The Value of Liquidity
Do Investors Price Corporate Cash Consistently during the Business Cycle

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Abstract

Title:	The Value of Liquidity – Do Investors Price Corporate Cash Consistently during the Business Cycle
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Keywords:	Cash, stock return, business cycle, upturn, downturn, capital structure, corporate governance, agency theory, Sweden, Denmark, Finland.
Purpose:	The purpose of this study is to investigate the impact of liquidity on stock return in different stages of the business cycles.
Theoretical framework:	The theoretical framework covers capital structure theories such as the pecking order hypothesis, trade-off theory, leverage aggressiveness hypothesis and long purse hypothesis. Agency theories regarding underinvestment, overinvestment, information asymmetry, asset substitution and stockholder – bondholder conflict have also been covered. Additionally, previous empirical studies covering the value of cash are presented.
Empirical framework:	A sample consisting of 1116 observations from 31 industrial engineering firm listed on the Swedish, Danish and Finnish stock exchanges during 2000-2009.
Methodology:	A deductive quantitative approach using multiple regression analysis.
Conclusions:	Large, mature firms with lower asset volatility are found to be less influenced by cash ratios during the business cycle while the stock returns of all other firms are highly influenced. A positive relationship is established between the cash-ratio and stock performance, but no specific benefit of cash during downturns can be established for the entire sample. Favoured by cash in downturns are firms with strong growth prospects and firms lacking a controlling blockholder. Firms with strong earnings and low uncertainty about investment opportunities are more severely penalized for cash holdings during upturns. Firms with a blockholder are not dependent on cash in downturns but suffer in return from a strong discount in upturns. We discuss different explanations for the observed patterns and see basically three explanatory trajectories, either related to (i) corporate governance and asymmetric information, (ii) the purpose of the held cash, and (iii) the required level of cash for the firm to finance its investment.

Contents

1 Introduction

The opening chapter intends to introduce the topic of the thesis. The thesis' background describes the fundamentals of stock returns and cash situation in firms and leads on to discuss why the topic is seen as relevant and how it could contribute to current research. Finally, thesis delimitations and chapter outline is presented.

1.1 Background to Proposed Subject

Many companies' treasurers still bear in fresh memory how the credit crunch of 2008 propagated into a full-blown financial crisis as the scarcity of cash severely inhibited operations. Only two years prior to the Lehman crash, the Swedish capitalist Christer Gardell made the headlines by demanding AB Volvo, a leading supplier of commercial transport solutions, to distribute its vast cash reserves to its owner as special dividends. Although facing resistance from industrialists the conduct of Gardell was not without support from the financial community; analysts were suspicious about companies hoarding cash and activist investors were eager to tap into the companies flushed with cash. Without resorting to overly tentative conclusions about the appropriate financial structure, one can thus maintain that the pendulum in this question is turning quickly, as evidence of corporate fitness at an instant became more resembling of financial anorexia.

Much attention has been devoted the question of financial structure and the consequences of different choices herein by academia, but generally this research target either how a particular financial structure is linked to the long-term valuation of a firm's assets or short-term consequences on stock prices of changes on the capital structure, e.g. the issuance of different classes of securities. More recent studies have also focused on the issue of how the market value cash held by companies, and concluded that investors value cash higher when held by companies subject to rigorous corporate governance systems due to the lessened risk of arbitrary expropriation, and studies of the long-term reaction on extraordinary dividends also indicate an efficient market as regarding the valuation of cash held by companies.

1.2 Problem Discussion

Following the latest financial crisis, it is evident that financial slack was a missing factor for many firms. The credit crunch saw operationally healthy but highly levered firms paralyzed and many were on the brink of bankruptcy. The real winners of the crisis were firms with strong cash holdings as they found themselves in a bargaining position in a market desperate for cash. What is interesting to learn is if the firm's cash holdings have an effect on the firm's stock return during different periods in a business cycle.

From what we understand the influence on stock returns by the level of cash in different economic states have only been studied to a certain extent. The closest work to our particular area of interest in which we have gathered inspiration is that of Campello (2003), which implicitly finds that the market values cash negatively in an upturn and positively in a downturn. This outcome indicates to us how investors value the opportunities of cash a firm has in a downturn. Campello (2003) in turn has based his findings on the work of Telser (1966) that finds that the opportunity of monopoly returns arises if the firm has a strong cash position. Campello (2003) also gathered inspiration to his work from Brander and Lewis (1986) that speak for debt rather than cash as cash is said to limit firm growth. Another study that opposes cash is La Porta et al. (2002) that finds that investors may be resistant to firms that have too easy access to large cash reserves as probability of expropriation by controlling shareholders may increase.

To fully come to grips with why investors behave in the way they do towards different firms in different economic states a number of theoretical perspectives are used. Jensen and Meckling's (1976) agency theory outlines the disciplinary role of debt, which locks in too abundant cash flows to deprive management of the option to arbitrary pursue unprofitable investments or conglomerate building which suggests that investor's views cash in a negative manner and finds other financing alternatives more suitable. The pecking order hypothesis however outlines the virtues of internally generated funds as a source of finance for corporate investments preferable to external financing, which state the opposite of what Jensen and Meckling (1976) says. Akerlof's (1970) work on information asymmetry shares the views of the latter and states in similar fashion how investors prefer internal financing before external financing as they constantly hold suspicions towards company financing activities.

We suggest one hitherto partly neglected way forward to reconcile the explanatory contributions of the theories, while avoiding the Gordian knot imposed by the state of opposition, by appointing a dynamic time variant perspective on the importance attached to each of the theories in different settings. Since it's established that investors' assessment of cash and leverage is not constant across markets but conditional on the intrinsic qualities of a particular market, it's intuitively appealing to regard also the relative importance investors assign the effects of cash stipulated by the theoretic framework as variable throughout the business cycle.

Our hypothesis is thus that investors' appetite for corporate savings is fluctuating over time insofar as stocks of companies with large cash holdings outperform its peers during downturns while punished when the economy is thriving. The rationale for assuming an alignment of investors' view of corporate cash holdings and the business cycle is obviously that the opportunities provided by cash is very distinct for the different states of the business cycle.

1.2.1 Purpose of the Study

By examining possible relationships between liquidity and stock return in the short perspective, the study aims to determine if useful conclusions can be drawn on the impact of liquidity on stock return in different stages of the business cycles. The identification of particular determinants or conditions relevant for the value of corporate cash is also central to our purpose since such supplements to the current body of knowledge is essential to provide guidance for future more specific studies on the topic.

The principal argument for distributing cash to owners is the weak returns generated by excess cash, while financial engineers advocate increased leverage to inflate equity value and impose more disciplined decision-making. Since investors are particularly disapproving about financial slack or accumulated cash in the end of periods of bull market, any findings suggesting that firms with ample liquidity outperforms firms strapped on cash in bear markets are interesting as it challenge the previously mentioned rationales behind the lean financial policy in late stages of the business cycle widely adopted by the business community of today. If cash is proven to have a significant value during downturns, the whole assumption of zero value added by excess cash is questioned. Since most valuation models simply add so-called excess cash at face value subsequent to the valuation, such findings calls for new principles comprising also the value of flexibility provided by corporate cash holdings when assessing the enterprise value.

1.2.2 Delimitation

Our sample includes listed engineering companies on the Swedish, Finnish and Danish stock exchanges. These exchanges are chosen as to achieve as homogenous sample as possible regarding aspects possibly influencing the value of cash. Included countries are selected by similarities in the minority shareholder protection provided by national corporate governance system and domestic corruption levels, but from this first sample Switzerland and the Netherlands are excluded although scoring equally on this matter. Switzerland is excluded since all other countries are categorized as political economies with high governmental interference and tax burden. The Netherlands does not have a sufficient number of engineering firms at the desired size and are thus also excluded from the sample. The time period has been limited to ten years due to poor quarterly data disclosure prior to 2001. The specified sample is considered sufficient as most previous studies have generally analyzed a shorter time period and at less frequent intervals.

1.2.3 Thesis Outline

The coming chapters are structured along the following outline. Chapter two presents the theoretical framework that the thesis is based upon. Chapter three presents the empirical and research methodology used to fulfill the purpose. Empirical findings are presented in chapter four. The thesis analysis is presented in chapter five followed by chapters six and seven in which the concluding remarks and proposal for further research is presented.

2 Literature Review

The following chapter describes the theoretical framework used in the thesis. Firstly, previous studies on the subject are presented. Thereafter a number of well-known models and studies are presented in detail regarding capital structure, corporate governance and information asymmetry, leading on to sections orienting the reader in corporate governance and macro-economic issues related to the value of cash.

2.1.1 Previous Studies

Several studies have already tried to establish relationships between the level of debt and company performance, but generally they are focused on only one year. Margaritis and Psillali (2007) are the most comprehensive mapping 12 240 companies in New Zeeland during 2004, and a significant relationship between leverage and firm efficiency can be established. Berent, Björk and Persson (2009) study the same relationship but for a much longer time period, as they study the real estate industry during 1988-2008. They however do not find any significant relationship between debt/equity and ROA. A remark by the authors is that the real estate industry is less suitable for this study as the companies generally have assets easy to value and liquidate which lessen the potential ambiguity otherwise caused by high leverage. The data is collected only annually, which is similar to the other studies mentioned. Similar to the research presented above Campello (2003) studies the relationship between the level of debt and firm performance but is more focused on firm performance in different economic states. Campello (2003) compares debt-heavy firms with cash-strong firms in up- and downturns and finds that firms with cash perform better in recessions and firms with debt in economic expansion.

Studies on corporate capital structure and the cross-section of capital returns have generally focused on leverage rather than cash holdings (Gomes and Schmid, 2009), but in a working paper Palazzo (2009) find a positive expected premium on corporate cash holdings that Fama and French's linear three factor model (Fama and French, 1993) fails to explain. An investment strategy that is long in stocks of firms with high cash-to-assets ratio and short in stocks with low cash-to-assets ratio thus produces an average excess return of 42 basis points per month according to Palazzo's study, which is explained by the Cash Factor (HCMLC[1]) introduced by Palazzo. Firms face a trade-off between distributing cash as dividends or retain cash for future investment opportunities. Both choices are costly for the company as cash earns a return below the opportunity cost of capital while equity issuance involves significant pecuniary costs as fees along with the negative stock price reactions predicted by pecking-order theory (Myers and Majluf, 1984). Palazzo's assumption is that firms with cash flows strongly correlated to aggregate risk are more induced to save cash of precautionary reasons. Relating corporate savings to a firm's level of risk provide the key explanation to the positive correlation between average equity returns and cash holdings.

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[1] High Cash minus Low Cash

(Palazzo, 2009) The rationale guiding the level of cash sensible to retain by the precautionary saving motive basically consists of four components; the mean and volatility of cash flows generated by assets in place, the equity issuance cost, the probability of receiving an investment opportunity, and the risk-free rate. The benefit of saving decline as the mean of cash flows increase or the cash flows become less exposed to systematic risk, as the probability of insufficient liquidity to finance available investments is reduced. If the cost of issuing equity is zero savings are too costly to justify, but as this cost increase so does the motive for savings. The more investment opportunities the firm is expected to receive, the higher liquidity is required to fund them hence increasing the saving motive. Finally the risk-free rate approximate the opportunity cost of capital and the higher the risk-free rate is relative the internal rate, the higher becomes the cost of corporate saving and hence the saving motive is diminished (ibid.). The sophisticated mathematical framework presented by Palazzo is not of great importance to our study, but the seemingly obvious model for the precautionary saving motive is very powerful to explain empirical findings on corporate cash holdings by other studies.

Most studies regarding the relation between corporate governance regimes and firm's cash position are conducted on a cross-national level, but Harford, Mansi and Maxwell (2007) hold the legal settings on the country-level constant to analyze cash holdings relative measures of agency problems within the US related to firm governance structure, such as antitakeover provisions. The study aims to investigate three main questions: (i) if agency conflicts arising by weak governance structure lead managers to stockpile cash reserves in the US, (ii) how weak governance structure impact the way cash is deployed by managers and (iii) if such differences are reflected also in firm profitability and valuation.

The general conclusion is that firms with higher insider ownership and stronger shareholder rights have higher cash holdings. Firms with weaker shareholder rights tend to spend more cash on capital expenditure and unprofitable acquisitions, and this pattern is exacerbated in combination of excess cash. R&D expenses is not found to be related to cash holdings, but significantly related to strong shareholder rights. The higher spending in weaker governance structures in the US is explained by the authors by the lower likelihood of external discipline arising from excess spending than for accumulating cash. The market for corporate control is thus stated as an important incentive to avoid drawing the attention of activist investors by visibly holding too much cash.

Harford et al. (2007) conclude that when a company's cash holdings increase dividends are likely to increase as well. Firms with weak shareholder rights tend to increase dividends in general, which is consistent with the finding on investors' preference for dividends in poor governance regimes by Pinkowitz et al. (2006). However, Harford et al. (2007) notice that it's primarily companies with strong shareholder rights or high insider ownership that chose to distribute excess cash as dividends while firms with weaker governance structure prefer the more flexible option to repurchase shares to avoid commitments to make future payouts.

The study also test but finds no evidence of a relationship between the ratio of stock option grants in top-management remuneration and relative cash holdings by firms.

The results are not consistent with mentioned international studies, e.g. La Porta et al. (2000), Dittmar et al. (2003) which find higher cash balances in countries with poor corporate governance and weak capital markets. The authors suggest that shareholder rights on the country-level suppress the effects of less substantial differences on the firm-level within the US (Harford et al., 2007). This finding is interesting since our sample is selected to be reasonable homogenous concerning governance settings on the national level, based on the ranking by Pinkowitz et al. (2006).

Pinkowitz et al. (2006) investigate if the value of liquid assets is discounted more heavily in countries with weaker investor protection and if dividends are valued at a premium. In countries of good corporate governance controlling shareholders aim to increase the wealth of all shareholders whereas in countries of poor corporate governance, controlling shareholders are enabled to fulfill their own interests before dealing with others, thus reducing the value of minority shareholders stakes. Myers and Rajan (1998) speak of cash as a double-edged sword and also concludes that problems with cash derive from issues associated with corporate governance. Previous research by Pinkowitz et al. (2006) finds that investors in countries with weaker investor protection do not have equal benefit from the firm having liquid assets. One dollar of cash can be worth as little as 0.29 to the investor whereas a dollar in countries with stronger investor protection is hardly discounted at all. Furthermore, Pinkowitz et al. (2006) finds that firms in poorly governed countries will on average hold more than the value-maximizing level of cash thus implying less cash going back to the investor. The obtained results indicate that values for Sweden, Denmark and Finland are somewhat similar to each other with some slight differences in the firm's level of cash and dividends. Minority shareholder rights retrieved from the anti-director index are also similar between the three countries (La Porta et al., 1998). Pinkowitz et al. (2006) concludes that a dollar of cash in countries with poor investor protection is worth less to minority shareholders. Pinkowitz et al. (2006) also finds that minority shareholders put a premium value on dividends in countries with less investor protection. Additionally, other studies have found that firms hold more cash in countries with low investor protection as well as when there exists an inconsistency between controlling shareholders' voting rights and cash flow rights.

Faulkender and Wang (2006) study how the financial characteristics of a firm influence the value of one additional dollar of cash reserves as perceived by the equity holder. The basic hypothesis is that the value is determined by how this dollar is likely to be spent. Three areas of spending is defined: (i) increase distribution to equity via dividend payments or share repurchases, (ii) reduce the dependence on cash raised in the capital markets, or (iii) pay down debt or other liabilites of the firm. Because of taxes on dividends the value of the marginal dollar is discounted to correspond to the amount accruing to the shareholder,

which can be significantly below one dollar. In the third alternative the additional dollar is discounted in proportion to how levered the firm is, because a fraction of the dollar benefit solely the creditor since the value of debt also increases slightly as the dollar is added to the cash reserves. This is in accordance with the division of firm value between shareholders and bondholders mentioned in section 2.2.4, and thus the pattern is reinforced the more levered the firm is. Only the second area of spending as defined above can thus be associated by a premium value of cash, and the marginal value of cash is found to decrease significantly when firm's cash reserves and leverage increase, while the value increases significantly for firms likely to encounter difficulties accessing capital compared to firms less likely to be constrained. This finding is particularly interesting for our study since inter-firm differences under fixed market settings at a particular time implies that a single firm ought to experience similar differences due to changing market conditions over time.

The empirical results of Faulkender and Wang (2006) include that aggregate marginal value of cash in the sample is 0.94, i.e. on average discounted. Investors penalize abundant cash reserves which signal a future inclination to distribute rather than raise funds, while rewarding additional cash in firms with valuable investment opportunities dependent on external funds. The highest marginal value of cash is enjoyed by financially constrained firms since transaction costs soar as capital markets associate constraint with asymmetric information, hence rendering internal cash a particular premium in this context. When distributing cash, share repurchase is relatively more appreciated than dividend payments in correspondence with the tax benefits of capital gains in the U.S.

Pinkowitz and Williamson (2007) also examine the marginal value of cash, focusing largely on the cross-sectional variation related to the firm's investment opportunity set. Using the methodology of Fama and French (1998), they find that shareholders of a firm with better growth options and more volatile investment opportunities place higher value on the firm's cash than a firm with fewer, more stable growth opportunities. We are more concerned about how the value of cash varies by the impact of differences in the financial characteristics of firms during the business cycle, although the analysis also target e.g. different opportunity sets. Furthermore we examine the variation in equity returns rather than in the level of the market-to-book ratio. Pinkowitz and Williams (2007) finds how value of cash varies by industry. They conclude that the industries in which a dollar is worth the least are industries that are relatively mature, have low growth or industries with relatively stable cash flows or set investment schedules. Typically for these types of firms is that cash often will be spent on low return investment projects. (Pinkowitz and Williamson, 2007)

2.2 Theoretical Framework

2.2.1 Modigliani and Miller's Four Assumptions

Modigliani and Miller's (1958) landmark paper *The Cost of Capital, Corporate Finance and the Theory of Investment* have raised many eyebrows and has on many occasions been criticized for its naïve propositions. M&M state four assumptions regarding the irrelevance of corporate financing, information and participation in capital markets. These assumptions state:

Perfect capital markets: There are under no circumstances taxes, transaction costs, institutional tensions, bankruptcy costs or financial distress.

Symmetric information: Information is equally available to all investors and firms and all parts share the same view of how this information will impact asset prices.

Given investment strategies: Firms' way of investing is taken for granted and has no association with the way firms finance themselves.

Equal access to capital markets: All investors, firms and others have the same access to financial markets at the same terms and conditions. (Modigliani and Miller, 1958)

Evidently these assumptions do not hold and it is due to these imperfections that agency problems, information asymmetry and financing problems occur. These issues inflict on investor behavior and their view of firms, which in turn also influences the firm's stock return. Noteworthy is that M&M's intent was not for the propositions to hold but rather raise discussions regarding why the propositions do not hold. Miller states in a later paper that perhaps more focus could have been concentrated on the other side of the "nothing matters" coin and on what does matter (Miller, 1988). The paper stands as ground to the theories below.

2.2.2 The Pecking Order Hypothesis

Myers and Majluf (1984) indicate in the pecking order hypothesis how investors have strict preferences in terms of corporate behavior and corporate financing. Contradictory to the static trade-off theory (see section 2.2.3) that speaks highly of taking advantage of the debt to equity ratio, investors according to the pecking order hypothesis are said to prefer firms to use internal financing before external (debt and new equity), which indicate that investors are not necessarily fixated about maximizing the value of the firm but rather have a steady cash flow. Having a steady cash flow enables the firms to go about investments how and when they like enhancing the flexibility of the firm. In addition to the desired financial flexibility investors have preferences regarding the firm's dividend policy. A stable dividend regardless of earnings, stock price or investment opportunities is desirable. Cash flows are also set to be at a certain level. If external financing no longer can be avoided the least risky security

available under the circumstances is preferred. Naturally, these terms and conditions cannot always be followed and more flexibility is assumed necessary. (Myers and Majluf, 1984)

The pecking order theory provides a more dynamic approach to the subject of capital structure in comparison to the static trade off theory, as it looks at the number of financing opportunities management has for their current investments rather than the static relation debt and equity has on the capital structure. (Ibid.)

Criticism has been directed towards the pecking order hypothesis and the presumed investor behavior regarding firms capital structure by many, not least Fama and French (1999) that argue in favor of the static trade-off theory rather than the pecking order hypothesis, as they state that debt is more suitable in mature firms with established track records compared to internal equity. Fama and French (2002) also find that smaller and lowly levered growth firms prefer equity issues to debt. Other critics to the hypothesis are Frank and Goyal (2003) that find that the financing deficit of a firm is observed more closely by issuance of new equity than by a firm's leverage. Regardless of the critique, in general there is a clear preference for internal equity by investors.

2.2.3   Static Trade-off Theory

The link between a firm's capital structure and its value is formulated in the *trade-off theory* by Kraus and Litzenberger (1973), linking the firm's level of leverage to two opposing forces influencing the value of the firm. By bundling all costs and benefits into these two forces imposed by a particular level of leverage it's apparent that an optimal point of leverage can be found resulting in a maximized value of the firm compared to the same firm financed only by equity. This point cannot easily be observed, nor is it constant over time or across firms. The optimal amount of leverage varies both as corporate tax rates vary across firms and as the rate at which expected costs of future financial distress and bankruptcy increase with leverage is highly firm specific (Ogden et al., 2003). In Exhibit 2.1 the value of a hypothetical firm is plotted as a function of leverage, $L(t)$. The value of the unlevered firm's securities is shown by the horizontal line denoted $V^E(t)$, while the heavy dashed line also includes the sum of all benefits related to leverage, $B(t)$, such as tax benefits and reduced agency costs (Culp, 2006). Note that the function is concave due to a decreasing marginal benefit of tax shield from excessive leverage. The heavy solid curve is the value of the levered firm net of the present values of benefits and the costs, denoted $C(t)$, and the optimal level of leverage, $L^*(t)$, corresponds with the maximized theoretical value of the firm, $V^*(t)$. The costs incurred by leverage are primarily related to expected financial distress costs and underinvestment issues (ibid.).
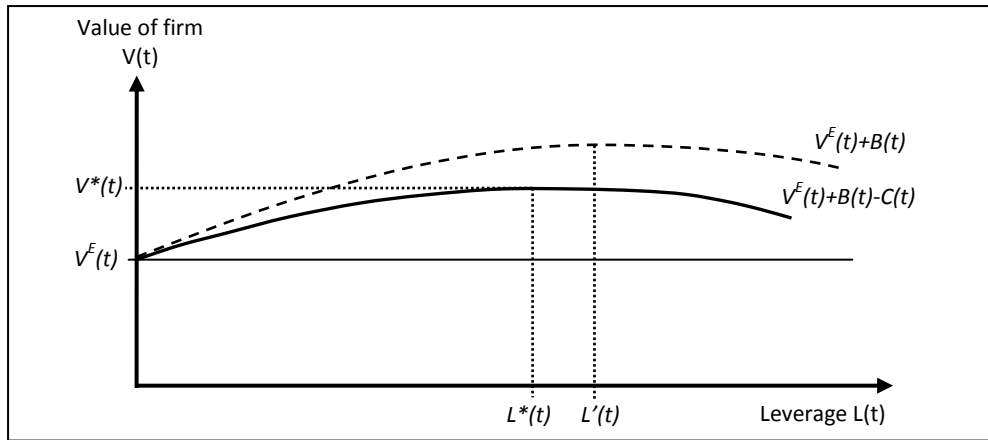
Exhibit 2.1   *The figure is based on Culp (2006)*

Empirical evidence suggests a negative relationship between leverage and the level of distress costs incurred on a firm in financial distress (George and Hwang, 2009). This is consistent with the trade-off theory and also indicates that firms manage their capital structure so as to balance its exposure to financial distress cost. Since the occurrence of low asset payoffs is partly systematic, financial distress costs born in low asset payoff states contribute to systematic risk. The enhanced systematic risk is mitigated by the firm by choosing low leverage to decrease the probability of default, but part of the systematic risk remains and justifies a premium on the stock market although the default probability is low (ibid.). The observed negative relation between leverage and returns is thus explained by a conscious choice of capital structure causing low-leveraged firms to have lower probability of default, greater exposure to systematic risk and higher expected returns (ibid.).

2.2.4   Underinvestment Problem and Agency Costs

Myers (1977) suggests the value of a firm's real assets to be divided into market value of assets in place, $V^A(t)$, and the market value of the firm's future growth opportunities, $V^G(t)$, so that at any time t the total value is the sum of these components. The financial capital of the firm is considered to be constituted by the market value of its equity and debt, and the values of the firm's real and financial assets should balance at any time t to satisfy equation (2.1): $V^A(t)+V^G(t)=[S(t)+\delta(t)]+[D(t)+\varrho(t)]$, where $\delta(t)$ denotes dividends and $\varrho(t)$ interest paid at time t. The expression has several important implications where the most obvious is that the value of the firm is entirely distributed between shareholders and bondholders, which explain the tension created by the sometimes conflicting interest of these groups as presented by Fama (1978). Gomes and Schmid (2009) develop a model for how firms that invest become less risky as the growth options are exercised, since the value of risky growth opportunities constitutes an ever-decreasing part of the total value of the firm. As the asset riskiness decreases Gomes and Schmid suggest additional debt to be added to the capital structure to take benefit of the tax deductions.

Since the equation (2.1) comprises no error-term one can also conclude that if the value of debt and assets in place is kept constant a deteriorating equity value can only correspond to a reduced present value of future growth opportunities. Basically two phenomena can explain this; the supply of opportunities is the same but the company fails to exercise all value-adding growth opportunities available, or the company is excluded from some of the opportunities previously presented. The first is related to what Fazzari, Hubbard and Petersen (1988) call investment cash flow sensitivity, meaning that firms with higher costs of raising external are more disposed of foregoing value-enhancing projects. Cash reserves thus enhance the likelihood for constrained firms to accept positive net present value (NPV) projects, which is not consistent with Miller and Modigliani's assumption of perfect capital market access stating that all positive NPV projects to be funded regardless of the firm's liquidity situation. The second phenomenon regard what Jankensgård (2009) refer to as the flow to solvency, as assets tend to flow from constrained firms to more solvent, eventually shifting the supply of opportunities offered to the advantage of the more solvent. In neither of the situations are the firm's assets employed in order to achieve the global maximum value of the firm.

Below is a quote by John Chambers, the CEO of Cisco since more than a decade, regarding the company's stated strategy of pursuing value-adding growth in particular during periods when financially constrained competitors cut back on their spending:

> *"We've become pretty good at tapping opportunities from economic down cycles. In the face of every one – in 1993, 1997, 2001, 2003, and now in the current one – we became even more aggressive in our investments in existing and new market opportunities. At the same time, our peers often became very conservative. Remember the Asian financial crisis in 1997? Most of the economies in the area were contracting. I knew that Cisco's peers were making a potentially major mistake by dramatically cutting back their resources there, so we did the reverse. Straight into the economic downturn, we decided to increase our resources and send a number of senior executives to expand our presence in the region. Within a year, we gained the number-one market position in almost all the Asian countries /…/." (Fryer and Stewart, 2008)*

2.2.5   Agency Problems

Jensen and Meckling (1976) introduced the concepts of agency costs based on the separation of ownership and control. The transferring of power over the firm's resources to management and the considerable discretion to act independent introduce an obvious risk that management will be guided by its own interest rather than that of the shareholders. Incentives can solve such problems but may in turn also lead to new problems. The desire is hence to form incentives in such a way in which both parts interests are in equilibrium. Problems may arise when firms have too much excess cash available for the agent to disperse of. The risk of this is purely that the agent may invest just for the sake of it and not in the best interest of the firm. This is known as the overinvestment problem. The problem can easily be mitigated but involves taking on debt, which in turn may lead to the firm being

subject to risk shifting and the underinvestment problem. Investors do not desire debt as highly levered firms may have problems taking on new investments as profits from potential investments may be overweighed by deadweight costs due to the large amount of default-risky debt. At times, circumstances are so severe that remaining profit is lower than the project's cost and management are hence reluctant to take on profitable projects. (Jensen and Meckling, 1976) When a firm substitutes low-risk assets for high-risk investments there is an uneven shift of risk between different types of investors. An equity holder gains value whilst bondholders lose value and take on a higher risk and higher probability of default. All gains end up in the equity holders' pockets as bondholders obtain a fixed return regardless of the success of future investments. The firm stands before a dilemma when choosing what investments to take on as some investments favor certain investors more and the firm's investment policy is assumed to be affected by the capital structure of the firm. (Ibid.)

2.2.6 Information Asymmetry

Investors are highly dependent on information trading in a public market. Akerlof (1970) claims that the market consists of "excellent" and "lemon" investments and that markets in general are characterized by moral hazard and adverse selection problems. Moral hazard problems exist due to the information advantage a seller has in comparison to buyers and underlines the importance of available information to investors. Investors are hence no longer able to distinguish between good investments and bad investments and consequently "excellent" investments are being driven out of the market by "lemon" investments. This relation holds in all markets. (Ibid.)

Signaling is hence a most important aspect for investors active on the market. Generally managers and insiders have better information than investors. The firm can be viewed as a "black box" in which equity cash flows give an indication to investors what to expect. Signals such as stock repurchases and increases in dividend influence investor behavior positively and drive up stock prices. Signals such as cash inflows in the form of equity issues or a reduction in dividends negatively influence investor behavior and lead to decreases in stock price. It is evident that there exist serious adverse selection problems with external financing. (Ibid.) Naturally debt and equity are subject to different levels of adverse selection due to the access managers have to private information compared to investors. Investors hence see equity as much riskier than debt and in turn demand a higher risk premium for external equity. (Ibid.)

2.2.7 The Monitoring Role of Blockholders

Ownership concentration is generally not considered to promote corporate governance (La Porta et al., 2002), but the presence of a large shareholder, or blockholder, can significantly reduce or exacerbate several of the discussed agency problems imposed by the division of ownership and control. The most obvious benefit is that blockholders are better enabled to closely monitor the management and Shleifer and Vishny (1986) emphasizes the mitigation

of freerider problem and managerial opportunism. Lins and Kalcheva (2004) find that cash holdings are more negatively related to firm value in presence of excessive managerial control, which is effectively suppressed by a blockholder. By exerting more effective control of managers a blockholder thus can allow higher levels of internal liquidity (Dittmar et al., 2003) in order to mitigate underinvestment problems caused by information asymmetry between management and external capital providers (Myers and Majluf, 1984). A blockholder often provide certain discretion to promptly resolve difficulties which can be very valuable (Pinkowitz et al., 2006). The balance is however fragile and a blockholder can also perform less favorable influence by reducing the management initiative (Burkart, Gromb and Panunzi, 1997) or unilaterally promote their own interests (Shleifer and Vishny, 1997). The prospect of adverse consequences by blockholders, in particular related to tunneling (see further 2.2.9), implies a trade-off for the minority owners, where the benefits of reduced agency costs induce minority shareholders to prefer companies with a blockholder until the point where the advantage is counterbalanced by the expected private benefits the blockholder reallocate from the company (Gilson, 2006). The situation reminds of the dual agency problem related to the possibility of well-informed but biased board of directors not aligned with the general interest of shareholders (Clarke, 2007).

The market for corporate control is a significant restraining force on management in the U.S. market, characterized by highly dispersed ownership (Clarke, 2007), and the inclination to hoard cash is clearly negatively biased by the occurrence of takeovers, as stockpiles of cash can attract the attention of activist investors. Harford et al. (2007) mention how Kirk Kerkorian's attack on Chrysler in 1995 demonstrated how managers' positions are threatened by visibly holding excessive cash, and Faleye (2004) shows how excess cash is a trigger for proxy contests facilitating increased executive turnover and reduced cash holdings. Theoretically an efficient market for corporate control eliminates the agency costs, and allows owners to monitor the work of management by observing the stock price (Jensen and Ruback, 1983). Since a concentrated ownership constitute an impediment to the market for corporate control, although not likely as capable as suggested by Jensen and Ruback, blockholders are required to balance the deficient threat from external correction by exerting an elevated level of monitoring in order to mitigate an expansion of the transaction cost bounds within which management are allowed to operate, suggested by Harford et al. (2007) to distinguish poorly governed U.S. firms. The generally more efficient market for corporate control in the U.S. may be a key explanation to why U.S. studies often find the role of ownership stakes by institutions to be inconsequential, as the market to a larger extent can fulfill a monitoring task the U.S. institutions rarely have the long-term commitment required to do, while the blockholder system have come to dominate in the Nordic region (Nachemson-Ekwall, 2010).

2.2.8 Financing in Different Economic States

Brander and Lewis (1986) developed a model focused on the "limited liability" effect of debt financing. The model challenges financial theory stating that the product market offers a

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random return and is unaffected by firms' debt-equity position in the market. Output market behavior is rather seen as highly correlated with the firm's capital structure and will influence financial decisions made by the firm. In general highly levered firms raise their returns in an upturn market whereas the opposite is true in a downturn market. Managers tend to use the capital structure of the firm as a way to adjust the output market in their favor. Firms that ignore the strategic effect of these financial decisions will have a lower value than a firm that take advantage of these effects. Firms utilizing these effects often have a predatory capital structure. If all firms within an industry use a similar capital structure these advantages will not exist. Symmetric firms primarily use their capital structure as a commitment variable to influence the output equilibrium whereas asymmetric firms use their capital structure to fend off rivals from entering the market that they are on. (Brander and Lewis, 1986)

The capital structure of a firm has a clear influence on the distribution of returns between debt and equity holders but also on equity holders favored output strategy. Firms in an upturn market in which its market position is poor may take more risk than it usually would do in order to solely please its equity holders. Equity holders speak in favor of a capital structure that promotes managers aggressive behavior, which suggests that the managers no longer are trying to prevent the worst from happening but rather do anything that pleases the investor. These agency problems occur as management is concerned about losing their position or appear to be poor managers, which is particularly evident in bankruptcies when it's difficult for outsiders to assess the quality of management's actions. Debt levels in a company may therefore restrict management from taking risk but at the cost of putting too much pressure on management and in turn also reduce industry output. Worth noting is that capital structure varies between industries and similar dilemmas may come about even though the capital structure is not identical to another firm. (Ibid.)

Opposite of what Brander and Lewis argue is what Telser (1966) states in his long purse hypothesis. The long purse hypothesis states the importance of liquid assets in firms and its importance to the firm when unexpected deficiencies come about. Generally no firms are completely scorched from cash and most have cash reserves in order to meet unexpected occurrences. Firms constantly seek monopoly returns in a competitive market and the way to achieve these returns are by two strategies: The predatory firm can either (i) acquire the victim firm or (ii) apply a cutthroat strategy, which is to sell products at predatory prices in order to drive competitors into bankruptcy. To be able to fulfill either of the two strategies the importance of having liquid assets and available credit lines is a requirement as the amount of equity controls what the limit of debt will be, since the level of debt can increase only if the level of equity are sufficient to meet the covenants by creditors. To achieve a monopoly easy access to financial reserves is a requirement when a firm aims to force competition out of business. Liquid assets like debt varies across industries but are more common in more concentrated industries where stronger balance sheets are also expected compared to in a less concentrated industry. (Telser, 1966)

Campello (2003) describes the dynamics of firm's capital structure and its effects on product market outcomes. The work of Campello (2003) is based on the original work of Telser (1966) and Brander and Lewis (1986). High leverage firms are found to lose out on market share to lower levered rivals but in comparison to Telser (1966), Campello (2003) finds that this is only relevant in recessions. The relation however only holds in industries in which leverage varies widely across firms. The earlier mentioned relation existent between leverage and sales growth has also been criticized by Campello (2003), as the relation seems to solely hold in an upturn market. Leveraged firms tend to invest less in a downturn market, which in turn also allow its less levered competitors to gain market share. Leverage is found to be a financial fragility rather than strength if levered firms are found to be in one of the following circumstances: (i) firm leverage is higher than its competitors, (ii) the firm operates in a market where leverage generally is low, or (iii) if a negative shift to demand exist. An interesting observation is that during a recession leveraged firms have a tendency to increase their price-cost margin at the expense of future sales, all in hope of making it through the hard times by increasing prices. The expected outcome of such markups within an industry is that industry rivals will inflate their prices too, resulting in reduced market share losses of financially constrained firms and in turn also a faster recovery for the exposed firm(s). Markup cyclicality depends on the firm's financial constraint as well as its rivals' status. Macroeconomic effects are often forgotten when evaluating firm's capital structure but should not be as firm's activity in the product markets are affected in particular by market changes. (Ibid.)

2.2.9   The Influence of Corporate Governance on Investors' Valuation of Cash

La Porta et al.'s (2002) seminal work on minority investor protection reveals the concept of tunneling, where controlling insiders in countries with weak corporate governance system expropriate corporate funds for private benefit. It's tempting to believe that such behavior would urge investors to demand companies to pay out excess cash as dividends when the likelihood of tunneling is greater, and to some extent this proposition is supported by recent studies. Pinkowitz et al., (2004) find very strong evidence for a relationship between the level of investor protection in different legal regimes and how investors value cash and dividends in a comprehensive study of 35 countries during a ten-year period. The study tests two hypotheses, the first states that minority shareholders assign a lower value to cash holdings in countries with weaker investor protection and thus greater probability of expropriation by controlling shareholders. The second hypothesis states that investors put a premium value on dividends in countries with less investor protection. The authors find evidence strongly supportive of both hypotheses. (Pinkowitz et al., 2004) A working paper by Liu and Chang (2009) concludes that U.S firms with good corporate governance generally holds more cash than other firms during the period 1990-2006, which is in line with Pinkowitz et al.'s (2004) findings. Further, Liu and Chang find that financially constrained firms with good corporate governance hold most cash, and that financial constraint is more important than rigor of governance policies as determinant for cash holdings. (Liu and Chang, 2009)

2.2.10 Macroeconomic Exposure

All firms can to some extent be considered responding to macroeconomic forces from outside the defined system (Ramsey, 1996) and already movements in the macroeconomic contingency can have substantial influence on the value of a firm by distressing cash flows via aggregated demand or changing the cost of capital (Andrén, 2001). Managers and investors are particularly agile to act on signs of downturns, and in the recent credit crunch *The Economist* (2008) called for awareness about Keynes' *paradox of thrift*, prophesying prudent firms to expedite imminent recessions by cutting its spending. Strictly financial disturbances can thus easily propagate into the real economy, also observable as minor disturbances can trigger an adverse feedback loop between greater asset value uncertainty and restrained economic activity, referred to as the financial accelerator by Bernanke et al. (1999). The importance of uncertain asset values for the general economic activity is emphasized by Jankensgård's (2009) results, as Swedish firms during the financial crisis in 1992 raised more cash on net basis by asset sales than on the combined proceeds from new borrowing and equity issues. Asset sales are thus established as a significant source of external liquidity for constrained firms when credit conditions are severe. Then is also the assumption of symmetric exposure challenged, as differences in individual risk perception are of obvious influence. Important determinants for asymmetric exposure identified in studies (e.g. Marston, 2001) are corporate structure, industry belonging and geographical domicile. All those areas are of interest relative firms' cash holdings, and studies on the value of cash related to differences in corporate structure are for example made on firm-level corporate governance (Harford et al., 2007), financial characteristics (Faulkender and Wang, 2006) and the opportunity set available for the firm (Pinkowitz et al., 2004). The importance on industry characteristics for the value of cash is targeted by Campello (2003), while differences in corporate governance systems on an international level and its effect on the value of cash are studied by e.g. Lins and Kalcheva (2004), and Pinkowitz et al. (2006). Vis-à-vis the mentioned sources of asymmetric exposure our study assess differences in corporate structure while our sample is intended to be homogenous regarding industry belonging and geographical domicile. As different to the approach by Harford et al. (2007), Faulkender and Wang (2006) and Pinkowitz et al. (2004), rather than identifying the impact by one aspect of the corporate structure on an aggregated level, our study reviews how investors reward different corporate structures in diverse conditions during the business cycle. To our knowledge that is not previously done.

3 Methodology

This chapter presents a detailed description of the process involved in conducting this study. Firstly, a comprehensive account of the choice of methodology, data and data collection are presented. Subsequently, the choice of statistical method when analyzing the data is described and is followed by a thorough explanation of the variables used in the analysis.

3.1 Methodological Approach

In order to meet the terms of the purpose of this thesis there is a need to perform an analysis over a full business cycle. An empirical study can have a qualitative or quantitative approach or a combination of the two. After studying previous research on the subject it is clear to say that the prevailing method used to state the relationship between stock performance and liquidity is the quantitative method. For this study to be comparable with previous ones the quantitative approach will therefore be used. The chosen method will aid in achieving the stated purpose as the collected data consists of a large number of observations (Bryman and Bell, 2001). Central to the quantitative method are statistical instruments, which are a requirement for achieving reliable conclusions and generalizations in the study (Holme and Solvang, 1996). The alternative qualitative method involves a more in depth analysis of only a few aspects and from our perspective would not be value adding to the study. Due to the time limitations of the study only a small number of observations could be achieved with a qualitative method and in turn mean misleading results.

The study concerns the relationship that can exist between stock return and cash, with a method inspired by earlier research. The intention is to create a model that may see this relationship and thereafter test it against the stated hypotheses as well as compare the results to previous research performed in the same area. The deductive approach is therefore seen as the most suitable method as the study derives from established theories (Bryman and Bell, 2001). The hypotheses will be tested in an empirical study. An inductive approach would have started in the empirical data and states that the hypotheses and models created derive from the empirical data (ibid.). This approach is thus not seen as suitable for the intended study as results cannot be compared with previous studies.

3.2 Data

3.2.1 Data Collection

The collected data is considered to be secondary data and consists of fundamental firm specific data retrieved from Reuters DataStream and firm's quarterly and annual reports. All data is collected in SEK, or when reported in different currency translated to SEK at the currency rate of the relevant date. The data series covers a ten-year period ranging from

December 2000 to December 2009. Since 2004, financial statements follow in compliance with International Financial Reporting Standards (IFRS) and are hence seen as fully reliable.

Other secondary data used in various parts of the thesis derives from published articles, working papers and literature. Working papers and articles have been retrieved from the electronic databases of ELIN@Lund and SSRN.

3.2.2 Time Period and Interval

The macroeconomic environment is constantly affected by disturbances of domestic or foreign origin, most of which are mean reverting but policy changes can shift the environment persistently (Oxelheim and Wihlborg, 2008). Significant and persistent shifts in the properties of earnings, distress and distress costs during the 1980's are identified in several international studies (e.g. Opler and Tittman, 1994; Fama and French, 1995; George and Wang, 2009) and a policy change with large impact in the Nordic region is the deregulation of the Swedish capital markets in the late 1980's (Nachemson-Ekwall, 2010). Obviously any such shifts in the accessibility of cash during the examined time period is undesired because it causes an inappropriate alteration of the perceived value of cash. Though at least an entire business cycle is desirable to cover, major policy-generated shifts in the macroeconomic setting thus constitute an upper boundary restricting the examined time period. As mentioned, most studies have annual observations but shorter intervals are preferable both to gain resolution since much can change during one whole year, and to obtain a reasonable number of observations without overly extending the time period. The shortest meaningful time-interval in this study is however determined by the quarterly release of data on e.g. cash holdings presented to investors.

3.2.3 Sample of Companies

The chosen dataset includes engineering companies quoted in Sweden, Denmark and Finland. The sample distribution between the countries is: Denmark 9.7 %, Sweden 61.3% and Finland 29%. The countries are selected to achieve a sample with similar shareholder protection attributable to corporate governance system and the domestic level of corruption following the rating by Pinkowitz et al. (2006). By reducing the sample to one industry the impact of other variables is somewhat lessened and engineering companies are chosen because their cyclical pattern as well as a strong dependence on continuous investments to maintain value-adding growth. Engineering firms included in DataStream's "Industrials index" have been used. Some sub groups to the index are excluded due to the mismatch with what the definition states. The sub-groups excluded are *industrial transportation*, *support services* and *containers and packaging*. From the sample firms is also excluded due to missing data or too recent listing on any of the stock exchanges. Smaller firms are excluded to ensure that the sample companies' underlying securities are traded as efficiently as possible regarding market liquidity and coverage by financial analysts. Smaller companies tend to have a lower and/or irregular level of activity (Holmén and Högfeldt, 2004) and more volatile stock

performance compared to established companies. The 31 remaining firms included in the sample are however not exposed to identical impact by macro-variables, and primarily it's the three different currency areas involved that can disturb the result.

International trade and integration of capital markets have increased the relative importance of global factors for firms' exposure since the late 1990's (Brooks and Del Negro, 2005), and this is in particular true for firms with a high ratio of foreign sales. Global competition also enforce the importance of industry belonging, and a number of studies confirm how industry belonging is gaining in importance over other sources of impact (e.g. Ammer and Wongswan, 2007). Campello (2003) speaks for both macroeconomic and firm-specific factors. He argues that macroeconomic factors has a clear impact on firms value but also speaks of how it is up to the firm specifically how these macroeconomic effects will influence them (ibid.). Depending on the industry of the firm and the capital structure that the firm chooses to take on, macroeconomic effects will influence firms different from others. Contrary to Campello's diplomatic answer Malliaropulos (1998) and Vuolteenaho (2002) find that the most important driver for changes in firm value is firm-specific factors such as cash flow news that can cause large fluctuations in the firm's value.

3.3 Variables

3.3.1   Dependent Variable

Stock Returns: When estimating investors' perception of cash, or other corporate characteristics, the dependent variable is almost inevitably related to equity value, either as enterprise value by adding the corresponding book value of debt (e.g. Pinkowitz and Williamson, 2007), excessive equity return by discounting for estimated benchmark portfolios (e.g. Faulkender and Wang, 2006), or as continuously compounded returns which is a frequently used method in academic finance literature as it makes the sample's results more easily comparable (Brooks, 2002). In this study the latter is chosen, so our dependent variable is the logarithm of stock returns. Del Negro and Schorfheide (2004) state their preference for stock returns to other variables as it reflects on changes in the market instantly which is considered necessary as we intend to use quarterly data and thus need changes to be registered before the next period begins.

Over time, the market is often proven to be efficient in pricing the signals provided by companies (Lie, 2000; Chou et al., 2009). However, the momentaneous market value reflects how the stock market perceives the exposure rather than the true exposure of a firm (Andrén, 2001) and deviations from what is strictly rational is hence expected due to investor sentiment, in particular during bear market conditions. Although market movements thus incur more noise than real cash flows (Oxelheim and Wihlborg, 2005), this noise can contain a component of "systematic" excessive market movements, possibly indicative of investors' perception of corporate cash and then highly relevant to our study. Enhanced comparability

is hence a crucial advantage of stock returns, tending to reflect common shocks without delay (Brooks and Del Negro, 2004; Ammer and Wongswan, 2007). Faulkender and Wang (2006) also argue for the use of stock returns to capture the market risk sensitivity, while Fama and French (1998) themselves point out the unfortunate in using variables dependent on accounting policies.

Firm-specific risk factors are noisy, and most papers related to asset pricing chose to study portfolio returns in order to benefit from the diversification effect suppressing some noise, but as noted by Faulkender and Wang (2006) the examination of individual stocks is difficult to avoid when analyzing the effect of cash holdings on shareholder wealth. Forming portfolios based on cash holdings with reasonable homogenous characteristics in all other aspects are difficult also within a single industry, and are thus not employed as method.

The problem with excessive noise expected from firm-level stock returns are however most serious in high-frequency data, as more extended time intervals decrease the volatility in true prices while the volatility in the component related to noise is unaffected (Aït-Sahalia and Mykland, 2003). The quarterly observation used in our study ought to absorb some insignificant volatility.

3.3.2   Independent and Control Variables

Cash (C): Similar to Jankensgård (2009) we use cash as an independent variable. The level of cash is put in relation to the firm's stock return during different market states in order to see how investors view cash in up- and down turn markets. The cash and total assets as reported in the previous quarter are used in comparison to the subsequent quarter's stock return, as this is the most recent data available for the investor when assessing the firm.

$$C_t = \frac{Cash_{t-1}}{Total\ Assets_{t-1}}$$

Market Leverage (L): The firm's long term debt in relation to the firm's shareholder equity influences a firm's value according to the trade-off theory. The value of the firm increases due to the value that the tax-shield imposes (Kraus and Litzenberger, 1973). The variable is included to see the influence of leverage on stock returns in comparison to cash influence on stock return.

$$L_t = \frac{Long\ Term\ Debt_t}{Shareholders\ Equity_{t-1}}$$

Access to Capital Markets (Div): A firm's dividend acts as a proxy for a firm's ability to access capital markets. A company with stable dividends signifies that the firm is less expected to experience any capital constraints compared to a non-dividend firm (Fazzari et al., 1988). A stable dividend yield sends positive signals to the investor regarding the financial condition of the firm (Modigliani and Miller, 1963) and hence is relevant for our paper as it is expected to influence investor's view of cash in the firm and in turn the firm's stock

return. We have used the latest stated annual dividend divided by four as the quarterly dividend during that year

$$Div_t = \frac{Dividends_{T \cap t/4}}{Total\ Assets_{t-1}}$$

Market to Book (MtB): The market-to book ratio is a proxy for firm investment opportunities where high values suggest good growth prospects (Fazzari et al., 1988). The firm's investment opportunities have a clear influence on the firm's investment activities and its financial policies (Smith and Watts, 1992). The ratio is of relevance to our paper as it gives us an indication of the firm's expected quarterly growth rate in relation to the quarterly stock returns.

$$MtB_t = \frac{MktV_t}{BookV_{t-1}}$$

International Listing (Intl): Jankensgård (2009) uses a dummy variable regarding the firm's international listing. The firm is defined as internationally listed if it can be found on the New York Stock Exchange or London Stock Exchange. The variable is awarded a value of one if the firm is listed and a value of zero if it is not listed. We choose to use the same variable in our study and like Jankensgård (2009) exclude most exchanges due to their size as well as their inability in achieving external funding to the same extent as the NYSE and LSE.

Blockholder (Block): A dummy variable representing the level of ownership in a firm is included in our study. The level of ownership acts as a proxy for the level of shareholder protection and corporate governance present in the firm. According to La Porta et al., (2002) blockholders give strength to the firm. Blockholders have a tendency to keep cash in-house and look to grow the company rather than distributing profits as dividends. A blockholder is defined as someone owning in excess of 20% of the total shares in a firm, and is represented with a one and a non-block holder with a zero.

Business Group Affiliation (BusG): Jankensgård (2009) uses the dummy variable business group affiliation in his study in which the firm in question is either associated with a defined business group (1) or not (0). In Sweden the Wallenberg group and the Handelsbanken sphere are considered main business groups. A firm is said to be associated with a business group if the group holds voting rights in excess of 10%. The variable is applied in similar fashion in our study.

Return on Assets (ROA): Return on assets is a frequently used variable seen in numerous previous studies. The variable shows the profitability of the firm and is thus highly influential on stock returns outcome.

$$ROA_t = \frac{Net\ Income_t}{Total\ Assets_{t-1}}$$

3.4 Statistical Method

The value of cash is measured through a multiple regression. The model consists of one dependent variable and a number of independent variables.

In order to achieve accurate results suitable estimators must be selected. A suitable estimator should possess the following characteristics; unbiased, efficiency and consistency. For the estimator to be unbiased the estimator must on average estimate the correct value of the dependent variable. Many estimators can be unbiased and it is therefore of importance that the best of these estimators are chosen. The chosen estimator should be the most efficient meaning that it should have the least variance in comparison to other models. For the estimator to be consistent the probability of an accurate estimation must be high. A high probability can be achieved by increasing the number of observations in the sample. (Brooks, 2002)

The model has been carried out in accordance with the ordinary least squares (OLS) method. For the method to be the best linear unbiased regression (BLUE) a number of assumptions must hold in accordance with the Gauss Markov theorem (ibid.). If the assumptions do not hold then there exist regression models that explain the output of the dependent variable better than the current model. Additionally, all conclusions made from the regression have the risk of being biased or being incorrect (ibid.). The first assumption implies that the dependent variable can be explained by a linear function with an intercept that can explain the variables and error term in the regression. Assumption two states that estimations of the dependent variable are on average expected to be correct and if not then it suggests that there is a systematic error in the model. The third assumption holds when the variance for the residual is the same for all observations. When the variance is not dependent on one independent variable the model is homoskedastic. Assumption four states that if covariance exists between residuals autocorrelation is present. Assumption five intends to include data in which it is possible to separate random effects from result of an independent variable. The final assumption is in parenthesis as normal distribution of the sample can be achieved solely by altering the size of the sample. (Ibid.)

Levels of significance have been set to one, five and ten percent and are denoted ***, ** and * respectively. The t-statistic has also been considered as a further mean of evaluating the variables significance. The t-statistic shows significance when it strongly deviates from zero (Gujarati, 2006).

Furthermore, the model has been tested for heteroskedasticity and autocorrelation to see if there exist better estimators for the distribution. The White test determines heteroskedasticity and the Durbin-Watson statistic ascertains the level of autocorrelation respectively. The level of normality has also been tested to see if the sample consists of abnormal observations. The kurtosis and skewness of the distribution are hence analyzed and indicate if the distribution is normally distributed or not. For the sample to be normally

distributed kurtosis and skewness must approximate three and zero respectively. The Jarque-Bera and chi-squared values have also been considered when testing for normality as they better reflect larger samples normality. The central limit theorem has also been referred to when the level of normality has been evaluated. The theorem states that the larger the number of observations the more the distribution in the sample will regress towards a normal distribution. (Ibid) Observations that are missing full data have been removed from the sample as they are assumed to influence the regression in a negative manner.

Multicollinearity has also been tested for in the sample. Pair wise correlation between variables has been considered. Variables with a correlation below 0.8 are not considered to be strongly correlated and are thus not reason for concerns. (Gujarati, 2006)

3.5 Practical Method

The study has two focal points. The first part of the study is focused on the engineering industry in general and the influence included variables have on stock returns for the entire sample. In the second part the sample is divided based on certain characteristics in performance and corporate structure, whereby individual variables in turn is fixated to identify how different conditions can change the impact of the total set of variables. This is done in order to better understand and explain the results observed for the entire sample.

3.5.1   Indicators of Upturns and Downturns in the Market Guiding Investor Sentiment

If running a simple regression on the impact on stock returns by corporate cash holdings the hypothesized differences in specific market conditions will be impossible to single out. In order to separate from the general contribution of cash the specific components related to cash in favorable and unfavorable market conditions respectively, we must introduce two things: (i) a definition for identifying time periods characterized as either upturns or downturns, and (ii) dichotomous dummy variables signifying these properties so as to identify the relevant quarters when running the regression.

Macroeconomic disturbances are assumed to propagate across national borders as well as between the financial environment and the real economy as previously explained (see section 2.2.10). To establish one single indicator revealing investors' appetite for cash in such environments is difficult, and coinciding results by several indicators by different origin are thus the method employed to determine periods when the economic activity is soaring or deteriorating. The volatility index (VIX) computed by the Chicago Board Options Exchange became the premier benchmark for U.S. stock market volatility in the early 1990's, and is today an estimate of the expected volatility in the S&P 500 Index based on near- and next-term put and call options (CBOE, 2009). The index is often referred to as the "fear index", and is widely established as indicator for anxiety among investors although basically related to U.S. stocks. The Swedish business newspaper *Dagens Industri* recently referred to VIX levels exceeding the informal threshold level of 30 to emphasize the severity in the threat

presented to the Swedish stock market by fiscal imbalances in the PIIGS[2]-countries (Mauritzon, 2010). Exhibit 3.1 below shows how VIX has developed during the examined time period, and interestingly the peaks exceeding the mentioned threshold of 30 have corresponding troughs in the Swedish industrial benchmark index SX20PI[3] (Exhibit 3.3), hence validating some explanatory power of VIX as indicator also in Nordic conditions.

VOLATILITY S&P 500 (^VIX)

Week of Oct 20, 2008: ■ ^VIX 79.13
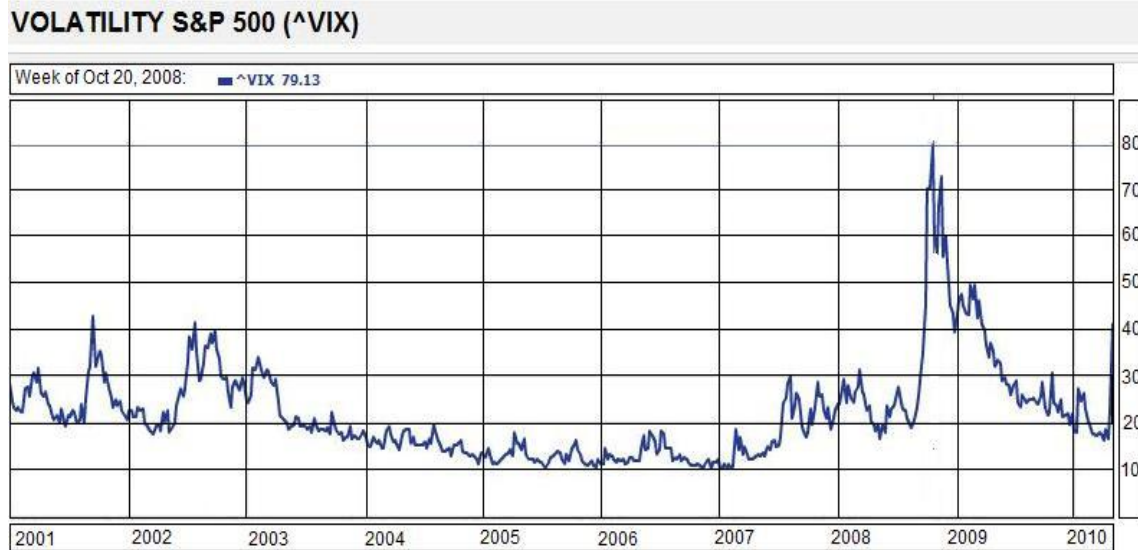
Exhibit 3.1   *Weekly observation of VIX during the period 2nd January 2001 and 12th May 2010 (data from CBOE)*

Interest rate is obviously an important market price variable with a significant impact on the cash flows generated by a firm, and it is empirically well established that the yield curve, or the spread between long- and short-term interest rates, is highly correlated to economic activity. Palazzo (2009) discuss more specifically how changes in the relative interest rates influence firm-level costs of holding cash and thus also the incentives for corporate saving. Changes in interest rates, like changes in exchange rates and inflation, also reflect the development in GDP, aggregated demand, and other important macro variables with an impact on firms in general (Oxelheim and Wihlborg, 2008). The pattern of particular interest to us is what economists call a yield curve inversion, which emerges as the short-term interest rate exceeds the long-term rate. This event is empirically linked to certain changes in GDP, consumption, industrial production and investment. Estrella and Trubin (2006) argue that the body of reasonable theoretical explanations is sufficient to establish the inversion of the yield curve as a robust indicator suitable of predicting also future activity. The primary drivers of the pattern provided by the authors are contracting monetary policy intended to curb high inflation pressure in the short-term, and investor expectations changing the slope by putting pressure on future real interest rates. Since the recession signals given by the yield

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[2] PIIGS includes Portugal, Italy, Ireland, Greece and Spain, all of which are troubled by high fiscal deficits and national debts. Ireland is a late addition to the rather unflattering epithet PIGS.
[3] In not reported comparisons SX20PI is representative also for the corresponding indices CX20PI and HX20PI for Danish and Finnish industrial companies respectively.

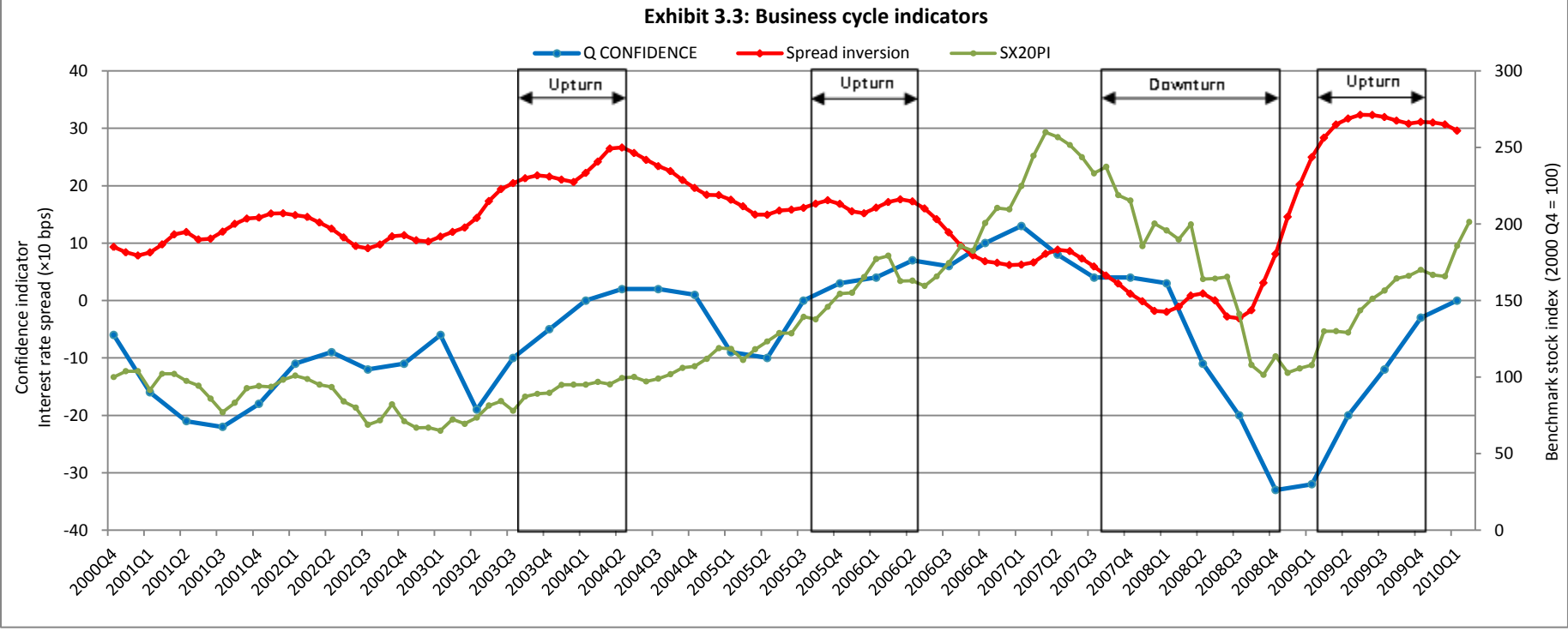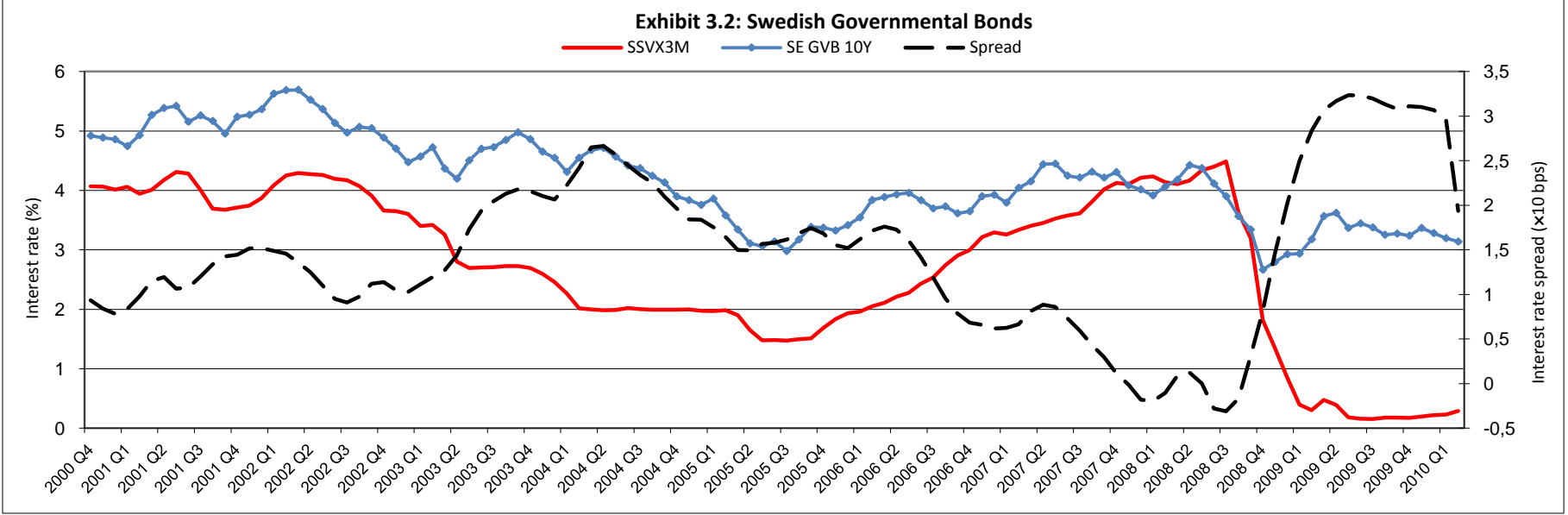curve are based primarily on forward-looking expectations they come significantly earlier than those produced by other indicators that are linked to the real economy (Estrella and Mishkin, 2001). Estrella and Trubin (2006) propose a sophisticated model which translates the input as a measure of the steepness of the yield curve in month *t*, into output as the probability of recession occurring in month *t+12* i.e. one year ahead following the normal distribution. Note that the indicator is based on the level of spread and not simply occurrences of yield curve inversion. Treasury rates are recommended for best consistency and suggested maturities are three months and ten years. The model is claimed to correctly predict each recession since 1968 by the authors. The lowest predicted probability of recession actually followed by one is the recession in 1990, and this result exceeds the highest erroneously predicted recession. The financial crisis during 2008-2009 is not included in the sample, but the last observation for July 2007 results in a probability of recession only three percentage points below the estimated probability anticipating the recession of 1990. (Estrella and Trubin, 2006)

When assessing the model, the authors propose all monthly or quarterly observations by National Bureau of Economic Research (NBER) between peak and the subsequent troughs to be considered as recession in the U.S., excluding the peak observation itself while counting the trough. We follow this recommendation to count only quarters subsequent to a shift in our indicators rather than the breakpoint itself. We have not used the full model since the parameters in the model determined by Estrella and Trubin (2006) are specific for the U.S. market. In the spirit of their interesting results we have however considered the occurrence of very low or even inversed interest rate spreads an important measure when determining the period defined as downturn. Rather than introducing ECB-rates influenced by the economic activity in a much larger and more dispersed currency-area, Swedish three-month and ten year governmental bonds are used as benchmarks, considered to better represent the regional Nordic conditions because of the formal independence of Sweden relative e.g. the Euro. Both interest rates and the intermediate spread are presented in Exhibit 3.2 below.

One problem with finding indicators based on industry-specific real measures is an inevitable time lag relative the financial market. As part of the monthly economic tendency survey published by the Swedish National Institute of Economic Research, Konjunkturinstitutet (KI), an industrial confidence indicator is computed based on a number of estimations made by surveyed executives. Two benefits are the industry-specificity matching our sample, and that the indicator is intended to be forward-looking. Since enterprise values are based on discounted expectations of future profits (Koller et al. 2005) a forward-looking real measure may harmonize better with investors' sentiment. Quarterly observations of the confidence indicator are presented in Exhibit 3.3.

Exhibit 3.2: Swedish Governmental Bonds

SSVX3M — SE GVB 10Y — Spread

Interest rate (%)

Interest rate spread (×10 bps)

Exhibit 3.3: Business cycle indicators

Q CONFIDENCE — Spread inversion — SX20PI

Confidence indicator
Interest rate spread (×10 bps)

Benchmark stock index (2000 Q4 = 100)

Upturn   Upturn   Downturn   Upturn

The set of indicators mentioned above offer a wide range of expectation input; executives' view on the near future of the real economy from an industry-specific angle, the markets' view on its own inherent uncertainty and the more policy-related general economic conditions communicated by interest rates. Based on these indicators we identify groups of at least two adjacent quarters which can be qualitatively categorized either as upturn or downturn. The perception of investors, creditors and managers alike are expected to be guided by the gradient rather than absolute levels of the macro environment, except for the interest yield inversion where Estrella and Trubin (2006) convincingly advocate the use of levels, and consequently the categories are primarily formed by significant breakpoints in the gradients of the indicators. From a strictly methodological perspective using absolute levels may appear less arbitrary, but the reader can easily establish that levels alone fail to explain e.g. much of the variation in the included benchmark index in Exhibit 3.3. Although not reported, these assumptions are confirmed by inconsequential results when applying our model on the same sample based on high- and low levels instead of positive and negative trends.

3.5.2   Periods in our Time-series defined as Upturns or Downturns

The period categorized as downturn begins by the fourth quarter of 2007 and extends through the fourth quarter of 2008 (note that all periods are marked on the chart in Exhibit 3.3). The industry confidence indicator has a significant break point between the first and second quarters of 2007 and declines from its highest quotation during the entire observed period (13) for seven consecutive quarters to a bottom at -33[4] in the fourth quarter of 2008. The 10-year interest rate has a break from a three-year high (4.4495%) in July 2007 also suggestive of a more pessimistic view in the market, while the interest rate spread fall short of the 0.5 percent level during the fourth quarter, steadily gravitating towards an inversion occurring in January 2008. The VIX increases suddenly from very low levels in mid-2007, approaching the threshold value of 30 which is also exceeded by the trend line in the end of 2007. The downturn ends as the ten-year interest rate reach a global minimum in December 2008, allowing the interest rate spread to recover above the 0.5 percent level in January 2009. Also the plummeting confidence interval begin to recover post to the fourth quarter of 2008, while the VIX of January 2009, yet well above normal levels, is only half of the quoted levels between the third and fourth quarters of 2008.

The first observed period categorized as upturn begin by the fourth quarter of 2003 and extends through the second quarter of 2004. The confidence indicator increases significantly during the preceding quarter (from -19 to -10) and the positive trend is maintained throughout the period to level out in the third quarter. VIX levels out below 20 in the third quarter after a rather noisy period and are then sustained at low levels. The short-term interest rate is falling, indicative of cheaper liquidity, while the interest rate spread continue

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[4] The monthly indicator actually reaches as low as -41, which is a result on par with the lowest quotation during the Swedish financial crisis in 1992 (-45).

to grow to reach a top quotation in the second quarter of 2004, followed by the extended period of declining long-term interest rates signifying a less optimistic view on the future.

The second upturn period is set to begin two years later by the fourth quarter in 2005 and extend through the second quarter of 2006. The confidence indicator rises significantly between the second and third quarter and sustain a positive slope until the second quarter of 2006, suggesting a favorable development. Both the long-term and the short-term interest rate increases from the fourth quarter of 2005 (September and October respectively) but from unusually low levels. Both the interest rate spread and VIX are fairly flat during the period, but the spread is declining sustainably after the second quarter of 2006 due to falling long-term interest rates in tandem with persistently rising short-term rates, thus less favorable for investor sentiment.

The starting-point of the last period defined as upturn is rather messy, but the drastic decline in the confidence indicator due to the financial crisis is recovering rapidly, beginning by the first quarter in 2009 and reaching the average level of the indicator as stated by Konjunkturinstitutet early in the fourth quarter of 2009. Extremely low short-term interest levels and depressed valuations make the remaining three quarters of 2009 look favorable. The interest rate spread is ascending very fast due to recovery in the long-term interest rates prior to the period and VIX reaches below 30 in the second quarter for the first time in a year indicative of some newly instilled investor confidence.

3.5.3 Regression Model in Part One

The logarithm of stock returns acts as our dependent variable in all regressions. The main explanatory variables in the regression are *cash in upturn* and *cash in downturn* and denote cash in a firm held during upturns and downturns respectively as defined in section 3.5.2. The remaining variables are control variables defined in section 3.3.2 and are included to prevent omitted variable bias (Gujarati, 2006). Equation 3.1 gives the main regression.

(3.1) $\quad r_{i,t}^{*} = \alpha_0 + \beta_1 C_{i,t} + \beta_2 C_{i,t}\theta_{Up,t} + \beta_3 C_{i,t}\theta_{Down,t} + \beta_4 L_{i,t} + \beta_5 MtB_{i,t} + \beta_6 Block_{i,t} + \beta_7 BusG_{i,t}$
$\qquad\qquad + \beta_8 Div_{i,t} + \beta_9 Intl_{i,t} + \beta_{10} ROA_{i,t} + \beta_{11}\theta_{Up,t} + \beta_{12}\theta_{Down,t} + \varepsilon_{i,t}$

α_0 is the regression intercept, β_j are the regression coefficients for variables j={1:12}, $\theta_{Down,t}$ and $\theta_{Up,t}$ are dichotomous dummy variables and $\varepsilon_{i,t}$ an unobservable error term. The dichotomous dummy variables are applied to the cash variable in order to model the impact of the defined periods of upturn and downturn with the following properties.

$$\theta_{Down,t} = \begin{cases} 0, Not\ downturn \\ 1, Downturn \end{cases}$$

$$\theta_{Up,t} = \begin{cases} 0, Not\ upturn \\ 1, Upturn \end{cases}$$

The dummy variables for upturn and downturn are also included separately to allow for a shifted intercept during the periods of downturn and upturns.

3.5.4 Hypothesized Result from Part One

Our expectations are purely based on the theoretical framework presented in the previous chapter. Cash over the full period is expected to relate positively to stock returns as Telser (1966) states that most firms have cash reserves for unexpected reoccurrences and thus should be positive on stock returns. Cash in an upturn is expected to negatively influence stock returns as Campello (2003) states how cash limits firm growth. In a downturn cash is expected to positively influence stock returns as Campello (2003) argues how firms with cash poses great growth opportunities compared to more levered firms. Market leverage is thought to be negative in relation to stock returns, as investors dislike leverage according to the pecking order theory (Myers and Majluf, 1984). A firm with a block holder is expected to positively influence stock returns according to La Porta et al. (2002) as a blockholder takes on a monitoring role which in turn implies less problems associated with agency costs and information asymmetry. Firms associated with business groups are thought to have a negative impact on stock returns as being affiliated with business groups is seen as a liability due to the close relation business groups are assumed to have with a particular bank (Jankensgård, 2009). Jankensgård (2009) also stresses the strength of being internationally listed as this gives the firm access to new capital markets thus implying a positive impact on stock returns. A firm paying out dividends is a proxy for access to capital markets and implies that the firm has stable financials and thus should have a positive impact on stock returns (ibid.). Market to book value is a proxy for investment opportunities and is assumed to have a positive relation to stock returns as investment opportunities can suggest good expected returns (ibid.). Upturn and downturn are indicators of the economic state during certain time periods. The variables are thought to have a positive and negative influence on stock returns respectively. Return on assets is expected to contribute positively to stock returns as profitability demonstrates the firm's ability to internally generate funds (ibid.).

Industry		
Variable	**Value**	**Expectations**
Cash	Cash/Total assets	Positive
Cash in Upturn	Cash*Upturn dummy	Negative
Cash in Downturn	Cash*Downturn dummy	Positive
Market Leverage	D/E book	Negative
Market to Book	MV/BV	Positive
Block Holder	Dummy	Positive
Business Group	Dummy	Negative
Dividends	Dividend/Total assets	Positive
International Listing	Dummy	Positive
Upturn	Dummy	Positive
Downturn	Dummy	Negative
Return on Assets	Net profit/Total assets	Positive

Table 3.1: *The expectations for each variable for the industry*

3.5.5 Regression Model in Part Two

Basically the regression from part one is tested on subsamples in part two primarily to enhance the interpretation of the results from part one. The second part of the study has been inspired by the work of Pinkowitz et al. (2006) that based on characteristics of the firm regrouped firms into high and low portfolios when above or below the median on a certain variable in order to distinguish how the value of corporate cash varies depending on the variable in question. Our study has in similar fashion regrouped firms into different categories based on the characteristics of the firm. Although it is common to compare only the top- and bottom strata for enhanced significance (e.g. Harford et al., 2007; George and Hwang, 2009), we only categorize companies in two subsamples per variable since the size of the sample is considered insufficient to facilitate more stratified tests. The four listed categories below have been identified as most relevant and value adding to our thesis. Previous research by Jankensgård (2009) has identified two of the four variables as key aspects in influencing the value of cash in a firm. He finds that international listing strengthens the position of a firm as it contributes to inflows from more than one capital market. The market to book value is seen as a proxy for the firm's investment opportunities and comparing firms with high and low market to book values is hence relevant as the need for cash are expected to vary depending on available growth opportunities. The category block holder is also included due to the relative importance of blockholders in the Nordic corporate governance system (Nachemson-Ekvall, 2010) and the inherent ambiguous relationship between blockholders and minority owners (Gilson, 2006). La Porta et al. (2002) states the importance of having a strong owner in a firm whereas Jankensgård (2009) states that this is not necessarily true if the block holder is connected to a bank. Including the block holder category hence also highlights the issues associated with agency theory. Return on assets is categorized due the large number of reoccurrences in previous studies and also due to the strong association profitability has on stock returns. The four categories used are summarized below:

- Firms with or without an international listing (regression 3.2)

- Firms with or without blockholders (regression 3.3)

- Firms with return on assets above or below the median (regression 3.4)

- Firms with a market to book value above or below the median (regression 3.5)

The regressions for the four categories are presented in equation 3.2-3.5 below:

(3.2) $\quad r_{i,t}^* = \alpha_0 + \beta_1 C_{i,t} Intl_{i,t} + \beta_2 C_{i,t} \theta_{Up,t} Intl_{i,t} + \beta_3 C_{i,t} \theta_{Down,t} Intl_{i,t} + \beta_4 L_{i,t} Intl_{i,t}$
$\qquad + \beta_5 MtB_{i,t} Intl_{i,t} + \beta_6 Block_{i,t} Intl_{i,t} + \beta_7 BusG_{i,t} Intl_{i,t} + \beta_8 Div_{i,t} Intl_{i,t} + \beta_9 Intl_{i,t}$
$\qquad + \beta_{10} ROA_{i,t} Intl_{i,t} + \beta_{10} \theta_{Up,t} Intl_{i,t} + \beta_{11} \theta_{Down,t} Intl_{i,t} + \varepsilon_{i,t}$

$$(3.3) \quad r_{i,t}^* = \alpha_0 + \beta_1 C_{i,t} Block_{i,t} + \beta_2 C_{i,t} \theta_{Up,t} Block_{i,t} + \beta_3 C_{i,t} \theta_{Down,t} Block_{i,t} + \beta_4 L_{i,t} Block_{i,t}$$
$$+ \beta_5 MtB_{i,t} Block_{i,t_{i,t}} + \beta_6 Block_{i,t} + \beta_7 BusG_{i,t} Block_{i,t} + \beta_8 Div_{i,t} Block_{i,t}$$
$$+ \beta_9 Intl_{i,t} Block_{i,t} + \beta_{10} ROA_{i,t} Block_{i,t} + \beta_{10} \theta_{Up,t} Block_{i,t} + \beta_{11} \theta_{Down,t} Block_{i,t} + \varepsilon_{i,t}$$

$$(3.4) \quad r_{i,t}^* = \alpha_0 + \beta_1 C_{i,t} MTB_{i,t} + \beta_2 C_{i,t} \theta_{Up,t} MTB_{i,t} + \beta_3 C_{i,t} \theta_{Down,t} MTB_{i,t} + \beta_4 L_{i,t} MTB_{i,t}$$
$$+ \beta_5 MTB_{i,t} MTB_{i,t_{i,t}} + \beta_6 MTB_{i,t} + \beta_7 BusG_{i,t} MTB_{i,t} + \beta_8 Div_{i,t} MTB_{i,t} + \beta_9 Intl_{i,t} MTB_{i,t}$$
$$+ \beta_{10} ROA_{i,t} MTB_{i,t} + \beta_{10} \theta_{Up,t} MTB_{i,t} + \beta_{11} \theta_{Down,t} MTB_{i,t} + \beta_{12} Block_{i,t} MTB_{i,t} + \varepsilon_{i,t}$$

$$(3.5) \quad r_{i,t}^* = \alpha_0 + \beta_1 C_{i,t} ROA_{i,t} + \beta_2 C_{i,t} \theta_{Up,t} ROA_{i,t} + \beta_3 C_{i,t} \theta_{Down,t} ROA_{i,t} + \beta_4 L_{i,t} ROA_{i,t}$$
$$+ \beta_5 MTB_{i,t} ROA_{i,t_{i,t}} + \beta_6 ROA_{i,t} + \beta_7 BusG_{i,t} ROA_{i,t} + \beta_8 Div_{i,t} ROA_{i,t} + \beta_9 Intl_{i,t} ROA_{i,t}$$
$$+ \beta_{10} ROA_{i,t} ROA_{i,t} + \beta_{10} \theta_{Up,t} ROA_{i,t} + \beta_{11} \theta_{Down,t} ROA_{i,t} + \beta_{12} Block_{i,t} ROA_{i,t} + \varepsilon_{i,t}$$

3.5.6 Hypothesized Results for Part Two

Only expected variables of value for the particular test have been commented on in this section. The test for international listing intends to show us if having an extra lifeline in the form of access to international capital markets will have an effect on the value of cash for firms. In accordance with Jankensgård (2009) a firm with an international listing is expected to value cash less than a firm with no international listing, as financing options are vaster when under financial constrain.

We have reason to believe that blockholders have some influence on how firms value cash as theory states that blockholders bring financial strength to the firm. Blockholder firms are assumed to value cash more than non-blockholder firms as blockholders monitor management, which implies more shareholder protection (Shleifer and Vishny, 1986).

Firms with a market to book above or below the median are expected to have an influence on the value of cash in firms as growth is seen as a value-enhancing characteristic that is dependent on cash or other forms of financing. High growth firms are thus thought to consistently value cash more than low-growth firms as cash is intended for investments (Faulkender and Wang, 2006).

Firms with return on asset above median are expected to value cash more, since high profitability is likely to be considered an indicator of good management and efficient corporate governance.

3.6 Research Methodology

3.6.1 Reliability

In order for our research to be reliable two challenges must be tackled. Firstly, the collected data must be derived from reliable sources and secondly the process of conducting the research must be done in a reliable manner. Our study comprises of quarterly data during the period 2001-2010 collected from Reuters DataStream and companies' annual reports. Data has been compared between the two sources to limit the possibility of error. The process of

conducting the research has been dealt with in a clear, consistent and structured way, which enables replicating research to yield comparable results. To process all data and perform the intended regressions Microsoft Excel 2007 and EViews 7.0 have been used respectively.

The data has been limited to large cap listed engineering companies on the Swedish, Finnish and Danish stock exchanges. Even though this will only yield results based on a specified sample we can with confidence say that the results will give a general picture of the behavior of engineering companies in the studied business cycle. Similar studies to ours have had the same approach and achieved successful results, which puts further reliability in our data sample. The research process has been conducted in utter caution in order to limit the degree of error when testing OLS assumptions and specification errors of the sample.

3.6.2   Validity

Validity is concerned with the "truth" that the researched topic states, that is, if the researched topic actually reflects reality. There are two areas in our paper where validity is of great importance. The first area concerns the validity of our results. The findings achieved have been based on the previously collected data. The data has a strong association with the topic and have been gathered in a cautious and reliable manner. The second area regards the way we come to our conclusions and interpret the results achieved. Since there has been some similar research in the area, a comparison can be made which can confirm the validity of the study. Our analysis aims to merge theory and results as unbiased as possible, and although the conclusions naturally are subjective, the presentation intends to facilitate a qualitative assessment by the reader.

3.6.3   Source Criticism

The sources used in the study consist of new and old articles from ELIN@Lund, some articles dating back to the beginning of the 1950's and others recently published. The purpose of including both new and old articles on the subject is to gain a wider perspective. The old articles contribute to the study with fundamental ideas on the subject while more recent articles bring newer perspectives on the subject. The older articles can be criticized for being outdated and in order to choose the ones with most relevance the ones referred to in recent work are chosen. The methodology and results of unpublished articles retrieved from SSRN is not objectively reviewed and must thus be treated even more critically than published articles.

Another aspect to consider is the origins of the data collected. If the sources provide wrongful information this would contribute to misleading results. The information used in this study is however considered most reliable. The data has been retrieved from company's quarterly and annual reports as well as Reuters DataStream and is thus not considered to contain any false information. With the laws and legislations imposed on company reporting one can with confidence state that the collected data is as reliable as it gets.

4 Empirical Findings

This chapter intends to present the empirical findings and its statistical significance. The chapter commences by describing sample specific statistics and presents the heteroskedasticity, autocorrelation, multicollinearity and normality. Thereafter, the main regression followed by the firm-specific regressions are presented, highlighting the differences between firms with and without block holders and international listing as well as the differences between firms that have values above or below the median market to book and return on assets respectively.

4.1 Descriptive Statistics

The sample after losses consists of 1116 observations from 31 engineering firms. The obtained model fulfils all Gauss-Markov assumptions and achieves a best linear unbiased regression, which states that no better estimators can be used to carry out the same regression. Statistics for the whole sample are presented below.

	Group Statistics				
	Mean	Median	Std. Dev.	Maximum	Minimum
Log stock return	0,01	0,02	0,08	0,40	-0,41
Cash	0,07	0,05	0,06	0,70	0,00
Cash in Upturn	0,02	0,00	0,04	0,29	0,00
Cash in Downturn	0,01	0,00	0,03	0,70	0,00
Market Leverage	0,54	0,44	0,55	4,53	0,00
Market to Book	2,49	2,07	1,54	11,21	0,28
Block Holder	0,58	1,00	0,49	1,00	0,00
Business Group	0,22	0,00	0,41	1,00	0,00
Dividends	0,05	0,03	0,06	0,44	0,00
International listing	0,24	0,00	0,42	1,00	0,00
Upturn	0,25	0,00	0,43	1,00	0,00
Downturn	0,14	0,00	0,35	1,00	0,00
Return on Assets	0,02	0,02	0,03	0,62	-0,17

Table 4.1 *provides an overview of the total sample*

Dispersion in the variables is seen as low to moderate with the only notable exception found in the variable market value to book value where the minimum value is 0.28 and the maximum is 11.21. The sample shows signs of normality even though the values in kurtosis and skewness indicate that the sample is slightly negatively skewed and leptokurtic. The Jarque-Bera value in relation to the number of observations is considered low and gives a Chi-square value of 0.0024. The obtained Chi-square value does not exceed the critical Chi-square value (at two degrees of freedom) of 0.1026. The null hypothesis regarding normal distribution is hence not rejected. The level of probability further strengthens the normal distribution of the sample.

Series: Residuals	
Sample 1 1116	
Observations 1116	
Mean	1.62e-18
Median	0.001080
Maximum	0.351084
Minimum	-0.351518
Std. Dev.	0.072413
Skewness	-0.411432
Kurtosis	4.843348
Jarque-Bera	189.4891
Probability	0.000000
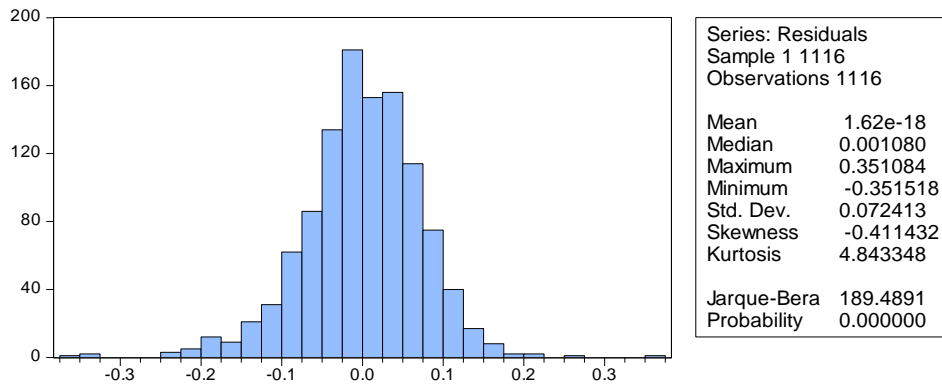
Exhibit 4.1: *The reasonably bell-shaped curve and values of kurtosis, skewness and Jarque-Bera demonstrate the normal distribution of the sample.*

The White test reveals that the sample is homoskedastic with a probability of 0.0022 significantly close to 0. The Durbin-Watson statistic of 1.78 implies that the sample is free from autocorrelation and in similar fashion to homoskedasticy proposes that no better estimators can be found to explain the residual distribution. A low level of multicollinearity is detected in the sample. The correlation matrix demonstrated below implies that there are no pair wise correlations of significance present in the sample and hence no significant level of multicollinearity present.

	Correlation Matrix												
	Log Return	Cash	Cash Up	Cash Down	D/E	MTB	Blockholder	Bus.group	Dividends	Int.listing	Upturn	Downturn	ROA
Log Return	1,000	0,060	0,200	-0,236	-0,018	-0,119	0,012	-0,013	0,039	0,014	0,283	-0,430	0,056
Cash		1,000	0,260	0,317	-0,242	0,139	0,053	-0,001	0,034	-0,052	0,013	-0,036	0,026
Cash Up			1,000	-0,117	-0,077	-0,021	0,008	0,008	0,013	0,023	0,787	-0,182	-0,001
Cash Down				1,000	-0,053	0,166	0,011	-0,032	-0,028	-0,032	-0,149	0,643	0,007
D/E					1,000	-0,018	-0,085	0,030	0,336	-0,023	-0,017	-0,012	-0,132
MTB						1,000	0,097	0,075	0,318	-0,085	-0,080	0,230	0,210
Blockholder							1,000	0,294	-0,114	-0,020	0,000	0,000	0,016
Bus.group								1,000	-0,145	0,438	-0,007	-0,007	0,048
Dividends									1,000	-0,141	-0,011	-0,039	0,163
Int.listing										1,000	0,040	0,003	-0,089
Upturn											1,000	-0,232	-0,022
Downturn												1,000	0,030
ROA													1,000

Exhibit 4.2*:   Correlation matrix of the variables included in our study*

4.2 Results

4.2.1 Industry

The sample's adjusted R-squared value explains approximately 23% of the variance in the dependent variable. Even though the adjusted coefficient of determination is low the level of significance in the sample is high as the probability is 0. The regression states that out of the 12 variables only four are significant to a five percent significance level. The significant variables corresponding t-statistic further determines the significance as they all strongly deviate from zero. The variable denoted *cash* is significant (*) and the coefficient suggest cash in general to have a positive influence on the stock return. *Cash in upturn* is significant (**) and indicates that in an upturn cash has a negative impact on the stock return. In comparison to holding cash over the full period, cash in an upturn has a strong negative effect on the stock return. The variables *upturn* and *downturn* are significant (***) and indicate as predicted that in an upturn stock returns increase and in a downturn stock returns decrease. The contribution of the coefficients in either scenario is weak. The very high t-statistics indicate that the selection of quarters defined as upturns and downturns respectively is highly relevant. The final variable *return on assets* is significant (***) and has a strong positive impact on stock returns. Worth mentioning is the insignificance of *market leverage* in the regression. Market leverage has a notably high probability and a very weak negative effect on stock returns.

Variables	Industry	Variables	Industry
Constant	0.007	Business Group	-0.006
	(1.030)		(-0.868)
Cash	0.084*	Dividends	0.047
	(1.658)		(1.130)
Cash in Upturn	-0.218**	International Listing	0.006
	(-2.023)		(1.033)
Cash in Downturn	0.097	Upturn	0.051***
	(0.966)		(5.798)
Market Leverage	-0.001	Downturn	-0.095***
	(-0.299)		(-10.372)
Market to Book	-0.003	ROA	0.210***
	(-1.580)		(-2.824)
Blockholder	0.004	Observations	1116
	(0.862)	Adjusted R2	0.23

Table 4.2 *demonstrates the values from the regression for the industry in general*

4.2.2 International Listing

In the category *firms with and without international listing* the variable *cash* is significant for both types of firm. Cash is significant to a ten percent significance level in internationally listed companies whereas cash in not internationally listed firms are significant to a five percent significance level. Cash has a positive impact on stock returns in both cases with the exception

that cash in not internationally listed firms contribute more to stock returns than internationally listed firms. *Cash in upturn* is highly significant (***) in firms that are not internationally listed and has a very negative impact on the stock return. The same variable is insignificant for internationally listed firms. *Market leverage* and *market to book* are however highly significant (***) for firms that are internationally listed. The variables have a weak influence on the stock return and impact the stock returns positively and negatively respectively. Market leverage is highly insignificant in firms that are not internationally listed. The variable *block holder* is significant (*) in firms that are not listed internationally and has a weak positive impact on the stock returns. The significance in the remaining variables is extremely high (***) for internationally listed firms and the coefficients for return on assets and access to capital markets contribute very positively to the stock return. Significance in the last three variables is extremely high (***) for not internationally listed firms in which influence on stock return is strongly positive for *return on assets* but weak in *upturn*. Stock return is negatively influenced by the final variable *downturn*. The t-statistics strongly deviate from 0 in each significant variable, which further strengthens the significance of the variables. Notable is that cash in downturn is not significant in either case.

4.2.3   ROA

There are significant differences and similarities between the two groups of firms in the category firms with a return on assets above and below median. *Cash* in firms with a ROA above the median has a high significance (***) and positively influences the stock return. Cash in firms with a ROA below the median is also significant (**) but does not influence the stock return to the same extent as firms with a ROA above median. *Cash in upturn* is very significant (***) for firms with a ROA above the median and has a strong negative influence on the stock return. *Market leverage* shows itself significant (***) in firms with a ROA above the median, which in similar fashion to the previous variable has a negative impact on the stock return. The coefficient is however weaker than in the previous variable. The market to book value in firms with a ROA below the median is significant (***) and has a weak negative effect on the stock return. The *block holder* variable is also significant (**) but in the same way as the previous variable has a weak positive impact on the stock return. Notable is that the same variable is highly insignificant for firms with a ROA above the median. *Business group affiliation* in firms with a ROA above the median is significant (*) and has a weak negative effect on the stock return. The variable *international listing* is significant (*) in firms with a ROA above the median and has a weak positive influence on the stock return. The variables *upturn* and *downturn* are very significant (***) in both groups of firms and have a weak positive and negative influence on stock returns respectively. The variable *return on assets* is also significant in both cases (**, ***) and has a positive influence on the stock return. Noteworthy is that cash in downturn is insignificant in both cases.

Variables	International Listed	Not International Listed
Constant	0.000	0.003
	(-0.307)	(0.732)
Cash	0.072*	0.100**
	(1.668)	(2.167)
Cash in Upturn	-0.044	-0.281***
	(-0.452)	(-2.599)
Cash in Downturn	0.361	0.070
	(1.392)	(0.759)
Market Leverage	0.022***	-0.001
	(3.746)	(-0.317)
Market to Book	-0.010***	-0.002
	(-4.527)	(-1.473)
Blockholder	-0.002	0.008**
	(-0.427)	(1.791)
Business Group	-0.002	-0.011
	(-0.522)	(-1.542)
Dividends	0.517***	0.048
	(3.982)	(1.228)
Return on Assets	0.630***	0.202***
	(4.226)	(2.957)
Upturn	0.043***	0.055***
	(5.715)	(6.255)
Downturn	-0.108***	-0.093***
	(-8.213)	(-10.117)
Observations	1116	1116
Adjusted R2	0.21	0.34

Table 4.3 *Regression values refer to firms that are internationally and not internationally listed.*

Variables	ROA Above Median	ROA Below Median
Constant	0.002	0.001
	(1.117)	(0.350)
Cash	0.167***	0.101**
	(4.312)	(2.031)
Cash in Upturn	-0.311***	-0.182
	(-3.536)	(-1.546)
Cash in Downturn	0.146	0.045
	(1.003)	(0.491)
Market Leverage	0.013***	-0.004
	(3.603)	(-0.903)
Market to Book	0.000	-0.008***
	(0.158)	(-0.3779)
Blockholder	0.002	0.012**
	(0.650)	(2.333)
Business Group	-0.009*	-0.006
	(-1.720)	(-0.810)
Dividends	-0.029	0.068
	(-0.817)	(1.455)
International Listing	0.010**	0.05
	(1.945)	(0.800)
Upturn	0.038***	0.074***
	(5.278)	(7.921)
Downturn	-0.092***	-0.087***
	(-8.994)	(-9.485)
ROA	0.132**	0.376***
	(-2.494)	(3.026)
Observations	1116	1116
Adjusted R2	0.230	0.267

Table 4.4 *Regression values refer to firms with a ROA above and below the median.*

4.2.4 Blockholder

In the third category, blockholder/non-block holder *cash* and *cash in upturn* are very significant (***) in firms with blockholders. Cash in these firms positively impact the stock return whereas cash in upturn has a strong negative influence on stock return. *Cash in downturn* is significant (**) for non-blockholder firms and has a positive impact on the stock return. Worth noting is that cash in downturn for blockholder firms is highly insignificant. *Market to book* is significant (*) for firms with blockholders and has a strong positive influence on the stock return. The variable *return on assets* is highly significant (***) for both groups of firms with the only difference being that influence on stock returns is stronger in block holder firms than in non-block holder firms. The variables *access to capital markets* and *international listing* are significant (**) for firms with no block holders. The variables have a weak influence on stock returns. The variables *upturn* and *downturn* are significant (***) in both types of firm and influence stock returns in a positive and negative manner.

4.2.5 Market to Book

In the category market to book above and below median the variables *cash* and *cash in upturn* are highly significant (***) for the group of firms with a market to book below the median. Cash throughout the period has a strong positive effect on stock return whereas cash in upturn has a strong negative impact on stock return. The variable *cash in downturn* is significant (**) in firms with a market to book value above the median and has a strong positive influence on the stock return. Firms with a market to book below the median show strong significance (***) in the variable *access to capital markets*, which in turn strongly impacts the stock return in a positive manner. The same variable is completely insignificant to the other group of firms and is worth mentioning following the high significance for the first group of firms. The variables *upturn* and *downturn* are significant (***) in both cases and have a weak positive and weak negative effect respectively on the stock return. *Return on assets* is highly significant for firms with a market to book above the median and has a strong positive effect on the stock return.

Variables	Blockholder	Non-blockholder
Constant	0.001	0.001
	(0.621)	(0.441)
Cash	0.132***	0.088
	(3.371)	(1.595)
Cash in Upturn	-0.344***	-0.153
	(-3.249)	(-1.441)
Cash in Downturn	0.012	0.281*
	(0.145)	(1.801)
Market Leverage	0.006	-0.006
	(1.467)	(-1.280)
Market to Book	-0.003*	-0.001
	(-1.696)	(-0.694)
Return on Assets	0.317***	0.171***
	(3.374)	(2.776)
Business Group	-0.006	-0.006
	(-1.107)	(-0.550)
Dividends	0.045	0.088**
	(0.714)	(2.079)
International Listing	0.006	0.013
	(1.147)	(2.008)
Upturn	0.055***	0.058***
	(6.503)	(6.946)
Downturn	-0.081***	-0.115***
	(-9.995)	(-10.248)
Observations	1116	1116
Adjusted R2	0.22	0.26

Table 4.5 *Regression values refer to firms with and without a block holder.*

Variables	MTB Above Median	MTB Below Median
Constant	-0.001	0.001
	(-0.654)	0.526
Cash	-0.029	0.185***
	(-0.724)	3.654
Cash in Upturn	0.062	-0.432***
	(0.655)	(-3.723)
Cash in Downturn	0.372**	-0.039
	(2.390)	(-0.441)
Market Leverage	0.003	0.005
	(-0.730)	(0.954)
Market to Book	-0.003***	-0.010***
	(-2.724)	(-2.962)
Blockholder	0.006	0.007
	(1.573)	(1.289)
Business Group	-0.003	-0.005
	(-0.522)	(-0.641)
Dividends	0.001	0.434***
	(-0.028)	(3.986)
International Listing	0.008	0.006
	(1.240)	(1.101)
Upturn	0.026***	0.070***
	(3.080)	(8.145)
Downturn	-0.110***	-0.086***
	(-10.208)	(-9.661)
ROA	0.984***	0.044
	-8.006	(0.715)
Observations	1116	1116
Adjusted R2	0.265	0.256

Table 4.6 *Regression values refer to firms with a market to book above and below the median.*

5 Analysis

This chapter intends to present our interpretations of the retrieved results in relation to the theoretical framework and thus stand as a platform for the final chapter.

5.1 Cash in General

The findings present a mixed view of cash in firms but are to some extent consistent with stated expectations. For the entire sample, cash in general is found to have a significant and positive effect on the stock return. Telser (1966) suggest defensive cash holdings to be value creating over time by absorbing unexpected occurrences, while the rationale provided by Palazzo (2009) is that firms retaining more cash usually do so because of higher exposure to systematic risk. The coefficient is rather modest, but as the results varies considerably between the subsamples, some effects are probably cancelled out by differences in corporate structure.

The coefficient for cash in general is much higher for firms where a blockholder is present, suggesting that investors appreciate the strength and stability said to be provided by blockholders to a firm (La Porta et al., 2002) as well as the better monitoring abilities (Shleifer and Vishny, 1986). Particularly the latter allows firms with a blockholder to hold higher cash levels (Dittmar et al. 2003) than independent firms. Outright tunneling effects as described by La Porta et al. (2002) are not likely to discourage investors due to the robustness of Nordic corporate governance systems. The results are thus consistent with our hypothesized results.

Companies with market to book below median unexpectedly have a significant benefit of cash in general, although the firm characteristics associated with a high marginal value of liquid assets such as growth opportunities and volatile cash flows (Pinkowitz and Williamson, 2007; Palazzo; 2009) are not typically applicable on this subsample of companies. There is however arguments for assigning cash a certain value also for these firms. Managers prefer to spend cash on capital expenditures and acquisitions rather than accumulating it since the latter is considered to expose management to the greater risk according to Harford et al. (2007), while any investments which expands the installed capital generally increase the wealth of management irrespective if it destroys value for the shareholders (Harford and Li, 2007). Strong cash positions can thus in consistency with the conclusions by Harford et al. (2007) be interpreted as an indicator of superior governance structures, since management otherwise would exploit the discretion offered by inferior governance to spend the cash. Since well governed firms generally outperform peers (La Porta et al., 2002) one can by this reading of our result expect a higher cash-ratio to correspond with higher stock returns.

Firms internationally listed are as expected less dependent on retained cash due to better capital market access consistent with the findings by Jankensgård (2009). International listing can be interpreted as a proxy for size since primarily larger firms have the resources to benefit from the rather cumbersome procedure, which is also noted by Jankensgård (2009) when defining the variable. The negative and significant relationship between market size and average returns, referred to as the size premium, is well established by Fama and French (1992) and although our results says nothing about average returns one can notice that at least returns in upturn are higher for firms not internationally listed and thus consistent with the notion of a size premium. The difference is however small and can also be explained by different macro-exposures on foreign stock markets. Other coefficients are however supportive of a difference between the subsamples related to the size and maturity of the firms. In particular the results for cash, leverage and dividends make the industry equilibrium model proposed by Williams (1995) relevant, suggesting an optimal set of financial contracts for each firm within an industry where large companies are more mature and have high fixed-capital investments funded by debt, while smaller firms are less profitable and have lower debt levels. If international listing is accepted as proxy for size the subsamples can be assigned certain characteristics, e.g. are assets in place expected to constitute a larger proportion of the total value for firms internationally listed in the decomposition proposed by Myers (1977)[5]. Since the size of the firms and increased access to international capital markets permit management to better circumvent some of the asymmetric information problems related to issuing equity (Fama and French, 2004), the cost of raising external capital is expected to decline. Further the riskiness of assets is reduced when the enterprise value is less dependent on the value of growth opportunities and cash flows are thus expected to become less volatile. The precautionary argument for corporate savings proposed by Palazzo (2009) is then basically eroded, explaining the lessened importance of cash, which is also empirically well established (Opler et al., 1999; Harford, 1999; Pinkowitz et al., 2004). The remaining positive relationship between cash and stock return may not be causal but depending on the properties of listed firms. Since larger firms generally hold lower ratios of cash-to-assets and size is not accounted for in our study, the benefit of the size premium for smaller firms may erroneously be contributed the larger cash holdings. Of the ten companies with the least average cash-ratios in the sample, five belong to top-ten by market cap, providing at least circumstantial evidence for the observation. Other coefficients are however also supportive of a difference between the subsamples related to size and maturity of the firms. When the company matures the dividends become a more important part of shareholders' total returns, and the importance of dividends suggested by our results for internationally listed firms are remarkable. The coefficient for ROA also implies the highest recorded sensitivity for changes in profitability of all subsamples, signifying a dependence on profitability rather than revenue growth for stock performance. Leverage is also more beneficial for this subsample than any other in the study. The industry equilibrium

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[5] Compare equation 2.1 in section 2.2.4.

model (Williams, 1995) suggest this category of firms to be financed by debt to a higher degree, and Gomes and Schmid (2009) also provide a rationale for adding debt when substituting growth opportunities for fixed assets as the company's asset-risk and pay-off then become more easily aligned with that facing the creditor, hence enhancing the benefits of debt described in the trade-off theory by Kraus and Litzenberger (1973). The observed benefit from leverage in the subsample is thus consistent with expectations.

5.2 Cash in Upturn

Firms in our sample are generally punished for cash holdings in upturns, and this result is expected. The incentives for retaining cash by Palazzo's (2009) precautionary saving motive are clearly decreased in upturns as the interest rate is likely to rise, the asset volatility to decrease and the cost of accessing the capital markets to diminish. The required level of cash is then altered and if not adjusting the cash holdings agency problems may occur. In particular the reduced volatility in cash flows allows for what Jensen and Meckling (1976) refer to as the overinvestment problem, when managers invest corporate cash simply to expand the invested capital of the firm, either by negligence or to extract private benefits e.g. as higher compensation (Harford and Li, 2007). This pattern is further emphasized when considering firms with ROA above the median, since higher profitability rapidly generates excess cash when more stable cash flows reduce the cash reserve required to buffer potential shortfalls in asset payouts. Chou et al. (2009) show that pro-cyclical equity issues in profitable firms commend low asymmetric costs which further reduce the need for precautionary saving. To retain all cash at inferior return without a clear purpose is hence not in the interest of the shareholders, and we interpret the results as though investors are discounting cash considered excessive. This result is consistent with Faulkender and Wang's (2006) findings on the declining marginal value of cash and discount on cash kept for reasons other than valuable growth.

The result for firms with market to book above average is also consistent with the latter clause, since high market to book is a proxy for valuable growth opportunities (Jankensgård, 2009). With prospects of growth the investor have reasons to expect that held cash will be reinvested in valuable growth and thus avoiding costs related to raising external capital. The premium on cash observable in the result is expected to equal the transaction costs involved to obtain the required funding externally (Faulkender and Wang, 2006). Rapidly growing firms with a high proportion of unrealized growth opportunities have high cash flow uncertainty and make poor candidates for debt (Gomes and Schmid, 2009), but also provide for high asymmetric costs when issuing new equity (Akerlof, 1970). Consequently the perceived transaction cost may be considerable, causing the benefit of retained cash to exceed the costs and hence incentivize investors to endorse corporate savings also in upturns, as manifested in our results for this sub-sample.

The reduced exposure to penalty for cash in upturn for listed firms may appear puzzling at first. Palazzo (2009) gives e.g. the cost of accessing capital markets and asset volatility as reasons for precautionary saving, and as stated upturns generally tend to relax these variables implying a decline in justified levels of cash. As internationally listed firms, the access to capital markets must be considered high (Jankensgård, 2009) and the fact that listed firms in general benefit from leverage indicate mature firms with low asset volatilities (George and Hwang, 2009; Kraus and Litzenberger, 1973). The assumption made in section 3.5.6. of international listing as proxy for size further implies the subsample to contain mature and stable firms with characteristics generally not promoted by piles of cash (e.g. Opler et al., 1999; Harford, 1999). Our rationale for cash holdings in internationally listed firms to be inconsequential in the matter rather than punished as first expected is based on the relative stability of the firms in question. In companies where the saving motive intermittently is very strong, our results suggest that high levels of cash can be justified in unsecure market conditions, but the change will also be large as the conditions improves, with subsequent risk of penalties for holding excess cash as seen by firms with ROA above the median. Because of previously mentioned assumed characteristics for listed firms, the oscillations in desirable levels of cash are likely to be smaller hence explaining the reduced exposure to investor sentiment in upturns, but also the unattainable benefits of cash when not in upturns, as indicated by our results. It is further established that the marginal value of cash is steadily decreasing, and high levels of cash are thus more likely to attract investors' attention, as discussed by Harford et al. (2007). Firms with generally lower levels of cash, as the subsample of listed firms, can then potentially act within the comfort zone of investors, hence not causing offend in the same way other firms do. This interpretation is however not possible to manifest based on the results provided of this study.

The opposite results are valid for firms with market to book below the median, severely hit by cash in upturn. Again the probable reason is the reduced adverse asset volatility in upturns causing the motive of saving to drop, but this change cannot explain the vast difference in impact by cash in general compared to cash in upturn. The simple explanation is that firms with low market to book is expected to have low returns and by locking large amounts of cash during a period when most companies outperform is obviously not a successful investor relation policy. DeAngelo, DeAngelo and Wruck (2002) argue that poor performance occurs due to poor management, and that the management of underperforming firms shall be kept within tight boundaries for spending. The results for firms with market to book below median actually provide some evidence to their point. Campello (2003) also discuss how constrained firms tend to boost short-term profits in order to deliver acceptable earnings although jeopardizing future sales growth. Cash can be interpreted as an indicator of the absence of such desperate measures in more difficult times, while this beneficial signaling effect of cash is offset by cash-related problems stipulated by the agency theory in upturns when the default risk lessens. This interpretation is also consistent with our results, and can be further extended when observing the likewise unexpected results for firms with ROA above median. The very severe penalty investors

assign cash held by this sub-sample in upturns indicate an objective and rational assessment based on the firms' actual need for cash, rather than the expected sentimental bias for profitability as indicator of good management (see assumption in section 3.5.3). Cash is thus not consistently valued exclusively by neither objective nor sentimental measures. Instead the analytic framework allowed to dominate appears to be contingent on the situation.

Blockholder firms offer an interesting case of corporate governance since minority investors are most of the time pleased by the long-term financial commitment and the enhanced monitoring performed by the blockholder, but our results indicate colliding interests in upturns. One explanation is the strong interest to avoid dilution of voting power by the blockholder (Agnblad et al., 2001) which give rise to a significant gap in the perceived cost of issuing equity in upturns compared to that of minority owners. The motive for retaining cash, and consequently the level of cash considered non-excessive, can thus be expected to diminish significantly more for the minority owners, not as influenced by the interest to sustain voting power. By refusing equity issues also when competitively priced for minority owners, blockholders can thus create a situation when held cash become subject to the discount related to inferior governance described by Pinkowitz et al. (2006). Since a blockholder also significantly inhibit the market for corporate control to threaten managers' positions, a corrective force on inefficient capital employment is eliminated in a similar way to the anti-takeover provisions Harford et al. (2007) proves harmful to investors' view on cash in U.S. firms. In general such actions are less common in the Nordic countries, and the additional barriers a strong owner implies may thus justify the severe penalty investors award cash in upturns as we observe in companies where blockholding is present.

5.3 Cash in Downturn

Cash in downturn is in the general regression unexpectedly not significantly positive. The possibility to become what Jankensgård (2009) define as a net acquirer during downturns, performing what John Chambers has done for Cisco (see section 2.2.4), is intuitively pleasing, and as Campello (2003) and Palazzo (2009) speaks in favor of cash holdings in particular during difficult times, the result is highly unexpected, although the coefficient is of expected sign however the unsatisfying t-statistics. Harford et al. (2008) find that cash is primarily spent on capital expenditure, acquisitions and similar while no significant difference can be identified in R&D-grants due to cash, and Jankensgård (2009) establish that the level of cash fails to discriminate firms that became net acquirers of assets during the Swedish financial crisis of 1991-1992 from other firms. Both observations are strongly suggestive of business conventions against releasing excess cash reserves as contra-cyclical sources of investment funding. The weak benefit cash is observed to have in downturns corresponds with those findings, implying that cash is simply used as liquidity buffer by the examined firms. The occurrence of solitary firms pooling vast amounts of excess cash suggests differently, but the general regression fails to reveal any such activity.

Only two subgroups of companies can claim a significant positive contribution of its cash holdings in downturns in addition to the outcome approximated by the coefficient for cash in general. Not surprisingly are the firms that reap the largest benefits of cash in downturns firms with market to book above median, signifying abundant growth opportunities, and firms without a blockholder that provides stability and long-term committed capital.

High growth is usually coherent with high asset volatility and high probability of new investment opportunities, and if the increased requirement for funds in order to finance all investment opportunities presented cannot be met by internal funds due to low asset pay-off, sale of assets is more likely to occur because of the properties of the corporate structure (Jankensgård, 2009). Pro-cyclical asset sales suffer under the financial accelerator resulting in firms forced to sell due to financial constraint although asset prices are depressed (Bernanke et al., 1999). The option of freezing investments is however often even worse, and by mobilize retained cash this vicious cycle can be avoided, obviously to the great advantage of the firm. Palazzo's (2009) precautionary saving motive is hence strongly supportive of corporate cash holdings in this situation as interest rates are decreasing easing the discount rate of held cash, the asset volatility is soaring enhancing the need for buffer liquidity, the transaction costs for accessing the capital markets are daunting due to depressed equity prices and high agency costs caused by asymmetric information (Bernanke et al., 1999; Akerlof, 1970). Meanwhile the possibility to attain the role as net acquirer of assets to bargain prices inflates the probability of valuable investment opportunities due to the flow to solvency effect predicted by Jankensgård (2009). This is in our view key to the value of cash in downturn, because although not used in the deal, a company with strong cash balances can act with confidence on the profitable side of the market – that is as net acquirer, while firms stripped on cash become increasingly restricted to the selling side in the brutal flow to solvency. The investment cash flow sensitivity defined by Fazzari et al. (1988) can also be related to this development, as low cash levels increase the probability of missing profitable investments, both of which act to impoverish the firm. Although we see the benefit in becoming net acquirer during a downturn, one cannot neglect that the cost of issuing equity is high for incumbent investors, and only the subsample for firms without blockholder have a more negative coefficient for stock return in downturn. Stock-based acquisitions thus incur a discount neutralizing much of the available gain for high market-to-book firms, further adding to the value of cash for predatory firms following Telser's (1966) strategies in achieving monopoly rents. One must also not forget that the flow to solvency is international, as noted by Jankensgård (2009) and nicely summarized in the aggressive Asian growth strategy for Cisco (Fryer and Stewart, 2008).

Firms without blockholders also gain significantly from cash in downturn, and the most probable explanation is that cash reserves mitigate the problem with asymmetric information, thus helping the independent firm with cash to better weather the crisis. The Swedish business newspaper Dagens Industri recently published a column about how firms with strong cash positions have performed significantly better during the most

indiscriminately volatile periods during the year (Wilke, 2010). The lack of a blockholder is apparent during crises as the committed and strong owner provides some security (La Porta et al., 2002). Firms where blockholders are present have no significant use of cash in downturns, which according to Palazzo's (2009) framework indicate that either is the cost of capital not increased as much as for other firms, which can depend on dedicated owners committing their own capital thus reducing adverse selection costs related to asymmetric information (Myers and Majluf, 1984) which are particularly bad during these conditions (Bernanke et al., 1999), or is the number of investment opportunities decreasing. Reasons for a firm governed by a blockholder not to even be considered as participant in an investment can be well-known risk averseness by the blockholder suffering from underdiversification (Demsetz and Lehn, 1985) or reduced management initiative (Burkart, Gromb and Panunzi, 1997).

5.4 Other remarks

Market leverage is thought to have a big influence on stock returns as theory states the benefits and positive effects leverage has on returns (Brander and Lewis, 1986). However, the impact of market leverage on stock returns is practically nonexistent and provides the sensation that investors are indifferent to the issue. According to Myers and Majluf this cannot be the case as internal equity is always preferred to external means of financing. Brander and Lewis (1986) however find that this could very much be the case, as investors generally accept debt as a mean of financing if it is widely used by the industry. As the engineering industry overall are keen users of leverage it is with confidence that we can say that this is the reason for investors ignorance to the matter. Frank and Goyal (2003) further validates our findings as they explain how firm's financing is generally first questioned when the firm issues new equity and not as Myers and Majluf (1984) state when debt is taken on. Furthermore, leverage is only seen as a financial fragility if the firm takes on leverage higher than its competitors or takes on leverage in a market where leverage generally is low (Campello, 2003). We find that engineering industry firms are quite similar to each other and in general have quite high leverage and hence should not be subject to the abovementioned criteria. Thus is market leverage in profitable firms and firms with international listing assumed to be more accepted by investors.

On industry level dividends generally do not influence stock returns whereas dividends in certain firms hugely influence stock returns. A dividend has different uses and is primarily used in countries with low shareholder protection as a signalling tool regarding firm's corporate governance (Pinkowitz et al., 2006). In countries with high shareholder protection dividends are primarily used to signal confidence regarding the firm's financial status (ibid.). In general investors' desire a dividend regardless of the situation of the firm (Myers and Majluf, 1984). Investors react positively to dividends in low-growth firms, which is understandable as it signals confidence to investors regarding the firm's current financial

position even though growth opportunities are low (Fazzari et al., 1988). The same reaction for dividends is expected for investors in non-blockholder firms.

Business group affiliation is not significant for the industry in general. It is solely significant in a negative manner in firms more profitable than the median. This gives an indication that profitable firms that are affiliated with business groups are not well received by investors. Having close leads to a bank is thus considered to pose a risk justifying the negative input on the firm's stock returns (Jankensgård, 2009). It is surprising though that the only subsample where the effect is significant is for firms more profitable than the median firm, since Jankensgård emphasize the drawback in business group affiliation to be the difficulty to raise cash when constrained caused by the less diversified market access.

Two types of firms have a significant benefit of a blockholder; firms with no international listing or low profitability gain from the presence of blockholders as it is believed to bring financial strength and stability to the firm (Fazzari et al., 1988) and better monitoring abilities in order to reduce problems in relation to corporate governance (Shleifer and Vishny, 1986).

Return on assets influences stock returns on industry level generally in a strong positive manner and is highly significant in most of the supporting firm-specific tests. The general trend is that investors show a liking for firms able to generate funds internally consistent with Myers and Majluf's (1984) pecking-order theory. A particular liking is shown for high-growth firms that are profitable; not surprisingly as a profitable high-growth firm is something every investor desires to have their money invested in. Notable is that profitability influence the stock returns much less for above median profitable firms compared to high-growth firms, again indicating the value investors put on firms able to grow financed by internal cash flows. Profitability in firms with a blockholder present also influences stock returns in a highly positive way as the blockholder then is shown to work in the same interest as other investors (La Porta et al., 2002).

6 Concluding Remarks

Corporate Governance is very intensely discussed for the moment both by policy makers, in media and within companies. Although not specifically the topic of our study the subject appear to be of eminent importance for how investors value cash in companies as well as how investors perceive of e.g. the presence of a blockholder in different conditions.

We establish a positive relationship between the cash-ratio and stock performance while the relationship is strongly negative in upturns, consistent with hypothesized results. The expected benefit from cash in downturns can however not be established on a significant level for the examined sample.

We cannot based on our findings argue against increases in dividends late in the business cycle on a general level, and that answer actually form a significant part of the purpose for this study. Nevertheless firms can learn how to better manage their cash levels, and start by realizing the importance this single variable appear to have on the stock-returns of firms. The second fundamental finding is that no rules are applicable across even a single industry, but differences in the corporate structure must be reflected in these choices.

Very large firms with presence on international capital markets, diversified cash flows and a mature corporate structure differ from other firms in our study since cash levels appear to be less important to their stock performance, instead determined by profitability, dividends and leverage. Our explanation is that the importance of the cash variable for a firm is reflected in by what amplitude the desired value oscillates; in very big firms the changes are limited and so is the significance of cash levels. All other firms in the sample are to a large extent influenced by the cash-ratio, and the shifts in how cash is regarded by the market are dramatic between upturns and downturns. In general surprisingly many firms are allowed to keep cash but it appears to be of different reasons because the reactions in upturns differ significantly depending on corporate structure.

Our results thus lend support to our hypothesis regarding the vanity in the pursuit for one ultimate explanatory model, and rather than one dominating scheme with occasional anomalies we argue for the presence of multiple patterns. Two very different paradigms for valuing cash emerge in our results, where firms with sound corporate structure are assessed objectively, while cash rather is valued by its signaling effect when held by firms subject to severe asymmetric information or other eminent problems. One very powerful tool for understanding the justifiable level of cash for the previous group of companies is in our opinion the framework of Palazzo (2009), where only four indicators must be governed to approximate the appropriate cash position: the relative interest rate of the firm, the transaction cost of approaching the capital market, the firm's asset volatility and the probability of investment opportunity. Explanations to most of our observations can be

derived from this simple framework, but important anomalies exist for the latter group of companies when cash is not valued objectively. Instead we observe how the explanatory power of models targeting more emotional aspects increases, as the agency theory and the pecking order. Our interpretation of the results is that the objective valuation contingent with Palazzo's framework is subordinated to the emotive assessment guided by e.g. asymmetric information where the latter is dominating when applicable, i.e. when the market feels insecurity about the firm. This is comparable with the multilevel model introduced by Harford et al. (2008) to explain how the value of cash in U.S. firms follow a pattern caused by differences in domestic cross-firm corporate governance systems that is subordinated to the established pattern related to differences on a cross-national level and thus primarily observable in domestic studies.

In upturns are only companies able to give investors reason to expect that held cash will be reinvested in profitable growth assigned a premium for accumulating cash on the balance sheet, e.g. firms with high market to book ratio indicative of excellent growth prospects. Firms that should avoid cash in upturns are firms without any convincing growth opportunities (low market to book), very profitable firms, and firms where a blockholder is present. If excluding the latter, the valuation is strictly rational since firms without growth opportunities or in possession of significant cash flows to fund them by actually not require any cash reserves as different to the rapidly growing firm with high cash flow volatility where a liquidity buffer to adverse shocks is suitable.

Blockholders are somewhat different since a firm where a blockholder is present is generally awarded a significant premium on cash held, which we interpret as a sign of trust for the enhanced monitoring executed by the blockholder. The relationship between a blockholder and the minority owners is however ambiguous, which is revealed in upturns when the firm is penalized for its cash, all else equal. This can either be linked to the tendency by deceitful blockholders to retain excessive cash to provide them with flexibility to further private benefits as discussed by e.g. Dittmar et al. (2003), or the conflict of interests caused by the difference in how minority owners and blockholders value the cost of issuing new equity, since the blockholder also have an interest in retaining voting power not shared by the minority mainly interested in pecuniary issues. The observed penalty is thus related to agency costs guided either by fear of fraudulent blockholders or concerns of unnecessary high cost of financing.

7 Further Studies

In order to get a better understanding of the influence cash has on stock returns a number of different topics have been suggested below.

- Instead of using the VIX-curve as an indicator of up- and downturns the TED-spread could be used. The TED-spread shows how tight credit is and derives from the difference between the three-month interest rate that banks internally have with other banks and the interest rate in which a country is obliged to pay back. The TED-spread can be seen as a suitable alternative to the VIX-curve in the study as it provides a more gentle view of what is happening on the market in comparison to the VIX-curve that sees the market from a much more pessimistic point of view. Naturally, the TED-spread will yield different results compared to ours but it is possible that they can still be comparable.

- An identical study to ours could be an option with the only exception being the use of panel data instead of a multi regression. Panel data gives a better and clearer picture of how other variables relate to cash and also how the variables relate to each other.

- A more comprehensive study than the one presented above can be conducted. Instead of comparing investor's value of cash in firms one can compare how investors value cash in different industries. This is presumed to present a better picture to the audience than perhaps a more firm-specific analysis would give. Differences and similarities between the industries can also be expected to be larger than on firm-specific level and in turn can more interesting results be expected.

- Two corporate governance systems with different shareholder protection could be compared. Differences and similarities between the two systems could be studied. Variables such as blockholder, dividends and international listing could especially be of interest to the study.

- Another study of interest could be comparing the value of cash in constrained and unconstrained firms in which a number of relevant variables in the sample could be included. Variables such as size and investment opportunities are seen as relevant to the study. Size is closely related to cash as is investment opportunities. The risk of bias is hence evident and must be handled accordingly for the results not to be faulty.

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9 Appendix I: Sample of Companies

Firms		
Sweden	**Denmark**	**Finland**
Atlas Copco	FLSmidth & Co	Konecranes
Autoliv	NKT Holding	Lemminikäinen
Cardo	Schouw & Co	Metso
Fagerhult		Ponsse
Haldex		Ruuki Group
Hexagon		Uponor
Munters		Vacon
NCC		Wärtsilä
NIBE		YIT-Yhtymä
Peab		
Saab		
Sandvik		
Scania		
Seco Tools		
Skanska		
SKF		
Sweco		
Trelleborg		
Volvo		