
Standardization	no	no	no	no	yes

The results of this regression are comparable to our earlier findings. Whereas the control variables are generally significant again (except for *market-to-book* and *growth* in case of firm fixed effects) the main explanatory variable lagged *io * market*

cap is only significant in case of the first quintile (column 3; 10% significance). Without firm fixed effects and clustering in addition to the lowest quintile, also the quintile with the largest firms becomes significant (both at 1% significance levels, see column 1). Whereas for the lowest quintile the coefficient is positive (0.00379), it is negative in case of the highest quintile (-0.00119). This shows that institutional holdings positively affect the leverage ratio for small firms and negatively influence it for the largest quintile of listed Swedish firms. Overall, this model has a similar fit for leverage as the prior one, having reached an R-squared of 73.8% and 18.8% with and without firm fixed effects respectively. Column 5 puts our regression coefficients into perspective again by standardization. Now we can observe that institutional ownership almost carries the same weight in the lowest and largest quintiles (0.0317 and -0.0263 respectively). In column 4 we have the same regression as before, but with firm fixed effects and we lose the significance for the highest quintile coefficient. Also the significance for the smallest quintile goes down a notch from the 1% to the 5% level.

In order to see if concentration of institutional ownership is a factor in determining a firm's leverage ratio we created a dummy variable, which indicates whether or not block holders have stronger influence on the capital structure (dummy variable is 0 for lowly concentrated firms and 1 for highly concentrated firms; the threshold is an ownership of >= 30% by the largest 3 institutional investors). There was no significant effect of block holders on leverage. With a similar test we wanted to check whether there is a difference in institutional influence on leverage between firms that are highly leveraged and firms that have little leverage (dummy is = 0 if the leverage ratio is < 30% and 1 otherwise). We found no evidence for this to be the case either.

Overcoming Endogeneity

An underlying assumption for the regression to uncover the true causal link between the variables of interest is the Conditional Independence Assumption. It postulates that unless there is no sample selection (omitted variables) bias the estimated effect is likely to be flawed and inconsistent. In practice this condition is frequently violated by the complexities that arise when analyzing imperfect sets of data. For example, the leverage ratio is determined by more factors than it is possible to control for.

Therefore, unobserved confounders present in the equation would bias the estimated effect of institutional holdings. Using fixed effects in the regression helped to control for some unobserved confounding variables. To take one step further we decided to implement a series of other measures to examine the true effect of institutional investors in Sweden on capital structure.

First of all, we use a difference-in-differences estimation (DiD) that only requires the no anticipation and common trends assumptions to be fulfilled. Secondly, we develop an instrumental variable to tackle omitted variables bias, potential reverse causality and measurement errors that may result in endogeneity.

Quasi-experiment & difference-in-differences estimator

We used the variation in leverage that was a result of a natural experiment – the inclusion of a particular firm into the OMX Stockholm 30 index – to construct a difference-in-difference estimator. The underlying intuition behind this method is that fund-indexers and investors who benchmark against the index start buying shares of the newly added companies to the OMXS30. According to a theory presented by Pruitt and Wei (1989) as well as Aghion et al. (2008), who used inclusion to the S&P500 index as an instrument, this is an exogenous shock to the institutional investors' holdings.

Nevertheless, it pays to distinguish between the S&P500 and OMXS30 indexes. The S&P is composed of selected shares based on market capitalization, industry, liquidity and profitability. Furthermore, alterations to the index can be done anytime "as needed"[8]. In other words, only publicly available information is considered and it this is already incorporated into a firm's capital structure. The OMX Stockholm 30 on the other hand is composed of the 30 most traded shares on the NASDAQ Stockholm exchange during the control period. Within that period, if a firm not belonging to the index was in the top 15 by trading volume it would replace one of the firms in the index with the lowest trading volume[9]. Therefore, it can be concluded that such changes are not a complete surprise to the market participants as the

[8] S&P U.S. Indices Methodology, February 2014
[9] "Rules for the Construction and Maintenance of the OMX STOCKHOLM 30 INDEX", Nasdaq OMX, 2014

inclusion into the OMXS index could have been foreseen based on stock performance.

The implication of this difference for our study is somewhat ambiguous. Strictly speaking this is not an exogenous shock anymore – company management can adjust capital structure in anticipation of an inclusion into the index because of the intrinsic characteristics. Nevertheless, it would make sense for the management to wait until the firm is actually included so that there is an increased demand for that firm's shares by indexers and benchmarking funds. This would drive prices up, therefore lowering the cost of issuing equity for the firm. Hence, it is likely that a firm's capital structure changes post-inclusion due to higher institutional ownership.
Since the index includes only the 30 most traded companies in the Swedish market the component firms do not change much between the years. We have captured all variation within the studied time frame, which yielded 17 firms qualifying for the treatment group. Although the OMXS30 is reshuffled twice per year we have used the annual composition of the index as of December of each year. This choice was dictated primarily by the fact that our company specific financial data is available with annual frequency, i.e. it would not be possible to fully capture the effect of change in leverage due to temporal differences.

To uncover the true causal effect (i.e. eliminate selection bias) in the DiD setting we have matched the treatment with the control group on the basis of the time frame and the most important determinants of leverage – size, market capitalization, profitability and leverage itself measured prior to the year of inclusion using a propensity score (refer to Table IX). The main limitation of matching was the small number of firms in the pool of controls, which were only 306. This implicates that matching was not done perfectly, i.e. there are some differences between treatment and control groups.

The DiD estimator was obtained using two methods – first, as a difference between changes in leverage before and after inclusion into the index for both treatment and control groups and also using a regression.

1) $DiD = \left(Lev_{tre,post} - Lev_{tre,pre}\right) - (Lev_{con,post} - Lev_{con,pre})$

2) $Lev = \alpha + \beta_1 Tre + \beta_2 Post + \beta_{DiD} Tre * Post + \varepsilon$

For each specification we used two time frames - restricted to 2 years [-1, 0] & 3 years [-1, 0, 1] to capture the possible lag in the adaption of capital structure following an addition to the index. For instance, if the firm was added in December of a given year changes to leverage would only emerge in the next year. Since only annual data is used, firms which were added in June are mixed with firms added in December. Therefore, a drop in leverage in a year of addition could be attributed to the firms that were added to the index in June. This calls for using an extended event window. In our 2 period sample, however, the magnitude of decrease in leverage is somewhat greater. Matched control and treatment groups as well as DiD estimators are presented in the table below.

Table IV

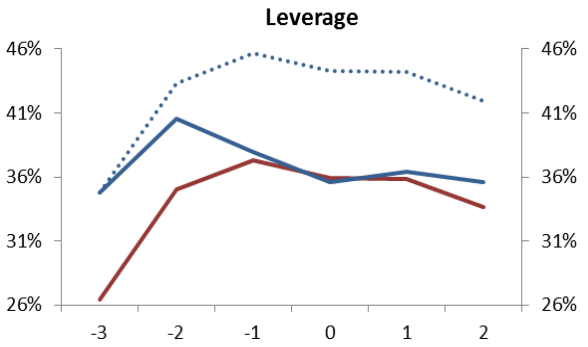
This table shows the Difference-in-differences estimation, matching and results

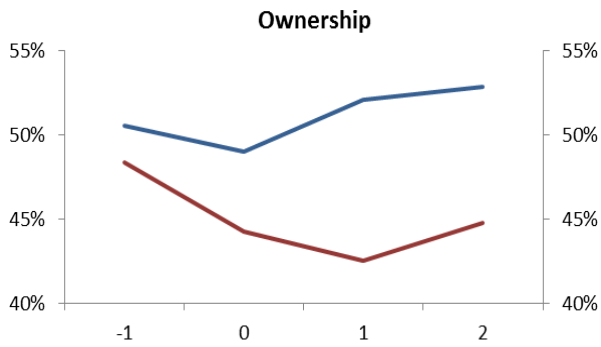
Sample description	Treatment	Control
Size, ln (total assets)	15.4	15.0
Leverage	37.9%	37.3%
Market Cap, bn SEK	32.7	36.8
Profitability	11.3%	6.4%
Tangibility	60.7%	71.4%
Firms	17	17

DiD result	2 periods	3 periods
Treatment*Post	-0.9%	-0.5%
T-statistic	-0.07	-0.04

Due to the small sample size, low variability between the observations and small difference between control and treatment groups the results are too insignificant to draw statistical inferences. However, it is worth pointing at the big difference in the firm profitability, which might undermine the validity of using the inclusion into the OMXS30 as an instrument. A simple eyeball test can be used to validate that there is indeed a drop in leverage prior to the addition to the index. We also check whether institutional ownership levels are the same. The effect is actually positive with a magnitude of 4.9% for the treatment against control group in the year of inclusion, which reflects the increased demand from the indexer funds. These findings are illustrated in the graphs below.

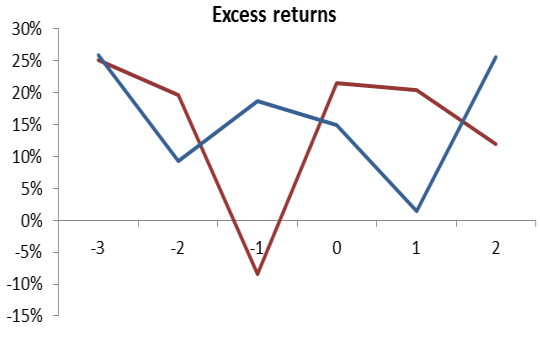
Graphs 1 & 2, Difference-in-differences estimation; red is for the control group, blue for the treatment and the dotted line for the hypothetical evolution of the treated firms

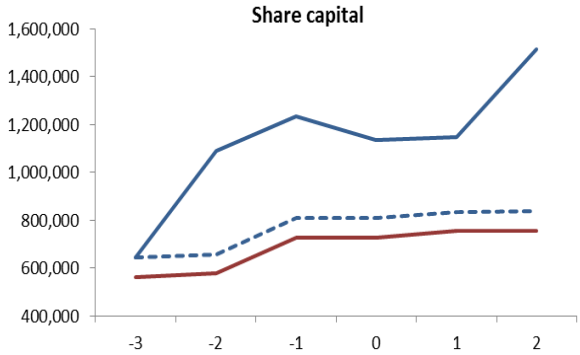




It appears that superior profitability of firms in the treatment group actually leads to deleveraging 1 - 1.5 years prior to the inclusion in the index. It could be that the firm's superior financial performance induces investors to re-evaluate a firm's perspectives and leads to the increased demand for its stock, which eventually results in the addition to the OMXS30, which in turn attracts institutional investors. In fact, Dong et al. (2011) find support for the market timing theory, which states that overvalued firms tend to issue equity. If this were true then one would expect treated firms to have superior excess returns (actual less the returns predicted by CAPM) and also higher share issuances. We find that this is the case as shown in the graphs below.

Graphs 3 & 4, Difference-in-differences estimation; red is for the control group, blue for the treatment and the dotted line for the hypothetical evolution of the treated firms





All graphs combined indicate that some portion of deleveraging is associated with increased demand by institutional investors. However, most likely this is a direct

consequence of the superior performance and market timing by companies included in OMX Stockholm 30.

Instrumental Variable

A good technique to bypass endogeneity is to use an instrumental variable. We were presented with the challenge to find a valid instrument that has a strong enough correlation with institutional holdings and yet is not related to any other determinants of leverage – observed or not. Given the data constraints we employed implied mutual fund outflows as an instrument. This approach was first introduced in a paper by Edmans, Goldstein and Jiang (2011) and applied by Michaely and Vincent (2012). The following intuition applies: when for any reason investors decide to withdraw their investments from mutual funds, the funds are in turn forced to liquidate part of their positions. This would result in a decrease of institutional holdings for the given firm. Since individual investors are unlikely to undertake withdrawal decisions based on a particular firm's capital structure within the mutual fund's portfolio, it is probable that mutual fund outflows would be as good as random with respect to the impact on firms. We use time fixed effects to alleviate potential temporal similarities. Since the exclusion restriction is unlikely to hold if the decision to divest is due to the capital structure of the firm, we have constructed the instrumental variable on the basis of hypothetical rather than actual trades. Hence, we look to obtain mechanical correlation of the instrument with institutional holdings.

Since information about mutual fund holdings in Sweden is not readily available to the public we had to hand-collect information from SIS Ägarservice. We selected the 100 biggest mutual funds that had holdings of more than 5 million EUR and obtained data for the period from 2001 to 2012 (no prior years were available). With a few exceptions it was possible to obtain data for December of a given year and otherwise the latest observation for that year was used.

Our instrument was constructed in the following way:

$$Total\ Outflow_{i,t} = \sum_{k=1}^{m} \frac{-TotalFundOutlfow_{k,t}}{TotalFundHoldings_{k,t-1}} * Value\ of\ investment\ in\ firm_i\ ,$$

where "Total Outflow" is an instrument and k = 1 …m index mutual funds.

Due to the nature of the data on hand we used OMXS30 index changes to proxy for individual fund returns. This was necessary in order to detect year-on-year outflows of funds. Furthermore, to allow for a margin of error we also required the mutual fund holdings to decrease by at least 5% in a given year to qualify as an instrument. Absolute values of a given firm's holdings were scaled by the relative outflows and summed across funds.

Using a two-stage least-squares regression we found that this instrument proves to be relatively weak with a F-statistic between 12.74 and 13.03 and adjusted R-squared around 0.2 depending on the leverage specification. In the second stage adjusted debt-to-equity ratio proved to be the most significant measure of leverage yielding a p-value of 6% (please refer to the table XII in the appendix). The results indicate that there is a slight evidence of an overall positive effect of institutional ownership on leverage.

Effect of changes in institutional ownership on changes in leverage

After assessing the impact of institutional ownership on leverage in a static setting we now consider in the following table a similar model but look at how changes in ownership affect changes in leverage. Therefore we alter our prior variables to reflect this. The dependent variable *Δlev (t)* reflects the change in leverage between time t and t-1 and all independent variables account for changes between time t-1 and t-2. We also introduce one new additional variable, *Δlev (t-1)* (between time t-1 and t-2), in order to control for how prior changes in leverage have an effect on current changes in leverage. This variable enables us to detect trends in changing leverage since it is assumed that if a firm decides to change its capital structure it will only do so cautiously over time.

Table V

This table shows the same setup as our basic one but in first differences. Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1

VARIABLES	*Δlev (t)*	*Δlev (t)*	*Δlev (t)*	*Δlev (t)*
Δlev (t-1)	-0.191***	-0.191***	-0.279***	-0.279***
	(0.0435)	(0.0354)	(0.0412)	(0.0454)
Δio (t-1)	-0.000359	-0.000359	-0.000371	-0.000371
	(0.000513)	(0.000524)	(0.000590)	(0.000537)
Δassets (t-1)	0.0199	0.0199*	0.0223	0.0223
	(0.0122)	(0.0119)	(0.0141)	(0.0138)
Δprofitability (t-1)	-0.0355***	-0.0355***	-0.0401***	-0.0401***
	(0.00759)	(0.00947)	(0.0122)	(0.00917)
Δmarket-to-book (t-1)	0.00129**	0.00129**	0.00117*	0.00117**
	(0.000570)	(0.000555)	(0.000708)	(0.000545)
Observations	1,600	1,600	1,600	1,600
R-squared	0.079	0.079	0.252	0.252
Clustering	no	yes	yes	no
Firm Fixed Effects	no	no	yes	yes
Year Fixed Effects	yes	yes	yes	yes

In fact, this variable proves to be highly significant, even when including firm fixed effects and clustering (1% significance level). The coefficient for changes in institutional holdings is negative, suggesting that a rise in lagged institutional ownership leads to a decrease in leverage, but ultimately proves to be insignificant.

After having conducted the previous tests it can be concluded that evidence of an effect of institutional holdings on leverage is marginal if existent at all. Our results concerning our hypothesis are mostly inconclusive. We found no proof of existence for a substitution effect between institutional ownership and leverage as suggested by our hypothesis and supporting academic literature. Neither did we find strong evidence of the existence of an opposite effect, except for the positive correlation between leverage and institutional ownership in the smallest quintile of Swedish firms, which is the only evidence we found at significant levels with firm fixed effects and clustering. So if the argument for influence of institutional holdings on leverage is weak at best, maybe there is evidence of the opposite effect? More precisely, is there endogeneity and thus a potential for a capital structure clientele effect in Sweden?

Effect of leverage on institutional ownership

In order to find an answer to this question we first of all check for reverse causality. In the next table (Panel A) we present the results of our regression of leverage on institutional ownership. Ownership is considered at time t and all independent variables are lagged by one year (time t-1). Beside our core explanatory variable of interest, which is *lev*, we initially included a *market-to-book* ratio, log *sales*, a *dividend* dummy, *beta* and annual *adjusted return* (annual return in excess of return predicted by CAPM) as control variables. According to Grinstein and Michaely (2005) sales and beta function as risk measures and the market-to-book ratio controls for growth opportunities and asymmetric information. We additionally include a dividend dummy in order to account for a dividend clientele effect and add annual adjusted return in order to control for market timing effects.

Table VI

This table shows the regression of institutional ownership on leverage. In Panel A the regression is run in levels with lagged explanatory variables. In Table B the same is done but in first differences, so changes in institutional ownership are regressed on changes in leverage. Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1

	Panel A				**Panel B**	
VARIABLES	*io (t)*	*io (t)*	*io (t)*	*io (t)*		*Δio (t)*
lev (t-1)	7.028***	7.028	5.095*	5.095**	*Δlev (t-1)*	0.546
	(2.359)	(4.850)	(2.750)	(2.005)		(2.070)
market-to-book (t-1)	-0.0346	-0.0346	0.0492	0.0492*	*Δmtb (t-1)*	0.0180
	(0.0358)	(0.0498)	(0.0342)	(0.0280)		(0.0171)
sales (t-1)	2.564***	2.564***	0.371	0.371	*Δsales (t-1)*	-0.166
	(0.229)	(0.533)	(0.422)	(0.287)		(0.333)
dividends (t-1)	6.388***	6.388***	0.173	0.173	*Δdividends (t-1)*	0.598
	(1.113)	(2.298)	(1.194)	(0.831)		(0.769)
Observations	1,637	1,637	1,637	1,637		1,343
R-squared	0.167	0.167	0.890	0.890		0.196
Clustering	no	yes	yes	no		no
Firm Fixed Effects	no	no	yes	yes		yes
Year Fixed Effects	yes	yes	yes	yes		yes

Without firm fixed effects and clustering (see column 1), leverage, sales and dividends are highly significant. All other control variables fail to add improvement to the model and thus are dropped from our regression. Even when including firm fixed effects and clustering, our main variable leverage stays significant (at 10% level, see column 3). In economic terms the estimation coefficient of 5.095 means that if the

leverage goes up by 1% or 100 basis points, then institutional ownership in absolute terms is higher by ca. 0.05%. This model has a high R-squared of 89%.

In Panel B on the right hand side of the table we see the results for the same regression but with changes of institutional holdings on changes in leverage. Changes in the latter are accounted for by differences between t and t-1 and for the former and all control variables between t-1 and t-2. As it can be seen in column 6 the R-squared decreases dramatically and all regressors fail to be significant even at the 10% level (with firm fixed effects but no clustering, comparable to column 4).

Effect of institutional ownership on adverse selection and agency conflict

Earlier in this paper we stated that institutional owners have the power to influence firms and conjectured that their ownership might reduce frictions and mitigate problems such as adverse selection and agency conflicts. If this were the case one would have expected leverage to go down following a rise in institutional ownership. Up to this point we have not found clear evidence for this assumption. In order to investigate this issue further we will engage in a more detailed analysis. First of all, we need to divide our sample of firms into different categories. Our first group of firms is characterized by a large market capitalization and low growth prospects. We could call them cash cows. In accordance with the method applied to firm size defined by assets, we now divide all firms into quintiles based on the extent of their market capitalization. The lowest two quintiles will be defined as small firms and the largest two quintiles as large firms. We do the same for the market-to-book ratio, where we define the lowest two quintiles as low growth firms and characterize the largest two quintiles as high growth firms. Combining these two characteristics we define two dummy variables, namely adverse selection (defined as small market cap. and high growth) and agency (defined as large market cap. and low growth); see Table XI in the Appendix for details on average market capitalization and market-to-book ratios for each group. The reason for introducing these dummies is that small firms with good growth prospects are more likely to encounter information asymmetry problems that lead to adverse selection than large firms with low growth prospects, which rather have to deal with agency conflicts since management of

such cash rich firms might e.g. engage in empire building. We run a regression of leverage on *io*, *lev*, *profitability*, *tangibility* and *collateral* for each dummy variable, once with additionally controlling for leverage and once without (all regressors are lagged). The results are presented in the following table.

Table VII

This Table shows the basic setup but on the regression is run on two distinct subsamples. The first is called Adverse Selection and only comprises firms which are in the lowest 2 quintiles (40%) in terms of market capitalization and in the largest 2 quintiles for market-to-book values. The Agency subsample comprises firms, which are in the opposite 2 quintiles respectively, so the upper 2 quintiles for market capitalization and the lower 2 quintiles for market-to-book ratio. Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1

	Adverse Selection		**Agency**	
VARIABLES	*lev (t)*	*lev (t)*	*lev (t)*	*lev (t)*
io (t-1)	0.00394*	0.00395*	0.000867	0.000330
	(0.00214)	(0.00225)	(0.00153)	(0.00124)
lev (t-1)		-0.00164		0.498***
		(0.147)		(0.0944)
ind lev (t-1)	0.0751**	0.0751**		
	(0.0375)	(0.0377)		
profitability (t-1)	-0.00875	-0.00897		
	(0.0656)	(0.0637)		
tangibility (t-1)	0.246***	0.246**	0.261	0.0368
	(0.0876)	(0.0970)	(0.336)	(0.191)
collateral (t-1)	0.270**	0.271**	0.202	0.0625
	(0.120)	(0.128)	(0.308)	(0.174)
Observations	251	251	247	247
R-squared	0.836	0.836	0.787	0.839
Clustering	no	no	no	no
Firm Fixed Effects	yes	yes	yes	yes
Year Fixed Effects	yes	yes	yes	yes

In both cases *io* has a positive effect on *lev* but it is only significant for the adverse selection dummy. In economic terms the coefficient of 0.00395 translates into an effect of 0.395% on leverage if ownership goes up by 1% (10% significance level with firm fixed effects and without clustering, see column 2). Also mean *ind lev, tangibility* and *collateral* are significant at least at the 5% level. Profitability and lagged leverage failed to have this significance (column 2). However, when looking at the regression of the dummy variable agency, *lev* becomes highly significant (at 1% level, column 4). Intuitively this makes sense since large firms are naturally slower to change their capital structure and thus have more impact of lagged leverage on current leverage. In fact, all other control variables fail to have any

significance. The R-squared for both dummies is quite high with values of 83.6% and 83.9% respectively, suggesting an overall good fit of the model.

In terms of economic interpretation this outcome seems counterintuitive at first since we assumed in the beginning that institutional investment leads to a lower leverage ratio. However, taken together with our prior findings it strengthens the notion of having a complementary relationship between ownership and leverage. The fact that institutional holdings have an impact on our adverse selection dummy makes intuitively sense because one can easily imagine that large investors with extensive knowledge and resources are able to influence small firms more easily than large firms, which are more likely to be persistent in their processes and capital structure. To support this assumption we looked at institutional ownership concentration in the five quintiles and indeed found that the share owned by institutional investors is highly concentrated for the smallest quintiles and is lower for the larger quintiles. It can be see that in case of the smallest quintile almost all institutional holdings are concentrated in the three largest institutions whereas in the largest quintile they roughly make up only half of the ownership (see Table X in the Appendix).

Concerning the positivity of the coefficient, the pecking order could play a role here since it states that issuing debt is preferable to issuing equity. In the next paragraph we will therefore investigate whether this assumption actually holds and if firms with higher institutional ownership have a higher propensity to issue debt than equity.

Effect of institutional ownership on the propensity to issue equity, engage in share repurchases or issue debt

Although we have only found little evidence of an influence of institutional ownership on the capital structure of Swedish firms so far, we nevertheless want to investigate, if a firm decides to rebalance debt and equity, and if so, how this change happens. That is, will a firm more likely issue equity, repurchase shares or issue new debt in response to a change in institutional ownership in order to affect its capital structure? We mostly follow Michaely and Vincent (2012) when defining our three dependent variables. First of all there is equity issuance, which is a dummy variable indicating whether a firm issues equity in a given year or not. Issuance is defined as a change

in equity (in %), which in turn is the change in the nominal value of all outstanding shares (between time t and t-1) divided by the total assets of a firm (time t-1). If this happens to be >1% equity issuance occurs and the dummy variable becomes one, otherwise it becomes zero. Our second dummy variable is equity repurchaser, which will be one in case the change in equity is <-1%. Finally, we define our last dummy variable net debt issuance as the change in debt minus the change in equity. In case the dummy variable is >0% net debt is issued and the dummy becomes one, otherwise stays zero. Here, debt is defined as the sum of current and non-current liabilities to group companies and credit institutions.

In order to detect an effect of institutional holdings on issuance decisions we run separate regressions on the three dependent dummy variables using logistic regressions. Beside our main explanatory variable institutional ownership we used leverage, size, profitability, market-to-book, industry leverage, dividends, tangibility, collateral, adjusted return and beta as control variables (all at time t-1), all of which have been previously defined in this paper. Except for leverage, size, tangibility and collateral all controls proved to be insignificant and were thus dropped from our regression. The results of our final regression are presented in the next table.

Table VIII

This table shows logit regression results. The dependent variable is a dummy variable indicating how likely it is that a firm will issue equity, repurchase equity and issue debt in a given year. The explanatory variables are all lagged. Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1

VARIABLES	*eqty iss.*	*eqty repu.*	*debt iss.*
io (t-1)	-0.00952**	0.00627	0.00562**
	(0.00411)	(0.00832)	(0.00280)
lev (t-1)	1.382***	0.308	0.403*
	(0.310)	(0.476)	(0.212)
size (t-1)	-0.302***	-0.252**	0.0414
	(0.0486)	(0.101)	(0.0335)
div (t-1)	0.655**	0.634	0.725***
	(0.267)	(0.525)	(0.183)
tangibility (t-1)	-1.619***	-1.128***	0.497***
	(0.195)	(0.353)	(0.108)
Observations	2,274	2,164	2,274
Pseudo R-squared	0.2035	0.0809	0.0505
Clustering	yes	yes	yes
Firm Fixed Effects	no	no	no
Year Fixed Effects	yes	yes	yes

In column 1 we show the coefficients for equity issuance, which were all estimated using year fixed effects and clustering. All independent variables are significant at least at the 5% level including *io*, whose coefficient of -0.00952 in economic terms suggests that on average, if a firm experiences an increase in institutional ownership by 1%, the chance that it will issue equity the following year is ca. 1% lower (5% significance). When it comes to share repurchases there is ultimately no significant effect detectable. In case of net debt issuance, however, there is a positive effect of institutional holdings. The respective coefficient of 0.00562 means that if *io* goes up by 1%, the chance of an increase in net debt in the following year goes up by 0.5% (5% significance, column 3).
For further robustness we increased the cutoff point for the change in equity to 5%, in order not to have minor share fluctuations, e.g. caused by the exercise of share options and convertible bonds, influencing actual share issuances. Now the effect of institutional holdings increases, from prior 1% to now 1.4% (still 5% significance, unreported). The effect on share purchases stays insignificant.

Taking both significant findings on share and debt issuances into consideration we find further support for our earlier findings that institutional investors in Sweden have a positive influence on the leverage ratio, since a higher institutional ownership makes a firm more likely to issue debt and less likely to issue equity in response.

Effect of institutional ownership on the cost of debt

Having observed a greater chance of debt issuance after an increase in institutional holdings, it is worth noting whether this is at least partly due to an effect of institutional ownership on the debt interest rates of firms. More precisely, does higher institutional ownership lead to lower costs of debt for firms? Sengupta (2003) found a negative relation between those two in case of the U.S., meaning that increased institutional ownership has the effect of lower debt interest rates for a firm. He found that higher institutional holdings lead to lower bond yields. In our study about Sweden we use the interest rate on debt as our dependent variable at time t in excess of the Swedish central banks' interest rate. Our independent variable of interest is lagged *io* (time t-1) again. As lagged controls at time t-1 we introduce the variables firm *size*, *lev* and membership of a major index (in our case *OMXS 30*

membership), which are also used as firm-specific variables in a study by Elyasiani (2007). The results of our regression can be observed in the following table.

Table IX

This table shows the regression results of cost of debt on institutional ownership. All explanatory variables are lagged. Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1

VARIABLES	*cod (t)*	*cod (t)*
io (t-1)	-0.000285*	-0.000285
	(0.000148)	(0.000226)
lev (t-1)	-0.0277**	-0.0277
	(0.0137)	(0.0175)
size (t-1)	0.00432**	0.00432
	(0.00189)	(0.00277)
OMXS 30 (t-1)	-0.0331***	-0.0331**
	(0.0112)	(0.0162)
Observations	2,052	2,052
R-squared	0.021	0.021
Clustering	no	yes
Firm Fixed Effects	no	no
Year Fixed Effects	yes	yes

The results are insignificant but indicate to be in line with our assumption that institutional investors have a negative impact on the cost of debt. The reason is that only without firm fixed effects and clustering we gain significance for the negative *io* coefficient (10% significance, column 1). In economic terms an absolute 1% higher share of institutional holdings would translate into a cost of debt, which is ca. 0.03% lower. Although this supports our earlier findings its lack of robustness has to be considered. Data issues prevent us from a more detailed analysis of this topic. Especially the lack of detailed bond data as it was used in prior studies. Minton and Schrand (1999) for instance calculated the cost of debt as the yield spread between a firm's bonds and matched treasuries based on duration. This more sophisticated approach was not feasible with the available Serrano data on hand, which is limited to firm specific data. The access to bond specific data, such as issue size, maturity, age and rating, which were used in a prior study by Klock et al. (2004), would have rendered possible a more comprising analysis.

Conclusion

As sophisticated players in the financial markets, institutional investors allocate capital where they see the best risk-return potential. Since they often have access to private information and superior resources to perform due-diligence, their decision to

invest in a firm is a signal to the market that the firm is financially sound. An institutional investor is also more likely to be an active shareholder, which means that going forward the target firm is unlikely to engage in risky projects. As a result, the firm will find it easier to raise both equity and debt for two reasons:

1. The institutional investor's opinion that the firm is healthy is priced in by the market
2. The market also prices in that institutional investor's active involvement in a firm's business will improve its corporate governance and reduce its risk going forward.

Our research has found that institutional ownership is positively related to leverage for smaller firms which are most affected by information asymmetry. Furthermore, using an instrumental variable we established that institutional investors positively affect leverage for the entire sample. In economic terms this phenomenon can be explained by the pecking order theory – firms would prefer debt to equity financing. In addition to that an institutional investor with substantial ownership may also induce more debt into a firm in order to keep its management from making value-endangering decisions as for instance empire building. In this case institutional owners reduce the agency conflict.

Firms that are part of the OMXS30 index tend to deleverage by issuing equity. This is a result of their intrinsic characteristics and market valuation of their stock rather than the consequence of a signaling effect of an institutional investor's entry. Although difference-in-differences estimation was insignificant due to the sample size and low validity of inclusion into OMXS30 as an information-free event we were able to find support for the fact that companies time the market when it comes to equity issues.

Since our research found that leverage affects institutional ownership, we have used a mutual fund holdings dataset that was constructed for the IV procedure to test whether institutional investors have different preferences for leverage. We did so by restricting the sample to funds present in all the years from 2002 to 2012, then taking the weighted average leverage by value of holdings in each firm. We confidently reject the hypothesis that the means of weighted average leverage are equal between the funds. This signals that there is a clientele effect, i.e. investors that

prefer highly leveraged firms will buy shares of such firms; the same holds for firms with low levels of debt. As has been shown by Sulaeman (2007) this is the case for the US market. Furthermore, in addition to the clientele effect he finds that varying preferences also have an affect on future leverage ratios of firms since some firms tend to adjust their leverage ratio according to their investor's target leverage ratio.

To further build on our findings it should be outlined that prior research also found that different types of investors have varying effects on company parameters. For instance, Cella (2014) finds that long-term investors influence investment via monitoring as opposed to quasi-indexers that have no such effect. For instance, bank and firm ties are known to be prominent in Sweden and therefore it may be that higher bank ownership would also result in levering up. This could be due to a lower cost of debt and banks incentivized to promote and sell their products to the firms they have a major share in.

For the research going forward it would be interesting to examine whether investment horizons and also the type of institutional investors affect the capital structure of Swedish companies.

References

Articles

Admati, A. R. & Pfleiderer, P. 2009, "The "Wall Street Walk" and Shareholder Activism: Exit as a Form of Voice", *The Review of Financial Studies,* vol. 22, no. 7.

Aghion, P., Van Reenen, J. & Zingales, L., 2009, "Innovation and Institutional Ownership", National Bureau of Economic Research, Working Paper

Agrawal, A. & Mandelker, G. N. 1990, "Large Shareholders and the Monitoring of Managers: The Case of Antitakeover Charter Amendments", *Journal of Financial and Quantitative Analysis,* vol. 25, no. 2, p. 143.

Ajinkya, B., Bhojraj, S. & Sengupta, P. 1999, "The Effect of Corporate Governance on Disclosure", Working Paper, University of Florida.

Allen, F., Bernardo, A. D. & Welch, I. 2000, "A Theory of Dividends Based on Tax Clienteles", *The Journal of Finance,* vol. 55, no. 6.

Alti, A., Sulaeman, J. 2012, "When do high stock returns trigger equity issues?", *Journal of Financial Economics*, vol. 103, pp. 61-87.

Emamalizadeh, M., Ahmadi, A. & Pouyamanesh, J. 2013, "Impact of financial leverage on dividend policy at Tehran Stock Exchange: A case study of food industry", *African Journal of Business Management*, vol. 7, no. 34, pp. 3287-3296.

Berglöf, E. 1993, "Ownership of Equity and Corporate Governance: The Case of Sweden", *Institutional Investors and Corporate Governance*, Baums, T., Buxbaum, R. M. & and Hopt, K. J. (Eds.), Walter de Gruyter, Berlin and New York, edn. 28th, pp. 312-327.

Bhojraj, S. & Sengupta, P. 2003, "Effect of Corporate Governance on Bond Raitngs and Yields: The Role of Institutional Investors and Outside Directors", *Journal of Business,* vol. 76, no. 3.

Cella C., 2014. "Institutional Investors and Corporate Investment", Stockholm School of Economics.

Chen, X., Harford, J. & Li, K. 2007, "Monitoring: Which institutions matter?", *Journal of Financial Economics,* vol. 86, pp. 279-305.

Chung, K.H. & Zhang, H. 2011, "Corporate Governance and Institutional Ownership", *Journal of Financial and Quantitative Analysis*, vol. 46, no. 1, pp. 247-273.

Demirguc-Kunt, A. & Levine, R. 1999, “Bank-Based and Market-Based Financial Systems: Cross-Country Comparisons”, Working Paper, World Bank Policy, no. 2143.

Demsetz, H. 1983, “The Structure of Ownership and the Theory of the Firm”, *The Journal of Law and Economics,* vol. 26, no. 2, pp. 375-390.

Dong M., Loncarski I., Horts J., Veld C., 2011. “What Drives Security Issuance Decisions: Market Timing, Pecking Order, or Both?”, working papers series.

Edmans A., Goldstein I. and Jiang W., 2012. “The Real Effects of Financial Markets: The Impact of Prices on Takeovers”, Journal of Finance, vol. 67, no. 3, pp. 933-971.

Elyasiani, E., Jia, J. & Mao, C. 2007, “Institutional Ownership Stability and the Cost of Debt”, Working Paper, Temple University and Southern Illinois University.

Frank, M. Z. & Goyal, V. K. 2009, “Capital Structure Decisions: Which Factors Are Reliably Important?”, *Financial Management*, Spring 2009, pp. 1-37.

Friend, I. & Lang, L. H. P. 1988, “An empirical test of the impact of managerial self-interest on corporate capital structure”, *Journal of Finance,* vol. 43, pp. 271-281.

Gaspar, J., Massa, M., Matos, P., Patgiri, R. & Rehman, Z. 2005, “Payout Policy Choices and Shareholder Investment Horizons”, Working Paper, ESSEC Business School, INSEAD & University of Virginia.

Giannetti, M. & Laeven, L. 2007, “Pension Reform, Ownership Structure and Corporate Governance: Evidence from a Natural Experiment”, Working Paper, Stockholm School of Economics.

Grier, P. & Zychowicz, E. J. 1994, “Institutional Ivestors, Corporate Discilpine, and the Role of Debt”, *Journal of Economics and Business,* vol. 46, pp. 1-11.

Grinstein, Y. & Michaely, R. 2005, “Institutional Holdings and Payout Policy”, *The Journal of Finance,* vol. 60, no. 3.

Grossman, S. J. & Hart, O. D. 1980, “Takeover Bids, the Free-Rider Problem and the Theory of the Corporation”, *The Bell Journal of Economics,* vol. 11, no. 1, pp. 42-64.

Isaksson, M. & Skog, R. 1994, “Corporate governance in Swedish listed companies”, *Institutional Investors and Corporate Governance*, Baums, T., Buxbaum, R. M. & and Hopt, K. J. (Eds.), Walter de Gruyter, Berlin and New York.

Jain, R. 2007, “Institutional and individual investor preferences for dividends and share repurchases”, *Journal of Economics and Business,* vol. 59, pp. 406-429.

Jensen, M. C. 1986, “Agency Costs of Free Cash Flow, Corporate Finance, and Takeovers”, *American Economic Review*, vol. 76, no. 2, pp. 323-329.

Kahn, C. & Winton, A. 1998, “Ownership Structure, Speculation, and Shareholder Intervention”, *The Journal of Finance,* vol. 51, no. 1, pp. 99-129.

Kim, E. H., Lewellen, W. G. & McConnell, J. J. 1979, “Financial Leverage Clienteles”,*Journal of Financial Economics*, vol. 7, pp. 83-109.

Klock, M. S., Mansi, S. A. & Maxwell, W. F. 2004, “Does Corporate Governance Matter to Bondholders?”, *Journal of Financial and Quantitative Analysis*, forthcoming.

Lemmon, M. L., Roberts, M. R. & Zender, J. F. 2008, “Back to the Beginning: Persistence and the Cross-Section of Corporate Capital Structure”, *The Journal of Finance*, vol. 63, no. 4.

Michaely, R. & Vincent, C. 2012, “Do Institutional Investors Influence Capital Structure Decisions?”, Working Paper, Cornell University.

Miller, M. H. 1977, “ Debt and Taxes”, *The Journal of Finance*, vol. 32, no. 2.

Minton, B. A. & Schrand, C. 1999, “The impact of cash flow volatility on discretionary investment and the costs of debt and equity financing”, *Journal of Financial Economics*, vol. 54, pp. 423-460.

Modigliani, F. & Merton, M. H. 1958, “The Cost of Capital, Corporation Finance and the Theory of Investment”, *The American Economic Review,* vol. 48.

Myers, S. C. & Majluf, N. S. 1984, “Corporate Financing and Investment Decisions: When Firms have Information that Investors do not have”, *Journal of Financial Economics,* vol. 13, pp. 187-221.

Palmiter, A. R. 2002, “Mutual Fund Voting of Portfolio Shares: Why Not Disclose?”, Research Paper, no. 2, Wake Forest University.

Parrino, R., Sias, R. W. & Starks, L. T. 2003, “Voting with their feet: institutional ownership changes around force CEO turnover”, *Journal of Financial Economics,* vol. 68, pp. 3-46.

Perez-Gonzales, F. 2003, “Large Shareholders and Dividends: Evidence from U.S. Tax Reforms”, Working Paper, Columbia University.

Rajan, R. G. & Zingales, L. 1995, “What do we know about Capital Structure? Some Evidence from International Data”, *The Journal of Finance*, vol. 50, no.5, pp. 1421-1460.

Redding, L. S. 1997, “Firm Size and Dividend Payouts”, *Journal of Financial Intermediation”,* vol. 6, pp. 224-248.

Shleifer, A. & Vishny, R. W. 1986, “Large Shareholders and Corporate Control”, *The Journal of Political Economy,* vol. 94, no. 3, pp. 461-488.

Shuetrim G., Lowe P., Morling S. 1993, “The Determinants Of Corporate Leverage: A Panel Data Analysis”, Reserve Bank of Australia.

Song H. 2005, “Capital Structure Determinants: an Empirical Study of Swedish Companies”, CESIS Electronic Working Paper Series.

Sulaeman J. 2010, “Do Shareholder Preferences Affect Corporate Policies?”, EFA 2008 Athens Meetings Paper.

Wållgren, A. 2006, “Dividend Policy and Ownership Structures in Swedish Firms”, Master’s Thesis, Stockholm School of Economics.

Internet References

“Institutional Investors Statistical Yearbook 2003“, OECD, http://www.oecd-ilibrary.org/finance-and-investment/institutional-investors-statistical-yearbook-2003_9789264020009-en-fr

13 CFR 108.50 (Title 13 - Business Credit And Assistance; Chapter I - Small Business Administration; Part 108 - New Markets Venture Capital (“NMVC”) Program; Subpart B - Definition Of Terms Used In This Part 108), U.S. Code of Federal Regulations
http://www.gpo.gov/fdsys/granule/CFR-2014-title13-vol1/CFR-2014-title13-vol1-sec108-50

“The 2010 Institutional Investor Report: Trends in Asset Allocation and Portfolio Composition” (New York: Conference Board, 2010)
http://www.shareholderforum.com/e-mtg/Library/20101111_ConferenceBoard.pdf

“European Institutional Investors”, PwC, https://www.pwc.lu/en/asset-management/docs/pwc-european-institutional-investors.pdf

FactSet Research Systems, http://www.factset.com/websitefiles/PDFs/institutional_ownership/institutional_ownership_2.20.14

“The Swedish Financial Market 2013“, Sveriges Riksbank, 2003, http://www.riksbank.se/Documents/Rapporter/Finansmarknaden/2013/rap_finansm_130830_eng.pdf

S&P U.S. Indices Methodology, May 2014, http://www.spindices.com/documents/methodologies/methodology-sp-us-indices.pdf

“Rules fort he Construction and Maitenance oft he OMX STOCKHOLM 30 INDEX“, Nasdaq OMX, 2014 https://indexes.nasdaqomx.com/docs/Methodology_OMXS30.pdf

Appendix

TABLE X

Table describes average market capitalization and institutional ownership per quintile.

quintile	avg. market cap in MSEK	io	top3 io concentration
1	47	14.7%	12.9%
2	212	22.6%	18.1%
3	566	33.6%	23.6%
4	1,680	42.5%	25.5%
5	44,600	52.5%	26.6%

TABLE XI

Table describes the sample for the adverse selection and information asymmetry regressions. Agency is built of 2 largest market cap and 2 smallest M-t-B quintiles. Adverse selection is built of 2 smallest market cap and 2 largest M-t-B quintiles.

	observations	market cap (in MSEK)	market-to-book
Agency	277	17,500	0.76
Adv. Sel.	314	132	8.62

TABLE XII

Table describes instrumental variable regression results.

VARIABLES	lev1	lev4	lev5
Io (t-1)	0.0127	0.0585*	0.00459
	(0.00815)	(0.0310)	(0.00290)
Init. firm lev	-0.00232***	-0.00324**	-0.000202
	(0.000777)	(0.00132)	(0.00178)
size (t-1)	-0.00541	-0.0580	-0.0204**
	(0.0259)	(0.0958)	(0.00911)
profitability (t-1)	-0.256***	-0.921***	-0.0477*
	(0.0723)	(0.296)	(0.0270)
tangibles (t-1)	0.210***	0.722***	0.240***
	(0.0633)	(0.273)	(0.0318)
market-to-book (t-1)	0.00448	0.0220	0.00212*
	(0.00368)	(0.0160)	(0.00125)
collateral (t-1)	0.239***	1.015***	0.204***
	(0.0849)	(0.350)	(0.0375)
growth	0.0415*	0.245**	0.0397**
	(0.0213)	(0.110)	(0.0164)
Observations	706	707	706
p-value	0.12	0.059	0.114
First stage F-stat	12.82	13.03	12.74
First stage adj. R^2	0.1974	0.1992	0.1976
Year fixed effect	yes	yes	yes

Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1

TABLE XIII

Table describes distribution frequency of the firms in the treatment group as well as in the matched control group.

DiD frequency by year	
Year	Frequency
1998	1
1999	5
2000	3
2001	
2002	2
2003	
2004	
2005	1
2006	2
2007	1
2008	2