Propensity to Pay Dividends
A Test of The Life Cycle Theory

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Abstract

A firm can distribute cash to its shareholders through dividends and share repurchases. Within the area of dividend policy, there is a plethora of previous research studying factors driving a firm to distribute, or not to distribute, cash to its owners. Using Swedish and US yearly panel data from January 1st 1997 to December 31st 2011 and performing LPM-regressions, we find firm maturity, approximated by retained earnings to total common equity, to have a significant positive impact on a firm's propensity to pay dividends. The results are robust, also when controlling for profitability, size, investment opportunities, solidity, cash holdings and dividend history. Our findings are consistent with the Life Cycle Theory developed by Fama and French in 2001. One unique finding of our study is the strong indication of a higher general propensity to pay dividends in Sweden, compared to the US. Part of this difference appears to be explained by the relative tax disadvantage for dividends to capital gains in the US prior to 2003. Also, use of share repurchases is more frequent in the US. As earlier research (e.g. Grullon and Michaely 2002) find evidence supporting a substitution effect between the two ways of distributing cash, this finding provides a second explanation to the general difference. One conclusion is that investors prioritizing dividends should favor Swedish firms over US firms as, assuming identical firm characteristics, the probability that a firm will pay dividends in a given years is higher for a Swedish firm.

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1. Introduction

On March 19th 2012, Apple Inc announced a plan to initiate a dividend- and share repurchasing program later this year (Apple press release 2012). This is the first time since 1995 Apple Inc. will distribute cash to its shareholders through dividends. At the time of the announcement, the ratio of Apple Inc's retained earnings to total shareholders' equity was approximately 84 percent and its cash holdings were estimated to USD 100 billion. Apple Inc motivated this action referring to years of investments and developments together with enough cash to distribute while maintaining enough funding to execute their strategy and secure future business.

The Apple case manifests the relationship between a firm's maturity and dividend propensity, which is the focus of this thesis. We find that dividends tend to be paid by mature, large firms with relatively fewer investment opportunities and high profitability. Dividends are less likely to be distributed by smaller firms with rich investment opportunities and lower profitability. The factors driving propensity to pay dividends appears to be the same for Swedish- and US firms.

General propensity to pay dividends appears to be higher for Swedish firms in comparison to firms in the United States[1]. Share repurchasing is more frequent in the US and possibly reflecting a substitution effect between the two alternatives to distribute cash (Michaely and Grullon 2002). Propensity in the US tend to be somewhat higher post the Tax Reform Act of 2003 when taxation on dividend payments was reduced in the US (Public law 108 – 27 2003).

By employing a framework from the life cycle theory, developed by Fama and French (2001), we test the hypothesis that firm maturity have a positive impact on the propensity to pay dividends and evaluate the propensities in Sweden against the US. Our attempt is to follow the method applied in *Dividend policy and the earned/contributed capital mix: a test of the life cycle theory* (DeAngelo et al. 2006) as closely as possible. We assess the theory by evaluating whether the probability that a firm pays dividends is higher when the fraction of retained earnings to total common equity is higher. The fraction of retained earnings to total common equity or total assets is used as a proxy variable for firm maturity, as it measures to what extent a firm is self-funded and not relying on external capital according to the above mentioned authors. Firms with a high level of retained earnings to total equity (or total assets) tend to be mature, well established and operate with ample cumulative profits, making them self-financed to a higher degree and hence stronger candidates to distribute dividends.

The life cycle theory is based on the trade-off between the cost and the advantage of retaining capital within the firm. Cost of retaining capital is the agency cost of free cash flow (Jensen 1986), which is the cost imposed on shareholders to control management from pursuing their own projects that might not be in the best interest of the shareholders. The advantage of retaining capital is the reduction in flotation cost. An optimal trade-off evolves over time and as profits accumulate and investment opportunities

[1] Henceforth US.

decline, benefit reduces and cost increases. Hence, as a firm matures, distribution is more likely to dominate retention and dividend becomes more desirable.

We use linear probability model regressions and summary statistics to examine the characteristics of dividend paying firms. In order to create two equivalent samples of similar size for Swedish and US firms we use propensity score matching based on retained earnings to total common equity, SIC-codes[2], market capitalization and sales. In addition to evaluating the impact of retained earnings, profitability, market valuation and investment opportunities, country differences and the US tax reform in 2003, we control for solidity, cash holdings, one year lagged profitability and dividend history.

1.1 Contribution

In previous research on corporate finance and dividend policy, taxation of capital-distribution and gains is often a central topic. Several authors (e.g. Allen and Welch 2000) attempt to explain firms' behavior with respect to tax regulations. In Sweden, the same tax rate applies to both dividends and capital gains, which has been the case for two decades. In the US, dividends and capital gains face the same tax rate if the investment is held for the entire required time period; otherwise there is a preferential tax rate on capital gains. Prior to 2003 there was a relative tax advantage for capital gains compared to dividends.

Share repurchases are also central in the discussion regarding divided policy. Several earlier empirical studies (e.g. Grullon and Michaely 2002) argue there to be a substitution effect between the two ways of distributing cash to shareholders and they observe a growing number of US firms repurchasing their own shares. In Sweden, share repurchasing became legal from 2000 (Proposition 1999/2000:34). In the US, share repurchases have never been explicitly forbidden, although the practice was rare until the introduction of Rule 10-18b in 1982 (SEC 1982).

Since two of the most important aspects in research and discussions regarding dividend policies, share repurchases and tax regulation, have been significantly different in Sweden and the US, we aim to evaluate these aspects and contribute to the discussion by taking a new angle when comparing these two countries.

2. Theoretical Framework and Hypotheses

This section provides a summary of previous literature published with relevance to our thesis. We will present essential institutional settings for dividends and share repurchases in Sweden and in the US, as well as hypotheses on aspects we intend to evaluate.

2.1 Related Literature

In 1961, Miller and Modigliani presented the dividend irrelevance proposition stating how, under the assumption of an ideal economy, investors should be indifferent between capital gains and dividends. The characteristics of an ideal economy are a perfect capital market, rational behavior by investors and perfect

[2] Standard industry classification.

certainty. In a perfect capital market all buyers and sellers are price takers; all relevant information about a security is without cost available to everyone and there are no taxes or transactions costs. Rational behavior by the investors implies preference for more wealth and an indifference to the source of wealth. Perfect certainty means that all contracts are perfectly enforceable. In such a market, the level and pattern of a firm's dividend payments should not influence the value of the share. The dividend policy of any share should therefore be irrelevant to its market valuation.

2.1.1 The Signaling Theory

If we would to relax the perfect market assumption of equal and costless information and allow for asymmetric information, one explanation could be that dividends are paid to communicate relevant information to shareholders. Dividends can occur as a mechanism for managers to signal a firm's true value by expressing private information about the firm's future earnings (Miller and Rock 1985).

Some information could be communicated through financial statements but other information, such as confidential outcome of research and development, may be more difficult to disclose. A manager could issue a public announcement proclaiming future success of conducted research. However, firms with less successful research and development department could issue similar statements. On the other hand, a manager would not like to reveal too much detailed information as it might reduce their competitive advantage.

To study the level of information conveyed in conjunction with dividends a number of empirical experiments have examined how unanticipated changes in dividends can cause changes in the pricing of the stock. Aharony and Swary (1980) find share prices tend to rise after announcements of dividend increases and prices tend to fall after announcements of dividend decreases, even after controlling for contemporary earning announcements.

A second relaxation from the perfect capital market assumptions in the irrelevance proposition is the introduction of taxes. Assuming that dividend works a costly signal, a dividend of a given size, everything else equal, should convey more information in times when the relative tax rate is higher on dividend compared to capital gains. Consistent with this theory, Bernehim and Wants (1995) find share price reaction to dividend changes to be greater in periods of higher relative taxes on dividends. However, Grullon and Michaely (2001) studied market reaction to the Tax Reform Act of 1986, and found market reactions to be greater before 1986 when dividends were taxed less heavily than capital gains. This evidence is somewhat contradictory and it is not clear how much information dividends reveal.

DeAngelo et al. (2004) cast further doubt on signaling theory as the major determinant of dividend policy. The authors find dividends in the US increasing, concentrated among a small numbers of large firms. If firms use dividends to communicate with shareholders, signaling should occur primarily in small, relatively unknown firms with limited access to the financial press. The authors arrive at the conclusion

that signaling could be marginally important for some dividend paying firms, but not to any greater extent.

2.1.2 The Life Cycle Theory

A second explanation to why firms pay dividends is suggested by Fama and French (2001). The authors find that dividends tend to be paid by mature, well established firms. They further elaborate on three firm characteristics that affect a firm's propensity to pay dividends: size, profitability and investment opportunities. The propensity to pay dividends tend to be higher among large, profitable firms with small investment opportunities and the tendency of retaining is higher among small firms with low profitability and a high growth rate.

DeAngelo et al. (2006) presents evidence supporting Fama and French's study as they observe a significant relationship between the decision to pay dividends and the earned/contributed capital mix. The authors argue these findings to reflect a financial life cycle where each phase will impact a firm's propensity to pay dividends and they present it as the life cycle theory. Newly established firms tend to be in the retention phase where investment opportunities are abundant, limited resources common, and the retention of capital will dominate distribution. As firms mature, they become more likely to be in the distribution phase, where profitability is higher, the attractive investment opportunities are fewer, and distribution, consequently, dominates retention. These findings are robust and remain when controlling for growth, lagged dividends, total common equity, cash balance, and the firm history of dividends.

The dominance of distribution over retention during the distribution phase, results from a trade-off between advantages and costs associated with retention. The advantage of retention is a reduction in flotation costs, due to the decreased likelihood of a need to raise external funds, as well as scrutiny by professionals such as lawyers and investment bankers. As discussed by Jensen (1986), the cost of retention is the agency cost of free cash flow. Some managers may use excess cash flow and act in the interest of maximizing their own utility and those actions may not necessarily be consistent with maximizing shareholders' value. Free cash flow is here defined as cash flow in excess of what is needed to fund projects with positive net present value. By distributing the excess cash flows, managers' ability to pursue their own objectives is limited. The trade-off between advantage and costs of retention evolves over time. As profits accumulate and investment opportunities decline, benefits are reduced and costs increase. Thus, as a firm matures, distribution becomes more desirable.

Fama and French (2001) present results in line with the life cycle theory. They further elaborate on three firm characteristics that affect a firm's propensity to pay dividends: size, profitability and investment opportunities. The propensity to pay dividends is higher among large, profitable firms with small investment opportunities and the tendency of retaining is higher among small firms with low profitability and a high growth rate.

2.1.3 Share Repurchases – A Substitute for Dividends?

According to the irrelevance proposition and its assumption of perfect capital markets, share repurchases and dividends are perfect substitutes, given how investors are indifferent of the source of gain (Miller and Modigliani 1961).

The majority of signaling theories make no distinction between the repurchases of shares and dividends. Both ways of capital distribution are ways for managers to reveal private information to shareholders. Dann et al. (1991) find earnings per share to rise in the years after a share repurchase and how the market reaction to the repurchase is positively correlated to future earnings. In Miller and Rocks model from 1985 the cost of signaling is the reduction of investment, a cost that is the same regardless of method of distributing cash to shareholders.

Michaely and Grullon (2002) find that until 1984, the practice of repurchasing was a rarity but has since then accelerated, and have increasingly come to substitute repurchases for dividends in the US. Over the last decades share repurchases have been growing at an extraordinary pace. In 1980 the expenditures on stock repurchase was only 4.8 percent of total earnings, in 2000 it had increased to 41.8 percent. They present the reason to be the Rule 10b-18 in the Securities and Exchange Commission[3], which was admitted in 1982. The rule provided a safe harbor for firms repurchasing shares. Before the rule was admitted firms buying back shares were commonly accused for trying to manipulate the share price.

When using Lintners model (1956) of forecasting dividends, Michaely and Grullon (2002) find forecasts error to be negatively correlated with share repurchases activity. The results imply the difference in actual and forecasted dividends tend to be negative when a firm spends more money on share repurchases, which is argued to be evidence supporting the substitution hypothesis. Further, the authors find that different tax rates on capital gains and dividends tend to matter, as the market reaction to a repurchase is greater when the relative tax gains from repurchases to dividends are larger. Given this relative tax advantage, firms should have repurchased shares more frequently earlier. They argue this to be due to a learning process after the implementation of Rule 10b-18, and discuss the possibility that it took a while for firms to learn about how share repurchases did not lead to a manipulation charge by the SEC.

One advantage of repurchases in comparison to dividends is the strong unwillingness to reduce dividends once they have been introduced. Since firms are highly reluctant to cut dividends, a dividend represents, to some extent, a commitment to pay dividends in coming years (Lintner 1956). In comparison, repurchases are seen more as a one-time event.

In 2007 Schorr and Larsson presented a study on Swedish industrial firms repurchasing behavior between 2001 and 2003. The authors find the level of institutional owners and volatile operational income to have a possible impact on a firm's propensity to buy back shares. Schorr and Larsson further argue that companies, when deciding whether or not repurchase shares, have to consider the reaction of

[3] Henceforth SEC.

stakeholders and how companies may avoid share repurchases, as they can never be fully certain of the stakeholders' preferences.

2.2 Institutional Settings

2.2.1 Sweden

Share repurchases for Swedish public companies have been allowed since March 2000 (Proposition 1999/2000:34). The aim of the proposition was to make it easier for companies to efficiently handle their investment opportunities and to give flexibility when it comes to distributing cash to the shareholders (Schorr and Larsson 2007).

Share repurchases can be carried out on a stock exchange or an authorized marketplace in Sweden; on a stock exchange or an authorized marketplace outside of Sweden, or in agreement through an acquisition offer aimed towards all stockholders or all stockholders that hold a specific type of stock.

In Sweden, dividends are taxed at the same rate as capital gains, which are 30 percent regardless of what tax rate the investor faces on its ordinary income (The Swedish Tax Agency 2012). If an investor sells off shares at a repurchase offer, it will face the same tax rate as capital gains.

2.2.2 US

In the US, share repurchases have never been explicitly prohibited, but until 1982 it was not common practice. Even though there were no laws against it, companies feared to be accused of illegal price manipulation as a consequence of the 1934 Securities Exchange Act (SEC 1982). In 1982 the Securities and Exchange Committee introduced the Rule 10b-18 which set the framework for share repurchases in the US and provided a safe harbor for repurchasing firms.

The repurchase of shares can be carried out through a tender offer[4], a Dutch auction[5], direct negotiations with the largest block holder or firms may buy back shares in the open market like all other investors (Eckbo 2008). In the US, ordinary dividends are paid out using the earnings of the corporation and are taxed as ordinary income (International Revenue Service 2012b). Repurchases and dividends that meet the requirement of *qualified dividend* are instead taxed as net capital gain at a preferential rate in relation to ordinary income. For a dividend to be classified as a qualified dividend it must meet the holding period requirement, where is when the investor held the stock for more than 60 days during the 121-day period that begins 60 days before the ex-dividend date (90 days during the 181-day period for preferred stocks) (International Revenue Service 2012a).

[4] A tender offer is when the firm offers to buy a stated number of shares for a price above the market price, usually 20 percent.
[5] A Dutch auction means the firm offers a series of prices they are willing to buy back shares for and shareholders then present how many shares they are willing to sell at each price.

The tax rate on capital gains depends on the amount of time the investor holds the security and in which tax bracket the investor is to be found. Short-term capital gains (defined as investments hold for a year or less) are taxed at the same rate as used on the investor's ordinary income. Long-term capital gains (defined as investments held for more than a year) are taxed at 15 percent for investors with a tax rate on ordinary income of 25 percent or more. For individuals with a tax rate on ordinary income below 25 percent, the tax rate on capital gains is 0 percent (International Revenue Service 2012c).

Before the Jobs and Growth Tax Relief Reconciliation Act of 2003 (Public law 108 – 27 2003), the taxation on all dividends was higher than taxation on capital gains (8, 10 and 20 percent). When the act was introduced, the tax rate on capital gains for investors with a tax rate on ordinary income below 25 percent was lowered to 5 percent and it was lowered even further to 0 percent in 2008 as a result of the Tax Increase Prevention and Reconciliation Act of 2005 (Public Law 109-222 2005).

Chetty and Saez (2004) examine the effect of dividend taxation on firm behavior using the tax cut on dividends in 2003 (Public law 108 – 27 2003). The authors find the number of dividend paying firms, after having declined for several years, began to increase in 2003. Also, many firms already paying dividend prior to the reform raised their dividend payments considerably. These effects are robust for control variables such a profits and other firm characteristics. The authors describe the reactions to the tax reform as heterogenic among firms with different dividend policies and argue that this emphasizes the mechanism through which dividend taxation affects corporate behavior.

In conclusion, share repurchases was first legalized in Sweden in 2000, in the US it has never been explicitly forbidden but until 1982 it was rare as firms was easily accused for illegally trying to manipulate its stock price. Repurchases are always taxed as capital gains in both Sweden and the US, the only difference is that the tax rate is somewhat lower in the US and also dependent on the investors tax bracket. Dividends are always taxed at the same rate as capital gains in Sweden and if the investor meet the holding period of 60 days also so in the US. If the investor does not meet the holding period the dividend is taxed at the same rate as ordinary income.

2.3 Hypotheses

In this thesis we aim to follow the research by Fama and French (2001) and DeAngelo et al. (2006) and test the hypothesis that firm maturity, approximated by the fraction of retained earnings in relation to total common equity or retained earnings to total assets, has a positive impact on a firms propensity to distribute cash to shareholders through dividends.

Hypothesis 1: Firm maturity has a positive impact on the propensity to pay dividends.

Given the historical tax disadvantages for dividends in relation to share repurchases in the US and the historical ban on share repurchases in Sweden, we expect a higher general propensity for a firm to distribute capital through dividends in Sweden compared to the US.

Hypothesis 2: There is a higher general propensity to pay dividends among Swedish firms compared to US firms.

3. Data Description

In this section the process of obtaining and adjusting the data is described and the consideration of data and summary statistics of our independent variables are presented.

To perform the analysis we need yearly panel data, including a number of variables for Swedish- and US firms.

The Swedish yearly panel data consists of firms listed on the Nasdaq-OMX Stockholm Stock Exchange[6], The Nordic Growth Market and Aktietorget, from January 1st 1997 to December 31st 2011. The data consists of sales, EBIT, dividends, total number of shares, total assets, total common equity, retained earnings, SIC-codes, cash and short-term investments. We also obtain year-end-stock prices and yearly share repurchases. In Sweden, the combined dataset consists of 5 069 observations, before further adjustments.

The accounting data is accessed from the COMPUSTAT database and the year-end stock prices are obtained from Thomson's DataStream. Share repurchases are obtained from the webpage of Nasdaq-OMX which only reports share repurchases for firms listed on the Nasdaq-OMX. However, the Nasdaq-OMX is the largest stock exchange in Sweden with regards to market capitalization and number of firms. Data for share repurchases is available from 2000, and for the 12 years available we observe 183 share repurchases. From the combined Swedish dataset, a series of variables are generated:

RE/TE (retained earnings/total common equity)
RE/TA (retained earnings/total assets)
TE/TA (total common equity/total assets)
ROA (return on assets = *EBIT*/total assets)
ROA_{t-1} (one year lagged *ROA*)
SGR (annual sales growth rate = $(sales_t - sales_{t-1})/sales_{t-1}$)
AGR (annual assets growth rate = $(assets_t - assets_{t-1})/assets_{t-1}$)
Cash/TA (cash and short term investments/total assets)
Size group (deciles of market capitalization)
If div (binary variable that equals 1 if the firm paid out dividend in a given year)
$If\ div_{t-1}$ (one year lagged If div)
If repurchase (binary variable that equals 1 if the firm repurchase shares in a given year and 0 otherwise).

[6] Henceforth Nasdaq-OMX.

Initially, all financial- and utility firms are removed from the Swedish dataset. Financial firms are removed as they often have highly complex capital structure and this may impact the results. Utility firms are removed as they face heavy regulation and therefore do not compete on the same premises (Fama and French 2001). We exclude observations where the SIC-code is in the ranges 6 000-6 800, 4 900-5 000 or above 9 900. This removes 168 observations (see Table 1). Secondly, all observations where dividend data are reported as missing are removed. This reduced the number by another 2 713. As proposed by DeAngelo et al. (2006) observations where total common equity is negative are removed, this reduced the number of observations by 9. To adjust for outliers among the created variables, the observations below the first percentile or above the 99th percentile are removed. Table 1 presents a full outline of the number of observations removed from each variable. The removal of a large number of missing dividend observations are discussed under the section *Economic considerations*. In total, the adjustment for outliers decreases the dataset by 439 observations and after the adjustments the Swedish dataset consists of 1 740 observations.

Similar to the Swedish dataset, the yearly US panel data consists of firms listed on NYSE Amex and Nasdaq from January 1st 1997 to December 31st 2011. This dataset includes the same variables as the Swedish dataset but all data is obtained from the COMPUSTAT database, where yearly data on stock repurchases is available from 2004 and forward. Therefore all analysis regarding frequency of dividend payouts and share repurchases will be computed using the years 2004 to 2011 (for both Swedish- and US firms). The US dataset consists of 168 147 observations and all numbers are converted to SEK by using the SEK/USD exchange rate for the last date of each year.

We follow the same procedure for both the US and the Swedish dataset. Removing financial- and utilities firms reduces the number of observations in total by 52 327 (see Table 1). All observations where data on dividends are reported as missing are then removes, which reduces the total number by another 9 546. When removing observations where total common equity is negative we reduce the number of observations by 14 303.

The same variables as for the Swedish dataset are created and we remove values below the first- and above the 99th percentile. These adjustments for outliers lower the number of observations by 40 733 (see Table 1). After all adjustments the US dataset consists of 51 238 observations.

As we aim to compare the dividend policies in Sweden and in the US, we use the propensity score matching which helps us find US observations that are similar to the Swedish observations with respect to *RE/TE*, *SIC-code*, *market capitalization* and *sales*. We set the match equal to 1, to find the best match in the US sample for each Swedish observation. When matching US- with Swedish observations 49 602 and 54 observations are lost. The reduction in observations is due to the fact that all observations cannot be matched. The final dataset contains a sample of 1 686 Swedish observations and a sample of 1 636 US observations.

After the final adjustments we create a binary variable, named *SWE*, which equals 1 if a firms is Swedish and 0 if the firm is from the US. In addition, a binary variable that equals 1 if a firm is from the US and the year is after 2002 is created, named *Post US*.

3.1 Considerations

One issue with the COMPUSTAT database is the large number of missing observations for Swedish dividends. When removing the observations where dividends are reported as missing, we lose more than half of our observations (2 713 out of 5 069). Reducing any possibility that dividend data reported as missing from COMPUSTAT in fact being zero, a random sample of 20 firms having dividends reported as missing in COMPUSTAT is drawn, using a uniform random function. The sample also meets the criteria of being reported in the Bloomberg database. The reported dividends are then compared. Table 2 presents the random firms, reporting dividends as missing in COMPUSTAT and the corresponding reported dividend in Bloomberg. For the 20 firms, reporting dividends as missing in COMPUSTAT, we find dividends reported as missing (8), zero (5) and positive (7) in the Bloomberg database. This indicates the missing observations are unbiased and should therefore not violate the OLS assumption of random sampling (Wooldridge 2007).

To further control for the quality of the data, we calculate the average fraction of Swedish dividend paying firms for the years 1997-2011 for the two databases, COMPUSTAT and Bloomberg. The average fraction for firms in the COMPUSTAT databases is 83 percent and in the Bloomberg database it is 68 percent.

As mentioned above, share repurchases in Sweden are only available for firms listed on the Nasdaq-OMX. However, the number of observations from Nasdaq-OMX is much larger than the number of observations for the Nordic Growth Market and Aktietorget; hence we are still able to capture the majority of Swedish repurchases.

When reviewing the dataset, it is obvious that COMPUSTAT and Thomson's DataStream are not complete, as they do not report observations for firms we know for fact are listed. This is illustrated by the lack of observations in Thomson's DataStream for the Swedish firm Volvo. This challenge is although, not unique to COMPUSTAT, and we expect the missing data to be unbiased.

3.2 Summary Statistics

Table 3 present summary statistics for all independent variables to be used in the coming regressions, as well as market capitalization for both the Swedish- and the US sample combines. The combined sample is divided into two groups where the first group consists of dividend paying firms and the second of non-dividend paying firms.

Consistent with e.g. Fama and French's (2001) and DeAngelo et al's (2006) findings, the *RE/TE* is considerable higher for dividend paying firms than for non-dividend paying firms. For dividend paying

firms the *RE/TE* is 47.45 percent on average, compared to an average of 27.22 percent for non-dividend paying firms. The same pattern holds for *RE/TA*, the fraction is higher for dividend paying firms and still consistent with previous research. Average total common equity to total assets is not very different between the two groups, 43.3 percent for dividend paying firms and 52.98 percent for non-paying. As in previous empirical studies (e.g. Fama and French 2001) dividend paying firms are more profitable compared to non-dividend paying firms, where average return on assets (hence forth *ROA*) is 9.35 percent for dividend paying firms and 4.73 percent for non-paying. We find that average annual sales growth rate (*SGR*) is lower for dividend paying firms, 6.88 percent compared to 8.18 percent. These findings are also consistent with previous research (e.g. DeAngelo et al. 2006 and Fama and French 2001). Further, the average asset growth rate (*AGR*) is lower for dividend paying firms (12.65 percent in comparison to 19.59 percent for non-paying). Coherent with previous research we find that non-dividend payers have a higher level of cash to total assets (*Cash/TA*) compared to dividend paying firms (DeAngelo et al. 2006). In line with previous research, e.g. Fama and French (2001), we find that dividend paying firms are considerable larger than non-dividend paying ones, with respect to market capitalization.

Figure 1 graphically illustrates the comparison between Swedish dividend paying and non–dividend paying firms by showing the mean of all independent variable as a fraction of the largest observation for each variable for both groups.

Table 4 presents the frequency and proportion of dividend paying firms in our Swedish- and US sample for the years 2004 to 2011. The proportion of dividend paying firms is our Swedish sample is found in a range from 66.7 percent to 100 percent with an average proportion of 89.8 percent. The lowest fraction of divided-paying firms is observed in 2004 at 66.7 percent, and since then the fraction has increased every year until reaching 100 percent in 2007 (see Figure 2).

The proportion of dividend paying firms in our US sample is found in a range from 36.9 percent to 56.2 percent with an average percent of 48.9. In 2011, 47.9 percent of the firms in our US sample did pay dividends under the year. These findings are similar to DeAngelo et al's (2004).

The proportion of dividend paying firms is higher in our Swedish sample compared to our US sample, approximately 42 percentage points higher (See Figure 3).

Table 5 presents the fraction of share repurchasing firms in our two samples for the years 2004 to 2011. The proportion of share repurchasing firms in our Swedish sample ranges from 4.0 percent to 25.7 percent with an average percent of 12.8 (see Figure 2). In 2011, 18.5 percent of the firms in our Swedish sample did buy back some of its shares during the year. These findings are in line with Schorr and Larsson, even though the fraction of repurchasing firms tends to be somewhat higher if including only industrial firms as they do in their study from 2007.

The proportion of stock repurchasing firms in our US sample is found in a range from 57.7 percent to 81.0 percent with an average percent of 68.8 (see Table 5). In 2011, 81.0 percent of the firms in our US sample did buy back some of its shares during the year. These findings are in line with e.g. Grullon and Michaely (2002) who found that over the last years, the majority of firms initiated cash payouts to shareholders through repurchases.

The proportion of share repurchasing firms is considerable higher in the US sample than in the Swedish sample. The average proportion for the time period is 68.8 percent in the US sample and only 12.8 percent in Swedish, a difference of 56 percentage points (see Figure 3).

4. Methodology

In this section, the empirical strategy for the multivariate – and univariate analysis is described and motivated.

4.1 Multivariate Analysis

The most common way to test the life cycle theory is by assessing whether the probability of a firm paying dividends is positively correlated to its relation between earned and contributed capital. Thus, if firms with high ratio of retained earnings to total equity or total assets are more likely to distribute capital (e.g. Fama and French 2001). As suggested in previous research (e.g. DeAngelo et al. 2006) other factors that may impact a firms propensity to pay dividends. These factors are profitability, one year lagged profitability, growth, size, cash holding and one year lagged dividends. We attempt to follow the method applied in *Dividend policy and the earned/contributed capital mix: a test of the life-cycle theory* (De Angelo et al. 2006) to the possible extent.

When evaluating what factors determine a firm's propensity to pay dividends we will perform a multiple ordinary least square regression analysis with the dependent variable propensity to pay dividends. As we aim to explain a quantitative event (a dividend payment), our dependent variable is a binary variable that can only take on two values; 1 if the firm did pay at least 1 dividend in a given years or 0 otherwise (Wooldridge 2007).

A linear regression model with a binary dependent variable is called the linear probability model[7] because the response probability is linear in parameter. In the LPM, the estimated coefficient measures the change in probability that dependent variable equals 1 when the matching independent variable changes by one unit,

$$P(y = 1|) = \beta_0 + \beta_1 x_1 + .. + \beta_i x_1. \quad (1)$$

[7] Henceforth LPM.

The estimated coefficients are interpreted as the change in the probability that the dependent variable equals 1, given a one-unit increase in the matching independent variable,

$$\Delta P\ (y = 1|x) = \ \beta_i \Delta x_i. \qquad (2)$$

The interpretation of the estimated intercept is the predicted probability that dependent variable equals 1 when each independent variable is set to zero.

Our aim with the regression analysis is to test whether the coefficient estimates are significantly different from zero, based on a two-tailed t-test. If significant relationships are found that would suggest the variable in question affects the propensity to pay dividends. A positive (negative) value on an estimated coefficient implies that the variable has a positive (negative) effect on the probability that the propensity to pay dividends equals one. We will also present the value of the R^2, which is a measure of how much the variation in the dependent variable explained by our model. The value will be in the range of 0 and 1 in which a higher value indicated that the model explains much of the propensity to pay dividends. In addition, the standard errors have been adjusted for heteroskedasticity by using robust standard errors. To account for time trends, time fixed effects are included. (Wooldridge 2007).

4.1.2 Dependent Variable

Propensity to pay dividends: The dependent variable is a binary variable that takes the value 1 if a firm did pay dividends in a given year and 0 otherwise[8].

4.1.3 Independent Variables

The choice of the independent variables are based on previous research (e.g. Fama and French 2001, Lintner 1956 and DeAngelo et al. 2006).

Fraction of retained earnings: According to Fama and French (2001) the level of earned capital in relation to contributed capital is a proxy for a firm's life cycle stage. As a firm matures the fraction will increase, which will raise the propensity to distribute capital. There are two possible fractions to use, the fraction of retained earnings to total common equity (RE/TE) and the fraction of retained earnings to total assets (RE/TA).

Total equity to total assets: Previous research (e.g. Denis and Osobov 2008 and DeAngelo et al. 2006) chooses to control for total common equity to total assets (TE/TA) as a way of controlling for the solidity of a firm.

Profitability: Several studies find the level of profitability to have a positive effect on the likelihood to pay dividends, an intuitive relation e.g. Fama and French (2001) find evidence in line with. We measure

[8] Henceforth *prop.*

profitability as the return on assets (*ROA*) defined as the earnings before interest and taxes divided by total assets.

Lagged profitability: DeAngelo et al. (2006) find that lagged profitability (ROA_{t-1}) may have a positive impact on the propensity to pay dividend and therefore we want to control for the return on assets in the prior year.

Investment opportunities: According to the life cycle theory a mature firm is more likely to distribute capital since it does not face as many investment prospects as a newly established firm (Fama and French 2001). Investment opportunities are very difficult to measure but DeAngelo et al. (2006) propose to use growth as a proxy for investment prospects. Annual sales growth rate and annual asset growth rate are two optional proxy variables for investment opportunities. The *SGR* (*AGR*) is the fractional difference in sales (total assets) from one year to another.

Size: Fama and French (2001) find larger firms, on average, tend to be more likely to pay dividends compared to smaller firms. DeAngelo et al. (2006) measure size as the NYSE equity value percentile, the percentile in fractional form in which the firm falls into, based on the market value of equity in relation to the full market value of equity for all firms on the market. We generate a similar variable where ten deciles are computed based on the market value of equity (*Size group*).

Fraction of cash: DeAngelo et al. (2006) observe the level of available cash in relation to total asset in a firm may have a negative effect on the dividend policy and we therefore choose to include it in our analysis. We define the fraction of cash as cash and short-term investments to total assets (*Cash/TA*).

Dividend history: According to the smoothing hypothesis (Lintner 1956) firms tend to smooth their dividends over time. As a dividend is introduced firms are highly reluctant to cut or reduce the dividend. Therefore, we control for lagged dividends by introducing the variable *If* div_{t-1}, a binary variable that equals 1 if the firms did pay dividend in the prior year and 0 otherwise.

Sweden: To examine if there is a general difference in the propensity to pay dividends, given the different institutional settings in Sweden and in the US, we employ a binary variable called *SWE*, equaling 1 if the firms is Swedish and 0 otherwise

Post US tax reform 2003: As Chetty and Saez (2004) find the number of firms paying dividends to increase, following years of declining, after the reform in 2003, we want to control for this factor. As the above-mentioned authors, we employ a binary variable called *PostUS*, equaling 1 if the firm is from USA and the year is after 2002.

Our focal independent variables are *RE/TA* (*RE/TA*), *ROA*, *SGR* (*AGR*), *Size group*, *SWE* and *Post US*. The independent variables *TE/TA*, ROA_{t-1} and *If* div_{t-1} are control variables.

4.2 Univariate Analysis

We perform two proportion-tests[9], testing if the proportion of dividend paying and share repurchasing firms in our Swedish sample as in our US sample. Pr-test can be used to test the equality of proportion of two independent samples (Wang 2000) when using large sample statistics[10].

5. Results

In this section, we employ regressions, analyze and present the results in accordance with our stated hypotheses.

5.1 Multivariate Results

5.1.1 First Regression

Table 6 shows the results from our LPM regression where propensity to pay dividend is regressed on different predictors. The first model investigates the impact that our focal variables, *RE/TE*, *ROA*, *SGR*, *Size group* and *SWE* have on the dependent variable, propensity to pay dividends.

Results indicate the existence of a significant positive relationship between firm maturity and propensity to pay dividends on a 1 percent significance level[11] and a negative relationship between investment opportunities and propensity to pay dividends at a level of 1 percent[12]. Further, the results indicate both *ROA* and *Size group* has a positive impact on the propensity to pay dividend at a level of 1 percent.[13] Thus, the results indicate larger and more profitable firms are more likely to distribute cash to shareholders through dividends. The estimated coefficient for the binary variable *SWE* is positive and significant at a 1 percent level; the estimated intercept is higher in our Swedish sample compared to our US sample. This indicates an existence of a general higher propensity to pay dividends in our Swedish sample. The coefficient for the intercept is positive and significant at a 1 percent level[14]. The R^2 is 0,30 for this stage of the model.

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[9] Hence forth pr-test.

[10] $z = \frac{p_1 - p_2}{\sqrt{p*p*(\frac{1}{n_1}+\frac{1}{n_2})}}$, p_1 is proportion sample 1, p_2 is the proportion of sample 2, p is the pooled proportion, n_1 is the number of observations in sample 1, n_2 is the number of observations in sample 2. The decision rule is to reject H_0 if $z > z_\alpha$ or $z < -z_\alpha$ (Wang 2000).

[11] For all regressions we have alternatively use *RE/TA* as a proxy for firm maturity and the estimated coefficient is of similar magnitude and significance level.

[12] For all regressions we have alternatively used *AGR* as a proxy for investment opportunity and the estimated coefficient is of similar magnitude and significance level.

[13] For all three regressions we have alternatively excluded the Swedish – and US sample and arrive to the same conclusions with regards to the estimated coefficients for the independent variables. The one considerable difference is the intercept.

[14] For all regressions we have alternatively used the Fama and MacBeth (1973) approach, probit and logit regressions and the results are similar. The Fama and MacBeth approach is based on the idea to estimate the yearly coefficient and then the average of all yearly coefficients. The approach is used in the article *Dividend policy and the earned/contributed capital mix: a test of the life-cycle theory* (DeAngelo et al. 2006). The probit and logit regression are ways of limiting the estimated coefficient to lie in the interval between 0 and 1 by using the model , where G is a function is a function that take on values between zero and one, $0<G(z)<1$, for all z. This will make sure that all estimated coefficient is between 0 and 1. The difference between the logit and profit model is the function of G, in the logit model G is a logistic function and in the probit model G is the standard normal cumulative distribution function.

5.1.2 Second Regression

Table 7 presents our second step of the regression analysis, in which we add the independent variables; *TE/TA*, ROA_{t-1}, *Cash/Ta*, $If\ div_{t-1}$ to the first regression. This is done to further examine which variables have an impact in the propensity to pay dividends, to reduce the likelihood of an endogeneity problem and omitted variable bias (Wooldridge 2007).

We note a decrease in the estimated coefficient for *RE/TE*, but it remains positive and significant at a 1 percent significance level. The coefficient for *TE/TA* is negative and significant at a 1 percent level; this indicates firms with a high solidity are less likely to pay dividends. The coefficient for *ROA* decreases somewhat but remains positive and significant on a 1 percent level. Further, the coefficient for ROA_{t-1} is negative and significant at a 1 percent level. The coefficient for *SGR* decreases slightly in magnitude in the second regressions but it remains negative and significant at a 1 percent level. The variable *Cash/TA* seems to have a negative impact on the propensity but the coefficient is statistically insignificant. The coefficient for $If\ div_{t-1}$ is positive and significant at a 1 percent level, this indicates a firm paying out a dividend in the prior year is more likely to do so in a given year. The coefficient for *SWE* reduces somewhat in magnitude but remains positive and significant at a 1 percent level. Even when controlling for several firm-specific variables the intercept seems to be higher in our Swedish sample compared to our US sample. This indicates that the general propensity is higher among Swedish firms. The coefficient for the intercept decreases to half its size when we control for the added variables, however, it remains significant at a 1 percent level. Further, R^2 has increased 0.81 in this step of the model.

5.1.3 Third Regression

Table 8 presents the third and last step of the multivariate analysis, where we add the independent variable *Post US* to further examine the impact of tax regulation on the propensity to pay dividends. In the last regression, yearly time fixed effects are not included as we control for the year 2003 and forward.

The estimated coefficient for *RE/TE* is robust to the introduction of *Post US*; the coefficient is almost identical as in the second regression and still highly significant. The coefficient for *TE/TA* increases slightly in magnitude, from the second regression, but it is still significant at a 1 percent level. The coefficient for *ROA* is almost identical as in the second regression, still positive and highly significant. The same holds for ROA_{t-1}, *SGR*, *Size group* and $If\ div_{t-1}$; the coefficients are almost identical to the prior regression and the significance level is unchanged. The coefficient for *Cash/TA* remains negative and insignificant. *SWE* still has a highly significant and almost identical positive impact on a propensity to pay dividends as in the second regression. The coefficient for *Post US* is positive, the general propensity to pay dividends in the US seems to be higher after the tax reform, on a significance level of 1 percent. Results indicate that the general propensity to pay dividend increases for US firms after 2003. This increase in intercept is not enough to reach the same level as Swedish firms, but the gap between the intercepts seems to decrease after the reform. When we include the *Post US* variable the intercept

decreases somewhat in magnitude and significance level. Nevertheless, it is still positive and significant at a 10 percent level. Furthermore, the R^2 increases only slightly in the third regression; if we present two decimals the R^2 is the same in the second and third regression.

5.2 Univariate Results

The pr-test for the proportion of dividend paying firms shows the difference in proportion between the two samples is significant at 1 percent level (see Table 9). In conclusion, the proportion of dividend paying firms is significantly larger in our Swedish sample equals to our US sample.

The pr-test for the proportion of stock-repurchasing firms shows the difference in proportion between the two samples is significant at a 1 percent level (see Table 9). In conclusion, the proportion of stock repurchasing firm is significantly larger in our US sample than in our Swedish sample.

5.3 Main Results

The estimated coefficient of our focal variable *RE/TE* is ranging between the values 0.35 in the first regression, 0.041 is the second regressions and 0.045 in the third regression. The significance level is however always 1 percent. We can conclude a higher fraction of retained earnings increases the propensity to pay dividends on average.

The estimated coefficient for the second focal variable, *ROA*, is 0.73 in the first regression, it decreases to 0.57 and then 0.59 when control variables are added in the second- and third regression. The relationship between *ROA* and *Prop* is always highly significant, which indicates profitable firms are more likely to distribute cash through dividends.

The same reasoning holds for *Size group*, where the estimated coefficient is initial 0.028, decrease to 0.0059 in the second regression and increases slightly to 0.0063 in the third regression. As the coefficient is significant in all three regressions on a 1 percent level, the results indicate larger firms have a general higher propensity to pay dividends.

The estimated coefficient for *SGR* is negative in all three regressions, ranging between the values -0.15 in the first regression, -0.081 in the second regression and -0.078 in the third regression. The relationship between *SGR* and *Prop* is highly significant in all regressions and this indicates firms with further investment opportunities have a lower propensity to distribute dividends on average.

The magnitude of the estimated coefficient for *SWE* is 0.37 in the first regression, 0.059 in the second regression and 0.073 in the third regression. The coefficient is significant at a 1 percent level in all three regressions, which points towards a higher general propensity to pay dividends for Swedish firms compared to US firms.

The estimated coefficient for *Post US* is 0.017 and significant at a 10 percent level. This result indicates US firms' general propensity to distribute cash to shareholders is higher from 2003 and forward, compared to the years 1997-2002.

The estimated coefficient for *If* div_{t-1} is significant at a 1 percent level, and the magnitude is 0.83 in both the second and third regression. These results indicate that firms that paid in the prior year are more likely to do so in a given year.

The estimated coefficient for the intercept is significant at a 1 percent level in the first two regressions, but when we introduce the *Post US*, the significance level is reduced to 10 percent. The magnitude in the first regression is 0.090, in the second regression it decreases to 0.043 and in the third regression it decreases further to 0.028.

The estimated coefficient for *Cash/TA* is insignificant and we are not able to say anything about the variables impact on the dependent variable *Prop*.

Furthermore, the R^2 is low in the first regressions but increases considerably in the second- and third regressions. However, one should be careful when using R^2 as an assessment measure of whether the model has good fit or not (Wooldridge 2007). That the R^2 is low in the first regression and higher in the second and third regression may be due to the number of variables increasing, but it can also means that our model better captures the propensity to pay dividends.

The pr-tests strongly indicate the fraction of dividend paying (share repurchasing) firms is larger (smaller) in the Swedish dataset, compared to the US dataset. The difference is significant at a 1 percent level.

6. Conclusion and Discussion

In this section, conclusions with regards to the hypotheses are provided. This is followed by a discussion on our results limitations and finally, suggestions on further research are presented.

6.1 Conclusion

In this thesis, we study firms' propensity to pay dividends by testing the life cycle theory developed by Fama and French in 2001. This is accomplished by performing LPM-regressions on a set of Swedish- and US panel data from January 1 1997 to December 31 2011. We examine the impact of firm maturity on the likelihood of a firm distributing capital to its shareholder through dividends. By employing a country-specific binary variable we also evaluate the difference in propensity between Sweden and the US. In addition, the thesis also includes proportion test for dividend paying- and share repurchasing firms in Sweden and the US.

We find results in line with previous research (e.g. DeAngelo et al. 2006), supporting the life cycle theory. Our results indicate firm maturity and propensity to pay dividends have a positive and statistical

significant relationship. Furthermore, our results indicate a significant positive relationship between profitability, as well as market capitalization, and the probability that a firm pays dividend in a given year. Our findings also indicate firms with more investment opportunities and low solidity are less likely to distribute cash to its shareholders through dividends. These results are in line with Fama and French (2001), who also find a negative relationship between investment opportunities as well as solidity and propensity to pay dividends. We also find empirics supporting the smoothening hypothesis (Lintner 1956), as firm-specific dividend history appears to have a positive impact on the probability that a firm will pay dividends. All of the above mentioned results are consistent when alternatively excluding Swedish- and US firms. The same factors appear to drive the propensity to pay dividends in both countries. Hence, the life cycle theory can be further generalized, as it appears to provide a plausible explanation for dividend propensity in both Sweden and the US, potentially even for other developed countries.

One unique finding is the evidence strongly indicating a higher general propensity to pay dividends for Swedish firms, compared to US firms. The estimated intercept is significantly higher for Swedish firms. This difference in intercept decreases somewhat post 2003, when the relative tax disadvantage on dividend to capital gains was reduced in the US. Part of the difference in general propensity appears to be explained by differences in tax regulation between Sweden and the US, but it is not the whole story. Moreover, the use of share repurchases is more common in the US. Earlier studies (e.g. Michaely and Grullon 2002) find firms to use the same funds to finance share repurchases as otherwise would have been used to increase dividends. The substitution effect between the two alternatives to distribute cash to shareholders appears to be stronger in the US. The above authors observe a learning period for share repurchase in the US, and it is reasonable to assume the market development follows the same gradual pattern in Sweden. Hence, the legal history may explain the lower frequency of share repurchases in Sweden.

If the substitution effect and the tax regulations capture the entire different in propensity to pay dividend between Sweden and the US, or if there is something else, is for future research to assess.

6.2 Limitations

6.2.1 Missing data

When removing observations where dividends are reported missing, we lose half of our sample. As described in *Considerations*[15], we control that the missing data in COMPUSTAT does not follow any specific pattern, by comparing with the Bloomberg dataset. In addition, the lack of data for American share repurchases prior to 2004 reduced the number of observations considerable.

[15] Page 11.

6.2.2 Institutional settings

In our study the variable *SWE* captures all institutional differences between Sweden and the US and our results strongly indicates it to have an impact. The variable *Post US* indicates that the tax regulations have an impact, but it does not capture the entire difference in general propensity among Swedish and US firms. The proportion test, showing a higher frequency of share repurchasing firms, and the substitution effect (Michaely and Grullon 2002) provide a second plausible explanation. We cannot however exclude other factors as it is hard to evaluate the exact causality within the institutional black box; to distinguish the effects caused by the tax regulation, the history of tax regulation, the regulation history of share repurchases or the corporate culture.

6.2.3 Institutional investors

We are aware that some institutional investors in Sweden and the US face different tax rate compared to individual investors but we have not found any efficient methods to control for this or any suggestions by previous research in the area of payout policy.

6.2.4 Firm Age

It would have been interesting to use firm age as an alternative proxy variable for firm maturity. In our opinion, it would have been an intuitive implication of the Life cycle theory. However, the variable firm age is not found in any database available to us. In addition, an age variable could be problematic. Firms starting in the same year might still be in different phases of the life cycle, as they may have changed course of strategy. One example of this is Nokia that started producing wellington boots and is now producing cell phones and mobile technology (Roslund 2012).

6.3 Suggestion for Further Research

Performing this study brought up the question of repurchases in Sweden and why it is less common in Sweden compared to the US. It would be interesting to see if there is evidence in line with the substation hypothesis in Sweden as well as in the US where the frequency of share repurchases is higher. It would also be interesting to see if the frequency of repurchases is increasing in a few years, or if it will remain on a low level.

As discussed in *Limitations,* it would be of interest to evaluate what institutional differences that have the largest impact on the difference in propensity to pay dividends by defining direct- or proxy variables for the institutional settings. This could give a deeper understanding of the payout policy.

It would be of interest to compare the propensity to pay dividend between several north European countries (e.g. Sweden, Germany, Norway and Denmark), where perhaps the institutional settings are more similar than across the Atlantics. This might be a way to distinguish between the institutional settings, as the countries in general are more alike.

One aspect to consider, in respect to dividend policy, is the dynamics of the stock market. It would be interesting to evaluate if there is a higher propensity to pay dividends on a smaller market compared to a larger market, as a way to attract investors, as smaller market often are associated with a higher risk.

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8. Appendix

8.1 Tables

Table 1 - Outline of observations removal

Table 1 presents the removal of outliers and missing observations in a set of panel data for Swedish and US listed firms from January 1 1997 to December 31 2011

	Observation removal	
Variable	**Swedish**	**US**
Financial and utility firms	168	52327
Missing dividend data	2713	9546
Negative total common equity	9	14303
Market capitalization	63	1509
SGR	181	10146
AGR	36	1654
RE/TE	32	23655
RE/TA	32	1100
TE/TA	32	1078
Cash/TA	32	534
ROA	31	1057
Propensity matching	54	49602
Total removal	3383	166511

Table 2 - Comparison of missing dividend data between two datasets

Table 2 presents 20 randomly selected firms from a set of panel data for Swedish listed firms from January 1 1997 to December 31 2011 where dividends are reported as missing compared to a dataset from Bloomberg with the firms dividend as reported. Dividends reported in SEK per share.

		As reported in:	
Firm	**Year**	**COMPUSTAT**	**Bloomberg**
Assa Abloy AB	2011	.	4.5
Axis AB	2000	.	.
Bergs Timber AB	2008	.	0
Bilia AB	2011	.	12
Cybercom Group AB	2007	.	0
Duni AB	2005	.	.
Duroc AB	2007	.	.
Hexpol AB	2011	.	.
Indutrade AB	2003	.	.
Itab Shop Concept AB	2003	.	0
LM Ericsson AB	2009	.	2
Lundin Petroleum	2008	.	0
Micronic Mydata AB	2006	.	.
Nederman Holding AB	2006	.	.
Net Entertainment AB	2007	.	0.75
New Wave Group AB	1999	.	0.25
Orexo AB	2005	.	.
Peab	1997	.	0.2
Scania AB	2005	.	3.75
Swedish Orphan Biovitrum AB	2004	.	0

Table 3 - Summary statistics for our independent variables

Table 3 reports summary statistics for our independent variables, as well as market capitalization, using a set of panel data for Swedish and US listed firms from January 1 1997 to December 31 2011. Dividend paying- and non-dividend paying firms have been separated. *RE/TE* is the fraction of retained earnings to total common equity and it serves as a proxy for firm maturity; *RE/TA* is similar to RE/TE but it is the fraction of retained earnings to total assets; *TE/TA* is the ratio of total common equity to total assets; *ROA* is the firms profitability defined as earnings before interest and taxes (EBIT) to total assets; *SGR* is the sales growth rate defined as the fractional change in sales from one year to another; *AGR* is the asset growth rate defined as the fractional change in total assets from one year to another; *Cash/TA* is the ratio of cash and short term investments to total assets; *Market capitalization* is the firms market value of equity in MSEK; *Size group* is defined as the decile of firm market capitalization.

			Dividend paying			
Variable	Mean	Median	Std.Dev.	Min	Max	N
RE/TE	0.4745	0.4910	0.2806	-0.7109	0.9798	2232
RE/TA	0.2023	0.1832	0.1566	-0.2937	0.7128	2232
TE/TA	0.4330	0.4369	0.1930	0.04466	0.9306	2232
ROA	0.09348	0.08408	0.06854	-0.1911	0.3730	2232
SGR	0.06878	0.06792	0.1704	-0.7098	0.8790	2232
AGR	0.1265	0.05882	0.2901	-0.4290	4.178	2232
Cash/TA	0.1157	0.06674	0.1268	0	0.6920	2232
Market cap.	10900	1606	30000	2.006	299200	2232
Size group	6.823	7	2.413	1	10	2232

			Non-dividend paying			
Variable	Mean	Median	Std.Dev.	Min	Max	N
RE/TE	0.2722	0.2717	0.3417	-0.8812	0.9885	1234
RE/TA	0.1446	0.1163	0.1948	-0.4874	0.7106	1234
TE/TA	0.5298	0.5342	0.2095	0.04637	0.9423	1234
ROA	0.04729	0.05634	0.1047	-0.4167	0.3590	1234
SGR	0.08183	0.06978	0.2575	-0.7068	1	1234
AGR	0.1959	0.05560	0.5193	-0.5005	5.742	1234
Cash/TA	0.1637	0.1071	0.1671	0	0.7344	1234
Market cap.	4540	911.7	13670	3.127	20980	1234
Size group	5.594	6	2.523	1	10	1234

Table 4 - Frequency of dividend paying (non-dividend paying) firms

Table 4 reports yearly and total frequency and percent of dividend paying (non-dividend paying) firms using a set of panel data for Swedish and US listed firms from January 1 2004 to December 31 2011.

	Swedish				US			
	Dividend paying		Non-dividend paying		Dividend paying		Non-dividend paying	
Year	Frequency	Percent	Frequency	Percent	Frequency	Percent	Frequency	Percent
2004	114	66.7%	57	33.3%	54	50.9%	52	49.1%
2005	124	80.0%	31	20.0%	68	56.2%	53	43.8%
2006	128	90.8%	13	9.2%	53	46.9%	60	53.1%
2007	135	100.0%	0	0.0%	51	51.5%	48	48.5%
2008	113	100.0%	0	0.0%	31	36.9%	53	63.1%
2009	115	100.0%	0	0.0%	54	47.4%	60	52.6%
2010	126	100.0%	0	0.0%	47	50.0%	47	50.0%
2011	30	100.0%	0	0.0%	34	47.9%	37	52.1%
Total	885	89.8%	101	10.2%	392	48.9%	410	51.1%

Table 5 - Frequency of share repurchasing (non-repurchasing) firms

Table 5 reports yearly and total frequency and percent of share repurchasing (non-share repurchasing) firms using a set of panel data for Swedish and US listed firms from January 1 2004 to December 31 2011.

	Swedish				US			
	Share repurchasing		Non-share repurchasing		Share repurchasing		Non-share repurchasing	
Year	Frequency	Percent	Frequency	Percent	Frequency	Percent	Frequency	Percent
2004	15	9.2%	149	90.9%	24	61.5%	15	38.5%
2005	6	4.0%	143	96.0%	29	67.4%	14	32.6%
2006	10	7.5%	123	92.5%	31	60.8%	20	39.2%
2007	26	20.3%	102	79.7%	46	71.9%	18	28.1%
2008	27	25.7%	78	74.3%	48	80.0%	12	20.0%
2009	11	10.1%	98	89.9%	30	57.7%	22	42.3%
2010	20	16.7%	100	83.3%	33	67.3%	16	32.7%
2011	5	18.5%	22	81.5%	34	81.0%	8	19.0%
Total	120	12.8%	815	87.2%	275	68.8%	125	31.3%

Table 6 - First regression, results

Table 6 presents the regression output for the model: $Propensity\ to\ pay\ dividend\ (Prop)_{i,t} = \beta_0 + \beta_1 RE/TE_{i,t} + \beta_2 ROA_{i,t} + \beta_3 SGR_{i,t} + \beta_4 Size\ group_{i,t} + \beta_5 SWE_{i,t} + u_{i,t}$ using a set of panel data for Swedish and US listed firms from January 1 1997 to December 31 2011. The dependent variable is the binary variable propensity to pay dividends *(Prop)* that equals 1 if a firm did pay dividend in a given year and 0 otherwise. *RE/TE* is the fraction of retained earnings to total common equity and it serves as a proxy for a firms stage in the life cycle; *TE/TA* is the ratio of total common equity to total assets; *ROA* is the firms profitability defined as earnings before interest and taxes (EBIT) to total assets; *SGR* is the sales growth rate defined as the fraction change in sales from one year to another; *Size group* is defined as the decile of firm market capitalization; *SWE* is a binary variable that equals 1 if a firm is Swedish and 0 if it is US. The standard errors are robust for heteroskedasticity and we use time fixed effects on a yearly basis.

	RE/TE	ROA	SGR	Size group	SWE	cons	N	R^2
Prop	0.3527***	0.7295***	-0.1458***	0.02774***	0.3745***	0.08996***	3466	*Within* = **0.2830**
	(15.31)	(8.47)	(-3.87)	(9.89)	(26.84)	(4.26)		*Between* = **0.7824**
								Overall = **0.2993**

t-statistics for a two-tailed test in parentheses

* p<0.10, ** p<0.05, *** p<0.01

Table 7 - Second regression, results

Table 7 presents the regression output for the model: $Propensity\ to\ pay\ dividend\ (Prop)_{i,t} = \beta_0 + \beta_1 RE/TE_{i,t} + \beta_2 TE/TA_{i,t} + \beta_3 ROA_{i,t} + \beta_4 ROA_{i,t-1} + \beta_4 SGR_{i,t} + \beta_5 Size\ group_{i,t} + \beta_6 Cash/TA_{i,t} + \beta_7 If\ div_{i,t-1} + \beta_8 SWE_{i,t} + u_{i,t}$ using a set of panel data for Swedish and US listed firms from January 1 1997 to December 31 2011. The dependent variable is the limited variable propensity to pay dividends *(Prop)* that equals 1 if a firm did pay dividend in a given year and 0 otherwise. *RE/TE* is the fraction of retained earnings to total common equity and it serves as a proxy for a firms stage in the life cyde; *TE/TA* is the ratio of total common equity to total assets; *ROA* is the firms profitability defined as earnings before interest and taxes (EBIT) to total assets; *SGR* is the sales growth rate defined as the fraction change in sales from one year to another; *Size group* is defined as the decile of firm market capitalization; *SWE* is a binary variable that equals 1 if a firm is Swedish and 0 if it is US. The standard errors are robust for heteroskedasticity and we use time fixed effects on a yearly basis.

	RE/TE	TE/TA	ROA	ROA_{t-1}	SGR	Size group	Cash/TA	$If\ div_{t-1}$	SWE	cons	N	R^2
Prop	0.04148***	-0.08866***	0.5730***	-0.2353***	-0.08072***	0.005883***	0.02117	0.8346***	0.05919***	0.04252***	2968	*Within* = **0.8095**
	(3.09)	(-3.97)	(8.36)	(-4.25)	(-3.74)	(3.63)	(0.70)	(84.08)	(6.85)	(2.66)		*Between* = **0.9462**
												Overall = **0.8140**

t-statistics for a two-tailed test in parentheses

* p<0.10, ** p<0.05, *** p<0.01

Table 8 - Third regression, results

Table 8 presents the regression output for the model: $Propensity\ to\ pay\ dividend\ (Prop)_i = \beta_0 + \beta_1 RE/TE_i + \beta_2 TE/TA_i + \beta_3 ROA_i + \beta_4 ROA_{i,t-1} + \beta_4 SGR_i + \beta_5 Size\ group_i + \beta_6 Cash/TA_i + \beta_7 If\ div_{i,t-1} + \beta_8 SWE_i + \beta_9 Post\ US_i + a_i$ using a set of panel data for Swedish and US listed firms from January 1 1997 to December 31 2011. The dependent variable is the limited variable propensity to pay dividends *(Prop)* that equals 1 if a firm did pay dividend in a given year and 0 otherwise. *RE/TE* is the fraction of retained earnings to total common equity and it serves as a proxy for a firms stage in the life cycle; *TE/TA* is the ratio of total common equity to total assets; *ROA* is the firms profitability defined as earnings before interest and taxes (EBIT) to total assets; ROA_{t-1} is the profitability in the prior year; *SGR* is the sales growth rate defined as the fraction change in sales from one year to another; *Size group* is defined as the decile of firm market capitalization; *Cash/TA* is the ratio of cash and short term investments to total assets; $If\ div_{t-1}$ is a binary variable that equals 1 if a firm did pay dividend in the prior year and 0 otherwise; *SWE* is a binary variable that equals 1 if a firm is Swedish and 0 if it is US; *Post US* is a binary variable that equals 1 if the firm is US and the year is 2003 or later and 0 otherwise. The standard errors are robust for heteroskedasticity.

	RE/TE	TE/TA	ROA	ROA_{t-1}	SGR	Size group	Cash/TA	$If\ div_{t-1}$	SWE	Post US	cons	N	R^2
Prop	0.04513***	-0.09001***	0.5907***	-0.2602***	-0.0782***	0.006310***	0.02153	0.8326***	0.07310***	0.01749*	0.02841*	2968	0.8142
	(3.48)	(-4.04)	(6.59)	(-4.03)	(-3.66)	(3.83)	(0.75)	(59.12)	(6.03)	(1.66)	(1.65)		

t-statistics for a two-tailed test in parentheses
* p<0.10, ** p<0.05, *** p<0.01

Table 9 - Proportion tests of diviend paying- and share repurchasing firms

Table 9 presents proportion tests of the fraction of dividend paying and share repurchasing firms using a set of panel data for Swedish and US listed firms from January 1 2004 to December 31 2011. The variable *If div. Sweden (US)* is a binary variable equal to 1 (0) if the company did pay (not pay) dividend for a specific year. The variable *If rep. Sweden (US)* is a binary variable equal to 1 (0) if the company did repurchase (not repurchase) shares in a specific year.

Variable	Mean	Std.Err.	N	Variable	Mean	Std.Err.	N
If div. Sweden	0.8976	0.009656	986	If rep. Sweden	0.1283	0.01094	935
If div. US	0.4906	0.01769	802	If rep. US	0.6875	0.02318	400
Difference	0.4070		1788	Difference	-0.5592		1335
z-value	18.95			z-value	-21.35		
P>|z|	0.000			P>|z|	0.000		

8.2 Figures

Figure 1 - Mean values of independent variables as a fraction of largest observations

Figure 1 presents mean values of the independent variables, as a fraction of the largest observation, for dividend paying- and non-dividend paying firms in a set of panel data for Swedish and US listed firms from January 1 2004 to December 31 2011.

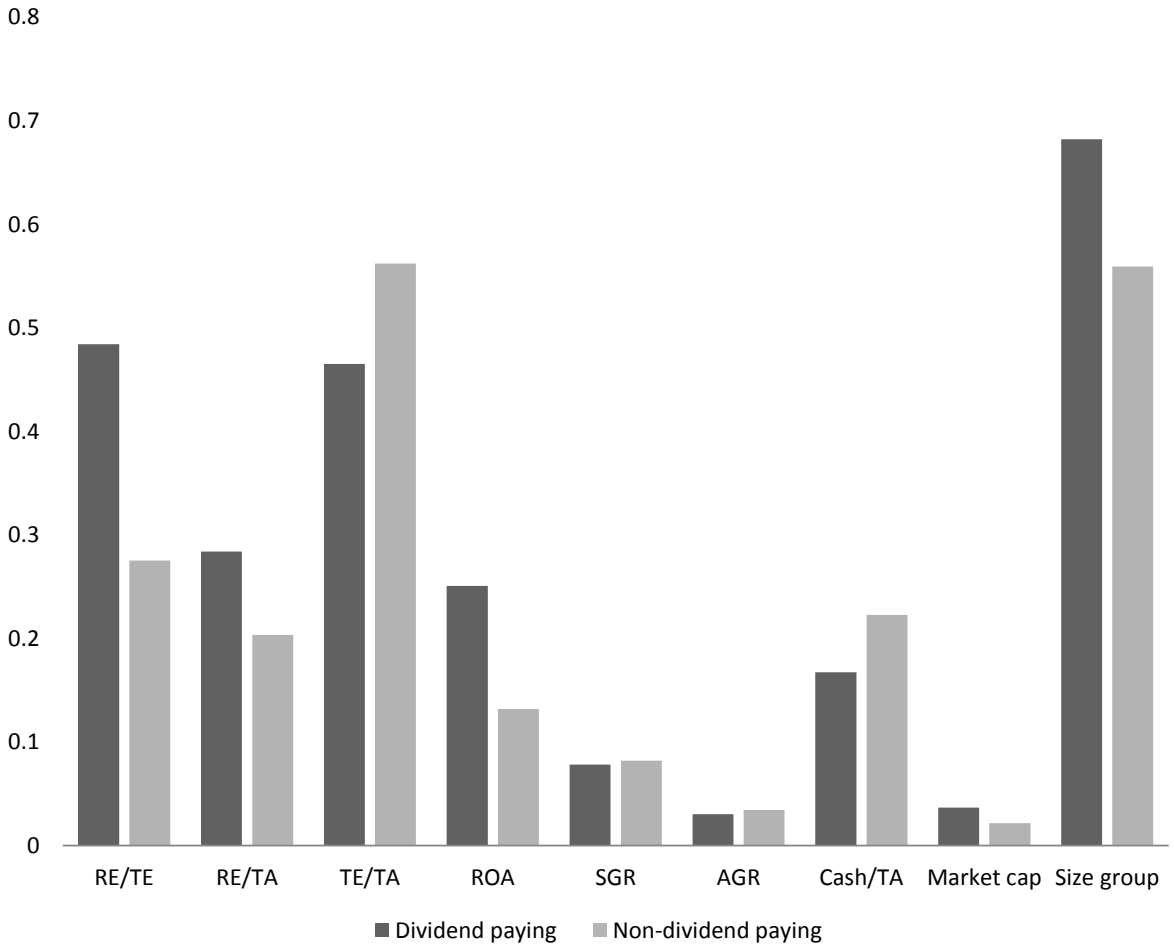

Figure 2 - Yearly fraction of dividend paying- and share repurchasing firms over time

Figure 2 presents yearly fraction of dividend paying- and share repurchasing firms in a set of panel data for Swedish and US listed firms in a set of panel data for Swedish and US listed firms from January 1 2004 to December 31 2011.

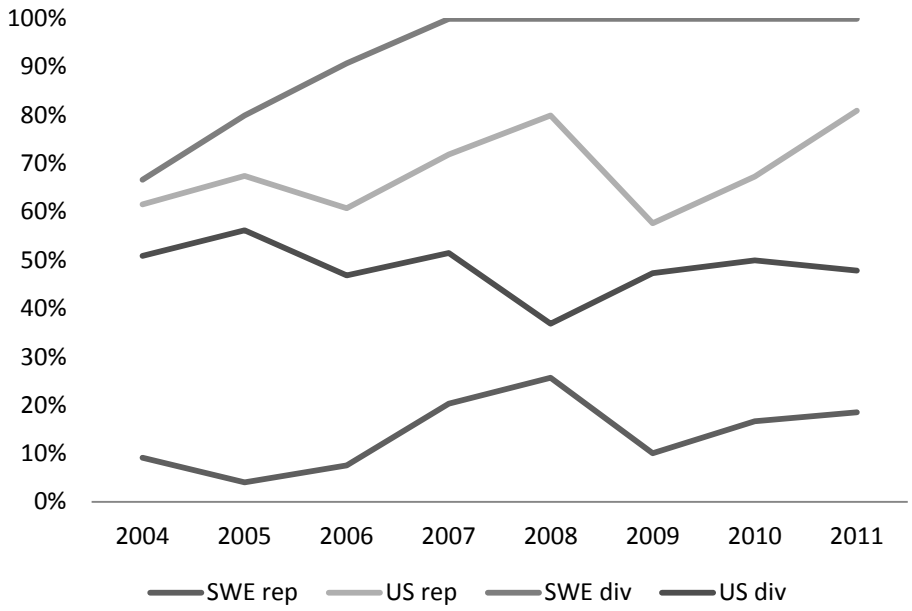

Figure 3 - Fraction of dividend paying- and share repurchasing firms

Figure 3 presents average fraction of dividend paying- and share repurchasing firms in a set of panel data for Swedish and US listed firms from January 1 2004 to December 31 2011.