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Determinants of Dividend Policy in Sweden

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Abstract

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Keywords: Determinants of dividend policy, dividend policy, dividend yield, bird-in-hand theory, agency theory.

Purpose: To empirically investigate what firm-specific factors influence a firm's dividend policy based on Swedish market by studying all small, medium, large caps in Sweden.

Methodology: Panel regression is employed to test 148 dividend paying firms in Sweden, based on annual data during 2010-2015, with in total 765 observations. Our model tests the relation between a firm's dividend policy and five firm-specific factors: liquidity, size, profitability, leverage and investment opportunities. The dependent variable in the panel model is dividend yield while the independent variables are: current ratio, ln (total asset), return on equity, debt to equity ratio and Tobin's Q. Other tests including diagnostic tests, multicollinearity test, panel unit root test and Granger causality test etc. are also conducted in the study.

Theoretical Perspectives: The theoretical framework consists of both previous studies on determinants of dividend in various markets and main theories regarding dividend such as irrelevance theory, agency theory, life-cycle theory, bird in hand theory and signaling theory.

Conclusions: The findings suggest that the majority of Swedish firms pay dividends during 2010-2015. The factors influence a Swedish firm's dividend policies are: size, liquidity and investment opportunities. Profitability and leverage of a firm cannot explain dividend changes in Sweden. We can conclude that larger firms, more liquid firms and firms with more investment opportunities have higher dividend payments.

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1 Introduction

In this chapter, we present the background and problem discussion for our chosen subject that form our purpose and research question. Furthermore, our research delimitations and outline for this thesis will be presented.

1.1 Background

"The harder we look at the dividend's picture, the more it seems like a puzzle, with pieces that just do not fit together" (Black, 1976, p. 8)

Why do some firms pay dividend while others do not? This questions has been asked by many scholars and have made corporate dividend policy one of the most controversial subjects in finance. Ever since Black (1976) described the phenomena of corporate dividend policy as a "puzzle", many studies have been conducted to bring clarity to the dividend puzzle and to gain a better understanding of the factors that influence a firm's decision regarding its dividend policy. Black (1976) discussed whether the reason could be that investors want a return on their investment and he suggested that firms pay dividend to reward the existing shareholders while at the same time attracting other investors to buy new issues of common stock at a higher price, because they value the dividends. Furthermore, Black (1976) argued that firms that do not pay dividends might choose not to do so because they rather reinvest their excess cash in attractive investment opportunities. Through the investment opportunities the value of the firm's shares, and thus the investor's wealth, may increase by a larger magnitude than what might have been the case if the firm used the excess cash to pay dividends instead (Black, 1976).

Many theories and studies regarding dividend policy are based on the Miller and Modigliani (1961) Irrelevance Theory which introduces the implications a perfect capital market and rational investors, have on firms' capital structure decisions. The theory implies that dividend policy is

irrelevant under these assumptions because a rational investor should always prefer more wealth than less, meaning that a capital gain (increased stock value due to reinvestments), or dividends of the same size should be of equal value to the investor. Thereby dividends should not have any effect on a firm's value or its stock price. However, because the markets are not perfect in reality, deviations from this suggested indifference have been observed in empirical studies. Baker and Powell (1999) state that 90 percent of management of firms, listed on Nasdaq in the U.S., believe that dividends affect the overall value of the firm. Furthermore, Kania and Bacon (2005) reviewed earlier empirical studies about which factors influence managers' dividend policy decision as well as doing their own empirical investigation in the U.S. Their paper illustrates that many agree that dividend plays a significant role for a firm's value (Kania and Bacon, 2005).

Looking at some real life examples of managers' opinions of dividends we find that they emphasize its role for the corporate strategy:

- ConocoPhillips' CFO Jeff Sheets highlighted in 2015, according to CNBC (07/30/2015), that ConocoPhillips' top priority is the dividend. In addition, its CEO Ryan Lance announced that "*The dividend is safe. Let me repeat that. The dividend is safe*."
- Another example is American Water Works Company's April 22, 2016 announcement of a 10 percent increase in its quarterly cash dividend payment, with its president and CEO Susan Story's statement: "*This increase continues our commitment to provide strong dividend growth aligned with our financial performance, while also providing needed investment in our systems for the benefit of our customers*," The company has increased its dividend every year since its IPO in April 2008, and now is the fourth consecutive year of double-digit dividend increases.

  As we can see the managers of these companies put weight into their dividend policies, which contradicts the Miller and Modigliani (1961) Irrelevance Theory.

1.2 Problem Discussion

After Black (1976) introduced the dividend puzzle, a large amount of studies on the subject of dividend policy have been conducted. Allen et al. (2000, p.2449) expressed that "although a

number of theories have been put forward in the literature to explain their pervasive presence, dividend remain one of the thorniest puzzles in corporate finance".

Contradictory to the Irrelevance Theory, Lintner's (1956) Bird-in-Hand Theory states that dividend payments would increase a firm's value. The theory suggests that investors prefer to have one bird in the hand (dividend), rather than two in the bush (capital gains), implying that investors prefer dividend paying shares since dividend payment from a stock is less uncertain than the promise of a capital gain in the future. Rozeff (1982), Easterbrook (1984) and Jensen (1986) suggested another reason why firms might have incentives to pay dividends. According to their studies, paying dividends can be way for firms to mitigate the manager's power as well as reducing the risk that she will make unprofitable investments with the excess cash. They found that mature firms with fewer growth opportunities and stable cash flows tend to pay more dividend. Furthermore, Miller and Modigliani (1961) claimed that in the real world, disregarding the perfect market assumptions, dividend policy can serve as an information signal to investors about a firm's future prospects which thus may affect the market price of the stock. This leads to the Signaling Theory first introduced by Akerlof (1970) with support from Bhattacharya (1979). Bhattacharya (1979) stated that firms have incentives to signal a positive future prospect of the firm in the presence of information asymmetry. This positive signal could be sent through increasing dividends, since an increase in dividends could indicate that the firm expects stable or higher cash flows in the future.

One of the most recent theories added to the dividend puzzle is the Life-Cycle Theory (DeAngelo, DeAngelo and Stulz, 2006), which suggests that the amount of dividend payments made by a firm depends on in which phase of the business life cycle it is. More mature firms are more inclined to pay dividend since they usually have higher and more stable profitability as well as fewer attractive investment opportunities. Young and high growth firms usually focus more on growth and face greater investment opportunities but with less and uncertain profitability.

Although considerable researches have been made to test the determinants of firm's dividend policy, no published researches on determinants of dividend have been conducted on the Swedish market. Only two theses are directly related to factors that influence dividend policy in Sweden.

Hellstrom & Inagambaev (2012) studied large and medium sized public companies in Sweden during 2006-2010. They investigated the relationship between the dividend payout ratio with free cash flow, growth, leverage, profit, risk and size and found that dividend policy for large firms have a significant relationship to free cash flow, growth and risk. For medium sized firms, dividend policy has a significant relationship to free cash flow, leverage, risk and size. Svensson & Thoren (2015) investigated large caps in Sweden under 2003-2013 with a focus on the impact of the global financial crisis on determinants of dividend policy. The determinants they focused on were: growth, profitability, cash flow, size, risk and retained earnings. Since there are limited studies conducted on the Swedish market there are still gaps to fill. Our study differentiates from the previous theses by focusing on the time period of 2010-2015 in which period the effects of the global financial crisis was mitigated. We also investigate all firms listed on Nasdaq OMX in Stockholm, including all small, medium and large caps.

Our study aims to contribute to the overall picture of the subject of dividend policy by investigating the determinants of dividend policy for Swedish firms. Within the research field there are a vast number of empirical studies investigating determinants of dividend policy, both in developed and emerging markets. Even if Sweden is classified as a developed market and many theories and empirical studies have been focused on the U.S., there still exist differences across countries, in both legal systems as well as country and firm-specific differences which make the transferability more challenging. Baker (2009) examined the evolution of European dividend policy, the cross-country determinants of dividend policy and compared the results to the U.S. between the years 1994-2006. He found that European managers and U.S. managers use similar factors in their dividend decisions, including firm-specific characteristics such as firm size, ownership structure and other country specific institutional and regulatory environmental factors (Baker, 2009, p89). Baker (2009, p.91) stated that although developed markets have similarities, there exist other factors influencing dividend policy. Thus it is interesting to investigate the dividend policy decision on the Swedish market.

1.3 Purpose and Research Questions

The purpose of this study is to investigate which factors that could influence the dividend decision for Swedish firms. We will focus on all small, mid and large caps listed on the Nasdaq OMX in Stockholm during 2010-2015. Our research questions are:

- *What are the firm-specific factors that influence the dividend policy decision for Swedish firms?*
- *How does these firm-specific factors influence the dividend policy decision for Swedish firms?*

1.4 Research Limitations

Because we deduce the determining factors for dividend policy from what has been found to be relevant in previous studies conducted in other countries, there is a risk that there are factors other than these that affect the dividend policy in the Swedish context that we will miss. Second, we will not consider tax effects in this thesis. We are aware that there are theories and studies with supporting evidence of the impact of tax effects on dividend policy, but because of limitations in time and due to the hefty workload required to take all tax effects into consideration we have chosen to disregard it. Another limitation we made was our chosen time period of 6 years between 2010-2015. The starting year of 2010 was we wanted to investigate a recent time period but also we wanted to mitigate the impact of from the recent global financial crisis started in 2007.

1.5 Thesis Outline

The first chapter introduces our subject, relevant background, problem discussions as well as our research purpose and limitation. In chapter 2, theoretical framework and previous studies will be discussed to derive potential determinants of dividend policy. In chapter 3, a detailed discussion on methodology, including our regression model, variable measurements, diagnostic tests, statistical tests and critism about the model will be discussed. In chapter 4, the empirical findings based on our model will be presented. In chapter 5, a detailed analysis on the regression results will be discussed. In the last chapter, we will summarize the paper and give suggestions for further research.

2. Literature Review and Determinants

In this chapter we will first briefly discuss what a dividend policy is. Next, we will present our two sources of firm-specific factors that can affect firm's dividend policy. The first source will be theories on the subject, the second source will be previous empirical studies on the dividend policy decision. In the end of the chapter we will summarize which factors we have found to possibly be relevant and present hypotheses that are derived from these sources.

2.1 Dividend

When a firm earns profit, it has two main choices of how to distribute its cash flow: 1) it could keep the profit within the firm as retained earnings, which can be used to reinvest in new projects or as a part of cash reserves for future use, or 2) it could distribute it to its shareholders, by either repurchasing its own shares from the market in a share buyback or by paying dividends. How a firm chooses between these options is determined by the firm's payout policy (Berk & DeMarzo, 2014, p.585). Instead of paying its dividend in cash, a firm can instead pay it in stock dividend, also called a stock split. In a stock split, a firm issues additional shares and the shareholders receive an additional share for each holden share instead of receiving a cash payment. As a result, the total number of shares increases, but the value being paid out has the same effect as a dividend (Berk & DeMarzo, 2014, p.586).

2.2 Theoretical Framework

2.2.1 Irrelevance Theory

Dividend has no relation with a firm's capital structure, profitability or value

The Miller and Modigliani (1961) Irrelevance Theory indicates that under perfect capital market assumptions, with rational investors and with no taxes or bankruptcy costs, dividend is irrelevant. The basic perfect capital market assumptions are:

- *Perfect capital markets:* In a perfect capital market all traders have equal and costless access to information where the market is efficient, i.e. there are no possibility for arbitrage. No transaction, bankruptcy or taxation costs exist.
- *Rational Behavior:* Rational investors prefer more wealth to less, meaning that investors are indifferent whether the wealth is coming from cash payments or an increase in the market value of their shares.
- *Perfect Certainty:* All investors have access to the same information, indicating that they all have knowledge of the return on investments and the future profits of every firm. Because of this, there is no need to distinguish between stocks and bonds as source of funds.

Miller and Modigliani (1961) argue that dividend policy has no effect on a company's capital structure or the stock price under these conditions.

From this theory we cannot deduce any factors that could impact the dividend policy decision. On the other hand, if we find no significant factors it could tell us that the Swedish market is close to having this perfect condition explained in this theory.

2.2.2 Bird-in-Hand Theory

Investors prefer to receive dividend today to avoid future uncertainties

"Better a bird in the hand than two in the bush."

(Lintner, 1956)

According to the Bird-in-Hand Theory (Lintner, 1956), dividend payments can increase a firm's value. The theory suggests that this is because investors prefer "one bird in the hand" which is dividend payment from a stock, since it is safer than "two in the bush" with a potential higher and uncertain capital gain. Lintner's (1956) work was elaborated by Gordon (1959 & 1962), which claimed that investors are not indifferent in their returns as investors prefer to receive dividend today since capital gains in the future are more uncertain. Lintner's (1956) and Gordon's (1959, 1962) work were further supported by Baker and Haslem (1974). Baker and Haslem (1974) highlighted that since investors are risk averse and dividends are assumed to be less risky than capital gains, dividend are the most favourable by investors. They further explained that dividend

changes may contain information, meaning that dividend may provide an indication of management's expectations about the firm's future earnings. Baker and Powell (2000) found the most important determinants of dividend policy is the current and expected future earnings which is in line with Lintner's (1956) Bird-in-Hand Theory. Furthermore they found the importance of firm's maintaining and keeping paying dividend. They concluded that managers believe dividend policy would affect stock prices and managers concern about the signals sent to the investors due to dividend changes.

This suggests that investors see a risk in the firm keeping their excess cash or reinvesting the excess cash and rather get it in cash, if the value does not differ enough. This means that for an owner to rather have the company keep the excess cash for reinvestments, the investments have to potentially be profitable enough to outweigh the other option of a secure dividend payment. This leads us to believe that one key factor which could decide the dividend policy decision is:

- *Profitability:* If the firm is profitable enough, the investor might see the potential, but uncertain, gain from reinvestments to be more attractive than dividends. But if the firm is not very profitable, the opposite would be true.

2.2.3 Signaling Theory

Firms pay dividend to signal investors and to mitigate the information asymmetry

The Signaling Theory (Bhattacharya, 1979), suggests that managers, as insiders, choose dividend policy to signal information to outsiders. They have incentives to do so when they believe the firm's stock is undervalued. Akerlof (1970) introduced information asymmetry by analyzing the market of "lemons" with an example of the automobile markets. In the presence of information asymmetry, "cherries" (good cars) and "lemons" (bad cars) will be sold at the same price since only the owners can distinguish the quality of the cars. Thus, under presence of information asymmetry, the owners with good cars will try to signal positive information to outsiders. Similarly, firms that pay dividend can be seen as a signal that they are not "lemons", instead they have a positive future prospect of the firm.

Signaling Theory was elaborated by Bhattacharya (1979) which found that despite the tax disadvantage, when a firm has a positive expected future cash flow, it intends to signal this information through increasing dividend to indicate the firm expects higher profitability in the future.

On the other hand, Easterbrook (1984) is opposed to the Signaling Theory, emphasizing the signal of dividend is unclear. Easterbrooks (1984) argued that since firms hire outsiders and disclose their prospects and profits, there is information available for outside investors. This is in line with Miller and Rock´s (1985) findings, the cost of signaling is higher than the value a firm receives. They also found the higher dividend payout ratio a firm has the lower level their investment is. However, for some firms, the cost of dividend signaling may be worth it to avoid giving the market the impression that the firm's earnings are not good enough to pay dividend.

- Profitability: We believe that according to the Signaling Theory, firms that are more profitable will tend to engage more in signaling by paying more dividends than those who do not.

2.2.4 Agency Theory

Paying dividend facilitates the alliance of interests between managers and investors

Jensen and Meckling's (1976) hypothesis is seen as a benchmark for Agency Theory. They highlight the conflict of interest between principals (the shareholders) and agents (management) when managers are assigned to maximize shareholders' value. Agency cost arises when managers increase their own wealth at the expense of the principals. Jensen and Meckling (1976) further state that the principal can limit the agency problem by monitoring and establishing appropriate incentives for the agent. Later on, Jensen's (1986) free cash flow hypothesis suggests that dividend could work as a proxy for monitoring as it would limit the firm's resources and thereby limit the manager's power, as managers have incentives to grow their firms beyond their optimal size by overinvesting. Moreover, Jensen (1986) argued that mature firms with less growth opportunities and stable cash flows should pay dividend as a monitoring device and as a consequence reduce the agency cost.

Rozeff (1982) elaborated a model of optimal dividend payout in which he found that increased dividend would lower the agency cost, but consequently raise the transaction cost of external financing. The combination of these two costs would determine the optimal dividend policy. Rozeff (1982) concluded that firms with greater investment opportunities have consequently lower dividend payouts, implying that investment policy influence dividend policy.

Easterbrook (1984) found that dividend could align managers' interest with investors which would reduce the agency cost. He provided two explanations for agency cost problems in a company, first is the monitoring costs which refer to the cost for the shareholders to supervise the managers. The second is the cost of managers risk aversion. In contrast to shareholders, who have a more diversified portfolio, manager's' personal wealth may be connected to a certain company. These two agency costs problems can be solved through dividend policy. Besides, Easterbrook (1984) highlighted that companies should only pay dividend in order to reduce the agency conflicts, since dividend doesn't create any value in themselves.

- Investment Opportunities: We believe that a firm's investment opportunities will have a negative correlation to its dividend policy, in accordance with Rozeff (1982).
- Profitability: We believe that a firm´s profitability will have a positive relationship with its dividend policy since more profitable firms with larger cash flow will pay more dividend to reduce agency problems.
- Size: Larger sized firms tend to be more mature with stable cash flows and with less investment opportunities, thus should pay more dividend in order to reduce agency costs Jensen, 1986).

2.2.5 Life-Cycle Theory

Dividend payments depend on a firm´s business lifecycle

DeAngelo, DeAngelo and Stulz (2006) developed Jensen's (1986) free cash theory. They observed that dividends tend to be paid by mature firms, according to the business lifecycle in which young and high growth firms face higher investment opportunities, while mature firms pay more dividend since they have more stable profitability and less attractive investment opportunities. This is supported by DeAngelo and DeAngelo (2006) where the Life-Cycle

explanations of dividend are based on a trade-off between pros and cons of paying dividend. Young and high growth firms in an early state of the corporate life cycle focus more on growth and investment opportunities, thereby paying less dividend. This trade-off evolves over time as a firm's investment opportunities decline and the firms receive more stable profits and thereby tend to pay more dividend. Other researchers who have similar findings and supportive evidences for the Life-Cycle Theory are Grullon, Michaely and Swaminathan (2002) and French (2001).

- Size: Because young small firms tend to reinvest their excess cash and mature larger firms tend to have less attractive investment opportunities, we believe that Size will have a positive correlation with dividend policy.
- Profitability: Mature firms tend to have more stable profitability with less investment opportunities, thus we believe that more profitability will have a positive correlation with dividends.
- Investment Opportunities: Young and high growth firms face more investment opportunities and thereby pay less dividend.

2.3 Literature Review and Determinants

A mix of studies, focusing on the firm’s dividend policy have been conducted in various countries and markets, covering both emerging regions and developed countries. The following literature reviews will start from researches focusing in developed countries and then move to emerging markets.

2.3.1 Empirical Studies in Developed Countries

Denis & Osobov (2008) examined dividend payout, by using cross-sectional and time-series method, in several developed financial markets, such as U.S., Canada, the U.K., Germany, France and Japan, during the time period 1989-2002. The results revealed common determinants of dividend across countries. Similar to Fama and French (2001), they found that dividend are affected by firm size, growth opportunities and profitability. They concluded that in all six countries, the likelihood of paying dividend was associated with the retained earnings to total equity ratio. Their studies revealed that firms with high retained earnings, large size and higher profitability are more likely to pay dividend. Dividend paying firms in Germany, France and

Japan had more valuable growth opportunities than dividend paying firms in US, Canada and the UK. Denis & Osobov (2008) also argued that their findings support Jensen's (1986) Agency Theory and DeAngelo & DeAngelo (2006) discussion of firm life cycle as a motivation for firms´ dividend decisions. Their study shows that dividend do not decline over time, as dividend are concentrated among the largest, most profitably firms in all six countries.

Kania and Bacon (2005) used OLS to analyze 542 publicly traded firms, listed on NASDAQ, AMEX, NYSE and OTC exchanges, to examine factors that influence dividend payout. They used a sample of firms creating by MultexInvestor.com which is a website which provides financial information on over 10,000 publicly traded companies. They observed the data for all firms in the selected sample at the end of the second quarter of 2004. They concluded that profitability (ROE), growth (sales growth), risk (beta), liquidity (current ratio), control (inside ownership) and expansion (growth in capital spending) have significant negative impact on a firm's dividend payout ratio. The results reveal that firms with more dividend payout have higher leverage, supporting the Signaling Theory as firms are willing to raise debt in order to pay out dividend. This argument is also held by Myers and Bacon (2004) who also found that a firm's dividend payout is positively related to its profitability growth opportunities. However, Rozeff (1982) claimed that dividend payout is significantly negative related to the firm's past and expected future growth rate, as high growth leads to higher investments. External financing will be costly and a high growth firm will avoid dividend payout policy as this would lead to lower internal funds. By investigating the determination of the optimal dividend payout, Rozeff (1982) also concluded that increasing dividend would lower the agency costs but raise the transaction cost of external financing.

Furthermore, Rozeff (1982) found dividend payout is positively related to number of shareholders, but negatively related to insider ownership. These findings support the Agency Theory, as a firm with greater percentage of insider ownership requires less monitoring of the management of the firm, while a firm with larger number of shareholders will pay higher dividend to reduce the agency costs. In addition, he argued that firms with high risk (beta), have

lower dividend payments due to firms' financial uncertainty as firms prefer to retain their earnings.

Grullon et al. (2003) studied firms listed on New York Stock Exchange (NYSE) and American Stock Exchange (AMEX) and that made dividend announcements between 1963 and 1997. They observed that dividend changes contain no information about future earning changes. Moreover, they found a negative correlation between dividend changes and future changes in profitability (ROA). This result is in line with Benartzi, Michaely and Thaler's (1997) study on non- foreign companies that are traded on NYSE or on the AMEX during the period 1979-1991, as the results concluded that there is little or no evidence that dividend increases signal better prospects.

Ho (2003) used panel data with 2235 firm-year observations to examine dividend policy corresponding to profitability, size, liquidity, leverage, risk, asset mix and growth in Australia and Japan. The results show that out of all the determinants, in Australia, larger firms tend to pay more dividend. In Japan, the firms that pay out more dividend are more liquid and less risky. This contradicts Kania and Bacon's (2005) finding that liquidity influences dividend policy negatively. Ho (2003) also pointed out that in both Japan and Australia, different industries have impacts on dividend policy. These results support agency, signaling and transaction cost theories of dividend policy.

Banerjee et al. (2002) studied the correlation between a firm's dividend policy and stock market liquidity of firms listed on NYSE and AMEX during 1963-2001. By using cross-section analysis, they concluded that larger and more profitable firms are more inclined to pay dividend while firms with more investment opportunities are less likely to do so. This result is in line with Nissim & Ziv's (2001) conclusion that dividend changes are positively related to earning changes as well as future earnings changes. Aivazian, and Booth (2003) also supported that both return on equity and profitability are positively correlated with dividend payout ratio. By comparing dividend behaviours from emerging market firms with U.S. firms, where dividend can be explained by profitability, debt and market-to-book ratio, Aivazian, and Booth (2003) stated that for both U.S. firms and promising market firms, profitability affects dividend payments, higher debt ratios are corresponding to lower dividend payments and higher market-to-book ratio has a positive effect on a firm's dividend payments.

Myers and Bacon (2004) conducted an empirically study of 483 firms from the Multex, a randomly mixed of companies that are traded on NASDAQ, AMEX, NYSE, OTC can be observed. They tested the relationships between dividend payout ratio and price to earnings ratio (P/E), profit margin, debt- to- equity ratio, current ratio, insider ownership, institutional ownership, float, the estimated five-year growth rates for earnings per share (EPS) and sales. Their study shows that firms with higher P/E and sales growth are likely to increase dividend payout ratio. On the other hand, insider ownership was negatively related to dividend payout. They suggested that the higher the firm's P/E, the lower its risk, and the higher the payout ratio. The positive relation between profitability and dividend, revealed by this study, is in support of previous studies (Banerjee, Gatchev & Spindt, 2002; Lintner, 1956; DeAngelo, DeAngelo & Skinner 1992), however the result was insignificant.

2.3.2 Empirical Studies on Emerging Markets

Mohamed et al. (2016) analyzed the determinants of dividend payment for the top 200 companies (measured by market capitalization) on Malaysian share markets during 2003-2005. The study confirmed that profitability and liquidity are important determinants of dividend payment. The results show that the likelihood for paying dividend is higher for larger firms, and that firms pay out averagely 40 percentage of their earnings as dividend. Moreover, fast-growing firms dispense larger dividend so as to appeal to investors. Malkawi (2007) also draw the conclusion that size, age and profitability of firms are factors of dividend policy, by testing determinants of corporate dividend policy in Jordan under 1989- 2000. These findings provide a strong support for the agency costs hypothesis.

By studying the determinants of the dividend policy in Gulf Cooperation Council (GCC) countries by examining non-financial firms listed on GCC country stock exchange, Kuwari (2009) found that dividend payments are positively relying on a firm's size and profitability. Kumari also highlighted that the firms pay dividend intent to reduce agency problems and the firms alter their policy frequently without adopting a long-run target policy. They also concluded

that dividend payments are negatively related to leverage ratio. Muhammad et al (2011) examined 100 non- financial firms that are randomly selected from Karachi Stock Exchange (KSE) 100 Index and tested changes in dividend payout with changes in return on equity (ROE), earning per share (EPS), cash flow per share (CF/S) and size of firms. The results indicate that firms with higher dividend payout have lower CF/S and ROE, but a higher EPS. Dividend policy in the same market are also investigated by Rehman and Takumi (2012), by analyzing 50 companies that announced dividend in 2009. The results reveal that debt to equity ratio, profitability are positively related to dividend policy, while market to book value ratio is negative. The positive relation between profitability and dividend is inconsistent with Muhammad's (2011) conclusion.

Kumar (2003) examined the determinants of dividend in India between 1994-2000 with a sample of 5224 firms. Kumar found that dividend payment is positively depending on earnings trends, whilst negatively related with debt-to- equity. Olatundun (2000) studied determinants of dividend in Nigeria under 1984-1994 by using Lintner-Brittain model that was estimated with OLS. The study showed that the dividend behaviour of Nigerian firms depends on growth prospects, level of gearing and a firm's size. Olatundun (2003) further studied 63 quoted firms in Nigeria during 1984 and 1997 by taking into account dummies that capture economic policy changes. The empirical results reveal that coefficient of operating cash flow is significant for small firms and cannot explain for average and large sized firms. To support this, he argued that small firms are less liquid than big ones, thus their dividend decisions are more depending on cash flow.

2.3.3 Comments on Previous Studies

Dividend policy issues have been discussed in both emerging markets and developed countries. Many empirical studies have been conducted in order to define the determinants that may influence a firm's dividend payout. Profitability, liquidity, size, financial leverage and growth are mostly discussed and defined as determinants of dividend policy. Other factors such as risk, investment opportunities, retained earnings and tax are also mentioned to be of importance in some of the studies. In addition to these, non-financial factors such as corporate governance (ownership structure, strategic management) were also discussed as determinants for dividend

policy. Based on the findings from the previous studies discussed in *section 2.3.1* and *2.3.2*, *Table 1* and *Table 2* below provide a brief summary of studies on the main determinants of dividend policy in both developed markets and emerging markets.

Table 1. Findings of Determinants of Dividend in Developed Markets

Authors	Market of study	Time Period	Methodology	Sample Size	Positive Relationsship	Negative Relationship
Denis & Osobov (2008)	US UK Canada France Japan	1989-2002	Multivariate Regression	> 60 000	Profitability Size Retained Earnings	Growth Opportunities
Kania & Bacon (2005)	US	2004	Multivariate Regression	542	Profitability Institutional Influence Growth	Risk Liquidity Leverage Insider Ownership Expansion
Myers & Bacon (2004)	US	2003	Multivariate Regression	483	Price to Earnings Sales Growth Leverage	Risk Liquidity Insider Ownership
Ho (2003)	Australia Japan	1992-2001	Multivariate Regression	2 235	Profitability Size Liquidity	Risk
Banejree et al. (2002)	US	1963-2001	Multivariate Regression	> 30 000	Profitability Size	Investment Opportunities
Nissim & Ziv (2001)	US	1963-1980	Multivariate Regression	> 30 000	Profitability Future Earnings	
Aivazian, and Booth (2003)*	US	1981-1990	Multivariate Regression	988	Profitability Liquidity	Leverage
Rozeff (1982)	US	1974-1980	Multivariate Regression	1000	Number of Shareholders	Insider Ownership Growth Risk
Fama and French (2001)	US	1963-1998	Multivariate Regression	> 80 000	Size Growth Opportunities Profitability	Asset Growth Market to Book Value
Svensson & Thorén (2015)	Sweden	2003-2013	Multivariate Regression	35	Growth Profitability Size Firm Value	Free Cash Flow Risk Retained Earnings
Hellström & Ingambaev (2012)	Sweden	2006-2010	Multivariate Regression	87	Profitability Size	Free Cash Flow Growth Leverage Risk

Table 2. Findings of Determinants of Dividend in Emerging Markets

Authors	Market of study	Time Period	Methodology	Sample Size	Positive Relationsship	Negative Relationship
Aivazian, and Booth (2003)*	Korea, India, Malasyia, Thailand, Jordan, Pakistan, Turkey	1981-1990	Multivariate Regression	3294	Profitability Market to Book value	Leverage Tangibility of firm assets.
Mohamed et al. (2016)	Malysia	2003-2005	Multivariate Regression	200	Profitability Size	Growth
Malkawi (2007)	Jordan	1989-2000	Multivariate Regression	160	Profitability Size Age	Insider Ownership
Kuwari (2009)	Gulf Cooperation Council (GCC)	1999-2003	Multivariate Regression	245	Profitability Government Ownership Size	Leverage
Muhammad et al. (2011)	Pakistan	2005-2009	Multivariate Regression	100	Earnings per Share	Profitability Liquidity
Rehman & Takumo (2012)	Pakistan	2009	Multivariate Regression	50	Profitability Leverage Corporate Tax Liquidity	Earnings per Share Market to Book Value
Kumar (2003)	India	1994-2000	Multivariate Regression	5 224	Profitability Dividend trend Investment Opportunities	Leverage
Olantundun (2000)	Nigeria	1984-1994	Multivariate Regression	882	Leverage After Tax Earnings	Growth Size

2.4 Selected Determinants and Hypothesized Relation

Different theories have been introduced to form the foundation to explain dividend policy. A large number of previous studies have provided a wide range of factors that can influence firms' dividend policy. Studies conducted in other countries test different sets of firm-specific factors, so it is hard to conclude which specific set of determinants are better to use. In addition to that, we could not find any published research on determinants of dividends in Sweden. Even though it is hard to choose certain firm-specific factors to test, previous studies on both emerging and developed markets provide a picture of generally tested determinants such as size, profitability, liquidity and leverage.

To select determinants for our study, we observe the commonly tested firm-specific factors from previous studies as well as address the potential determinants based on dividend relevant theories. Irrelevance theory claims that dividend policy has no relation with a firm's capital structure and profitability. To test whether a firm's capital structure and profitability play crucial roles of a

firm's dividend policy, our study will include both profitability and leverage as firm-specific factors. Signaling Theory further implies that a firm's profitability can be crucial in influencing its dividend policies. We derived from Agency Theory that dividend payments align the interests of managers and investors. Moreover, Life-Cycle Theory investigates corporates' dividend paying behaviors based on in which stage they are in their business life cycles. From this we deducted the level of investment opportunities as well as size to be of relevance for our study.

Dividend relevant theories and the commonly tested factors from previous studies lead to the conclusion that the five factors; Profitability, Size, Leverage, Liquidity and Investment Opportunities can be potential firm-specific factors that influence a firm's dividend policy. Thus, we will cover and mainly focus on these five factors in our study to investigate whether they would influence firms' dividend policy in Sweden. Further explanations of each selected determinant will be presented below.

2.4.1 Profitability

Profitability is used to assess a business' ability to generate earnings and to indicate whether the company is doing well. Profitability has long been considered as a determinant of a firm's ability to pay dividend (Ayman, 2015). Amidu & Abor (2006) argue that profit is seen as the single most important factor in a firm's financial statement and has been widely used in previous studies to determine the relationship with a firm's dividend policy. In addition, Muhammad et al. (2011) regarded profit as the primary indicator of the firm's capacity to pay dividend.

Most studies have found a positive relationship between profitability and dividend policy such as Rehman and Takumi (2012); Denis & Osobov (2007); Banerjee; S et al (2002); Nissim & Ziv's (2001); Mohamed et al. (2016); Kuwari (2009); Muhammad et al (2011); Aivazian and Booth (2003); Ayman (2015) and Malkawi (2007) found that firms with greater profitability are inclined to pay more dividend. Kumar (2003) also claimed that dividend are positively related to a firm's earning trends.

On the other hand, Grullon et al (2003); Benartzi et al. (1997) and Kania and Bacon (2005) observed a negative correlation between dividend and future changes in profitability. Both Ho (2003) and Myers and Bacon (2004) find that profitability is insignificant in explaining the dividend payout. Moreover, Anupam Mehta (2012) also claimed that more profitable firms pay less dividend.

Supported by Agency Theory (Jensen and Meckling, 1976; Jensen, 1986), Signaling Theory (Akerlof, 1970; Bhattacharya, 1979), Life-Cycle Theory (DeAngelo & DeAngelo, 2006) and Bird-in-Hand Theory (Lintner, 1956; Gordon, 1962), we project a positive relationship between dividend and profitability. We assume that a more profitable firm is one with more free cash flow, thus paying out more dividend will reduce manager's control over cash and thus agency problems. Due to the information asymmetry, companies are inclined to send information to investors under the circumstance that investors cannot distinguish good companies from bad ones. Therefore companies will signal positive information to investors by having higher dividends. This makes investors believe that firms have a sustainable profitability potential. According to Life-Cycle Theory (DeAngelo & DeAngelo, 2006), young and immature companies are believed to be unstable and less profitable while big and mature ones are more stable and profitable, thus companies with more profitability are inclined to pay more dividend. The Irrelevance Theory states that dividends does not affect a company's value or stock price and therefore should have no relationship with profitability.

Taking theories and previous studies into mind, we formulate the following hypothesis:

H1: Profitability will have a positive effect on dividend policy of Swedish firms

We are aware that our previous studies contradict each other, but we believe that the theories, which mostly support our hypothesis, are more applicable on the Swedish context than the previous studies. Also, a majority of the previous studies are in line with our hypothesis.

2.4.2 Size

The size of a firm is an important factor for its investment decisions (Svensson & Thoren, 2015). The size of the company has been one of the most commonly used factors in previous studies and various studies argue that the size of a firm is one of the factors that have the largest influence on dividend policy (Hellstrom & Inagambaev, 2012). The idea that firm size and dividend policy are positively correlated is generally accepted by many of our previous studies (Lee, 1995), Denis & Osobov (2007), Ho (2003), Kuwari (2009), Olantundun (2000), Aivazian and Booth (2003), Eriotis (2005), Malkawi (2007), Holder et al. (1998). Lee (1995) and Ayman (2015) emphasized a positive relations between a firm's size and dividend payout, as many studies claim that firms with larger size are more mature and less risky, thus can afford to pay out more dividend comparing to small firms. However, Muhammad et al (2011) found that size is insignificant regarding a firm's dividend policy.

We hypothesize a positive relation between a firm's size and its dividend policy. As supported by Life-Cycle Theory (DeAngelo & DeAngelo, 2006), young and high growth firms tend to pay less dividend while mature firms with stable cash flows pay higher dividend. The mature firms are believed to have larger size, thus pay higher dividend. Larger sized firms are also seen as the ones with more cash flow and the managers are having more power, thus paying out more dividend are considered to be a method to reduce agency costs, which is in support of Agency Theory (Jensen and Meckling, 1976; Jensen, 1986).

From theories and previous studies we formulate the following hypothesis:

H2: Size will have a positive effect on dividend policy of Swedish firms

2.4.3 Leverage

A mixed result is also found on a financial leverage impact of a firm on its dividend payment. Franklin and Muthusamy (2010) emphasized that leverage is a crucial factor which influence the dividend behaviours of a firm. A negative relation was observed between a firm's leverage and its dividend payment by Rozeff (1982); Kuwari (2009); Bradley et al. (1998); Aivazian & Booth (2003); Kumar (2003); Malkawi (2007) and Hellstrom & Inagambaev (2012), indicating that the

more debt a firm has, the less it pays dividend. On the other hand, Myers and Bacon (2004), Olantundun (2000) and Rehman & Takumi (2012) observed a positive relation between leverage and dividend payout. Myers and Bacon (2004) argued that large and reputational corporations embrace high dividends to ensure a strong financial reputation that allows for easy access to external capital. Therefore, even with high growth and debt, dividends will be high. However, Omar (2009) and Ho (2003) claimed that financial leverage does not influence a firm's dividend policy.

We hypothesize a negative relationship between financial leverage and dividend. According to the Agency Theory (Jensen and Meckling, 1976; Easterbrook,1984), managers are risk averse and are reluctant to take on more debt. Higher levered firms have higher financial risks, thus managers tend to maintain cash flow in order to mitigate financial risks. As a result, dividend payout will decrease. This is in support of the free cash flow hypothesis (Jensen, 1986) as managers use cash to pay back debt instead of dividend.

From theories and previous studies we formulate the following hypothesis:

H3: Leverage will have a negative effect on dividend policy of Swedish firms

2.4.4 Liquidity

Researchers have found different relations between liquidity and dividend policy in previous studies. Franklin and Muthusamy (2010) argued that for firms that are more conservatively financed, increasing liquidity might lower dividend payout. Firms with higher level of debt also need higher level of liquidity to allow for pay offs on potential implicit claims. This negative relation is in line with Kania and Bacon (2005), Muhammad et al (2011), claiming that the more liquidity a firm has, the less dividend payout would be. Kania and Bacon (2005) argue that the negative relation is due to that a higher dividend payment would decrease liquidity. However, Ho (2003), Banerjee et al. (2002) found that higher liquidity has a positive relation with a firm's dividend payout. A firm with a higher liquidity can be seen as one with less financial risks, thus having the ability to pay more dividends. Moreover, Anil and Kapoor (2008) found no correlation between liquidity and dividend policy.

We hypothesize a positive relation between liquidity and dividend. This is also consistent with Jensen's (1986) free cash flow hypothesis and Signaling Theory (Bhattacharya, 1979). Firms with more cash should pay more dividend, otherwise managers may invest the cash irrationally.

From theories and previous studies we formulate the following hypothesis:

H4: Liquidity will have a positive effect on dividend policy of Swedish firms

2.4.5 Investment Opportunities

Investment Opportunities are not studied as much as other factors regarding the determinants of dividend policy. Some previous hypothesis argue that investment policy and dividend policy have mutual influence. For instance, John & Lang (1991) and Lang & Litzenberger (1989) highlighted that changes in dividend reflect changes in managers' investment policy given their opportunity set. This can be explained by that dividend payments depend on a firm´s business lifecycle and since young and high growth firms focus more on investments, consequently they pay less dividend.

Banerjee et al. (2002); Ahmed.H & Javid.A.Y (2012); Amidu and Abor (2006) and Yoon & Starks (1995) all found a negative relation between investment opportunities and dividend policy, implying that firms with many investment opportunities pay less dividend. Though Souza & Saxena (1999) claimed that there is no relation between investment opportunities and dividend policy. Smith and Watts (1992) implied that firms with more assets in place and fewer growth opportunities have higher dividends.

We hypothesize a negative relation between investment opportunities and dividends, which is consistent the Life-Cycle Theory (DeAngelo & DeAngelo, 2006). Young and high growth companies face more investment opportunities while stable and mature companies have less investment opportunities, young firms would thereby use excess cash to reinvest instead of paying out dividend.

From theories and previous studies we formulate the following hypothesis:

H5: Investment opportunities will have a negative effect on dividend policy of Swedish firms.

2.5 Summary of Determinants and Hypotheses

Based on our theoretical framework and previous studies, we present a summary of our projected hypotheses below. In *Table 3* we will summarize the determining factors of dividend policy decisions we will investigate, the projected relation of each determinant with dividend policy, as well as the theories and previous studies that support the hypothesis.

Hypotheses

H1: Profitability will have a positive effect on dividend policy of Swedish firms

H2: Size will have a positive effect on dividend policy of Swedish firms

H3: Leverage will have a negative effect on dividend policy of Swedish firms

H4: Liquidity will have a positive effect on dividend policy of Swedish firms

H5: Investment opportunities will have a negative effect on dividend policy of Swedish firms.

Table 3 Summary of Projected Relations, Supportive Theories and Studies

Determinants	Projected Relations	Supportive Theories	Supportive Studies	
Profitability	Positive	Agency Theory Signaling Theory Life-Cycle Theory Bird-in-hand Theory Free Cash Flow Hypothesis	Rehman and Takumi (2012) Denis and Osobov (2007) Banerjee, S et al (2002) Nissim & Ziv's (2001) Mohamed et al. (2016) Kumar (2003)	Kuwari (2009) Muhammad et al (2011) Aivazian and Booth (2003) Ayman (2015) Malkawi (2007)
Size	Positive	Agency Theory Life-Cycle Theory	Lee (1995) Denis & Osobov (2007) Ho (2003) Kuwari (2009) Olantundun (2000) Aivazian and Booth (2003)	Eriotis (2005) Malkawi (2007) Holder et al. (1998) Ayman (2015)
Leverage	Negative	Agency Theory Free Cash Flow Hypothesis	Kuwari (2009) Aivazian and Booth (2003)	Kumar (2003) Malkawi (2007) Hellstrom & Inagambaev (2012)
Liquidity	Positive	Agency Theory Free Cash Flow Hypothesis Signaling Theory	Mohamed et al. (2016) Ho (2003) Banerjee, S et al (2002)	
Investment Opportunites	Negative	Life-Cycle Theory	Banerjee, S et al (2002) Ahmed.H & Javid.A.Y (2012) Amidu and Abor (2006) Yoon & Stark (1995)	

3. Methodology

In this chapter, we present a detailed description of our methodology choices. Firstly, our research approach and data collection approach are outlined. Secondly we present our chosen variables and regression model. After a discussion about the diagnostic tests we will perform on our regression model, this chapter will be concluded with discussions regarding validity, reliability and general criticism of our choices.

3.1 Research Approach

In order to fulfill our purpose to investigate which factors that could influence the dividend decision for Swedish firms, a deductive approach is used. Through a deductive approach we are able to empirically test the hypotheses we have derived from theories and earlier studies (Brooks, 2014, p.151). Holme and Solvang (1996, p.51) further discuss that a theory is never complete, a researcher can always question previous studies and derive new hypotheses that can be tested. By repeating empirical investigations, a researcher can evaluate the reliance of a theory. Our thesis is based on theories and empirical studies regarding determinants of dividend policy. For our theoretical framework we have included theories with different points of view, as well as empirical studies from both developed and emerging markets to reveal an overall picture. How we collect our data in order to answer our research questions will be described further down in the next section.

3.2 Time Period and Data Collection

In order to examine potential determinants of dividend policy of Swedish firms, this paper focuses on all large, medium and small caps that are listed on Nasdaq OMX in Stockholm. The chosen time period is 2010 - 2015, in total 6 years. This is because we want to investigate a recent time period. With the starting year of 2010, the impact from the recent global financial crisis that started in 2007 can be mitigated. We choose to end the period in 2015 because this thesis is limited to data available in 2016.

We collect secondary data, with Thomson Reuters DataStream as our source. Since we investigate small, mid and large caps in Sweden, a large amount of quantitative data is collected. The data collected directly from DataStream for each firm are: dividend yield, ROE, current ratio, total debts, market value and total assets. All data is collected for each year of our sample period 2010-2015. Further details about measurement units for all data collected and how we deal with the data to measure our variables will be discussed in section 3.4.

3.3 Sample and Exclusions

Our original sample consisted of 327 firms listed on the small, mid and large cap on Nasdaq OMX Stockholm. All financial firms are excluded which is in line with previous studies, as financials have different regulations, objectives and structure than non-financials (Koller et al. 2010, p.765), thus including these could mislead the results. We use the Industry Classification Benchmark (ICB) to identify which companies are classified as financials. We excluded 75 financial firms with an ICB code of 8000-8999. Furthermore, since we want to investigate dividend policy in Sweden we only included firm that are only listed on the Swedish market, i.e. we excluded cross-listed firms (firms that are listed on multiple stock exchanges). Third, we excluded all firms that went public after 2010 since we aim to capture the listed firms during the whole observation period 2010-2015. Lastly, in Sweden companies are allowed to have multiple shares - both A-class shares and B-class shares. As we do not want duplicates, we only include the most traded share for each firm. After these eliminations we had a sample of 189 firms left, consisting of both dividend paying and non-dividend paying firms. These will be used in our descriptive statistics to see how many firms of our sample that pay dividend during our chosen time period 2010-2015. Furthermore, in order to answer our two research questions, what are the firm-specific factors that influence the dividend policy decision for Swedish firms, and how these factors influence the dividend policy, we exclude firms that did not pay dividend at all during our period 2010-2015. Since we want to investigate the determinants of the dividend policy among those companies that paid dividend. After this we have a sample of 148 dividend paying firms.

3.4 Variables

To test our chosen determinants of dividend policy an important aspect is which variables we choose as proxies to represent our determinants. Below we will give a comprehensive discussion about the different measurements we choose for dividend policy as well as for our determinants.

3.4.1 Measurement of the Dependent Variable

In our model, dividend policy is our dependent variable. In order to answer our research question about which factors influence a company's dividend policy, it is highly important to define how dividend policy is measured. In this thesis we will use dividend yield as a measurement for dividend policy. The two most common measurements of dividend is dividend yield and dividend payout ratio.

3.4.1.1 Dividend Yield vs. Dividend Payout Ratio

Both dividend yield and dividend payout ratio are considered to be accurate measurements but they affect the result differently. They are both based on dividend per share but they have different denominators. Dividend yield is divided by the market price of common stock, while dividend payout ratio is divided by earnings per share (Fraser and Ormiston, 2016, p.224). The measurements of them are presented below:

$$Dividend\ Yield = \frac{Dividend\ Per\ Share}{Price\ Per\ Share}$$

$$Dividend\ Payout\ Ratio = \frac{Dividend\ Per\ Share}{Earnings\ Per\ Share}$$

In our study, we choose to use dividend yield as the measurement of dividend policy instead of dividend payout ratio. Fama and French (1988) argues that dividend yield is more informative than dividend payout ratio since it can forecast a firm's stock return, therefore dividend yield can be more appropriate in our model. Furthermore, dividend yield shows the relationship between

cash dividend and the market price of the firms stocks. This can reflect the return that investors expect to earn for the stocks they hold (Berk and DeMarzo, 2014, p273). Thus it can, to some extent, reflect more perspectives about both investors and firms. A higher dividend yield indicates that investors receive more dividend returns from the stocks they hold. Therefore, in line with Signaling Theory, a company would use dividend yield to reflect its dividend policy. A company can send a positive signal to investors by having a higher dividend yield.
Dividend yield is also used as measurement by Friend and Puckett (1964); Black and Scholes (1974); Miller and Scholes (1982); Litzenberger and Ramaswamy (1979) and Long (1978).

3.4.2. Measurements of the Determinants

3.4.2.1 Profitability

Different researchers have used different measurements for profitability. The commonly used measurements in previous studies for profitability are EBIT/total asset (EBIT/TA), return on assets (ROA) and return on equity (ROE). The measurement used in our paper is ROE, further explanations of each measurement will be presented below.

Denis & Osobov and Amidu and Abor (2006) used EBIT/Total Assets to measure profitability. The advantage of this measurement is that EBIT measures the overall performance of the company's operations, excluding its financing and investment activities (Fraser and Ormiston, 2016, p.221). The drawback is that firms' assets varies among different industries since in some industries firms are overall more asset light and in some it is the contrary. This will affect the measurement since the asset light firms will appear to have higher profitability than the asset heavy. Another common measurement is return on asset (ROA), used by Grullon et al (2003), DeAngelo and DeAngelo (2006), Ayman (2015), Franklin and Muthusamy (2010). ROA indicates how much profit a firm has relative to its level of investment in total assets and ROA is usually used to evaluate internal projects (Fraser and Ormiston, 2016, p.222).

Instead of using ROA or EBIT/Total assets, we consider ROE to be more appropriate for our study. ROE measures a corporation's profitability by telling us how much profit it generates with

the money shareholders have invested. It is also a common tool to evaluate a more company-wide performance such as a business strategy or the business as a whole and also to evaluate standalone projects that require investor financing (Culp, 2006, p81). Both ROA and ROE measure the overall success of the firm in the sense of generating profits, but ROE in addition measures the overall efficiency of the firm in generating return to shareholders (Fraser and Ormiston, 2016, p.234). Moreover, ROE is also used by DeAngelo, DeAngelo & Skinner (1992), Kania and Bacon (2005), Nissim & Ziv (2001) and Aivazian & Booth (2003). The formula we use to calculate ROE is:

$$ROE\ (Profitability) = \frac{Net\ Income}{Total\ Equity}$$

3.4.2.2. Size

To capture the potential effect of size on dividend policy, the natural logarithm of total assets (LNTA) and market capitalization (MC) among different measurements are commonly used to define size.

Market capitalization is used by Ho (2003), Ayman (2015) and Hellstrom & Inagambaev (2012). We find the natural logarithm of total assets to be the most suitable measurement since market capitalization is more market oriented, while total assets measures the firm's total resources (Dang and Li, 2013). The natural logarithm of total assets is often used as a measurement of a firm's size. Dang and Li (2015), Gul (1999) and Awan et al (2011) all used natural logarithm of total assets to measure a firm's size in their studies. We calculate the natural logarithm of the firms' total assets as measured in 1000 SEK. The formula is presented below:

$$Size = \ln(Total\ Asset)$$

3.4.2.3. Leverage

In order to examine the effect of leverage on dividend policy we used total debt over total equity in line with Ho (2003); Franklin & Muthusamy (2010); Rozeff (1982) and Malkawi (2007). Kania & Bacon (2005) used debt over total assets, but since debt over equity indicates the proportion that is financed by creditors relative to shareholders we think debt over equity is a

good measurement. The total value of debt and equity are collected from Datastream and D/E ratio is calculated manually by the formula below:

$$D/E(Leverage) = \frac{Total\ Debt}{Total\ Equity}$$

3.4.2.4 Liquidity

Liquidity is the firm's ability to meet its short term demands for cash. Ho (2003) measured Liquidity with working capital while Kania & Bacon (2005); Aivazian and Booth (2003); Myler and Bacon (2004) measure Liquidity with Current Ratio. Current ratio is also used in our study to measure Liquidity:

$$Current\ Ratio\ (Liquidity) = \frac{Current\ Assets}{Current\ Liabilites}$$

3.4.2.5 Investment Opportunities

In order to investigate firms' investment opportunities'' effect on dividend policy, Tobin's Q is used. One measurement for Investment Opportunities is through Tobin's Q which was introduced by James Tobin (1918). The ratio measures the market value of a firm to the replacement cost of the firm's physical assets. A higher Q indicates additional investment in the firm would make sense since profits generated would exceed the cost of the firm's assets. In other words, a higher Q implied more investment opportunities for a company (Lewellen and Badrinath, 1997). So, in this study we will use Tobin's Q as a measurement for Investment Opportunities which is in line with Lang & Litzenberger (1989); John & Lang (1991); Yoon & Starks (1995) and also Knyazeva and Knyazeva (2011).

We will calculate Tobin´s Q manually with the following formula:

$$Tobin's\ Q\ (Investment\ Opportunite) = \frac{Total\ Market\ Value\ of\ Firm}{Total\ Asset\ Value}$$

3.4.3 Summary of Measurements

In *Table 4* we summarizes all our measurements for our dependent and independent variables based on the previous discussion. Below we also present our null hypotheses we will test in order to answer our research question what are the firm-specific factors that influence the dividend policy for Swedish firms.

Table 4. Summary of Selected Measurements of Determinants and Supportive Studies

Dependent Variable	**Variable**	**Supportive studies of measurement**
Dividend Policy	Dividend Yield	Litzenberger & Ramaswamy (1964) Puckett (1964) Black & Scholes (1974) Long (1978) Miller & Scholes (1982) Fama & French (1988)
Independent Variable	**Variable**	**Supportive studies of measurement**
Profitability	ROE	DeAngelo, DeAngelo & Skinner (1992) Nissim & Ziv´s (2001) Aivazian & Booth (2003) Kania & Bacon (2005)
Size	ln(total assets)	Dang & Li (2013) Gul (1999) Awan et al. (2011)
Leverage	D/E	Ho (2003) Kania & Bacon (2005)
Liquidity	Current Ratio	Aivazian & Booth (2003) Myler & Bacon (2004) Kania & Bacon (2005)
Investment Opportunities	Tobin´s Q	Lang & Litzenberher (1989) John & Lang (1991) Yoon & Stark (1995) Knyazeva & Knyazeva (2011)

Null Hypotheses

*H01 : Return on equity has **no** effect on dividend yield.*

*H02 : LNTA has **no** effect on dividend yield.*

*H03 : Debt to equity ratio has **no** effect on dividend yield.*

*H04 : Current ratio has **no** effect on dividend yield.*

*H05 : Tobin's Q has **no** effect on dividend yield.*

3.5 Panel Regression Model

Our dataset embodies information in two dimensions; across both time (2010-2015) and different firms, which is in line with panel data that is often employed in the situation where the data comprise both time series and cross-sectional elements (Brooks 2014, p526). Thus panel data regression is deployed.

$$DY_{i,t+1} = \beta_0 + \beta_1 CR_{i,t} + \beta_2 LNTA_{i,t} + \beta_3 TD/TE_{i,t} + \beta_4 ROE_{i,t} + \beta_5 Q + \varepsilon_{i,t}$$

Where:

$DY_{i,t}$ = Dividend yield for firm i at time t+1.

$ROE_{i,t}$ = Return on equity for firm i at time t.

$LNTA_{i,t}$ = Natural logarithm of total assets for firm i at time.

$CR_{i,t}$ = Current ratio for firm i at time t.

$Q_{i,t}$ = Tobin´s Q for firm i at time t.

Beta = Constant

E = Error variable

Why panel data? By employing panel data regression, there are certain advantages. First, panel data can deal with more complex information as it combines both cross – sectional and time series data. This leads to the increase in the number of degrees of freedom and thus the power of the test. Furthermore, the impact of certain forms of omitted variables bias in regression results can be mitigated in panel data regression (Brooks 2014, p527). Gujurati (2004, p.640) further stated that panel data can better detect and measure effects that simply cannot be observed in pure cross-section or time series data, as panel data gives more informative data, more variability, less collinearity among variables, more efficiency and better dynamics of change. Nonetheless, panel data pose some estimation and inference problems. Since such data involve both cross-section and time dimensions, problems that plague cross-sectional data (e.g., heteroscedasticity) and time series data (e.g., autocorrelation) need to be addressed (Gujurati, 2004, p.655). These implicit problems will be discussed and tested in our paper under Diagnostic Tests (section 3.6).

With panel data, there are three models that are generally employed: pooling regression, fixed effects model and random effects model. In order to determine the most suitable regression model, a number of statistical tests need to be conducted. We first test whether the pooled regression can be used by conducting redundant fixed effect test, if not, we will further test fixed effects model and random effects model by using the Hausman test. In the rest of the chapter, we will present an introduction of each model and more detailed discussions about how we choose the most suitable model, as well as the corresponding tests.

3.5.1 Pooled Regression

According to Brooks (2014, p.527), we start by testing pooled regression by using ordinary least squares (OLS) first as it is the simplest to do with panel data. This involves estimating a single equation on all the data together, assuming that the average values of the variables and the relationships between them are constant over time and across all of the cross- sectional units in the sample. This will lead to assumptions of no heterogeneity and no time-specificity, thus the disadvantage - the information is lost in time dimension and cross-section dimension.

Redundant fixed effect test

We use redundant fixed effect test, also called likelihood ratio test, to test whether the data can simply be pooled and estimated using a standard ordinary least squares regression model or a fixed effects panel regression approach can be employed (Brooks 2014, p.692). We exercise redundant fixed effect test by Eviews, with the null hypothesis that a pooled sample can be employed.

3.5.2 Fixed Effects Model vs. Random Effects Model

Fixed effects models allow the intercept in the regression model to differ cross-sectionally but not over time, while all of the slope estimates are fixed both cross-sectionally and over time (Brooks, 2014, p.528). With time-fixed effects models, the average value of y (i,t) is assumed to change

over time but not cross–sectionally, hence the intercepts would be allowed to vary over time but be the same across entities at each given point in time (Brooks, 2014, p.531). Although fixed effects model is easy to apply, there are drawbacks. Gujurati (2004, p.649) argues that when introducing many dummy variables, the degrees of freedom would decrease. Problems with many variables can also cause the possibility of multicollinearity to increase. With both entity- fixed effects and time- fixed effects, a model would contain both cross- sectional and time dummies (Brooks, 2014, p.532).

Unlike fixed effects model, where the modeling can be costly in terms of decreasing degrees of freedom if many cross-sectional units exist, random effects model assumes different intercept terms for each entity and these intercepts are constant over time, with the relationships between the explanatory and explained variables to be the same both cross –sectionally and temporally (Brooks, 2014, p.536). In other words, it assumes that the entity's error term is not correlated with predictors which allows for time-invariant variables to play a role as explanatory variables.

Which model is better, fixed effects model or random effects model? The random effects model is more appropriate when the entities in the sample can be thought of as having been randomly selected from the population, but a fixed effect model is favored when the entities in the sample effectively constitute the entire population. Since fewer parameters are estimated with the random effects model and thus the degrees of freedom are saved, the random effects model contains more efficient estimation than the fixed effects approach. However, random effects approach is only valid when the composite error term is uncorrelated with all of the explanatory variables. To test which model is more appropriate, Hausman test is often employed (Brooks, 2014, p.537).

Hausman Test

Since random effects model is invalid when heterogeneity exist, meaning that error term is correlated with explanatory variables, Hausman test is often used to test whether a variable can be treated as exogenous or whether that variable needs a separate structural equation. Hausman test refers to a test for whether a random effects approach to panel regression is valid or whether a fixed effects model is necessary (Brooks, 2014, p.686). We exercise Hausman test by Eviews, with the null hypothesis that random effects model can be applied.

3.5.3 Final Regression Model

As discussed above, both redundant fixed effects model and Hausman test reveal that fixed effects model is more appropriate, therefore fixed effects model will be employed in our panel regression. Since our regression model concerns more about the determinants of the dividend policy, which are measured by cross-sectional entities, we apply fixed effects on both time period and cross- section dimensions. Though this adds in more dummies, the model generate reasonable and accurate estimates for the cross-sectional entities. Another concern for our model is the heteroskedasticity problem revealed by the BPG test (discussed under assumption 4). To correct this, white cross-section will be employed, leading to a robust cross-section heteroskedasticity. As a conclusion, the final model is with fixed effects on both period and cross-section dimensions with white cross section correction.

3.5.4 Granger Causality Test

Although regression analysis deals with the dependence of one variable on other variables, it does not imply causation. In addition to the panel regression, granger causality test is deployed to find out if whether the dividend policy will impact the selected factors backwards. At one extreme are people who believe that “everything causes everything” (Gujurati, 2004, p.699). To further study the relationship between dividend policy and the selected factors, granger causality test is applied. Granger causality test is dealing with bilateral causality and it can detect the direction of the causality. With the Granger causality test, we will test the variable dividend yield with each

determinant separately. The test can be conducted in Eviews, with the null hypothesis that the variable under consideration does not "granger cause" on other variable (Gujurati, 2004, p.702).

3.6 Diagnostic Test

Regression models may encounter any or the combinations of several problems, e.g. wrong coefficient estimates and wrong standard errors etc. In order to achieve more reliable and consistent estimates, our regression model demands to possess some desirable properties, which should be in line with OLS five assumptions. Hence various regression diagnostic tests are necessary before running a regression model. Each diagnostic test and the corresponding findings will be discussed below, starting from the five assumptions, then multicollinearity and stationarity.

3.6.1 Five Assumptions

Assumption 1: $E(u_t) = 0$

The first assumption requires the average value of the errors to be zero, Brooks (2014, p.181) claims that as far as a regression equation include a constant term, this assumption will not be violated.

Assumption 2: $var(u_t) = \sigma^2 < \infty$

The second assumption is that the variance of the errors is constant – this is also called the assumption of homoscedasticity. Otherwise heteroscedasticity would exist, supposing that the residuals are changing systematically with explanatory variables. Heteroscedasticity is often spotted in the cross-sectional data. If the errors are heteroscedastic, OLS estimators no longer best linear unbiased estimators (BLUE). In other words, they no longer have the minimum variance (Brooks, 2014, p.183). Two simple tests for heteroscedasticity are Breusch-Pagan-Godfrey (BPG) test and White's test. Eviews does not support direct heteroscedasticity test for panel data, thus we test BPG manually, by treating the squared residuals from the test equation as dependent variable and regress it with the original right hand side equations. The null hypothesis for BPG test is that errors are homoscedastic.

Assumption 3: cov(u_i , u_j) = 0 for $i \neq j$

Assumption 3 assumes that the covariance between the error terms over time or cross-sectionally is zero, meaning that the errors are uncorrelated with one another. If autocorrelation exists, the coefficient estimates derived from OLS are inefficient and R-squared gets inflated to its "correct value" for positive autocorrelation. Durbin- Watson (DW) test is used to test for first order autocorrelation with the null hypothesis that the error terms are independent of one another (Brooks, 2014, p.194).

Assumption 4: the xt are non-stochastic

Assumption 4 indicates that independent variables are non-stochastic, implying that the repressors are not correlated with error term of the estimated equation, otherwise OLS estimator will be biased and inconsistent. Hausman test is applied to test heterogeneity, which was discussed earlier.

Assumption 5: ($ut \sim N(0, \sigma 2)$

The last assumption implies that the disturbances are normally distributed. One of the most commonly used tests is the Jarque-Bera (JB) test, with the null hypothesis of normality. Another method is to observe the histogram plot of the residuals to see if the residuals are normally distributed. The null-hypothesis of the JB test is that the error terms are normally distributed.

3.6.2 Multicollinearity

Using the OLS estimation method also requires that the explanatory variables are not correlated with one another. "Multicollinearity" refers to a high correlation between explanatory variables. Multicollinearity would cause loss of precision, e.g. R-squared will be high but the individual coefficients have high standard errors and inference are not reliable (Brooks, 2014, p.218). We examine the correlation between the independent variables by using covariance matrix. An absolute correlation value exceeding 0.8 would indicate strong correlation and something that would necessitate us to remove one of the variables.

3.6.3 Panel Unit Root

According to Brooks (2014, p.694), it is necessary to examine the stationarity of data since the use of non-stationary data can lead to spurious regressions. Besides, it is not possible to validly undertake hypothesis tests about the regression parameters. A stationary series can be defined as one with a constant mean, constant variance and constant autocovariances for each given lag. There are various unit root test to examine stationarity of series. Unit root tests such as DF test, ADF test etc are weak and tend to accept the null hypothesis (Gujurati, 2004, p.821). Besides, individual unit root tests have limited power. Since we have panel data, Levin, Lin and Chu's (LLC) model (Brooks, 2014, p.548) is recommended as it allows for both entity-specific and time-specific effects. The null hypothesis is unit root exists, indicating the data is non-stationary. We will conduct panel unit root tests on each variable in its current level in our model,.

3.7 Validity and Reliability

Validity refers to how well the measurements used in our study correspond to what we intend to investigate (Bryman and Bell, 2011, p.39). When talking about validity there are usually two subcategories, external and internal validity. External validity refers to if there is support for generalization of our results. While internal validity of a study is determined by how much control that has been achieved in the study, referring to if the changes in the dependent variable is caused by a change in the independent variable and not by other confounding factors (Ryan et al, 2003). In order to achieve high internal validity we have excluded firms that we do not intend to investigate for example financial firms since they have different objectives than non-financials. The combination of deriving our measurement from previous studies combined with diagnostic and robustness tests increases the chance that our results are valid.

The starting point of a theory is often a simple model of reality. The theory can then be made more complex by adding new variables or new types of relationship between the existing variables. Then we can deduce various consequences which again can be tested empirically. This

allows new knowledge to be developed and build better understanding which others can use in other research (Holme and Solvang, 1996, p.51). This was explained by Holme and Solvang (ibid) when they discussed a deductive approach and a good example of why a study needs to be reliable. Reliability refers to whether the result of a study are repeatable and if our measurement are stable or not (Bryman and Bell, 2011, p.41). Reliability is concerned with issues of consistency of measures which make reliability closely related to replicability. This refers whether our results will be the same if our study is repeated (Bryman and Bell, 2011, p.42). While conducting this study, reliable data sources have been used and the methodological approach has been followed closely. This study is also described thoroughly so replication would be possible. The exclusion of firms is motivated and outlined and followed by previous studies. Data is collected from DataStream and our statistical tests and regression have been conducted with Eviews, ensuring valid calculation methods.

3.9 Criticism about the Model

When investigating the determinants of dividend in Sweden, our research period- six years - is limited due to that our study intends to mitigate the influence from the global financial crisis. There is a chance that our results will be specific for this period.

Another limitation can be that we do not have a certain set of firm-specific factors to replicate due to the limited studies on dividend on Swedish market. Many studies are conducted in various markets with different selected firm-specific factors. There is no perfect model for testing the determinants of dividend since each previously used methodology has its pros and cons. In addition, measurements for the selected firm-specific factors vary a lot in different research.

Last, though the differentiation among industries can cause firms to behave distinctively, our research does not catch the dividend policy industry-wise in Sweden. This is due to that Sweden has a small market and observations are limited if we divide companies by industries.

4 Empirical Findings

This session provides introduction to our statistical findings based on different tests. First, the dividend states in Sweden during 2010-2015 will be presented. Then, the descriptive and regression results on each variable will be discussed. Next, the results of Granger causality test will be presented to show how yield influences the independent variables. In the end of this session, a summary of all empirical findings will be presented.

4.1 Descriptive Statistics

Before investigating the determinants of dividend policy in Sweden, it is interesting to look into the background of corporates' dividend payout behaviors in Sweden. This will be conducted by observing companies with changes in dividend policy over our research period 2010-2015. In consistent with our statistical measurement, we use dividend yield as a proxy for a firm's dividend policy. We divide our sample of both dividend paying and non-dividend paying firms, in total of 189 firms in three groups:

1. The firms that did not pay dividend at all during 2010- 2015.
2. The firms that paid dividend every single year during 2010- 2015.
3. The firms that paid dividend in some years during 2010- 2015, but not in the whole period.

The observations based on these three groups will be presented below, starting from the introduction of the percentage of firms that pay/do not pay dividend.

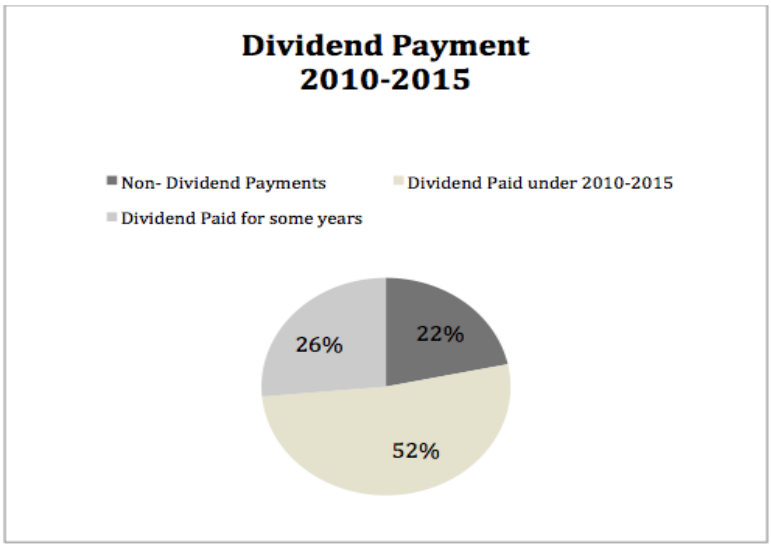
As shown in the *Table 5* and *Figure 1*, only 22% of all observations did not pay dividend at all during 2010-2015, while 26% paid at least for 1 year or more years. Among the 189 firms that paid dividend, 98 firms paid dividend continuously during all the years, which accounts for more than half of the total observations (52%). A total of 148 firms paid at least dividend for one year during 2010-2015, accounting for 78% of all observations.

Table 5. Dividend Paying Divisions in Sweden, 2010-2015

Dividend Payment, 2010 - 2015		
Status	**No. Companies**	**Percentage**
Non- Dividend Payments	41	22%
Dividend Paid under 2010-2015	98	52%
Dividend Paid for some years	50	26%
Total	**189**	**100%**

Resource: Datastream and group calculation.

Figure 2. Dividend Paying Divisions in Sweden, 2010-2015



Resource: Datastream and group calculation.

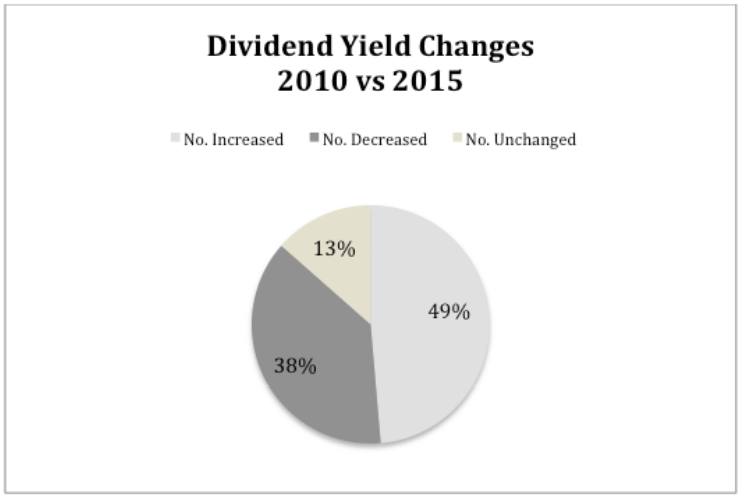
Next, by treating 2010 as base year, we compare among the 148 firms that paid dividend a company's dividend yield in 2015 and in 2010. The outcomes are shown in *Table 6* and *Figure 2*. The results reveal that 63% of the firms has either increased or kept its dividend yield, in total 92 firms. Among all observations, almost 50% of the firms has a higher dividend in 2015 comparing in 2010, while 38% has lower dividend in 2015 comparing to in 2010.

Table 6, Dividend Changes, 2010 vs 2015

Dividend Changes, 2010 vs 2015		
Status	**No. Companies**	**Percentage**
No. Increased	72	49%
No. Decreased	56	38%
No. Unchanged	20	14%
Total	**148**	**100%**

Resource: Datastream and group calculation.

Figure 2. Dividend Changes, 2010 vs. 2015



Resource: Datastream and group calculation.

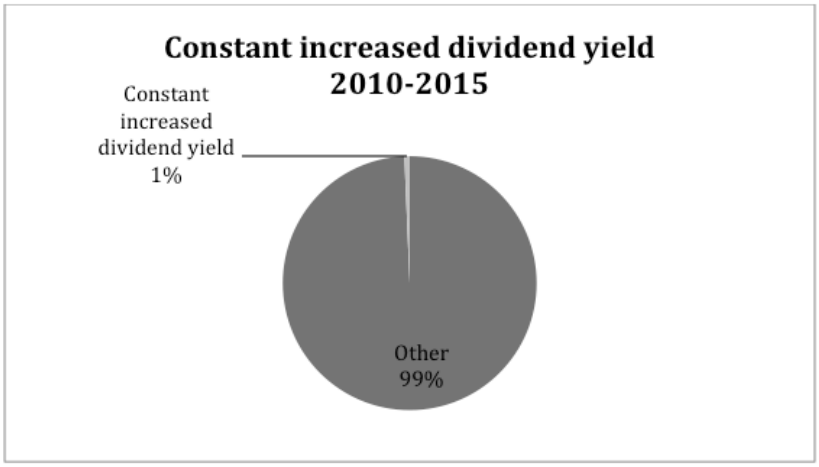
In the end, we investigate in continuous dividend changes during the whole period 2010- 2015 (*Table 7* and *Figure 2*), in order to detect a company's short- to mid- term dividend decisions. We compare a company's dividend yield in all these years and find out that only 6% of the firms have increased its dividend continuously over 2010-2015. The rest of the observations have either decreased dividend yield, unchanged or a fluctuated dividend yield over these years.

Table 7. Continued Dividend Changes during 2010-2015

Dividend Changes, 2010 - 2015		
Status	**No. Companies**	**Percentage**
Constantly increased its dividend yield	9	6%
Same or decreased dividend yield	139	94%
Total	**148**	**100%**

Resource: Datastream and group calculation

Figure 3. Continuous Dividend Changes during 2010-2015



Resource: Datastream and group calculation.

After understanding the overall dividend state for the observed Swedish firms during 2010-2014, we move to the statistical findings, where we observe each selected variable based on various tests.

In *Table 8* shows the descriptive statistics of all variables that are tested in our model. All the descriptions apply to the sample of the small, medium, big caps that are included in our model. Since we have panel data that contains both cross- sections and time series, the statistics are taking into account the yearly average during 2010-2015.

Table 8. Descriptive statistics of the studied variables

	Yield	**CR**	**LNTA**	**Q**	**TD/TE**	**ROE**
Mean	2.834	1.822	14.915	1.320	46.055	13.930
Median	2.65	1.470	14.552	0.970	36.465	13.73
Maximum	17.88	13.17	19.721	11.419	230.280	95.74
Minimum	0	0.046	11.041	0.078	0.000	-51.51
Std. Dev.	2.15	1.321	1.999	1.307	43.910	14.355

In overall, we can observe that the mean and median of dividend yield, Ln (total asset) and ROE are very close, meaning that each of the series is divided evenly around its mean and these samples do not have extreme outliers. Therefore we can conclude these series are good spread. CR, Q and TD/TE all has a mean that are slightly larger than their medians, implying that more data is to the left side of mean. For each variables, there can be a big range between its maximum and minimum value. This can be due to that firms in different industries have different financial states and strategies. The standard error of each series is not considered to be high comparing to each variable's overall state and based on our large sample size.

Dividend Yield - Dividend policy

The dividend yield's mean of 2.83 indicates that investors on these firms tend to receive 2.834% dividend return on each stock they invest. Investors can receive maximum 17.88% return on stock and minimum nothing based on the statistics.

Current Ratio - Liquidity

The current ratio has a mean of 1.82, indicating that one company's current asset is 1.82 times of its current liabilities. A current ratio under 1 would imply that a firm in question would be unable to pay back its obligations. In our case, companies averagely have a better financial capability. Investors can receive maximum 17.88% return on stock and as low as nothing based on the statistics.

Ln (Total Asset) - Size

The LNTA has a mean of 14.915, indicating that among all the firms we investigated, the average total asset for one is 3 billion SEK (exp(14.915)). Due to the reason that the sample includes small, medium and big caps and different industries vary a lot regarding assets, the range of the total assets is wide, from 91.035 million SEK (minimum, exp(11.04)) to 367 billion SEK (maximum, exp(19.721)).

Tobin's Q- Investment opportunities

Tobin's Q has a mean of 1.32, meaning that averagely one firm's market value (MV) is 1.3 times of its total assets. Since tobin's Q is higher than 1, it indicates that companies have more investment opportunities. The median Q if 0.97 (lower than the mean)implies that more firms have a tobin's Q to the left of mean. The big range of tobin's Q shows that companies face very different amount of investment opportunities.

Debt to Equity ratio (TD/TE) - Leverage

TD/TE has a mean of 46.05%, meaning that averagely one firm's total debt is 46.05% of its total equity. A higher TD/TE indicate a higher risk and more aggressive financial strategies. The maximum leverage we observed is 230%, and some firms have no leverage. This can be due to industries variations and capability of different sized firms.

Return on Equity - Profitability

The return on equity has a mean of 13.93%, indicating that averagely one company's net income is 13.93% of its total equity. In our observations, the company with the highest profitability has 95.74% ROE. On the other hand, companies make losses too. The worst ROE observed is -51.51%, meaning the company had a net loss accounting for 51.51% of its equity.

4.2 Regression Results

In order to investigate the relation between dividend and the chosen independent variables, we follow the steps presented in chapter 3, by testing the three commonly used models: pooled regression, random effects model and fixed effects model. *Table 9* below presents the results of pooled regression and random effects model. As shown in the table, the pooled regression results indicate a low value of R-squared of 0.07, meaning that 7% of the variations in the yield can be explained by the changes of independent variables, while all four independent variables are significant except the current ratio. All significant variables have a high level of significant, except Tobin's Q is significant at 5%, the other three (LNTA, ROE and D/E) are significant at 1%. This spurious results - low R-square value with high significant variables - bring out the concern whether this pooled panel regression is reliable and valid. This inaccurate results can also

be explained by that pooled regression does not deal with heterogeneity and time-specificity, hence the information is lost in time dimension and cross-section dimension.

The results from the redundant fixed effect test reveals that p-value is significant at 1% (Appendix 1), meaning that the null hypothesis should be rejected and pooled regression cannot be employed in our sample. Therefore we need to further test whether fixed effects approach or random effects approach is preferred and can be used. When looking into the Random effects model, it reveals that current ratio, ln(total asset) and return on equity are significant. We cannot reject that the dependent variable cannot be explained by the joint control variables as probability of F-statistic is 0 and R-squared shows that 57% percentage of variations in dividend yield can be explained by control variables. However, we cannot conclude from the results as random effects approach is only valid when the composite error term is uncorrelated with all of the explanatory variables. With heterogeneity, the results can be invalid and this is also confirmed by Hausman test that random effects model is not appropriate in our analysis. The p-value (Appendix 2) of cross-section random is significant at 1%, indicating that the null hypothesis should be rejected and random effects model is not appropriate for our panel data. As a result, fixed effects model is more suitable and will be employed as our final model.

Table 9. Summary of pooled regression and random effects model

Variables	Pooled Regression	Random Effects
Current Ratio	-0.075	0.273***
Ln (Total Asset)	0.131***	0.457*
Debt to Equity	-0.007***	0.001
Return on Equity	0.021***	-0.011*
Tobin's Q	-0.163**	0.060
R- Square	0.074	0.577
F- Statistic	12.422	5.591
Prob. (F- Statistic)	0.000	0.000

*** denotes significance at 1%

** denotes significance at 5%

* denotes significance at 10%

Since the results from both the pooled regression and random effects model have potential problems and are not accountable, we observe the determinants of dividend by looking into our final model - fixed effects model. This model is supported by both redundant fixed effect test and Hausman test. Moreover, it takes into the account of heterogeneity with white cross-section. Therefore, the results from the fixed effects model are more accurate and reliable. *Table 10* below presents the outcomes from the panel regression.

Table 10. Summary of Fixed Effects Model

Dependent Variable: Dividend Yield
Time Period: 2010-2015, yearly

Variables	Coefficient	t- Statistic	Standard Error	Probability
Current Ratio	0.226	3.305***	0.068388	0.001
Ln(Total Asset)	0.514	1.821*	0.282103	0.069
Debt to Equity	-0.001	-0.293	0.004565	0.770
Return on Equity	-0.008	-0.911	0.008541	0.363
Tobin's Q	0.200	22.601***	0.008860	0.000
R- Square	0.611			
F- Statistic	6.177***			
Prob. (F- Statistic)	0.000			
No. Observations	765			

*** denotes significance at 1%

** denotes significance at 5%

* denotes significance at 10%

Overall, the probability of F-statistics of 0 indicates that we should not reject the null hypothesis that all coefficients are zero, meaning that the dependent variable dividend yield can be explained by at least one control variable. R- squared (0.61) implies that 61% of variation in dividend yield can be explained by the independent variables. Breaking down into each independent variable, dividend yield is positively related to current ratio, ln (total asset) and Tobin's Q, while negatively related to debt to equity ratio and return on equity.

Current ratio

A positive relation is found between current ratio and dividend yield. According to the t-statistic (3.305) and the probability (0.001) of current ratio, the null hypothesis - current ratio has no

impact on dividend yield- should be rejected at 1% level of significance, meaning that changes in a firm's dividend yield can be explained by its current ratio. The coefficient of current ratio (0.226) indicates one percentage increase in current ratio would cause dividend yield to increase by 0.226%.

Ln (Total Asset)

A positive relation is found between the Ln (Total Asset) and dividend yield. The probability of 0.069 indicates that Ln (Total Asset) is significant at 10%. Therefore the null-hypothesis should be rejected, meaning that Ln (Total Asset) is significantly influencing dividend yield. Ln (Total Asset) has a coefficient of 0.514, indicating that 1% increase in total asset triggers a 0.005 % (0.514*0.01*100%) increase in dividend yield.

Debt to Equity

A negative relation is found between debt to equity ratio and dividend yield. The coefficient of debt to equity ratio (-0.001) indicates one percentage increase in debt to equity ratio would cause dividend yield to decrease dividend yield by 0.001%. However, according to the t-statistic (-0.293) and the probability (0.77) of debt to equity ratio, the null hypothesis - debt to equity ratio has no impact on dividend yield- cannot be rejected at 10%. The results imply that debt to equity ratio is not significant and cannot explain the changes in a firm's dividend yield.

Return on Equity

A negative relation is found between return on equity and dividend yield. The coefficient of return on equity (-0.008) indicates one percentage increase in debt to equity ratio would cause dividend yield to decrease dividend yield by 0.008%. Nonetheless, according to the t-statistic (-0.911) and the probability (0.363) of return on equity, the null hypothesis - return on equity has no impact on dividend yield- cannot be rejected at 10%. The results imply that return on equity is not significant and cannot explain the changes in a firm's dividend yield.

Tobin's Q

A positive relation is found between the Tobin's Q and dividend yield. The probability of 0.00 indicates that Tobin's Q is significant at 1%. Therefore the null-hypothesis - Tobin's Q has no impact on dividend yield- should be rejected. This implies that Tobin's Q can explain the changes

in dividend yield significantly. Tobin's Q has an coefficient of 0.2, indicating that 1% increase in Tobin's Q would increase dividend yield by 0.2%.

Breusch-Pagan-Godfrey test

Our result (Appendix 3) shows that F- statistic is significant, meaning that the null hypothesis should be rejected, thus heteroskedasticity exist in our test.

Durbin-Watson test

Our DW test (Appendix 4) indicates no autocorrelation exists since the DW value closes to 2.

Jarque-Bera test

The p-value is significant which indicates that the null hypothesis of normality should be rejected. However, with a large sample like in our case, non-normality is not considered as a problem. By observing the histogram plot of the residuals (Appendix 5), our residuals are close to being normally distributed.

Multicollinearity test

Our results (Appendix 6) reveal no multicollinearity among variables as no absolute correlation value exceeds 0.8.

Levin, Lin and Chu model

LLC's results (Appendix 7) show that the null hypothesis for all variables should be rejected, thus all our data series are stationary.

4.3 Granger Causality Test

The results of Granger causality test is shown in the *Table 11* below. With Granger causality test, we focus on whether the changes in dividend yield will cause back the changes in each determinant. All the probabilities of between dividend yield and current ratio (0.207), Ln (total asset) (0.46), return on equity (0.159), debt to equity ratio (0.148) and Tobin's Q (0.87) show that the null hypothesis should be rejected at 10% significance level. This indicates that dividend yield does not Granger cause any of the determinants backwards.

Table 11. Granger Causality Test

Null Hypothesis	**No. Observations**	**F-Statistic**	**Probability**
YIELD does not Granger Cause CR	536	1.58	0.21
YIELD does not Granger Cause LNTA	546	0.77	0.46
YIELD does not Granger Cause TD/TE	511	1.92	0.15
YIELD does not Granger Cause ROE	485	1.85	0.16
YIELD does not Granger Cause Q	542	0.13	0.88

4.4 Summary of diagnostic tests for regression model

Before performing panel regression, a number of diagnostic tests need to be conducted in order to check the reliability of our data set. All regressions in this study have been controlled for autocorrelation (DW test), heteroscedasticity (BPG test), heterogeneity (Hausman test), normality (JB test and residual normality histogram), multicollinearity (covariance matrix) and stationarity (Panel unit root test). Based on the results from each diagnostic test presented above, we can conclude that our data set is stationary and the residuals are near normally distributed. No autocorrelation, multicollinearity exist in our regression. On the other hand, heteroscedasticity and heterogeneity are spotted in our panel data but will be taken care of by our final panel regression model.

In order to find the most suitable regression model and to increase the robustness of our regression, we start from pooled panel regression. However, redundant fixed effect test suggests that pooled regression is not appropriate, instead fixed effects model should be conducted. Hence we carry out a panel least regression with both fixed effects model and random effects model. By taking into account the heterogeneity problem, Hausman test is performed, revealing the problem of heterogeneity and random effects model is not valid. The outcomes of both redundant fixed effect test and Hausman test lead to the conclusion that fixed effects model is recommended. By taking into the account of heteroskedasticity and heterogeneity and to examine accurate estimated for the cross-section entities, we exercise fixed effects on both period and cross-section dimensions with white cross section correction.

4.5 Summary of Empirical Findings

As discussed above, pooled regression model and random effects model cannot be adapted in our studies. Our final results for the determinants of changes in dividend yield are based on the fixed effects model. *Table 12* below summarizes our null hypothesis, tested results and relations between dividend yield and each control variable. We can observe a positive relation between dividend yield and size, current ratio and Tobin's Q, while a negative relation between dividend yield and ROE, TD/TE. However, ROE and TD/TE cannot be counted to explain the changes in

dividend yield because they are tested insignificance. To conclude, dividend can be significantly and positively explained by the LNTA, current ratio and Tobin's Q. When looking into how the changes in dividend yield may cause changes in each determinant backwards, the granger causality tests indicate that dividend yield does not Granger cause any of the determinants.

Table 12. Summary of the Hypothesis Testing

Hypothesis		**Status**	**Relation**
H01	*Return on equity has **no** effect on dividend yield.*	Rejected	-
H02	*LNTA has **no** effect on dividend yield.*	**Not rejected**	**+**
H03	*Debt to equity ratio has **no** effect on dividend yield.*	Rejected	-
H04	*Current ratio has **no** effect on dividend yield.*	**Not rejected**	**+**
H05	*Tobin's Q has **no** effect on dividend yield.*	**Not rejected**	**+**

5 Empirical Analysis

Empirical results will be analyzed and compared with our projected hypotheses. A discussion of each chosen determinant with theories will be presented as well.

5.1 Paying Dividend

During 2010 - 2015, 52% among all the observed Swedish firms have paid dividend during all these 6 years and 78% has paid dividend for at least one year. As the majority of the firms pays dividend, we can conclude that dividend policy is still a matter for Swedish companies and most of them are concerned about their dividend payments. When comparing individual Swedish firms' dividend yield in 2010 and 2015, by treating 2010 as a base year, 63% of the firms have either increased or kept its dividend yield. However, the continuous dividend changes during the whole period 2010- 2015 show that only 6% of the firms have increased its dividend continuously. This indicates that though most of the companies tend to pay dividend in Sweden, most of them do not manage to increase their dividend paying during 2010-2015.

As we suspected, we found deviations from what the Irrelevance Theory suggests; that dividend is not relevant, as Swedish firms that pay dividend are more plenty than those who do not. In consistence with Signaling Theory, we can assume that Swedish firms are concerned about dividend yield in order to send out positive signals and attract investors.

5.2 Statistical Findings

The results presented in the previous chapter will be analyzed and connected to our projected hypotheses discussed in Chapter 2. *Table 13* below shows the comparison between our projected hypothesis and observed results. Further discussions based on the empirical findings will be presented below.

Table 13. Projected Hypothesis and Observations

Determinant	**Variable**	**Hypothesized Relation**	**Observed Relation**
Profitability	ROE	+	Not significant
Size	LNTA	+	+
Leverage	TD/TE	-	Not significant
Liquidity	CR	+	+
Investment Opportunities	Tobin's Q	-	+

5.2.1 Larger Firms Tend To Pay More Dividend

The proxy for Size, LNTA, has a significant positive impact on dividend yield. Thus we can conclude that firms, listed on OMX NASDAQ in Stockholm, with more total assets tend to have a higher dividend yield. In other words, larger Swedish firms incline to increase its dividend payments. This result is in accordance with our projected hypothesis of a positive relation between a firm's size and its dividend payments.

Young and high growth Swedish firms can be seen as relatively smaller sized firms while a more mature Swedish firm usually have larger size. Following the business stages derived from Life-Cycle Theory (DeAngelo & DeAngelo, 2006), Swedish larger sized firms have less growth opportunities and more stable cash flows thus paying out higher dividend. Furthermore, Swedish investors may prefer to invest in companies with more stable cash flow to ensure their return on investment. Young and small Swedish firms can carry more uncertainties from the perspectives of investors. Therefore, to maintain and attract investors, big sized companies may increase its dividends to keep investors who prefer to receive dividends today since capital gains in the future

are more uncertain. This is in accordance with Bird-in-Hand Theory (Gordon, 1962). Furthermore, our result also supports the studies of Jensen and Meckling (1976), Rozeff (1982) and Jensen's (1986) free cash flow hypothesis, where increasing dividend can be seen as a method to mitigate the agency cost. As larger sized Swedish firms are seen as the ones with more cash flow and the managers are having more controlling power, thus paying out more dividends can constrain the free cash flow disposed by the managers, hence reducing the agency costs.

The positive relation between size and dividend policy in the Swedish market, is also accordance with the two previous theses (Svensson & Thoren, 2015; Hellstrom & Inagambaev, 2012) focusing on Sweden - larger firms tend to pay more dividend. The observation is also in line with other studies that have been conducted in both developed countries (Ho, 2003; Banerjee, 2002; Fama & French, 2001) and emerging markets (Mohamed et al. 2006; Malkawi, 2007; Kuwari, 2009).

5.2.2 More Liquid Firms Have Higher Dividend

Our test shows that current ratio is positively and significantly related to dividend yield. We can conclude that firms, listed on OMX NASDAQ in Stockholm, with higher current ratio tends to have a higher dividend yield. One percentage increase in current ratio of a Swedish firm would cause its dividend yield to increase by 0.226%. Current ratio, as a measurement of liquidity, focuses more on a firm's financial capability to pay back its obligations. This positive result is in line with our projected hypothesis of a positive relation between a firm's liquidity and its dividend payments. With a higher liquidity a firm reduces its financial risk. As a result, more dividend could be paid out. This is backed by Agency Theory (Jensen and Meckling, 1976; Rozeff, 1982). Furthermore, this positive relation between liquidity and dividend is also consistent with Jensen's (1986) free cash flow hypothesis. For a Swedish firm with higher liquidity, to some extent it reflects that the firm has more cash. Thus, paying out more dividend can reduce manager's control to avoid irrational investments, hence reducing the agency costs.

The positive relation between liquidity and dividend policy in our study is consistent with Ho's (2003), Aivazian & Booth's (2003) and Kumar's (2003) studies that a more liquid firm has higher dividend payments. However, the positive relation observed in our studies contradicts the negative relation found by Kania & Bacon (2005); Myers & Bacon (2004) and Muhammad (2011). The difference in results could be due to differences in laws and demographics in the different countries.

5.2.3 Firms with More Investment Opportunities Pay out More Dividend

Our test shows that Investment Opportunities are positively and significantly related to dividend yield. We can conclude that firms, listed on OMX NASDAQ in Stockholm, with higher Tobin's Q ratio tend to have a higher dividend yield. One percentage increase in Tobin's Q would increase dividend yield by 0.2%, meaning that a firm with more investment opportunities tend to pay out more dividend. This result is opposite to our projected hypothesis of a negative relation between a firm's investment opportunities and its dividend payments.

The observed positive relation cannot support free cash flow hypothesis (Jensen, 1986), Life-Cycle Theory (DeAngelo and DeAngelo, 2006), Agency Theory (Jensen and Meckling, 1976) that were discussed in Chapter 2, where we assume that companies with more investment opportunities would be more inclined to reinvest than pay dividends. Compared with previous studies, our observation is also against the negative relation between investment opportunities and dividend found by Banerjee et al. (2002), Ahmed & Javid (2012), Amidu and Abor (2006), Yoon & Starks (1995) and Smith and Watts (1992). The difference can be explained that different measurements, e.g. Market to book ratio, Tobin's Q, are used as a proxy of investment opportunities, thus triggering different results. The reason can also be that firms in different markets and countries behave differently.

Our results can be explained by that investors in Sweden may be less sensitive to observe investment opportunities, as investment opportunities are neither directly or commonly disclosed from a firm's financial statement nor used as a key financial indicator. Instead, investors may consider changes in dividend as a more important sign to sense whether a firm has a growth or not under information asymmetry. Though Swedish firms face more investment opportunities, they would avoid to decrease dividend payment as this can signal a negative information to investors under information asymmetry. This is consistent with Signaling Theory (Akerlof, 1970; Bhattacharya, 1979) that investors may see an increase in a firm's dividend as an indicator to show that the firm expects higher profitability in the future.

5.2.4 Leverage and Profitability Do Not Influence dividend

Though both debt to equity ratio and return on equity show negative relation with dividend yield, their statistic results are not significant. Hence, we cannot conclude that neither leverage nor profitability is a determinant of Swedish firm's dividend policy. The observed results cannot support our hypotheses that a firm's dividend is negatively related to its leverage while positively related to its profitability. Moreover, our profitability result is invalid to support Agency Theory (Jensen and Meckling, 1976; Jensen, 1986), Signaling Theory (Akerlof, 1970; Bhattacharya, 1979) and Life-Cycle Theory (DeAngelo and DeAngelo, 2006) discussed in Chapter 2 that a more profitable firm pays out more dividend. In our case, the result of leverage cannot support Agency Theory (Jensen and Meckling, 1976; Rozeff, 1982) and free cash flow hypothesis (Jensen, 1986), that a more leveraged firm tends to pay less dividend.

On the other hand, our hypotheses are in accordance with Miller and Modigliani's (1961) Irrelevance Theory, stating that no relationship between a firm's dividend policy with its capital structure nor profitability. This can be explained by that Sweden has a comparatively efficient capital market, due to Sweden having a transparent information disclosure system where people can access information easily. Other factors that can be accessed and estimated by investors may be considered more indicative than profitability or leverage. The reason for irrelevance relation

can also be that investors focusing on Swedish market are more indifferent whether the wealth is coming from cash payments or an increase in the market value shares.

Regardless of the changes in profitability, firms may base on other factors to decide its dividend policy. Looking into a large and mature firm, it may have saturated market and very limited profitability margin or growth rate. Thus it can be hard for the firm to have a significant increase or decrease in its profitability. Once the profitability margin or the business is stable for the firm, it may not change its dividend only based on changes in its profitability. On the other side, for a small and young firm with faster growing profitability margin and market penetration rate, it may retain the earnings and reinvest regardless of increasing in its profitability, thus not paying dividend. Or this small and young firm would like to attract more investors by raising dividend, thus raising funds from investors instead to reinvest. Therefore the role of profitability on dividend can be uncertain.

5.3 Discussion

We are aware that one reason for our differing results could be that we disregarded tax effects in this study, and since previous studies abroad have found it relevant this might have affected our results. In this thesis we focused on the most common dividend payment: cash payouts. Even so, it is important to highlight the effect of tax since a firm's dividend policy is affected by market imperfections, such as agency costs, taxes and asymmetric information. In the majority of countries, for instance in Sweden, shareholders are obligated to pay taxes on the dividend they receive as well as when they sell their shares. Scholes (1974); Miller & Scholes (1978); Litzenberger & Ramaswamy (1979) have investigated the relationship between paying dividend and taxation. The taxation-theory states that investors prefer capital gains above dividend since dividend is taxed at a higher rate than capital gains. Litzenberger and Ramaswamy (1979) argue that even if dividend and capital gains would be taxed equally, investors would prefer capital gains since they can choose to pay taxes when they sell their shares.

6 Conclusion

In this final chapter of our thesis we will look back at our purpose and answer our research questions in this study. We will end by suggesting further research.

The research questions formulated in this thesis are:

- *What are the firm-specific factors that influence the dividend policy decision for Swedish firms?*
- *How does these firm-specific factors influence the dividend policy decision for Swedish firms?*

Among the five factors we investigated in our study, we conclude that size, liquidity and investment opportunities are determinants of dividend policy for Swedish firms. Profitability and leverage failed to explain dividend policy in Sweden. We can observe that liquidity and size are in accordance with our projected relations and supportive theories.

Larger Swedish firms are seen to have more stable free cash flow and less growth opportunities, thus paying out more dividend. Though investment opportunities is also a significant factor for a Swedish firm's dividend policy, it shows a positive relation which oppose the negative relation we projected. The positive relation can be explained by Signaling Theory (Akerlof, 1970; Bhattacharya, 1979) that investors are not sensitive to a firm's investment opportunities and the firm will avoid sending a negative signal by cutting dividend under information asymmetry. Leverage and profitability are not determinants of dividend policy in Sweden and the two variable failed to support our projected hypotheses and theories. These can depend on many factors such as capital structure of Swedish firms and various corporate behaviors for different industries. When looking deeper into the causal relations between a firm's dividend yield and firm-specific factors (Granger Causality Test), dividend does not impact a firm's liquidity, size, leverage, profitability nor investment opportunities.

Overall, the evidence in Sweden supports some studies while it opposes others. This leads us to confirm Black's (1976, p.8) puzzle - *"The harder we look at the dividend's picture, the more it seems like a puzzle, with pieces that just do not fit together."* Though size, profitability and liquidity are determinants of dividend policy in Sweden under our research, there is no unified evidence to show which the absolute determinants are across countries or markets, especially under different research periods and research methods.

6.1 Further Research

Though our findings reveal some significant determinants of dividend policy in Sweden, it may not be the best model that suits Swedish firms. In order to fully detect the determinants of dividend policy in Sweden and to make a better-off model, further research should test more different firm-specific factors, i.e. risk, sales growth, free cash flow etc. Some non-financial factors can be considered as well in the model, such as insider ownership and management. Other factors, such as share repurchases and taxation in Sweden, can be also included in further studies. A longer research period can also be tested.

7 References

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8 Appendix

Appendix 1. Redundant Fixed Effects Tests

Equation: Untitled

Test cross-section and period fixed effects

Effects Test	Statistic	d.f.	Prob.
Cross-section F	5.334335	(145,609)	0.0000
Cross-section Chi-square	627.158480	145	0.0000
Period F	10.623359	(5,609)	0.0000
Period Chi-square	63.972132	5	0.0000
Cross-Section/Period F	5.639153	(150,609)	0.0000
Cross-Section/Period Chi-square	666.204551	150	0.0000

Appendix 2. Correlated Random Effects - Hausman Test

Test cross-section random effects

Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	57.734964	5	0.0000

Cross-section random effects test comparisons:

Variable	Fixed	Random	Var(Diff.)	Prob.
CR	0.273001	0.006125	0.005867	0.0005
LNTA	0.456792	0.157860	0.056986	0.2105
TD_TE	0.000681	-0.003272	0.000004	0.0499
ROE	-0.010853	0.004858	0.000007	0.0000
Q	0.060351	-0.044772	0.002796	0.0468

Cross-section random effects test equation:
Dependent Variable: YIELD
Method: Panel Least Squares
Date: 05/06/16 Time: 14:05
Sample: 2010 2015
Periods included: 6
Cross-sections included: 146
Total panel (unbalanced) observations: 765

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-4.450619	3.615704	-1.230914	0.2188
CR	0.273001	0.103787	2.630405	0.0087
LNTA	0.456792	0.245662	1.859434	0.0634
TD_TE	0.000681	0.002915	0.233580	0.8154
ROE	-0.010853	0.005603	-1.936932	0.0532
Q	0.060351	0.086939	0.694183	0.4878

Effects Specification

Cross-section fixed (dummy variables)

R-squared	0.577307	Mean dependent var	2.820196
Adjusted R-squared	0.474043	S.D. dependent var	2.007938
S.E. of regression	1.456215	Akaike info criterion	3.764449
Sum squared resid	1302.026	Schwarz criterion	4.680294
Log likelihood	-1288.902	Hannan-Quinn criter.	4.117017
F-statistic	5.590595	Durbin-Watson stat	1.594594
Prob(F-statistic)	0.000000		

Appendix 3. BPG test

Dependent Variable: RESID12
Method: Panel Least Squares
Date: 05/06/16 Time: 14:12
Sample: 2010 2015
Periods included: 6
Cross-sections included: 146
Total panel (unbalanced) observations: 765

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-7.856279	8.290610	-0.947612	0.3437
CR	-0.036562	0.237977	-0.153636	0.8779
LNTA	0.633094	0.563290	1.123923	0.2615
TD_TE	-0.000999	0.006685	-0.149471	0.8812
ROE	-0.007700	0.012847	-0.599370	0.5491
Q	0.254931	0.199346	1.278838	0.2014

Effects Specification

Cross-section fixed (dummy variables)

R-squared	0.485807	Mean dependent var	1.701995
Adjusted R-squared	0.360190	S.D. dependent var	4.174396
S.E. of regression	3.339022	Akaike info criterion	5.424123
Sum squared resid	6845.527	Schwarz criterion	6.339968
Log likelihood	-1923.727	Hannan-Quinn criter.	5.776691
F-statistic	3.867361	Durbin-Watson stat	2.411776
Prob(F-statistic)	0.000000		

Appendix 4. Fixed Effects Model

Dependent Variable: YIELD
Method: Panel Least Squares
Date: 05/06/16 Time: 14:02
Sample: 2010 2015
Periods included: 6
Cross-sections included: 146
Total panel (unbalanced) observations: 765
White cross-section standard errors & covariance (d.f. corrected)
WARNING: estimated coefficient covariance matrix is of reduced rank

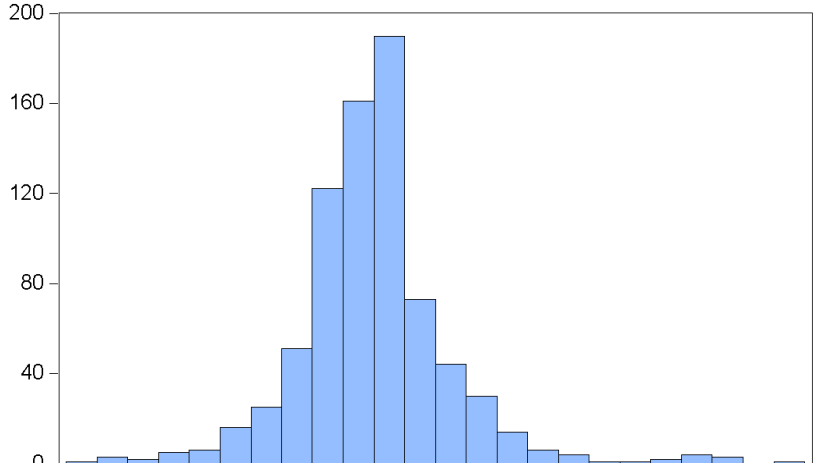
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-5.350264	4.162205	-1.285440	0.1991
CR	0.226025	0.068388	3.305052	0.0010
LNTA	0.513834	0.282103	1.821443	0.0690
TD_TE	-0.001338	0.004565	-0.293201	0.7695
ROE	-0.007781	0.008541	-0.910961	0.3627
Q	0.200254	0.008860	22.60117	0.0000

Effects Specification

Cross-section fixed (dummy variables)
Period fixed (dummy variables)

R-squared	0.611216	Mean dependent var	2.820196
Adjusted R-squared	0.512265	S.D. dependent var	2.007938
S.E. of regression	1.402305	Akaike info criterion	3.693897
Sum squared resid	1197.574	Schwarz criterion	4.640068
Log likelihood	-1256.916	Hannan-Quinn criter.	4.058139
F-statistic	6.176923	Durbin-Watson stat	1.609073
Prob(F-statistic)	0.000000		

Appendix 5. Residual Tests



Series: Standardized Resic
Sample 2010 2015
Observations 765

Mean	5.30e-17
Median	-0.038424
Maximum	6.595998
Minimum	-4.606951
Std. Dev.	1.252000
Skewness	0.855534
Kurtosis	7.846522
Jarque-Bera	842.0268
Probability	0.000000

Appendix 6. Covariance Matrix

Covariance Correlation	CR	LNTA	Q	TD_TE	ROE
CR	1.743761				
	1.000000				
LNTA	-0.719839	3.989532			
	-0.272917	1.000000			
Q	0.713829	-0.569461	1.705971		
	0.413871	-0.218282	1.000000		
TD_TE	-16.23126	32.59440	-18.63884	1925.624	
	-0.280106	0.371874	-0.325198	1.000000	
ROE	1.572309	1.266668	7.551478	-85.66715	205.7998
	0.082999	0.044206	0.403017	-0.136084	1.000000

Appendix 7. Panel Unit Root Test Summary

Levin, Lin & Chu Approach

User-specified lags: 0

Null: Unit root (assumes common unit root process)

Method	Statistic	Prob.**	Cross- sections	Obs
Yield	-18.9697	0.0000	129	643
CR	-35.1840	0.0000	138	678
LNTA	-14.0697	0.0000	139	689
ROE	-267.907	0.0000	137	634
TD/TE	-17.0017	0.0000	121	584
Q	-17.5118	0.0000	138	684