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Putting a Piece in the Dividend Puzzle

A study on the relationship between dividend payout ratio and excess returns

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Abstract: Empirical research shows that dividends affect firm value. This contradicts early financial theory and has therefore captivated researchers for decades. The true relationship between dividends and firm value has not yet been established and the research area has thus been named the *Dividend Puzzle*. At the heart of the *Dividend Puzzle* is the relationship between dividend policy and firm performance. This paper investigates the relationship between dividend payout ratio and excess returns, since the relationship between these two metrics has received little to no attention in financial research. Similar studies examining other metrics of dividend policy and firm performance are plentiful, but studies looking at these two in particular are rare. A cross-sectional regression is conducted using data from the 30 firms in the OMX30 Index over a span of 10 years. The results show a significant negative relationship between dividend payout ratio and excess returns. This relationship is in line with financial theory but contradicts the implications of similar research. While the results from this study are of interest to managers and investors, further research is required to gain full understanding of the true relationship. This would in turn contribute to the solution of the *Dividend Puzzle*.

Keywords: Dividend Policy, Firm Performance, Dividend Payout Ratio, Excess Returns, Sweden

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1. Introduction

This section introduces the research area examined in the paper. The research area is followed by a discussion on the purpose of the paper and its potential contribution. Lastly, the disposition of the paper is presented.

1.1 Research area

Early financial theory looking at dividends stated that firm value should be independent of dividend policy. However, subsequent empirical studies have shown that dividend policy in fact affects firm value. This contradiction has not been fully explained and therefore the topic has been named the *Dividend Puzzle*. Black (1976) expressed that "The harder we look at the dividend picture, the more it seems like a puzzle, with pieces that just don't fit together." At the heart of the *Dividend Puzzle* is the relationship between dividend policy and firm performance. It is of great interest to both managers and investors to understand how dividend policy correlates with the performance of firms. However, there is still no clear accepted view of the full relationship.

There are several ways to measure dividend policy. Some study the dividend payout ratio or dividend yield while others study actual dividends. Firm performance can also be examined with several measures such as stock returns or earnings growth. The insights on the relationship provided by leading theory are twofold. Some theory suggests that dividend policy has no effect on firm performance while other theory indicates that a negative relationship exists. Various measures of dividend policy and firm performance have been studied empirically and most studies show that a positive relationship exists. Hence, the important relationship between dividend policy and firm performance is still largely unsolved.

1.2 Purpose and contribution

This study examines the relationship between dividend payout ratio and excess returns. Dividend payout ratio is defined as dividends divided by net income. Hence it represents the share of earnings that is distributed to shareholders through dividends. Learning how the dividend payout ratio correlates with stock returns could provide valuable insights to both managers and investors. While both dividend payout ratio and stock returns have been studied in this context, studies on the combination of the two are rare.

If a clear relationship between dividend payout ratio and stock returns is established, this paper will provide additional insight to the *Dividend Puzzle*. In order to examine the

relationship between dividend payout ratio and stock returns, 10-year quarterly data from the Stockholm Stock Exchange is studied. Hence this paper will shed light on the relationship between dividend policy and firm performance in Sweden.

1.3 Disposition

The introductory chapter is followed by chapter 2 focusing on the theoretical background. The theoretical background describes relevant literature and empirical studies to establish the current research gap. Chapter 3 presents the methodology of the paper, where the data collection process is described and the regression model is presented. Subsequently, the variables are defined and discussed. Lastly, additional regressions are presented and the research question is defined. Chapter 4 gives an overview of the data set and the data is described using descriptive statistics. The exclusion of extreme values and quality of data are also discussed. Chapter 5 presents the empirical findings of the study. Several robustness checks are also made and the limitations of the study are discussed. Chapter 6 discusses the interpretation of the results and evaluates the findings of the study. The chapter also compares the results to existing literature and proposes future research topics within the research field. Lastly, chapter 7 ends the study with final conclusions.

2. Theoretical background

This section first describes relevant literature on dividend policy and its relation to firm performance. A brief overview of empirical studies in the field follows. The empirical studies are related to the research topic in this paper, but are not exactly similar. This results in the research gap studied in this paper.

2.1 Literature review

2.1.1 Miller & Modigliani Dividend Irrelevance Theory

The *Dividend Irrelevance Theory* was presented by Miller & Modigliani (1961). The theory shows that firm value is not affected by dividend policy assuming perfect capital markets and rational behavior. Miller & Modigliani derived the following relationship:

$$V_t = \frac{1}{1+r_t} * (E_t - I_t + V_{t+1}) \ (1)$$

where *V* is equity value, *E* is earnings, *I* is investments, *r* is the required rate of return and *t* represents each time-period. Equation (1) shows that firm equity value is independent from dividend policy. This can be concluded from the fact that dividends are not included in the equation and none of the variables are affected by dividends. However, Miller & Modigliani's theory is dependent on the assumption of perfect capital markets, which is not the case in the real-world equity markets. Allen & Michaely (2003) stated five areas where capital markets are imperfect:

i. Taxes – If dividends are taxed differently from capital gains, and investors cannot use dynamic trading strategies to avoid this higher taxation, then minimizing dividends is optimal
ii. Asymmetric information – If managers know more about the true worth of their firm, dividends can be used to convey that information to the market
iii. Incomplete contracts – If management contracts are incomplete or are not fully enforceable, equity holders may, under some circumstances, use dividends to discipline managers or to expropriate wealth from debtholders

iv. Institutional contracts – If various institutions avoid investing in non- or low-dividend-paying stocks because of legal restrictions, management may find that it is optimal to pay dividends despite the tax burden it imposes on individual investors
v. Transaction costs – If dividend payments minimize transaction costs to equity holders (either direct transaction costs or the effort of self-control), then positive dividend payout may be optimal

These imperfections in capital markets could mean that dividend policy, and in turn dividend payout ratio, is in fact relevant for firm value. This is the reason why other researchers have conducted further studies on the topic.

Notably, Miller & Modigliani mention the effect of dividends on stock returns. They state that there exists a tradeoff between dividends and capital gains, where higher dividends imply lower capital gains, assuming constant total return.[1] This indicates a negative relationship between dividend payout ratio and capital gains, i.e. stock returns. This does not contradict the main findings of the irrelevance theory as it simply predicts a negative relationship to stock returns. With regards to firm value, dividend policy is still irrelevant since rational investors value firms by total return, according to Miller & Modigliani.

2.1.2 Gordon Growth Model

The *Gordon Growth Model* presented by Gordon (1959) is one of the core models in stock valuation theory. It presents a relationship between dividends and firm value as follows:

$$P = \frac{D}{r-g} \quad (2)$$

where P is current stock price, r is the required rate of return and g is the constant growth in dividends. D represents the dividend in the next time period. The growth factor, g, consists of retention rate, r_{ret}, and expected return on the firms' investments, k, and can be calculated as follows:

$$g = r_{ret} * k \quad (3)$$

[1] Total return equals capital gain plus dividends

where retention rate is defined as:

$$r_{ret} = 1 - Dividend\ Payout\ Ratio \quad (4)$$

It follows naturally from equation (3) that the growth rate g increases when a firm increases its retention rate, which would indicate a higher stock price according to equation (2). However, Gordon argued that, as the retention rate increases, investors' required return, noted as *r* in equation (2), also increases since investors prefer more stable and reliable dividends ahead of investments made by the firm. Gordon argued that this effect would be larger than the increase in growth rate *g*, which indicates that the price of the stock decreases as retention rate increases. As equation (4) indicates, a higher retention rate is equivalent to a lower dividend payout ratio and thus a lower dividend payout ratio implies a lower stock price. With the same reasoning, a higher dividend payout ratio implies a higher stock price and therefore the relationship is positive, according to Gordon.

Gordon's study differs from the study made in this paper since Gordon only considers price level and not price returns. However, price levels and price returns are closely linked and this paper therefore hopes to shed new light on the topic.

2.1.3 Pecking Order Theory

The *Pecking Order Theory* was first introduced by Myers (1984) who, inspired by Donaldson (1961), developed the following order of priority between firms' sources of financing:

1. Firms prefer internal financing
2. Firms adjust their dividend payout ratio according to their investment opportunities. These adjustments are gradual since firms try to avoid sudden changes in dividends[2]
3. When the free cash flow from the fiscal year is not enough to finance investments, cash and cash equivalents are primarily used for financing rather than reducing dividends
4. If external financing is needed, companies primarily take loans from credit institutions, secondly issue bonds and lastly issue new equity

[2] Dividends are considered "sticky"

Point 2 of the pecking order suggests that firms with many investment opportunities have low dividend payout ratios, and firms with few investment opportunities have high dividend payout ratios. This is in line with the *Lifecycle Theory* discussed by DeAngelo, DeAngelo & Stulz (2006) as well as the predictions of the *Outcome Model* by La Porta et al. (2000).

It follows naturally that companies with many (few) investment opportunities will invest more (less) and thus experience higher (lower) earnings growth. Consequently, companies with low (high) dividend payout ratios will experience higher (lower) earnings growth.

The theory only addresses earnings growth and does not address price growth, however earnings growth and price growth are both indicators of firm performance and are thus strongly related.

2.2 Empirical studies

Several studies have examined the relationship between dividend policy and firm performance. Various measures of dividend policy and firm performance have been examined. The most studied measures of dividend policy include dividend payout ratio, dividend yield and actual dividends. Studied metrics of firm performance include short-run returns, long-run returns, earnings growth and more. Many studies employ a forward looking approach and examine expected return. However, this study focuses on actual return. Examples of relevant studies follow below.

Black & Scholes (1974) examined the relationship between dividend yield and stock returns but determined there is no clear correlation. Several papers refined the Black & Scholes study and found that the relationship between dividend yield and stock returns in fact was positive. These studies include Blume (1980), Bradford & Gordon (1980), Litzenberger & Ramaswamy (1979), Morgan (1980), Rosenberg & Marathé (1979) and Stone & Bartter (1979). Therefore, empirical studies point toward a positive relationship between dividend yield and stock returns.

The empirical findings on the relationship between dividend payout ratio and earnings growth also appear to be rather consistent and most studies point toward the relationship being positive. Some of the most notable studies include Arnott & Asness (2003) and Zhou & Ruland (2006). Arnott & Asness studied the relationship on index level while Zhou & Ruland followed by studying it on firm level. Both studies concluded that a positive relationship exists. While this contradicts the *Pecking Order Theory*, it does not provide sufficient grounds to invalidate it.

As previously described, few studies have focused on the relationship between dividend payout ratio and stock returns. Li (2016) studied the impact of dividend payout ratio on future stock returns and momentum profit. However, no studies on the pure relationship between dividend payout ratio and actual stock returns have been identified.

2.3 Research gap

The theoretical background and empirical studies show that there is clearly a research gap regarding the relationship between dividend payout ratio and stock returns. Several measures of dividend policy and firm performance have been studied extensively but not the combination of these two in particular. The relationship and potential insights are of upmost importance to both managers and investors. Therefore, this study will examine the relationship to determine its characteristics.

Baker (2009) expressed that the effect of dividend policy on share prices is at the heart of the *Dividend Puzzle*. Despite this, there is no clear established relationship and as Baker states, researchers have been "unable to identify the "true" relationship between dividend payments and stock prices".

3. Methodology

This section describes the methodology of the study. Firstly, the data collection process is described and the regression model is presented. Secondly, the regression variables are defined and discussed. Lastly, a few concluding remarks on the methodology of the paper are brought forward and the research question is defined.

3.1 Data collection

Market data and accounting data was gathered from the database Thomson Reuters Eikon. Quarterly data was collected between Q1 2008 and Q4 2017. This is equivalent to a time period of 10 years or 40 quarters. The firms studied are limited to the 30 firms in the OMX30 Index as of April 1, 2018. The OMX30 Index is comprised of the 30 most traded firms on Nasdaq OMX Nordic Stockholm, also known as the Stockholm Stock Exchange.

The market data gathered includes stock prices, market capitalization, trading volume and the risk-free rate.[3] With regards to accounting data, income statements and balance sheets of all 30 firms were collected from Eikon. From these reports the net income before extraordinary items, gross dividends to common shareholders, book value of equity and common shares outstanding were gathered.

In order to get valuable insights some data was excluded from the data set. Firstly, all observations with negative dividend payout ratios were excluded. Secondly, all observations without a quarterly 1-year excess return were removed from the data set.[4] Consequently, all observations for Essity, which has only been listed on the stock exchange since June 2017, were removed.

[3] 5-year Swedish government bond used as proxy for risk-free rate
[4] Detailed definitions of dividend payout ratio and excess return will follow in chapter 3.3

3.2 Main regression

The relationship between dividend payout ratio and stock returns is examined through multiple linear cross-sectional regression analysis. Excess return *(ExcReturn)* is the dependent variable while dividend payout ratio (*DPR*) is the primary independent variable. The other independent variables in the model are: the natural logarithm of market capitalization (*Size*), book-to-market ratio (*BTM*) and share turnover (*Activity*). The regression model is presented below:

$$ExcReturn_{it} = \beta_0 + \beta_1 DPR_{it} + \beta_2 Size_{it} + \beta_3 BTM_{it} + \beta_4 Activity_{it} + \varepsilon_{it} \quad (5)$$

where *i* represents each individual firm and *t* represents each quarter in the data.

3.3 Definition of variables

3.3.1 Dependent variable

- $ExcReturn_{it}$: Excess return, defined as the quarterly 1-year rolling return less the 1-year risk-free rate. The quarterly 1-year rolling return is equivalent to the 1-year percental change in stock price for each quarter. The 5-year Swedish government bond is used as a proxy for the risk-free rate.

3.3.2 Independent variables

Primary independent variable

- DPR_{it}: Dividend payout ratio, defined as the LTM (last twelve months) dividends divided by the LTM net income for each quarter. The LTM dividends and LTM net income for each quarter are equivalent to the sum of the dividends and the net income for the last 4 quarters. Dividends are defined as the gross dividends to common shareholders. Net income is defined as the net income before extraordinary items. Since dividends are predominantly paid out in Q2 and Q4, LTM figures are used to improve the comparability between quarters.

Other independent variables (control variables)

- $Size_{it}$: Firm size, defined as the natural logarithm of the market capitalization at the end of each quarter.[5]
- BTM_{it}: Book-to-market ratio, defined as the book value of equity divided by the market capitalization at the end of each quarter. Notably, the book-to-market ratio is the inverse of Tobin's *q*, a measurement of firms' investment opportunities.
- $Activity_{it}$: Share turnover, defined as the quarterly trading volume divided by the number of common shares outstanding at the end of each quarter.

3.3.3 Summary of variables

Table 3.1 Summary of variables

Name	Description	Definition
ExcReturn	1-year excess return	$\frac{Price_t}{Price_{t-4}} - 1 - r_f$
DPR	Dividend payout ratio	$\frac{Dividends_{(t-3)-t}}{Net\ income_{(t-3)-t}}$
Size	Logarithm of market cap	$\ln(Market\ cap_t)$
BTM	Book-to-market ratio	$\frac{Book\ value\ of\ equity_t}{Market\ capitalization_t}$
Activity	Share turnover	$\frac{Trading\ volume_t}{Shares\ outstanding_t}$

Name, description and definition of variables in main regression

3.4 Discussion of variables

Besides the dependent variable, *ExcReturn*, and the primary independent variable, *DPR*, several control variables are included. The variables are included as they are expected to increase the explanatory power of the relationship between dividend payout ratio and excess returns. Further reasoning for including each variable is presented on the next page.

[5] Usage of natural logarithm is considered best practice in regression analysis. For example used by Fama & French (2002)

The *Size* variable is included as firm size is generally considered to affect stock returns. In theory bigger firms are more established and mature, hence they could be expected to yield lower returns on average. This is in line with the *Three Factor Model* presented by Fama & French (1993) where the *SMB* factor predicts a negative relationship between market capitalization and returns. The relationship between firm size and excess returns is therefore expected to be negative in this study. However, it is not entirely clear whether this is true on the OMX30 where all firms have substantial market capitalizations. Also, while Fama & French consider long-run returns this study focuses on short-run yearly returns.

The variable *BTM* is included as the firms have different book-to-market ratios based on the market's different growth expectations. The *Three Factor Model* by Fama & French predicts a positive relationship between book-to-market ratio and returns as the *HML* factor is positive. However as previously described, Fama & French focus on long-run returns while this study focuses on short-run yearly returns. Also, the firms in this study are rather homogeneous and hence it is unclear whether the Fama & French prediction will hold true.

Activity is included as the volume of trading is expected to correlate with stock returns. One would expect stocks that yield either very high or very low returns to be traded more frequently. Consequently, it is not obvious whether the relationship between activity and excess returns should be expected to be positive or negative.

3.5 Additional regressions

Besides the main regression analysis, additional regressions are conducted to expand the implications of the results. In the additional regressions, the sample is split into three groups based on level of dividend payout ratio. The average dividend payout ratio for all firms within the studied time frame is calculated. The firms with an average dividend payout ratio above 60% are separated into one group, firms with a ratio between 60% and 45% are separated into another group and firms with a ratio below 45% are separated into a final group. The main regression model previously described in equation (5) is then applied for each of the three samples separately.

3.6 Research question and concluding remarks

This section seeks to explicate the research question of the paper with a few concluding remarks. Dividend policy and firm performance is a complex issue. There is no clear view on the true relationship due to the contradictions between financial theory and empirical research. As previously described, several measures of dividend policy and firm performance have been studied. However, little empirical research has focused the pure relationship between dividend payout ratio and stock returns. Therefore, this paper seeks to provide further insight to the *Dividend Puzzle* by shedding light on the relationship between dividend payout ratio and stock returns. This is conducted by answering the following research question:

1. Is there a significant relationship between dividend payout ratio and excess returns in Sweden?
2. If a significant relationship exists, is it positive or negative?

4. Data

This section begins with an overview of the data and descriptive statistics of the data set. This is followed by a discussion on the treatment of extreme values and quality of data used.

4.1 Overview of data

Table 4.1. Overview of data

Metric	Before exclusions	After exclusions
Firms	30	29
Quarters	40	40
Firm quarters	1200	1112
Types of data	8	8

Data overview before and after exclusions

The data set consists of panel data, meaning it contains data points over time for multiple firms. Specifically, 30 individual firms on the OMX30 Index during 40 consecutive quarters are part of the data set, with Q1 2008 as the first quarter and Q4 2017 as the last quarter. This is equivalent to 1200 firm quarters. Several types of market and accounting data are part of the data set. Market data consists of stock prices, market capitalization and trading volume. Accounting data consists of net income before extraordinary items, gross dividends to common shareholders, book value of equity and common shares outstanding. In total 8 different types of data were collected for each firm quarter. Following the exclusions described in section 3.1 the data set includes 1112 observations.

4.2 Descriptive statistics

This sub-section contains detailed descriptions and visualizations of the collected data, both on firm level and on aggregate level. The data analyzed in this section contains the 1112 observations after excluding observations with negative dividend payout ratios and observations without excess return.

4.2.1 Descriptive statistics on firm level

Table 4.2 below presents key statistics for all variables from the collected data.

Table 4.2. Key descriptive statistics for all variables in the collected data

Variable	Obs.	Average	Std. Err	1st quartile	Median	3rd quartile
ExcReturn	1112	0.13	0.79	-0.13	0.05	0.27
DPR	1112	0.86	8.07	0.32	0.48	0.69
Size	1112	25.17	1.28	24.52	25.19	26.09
BTM	1112	0.52	0.43	0.27	0.40	0.65
Activity	1112	0.69	2.68	0.14	0.22	0.34

Descriptive statistics of all variables during the 40 studied quarters

As can be seen in table 4.2, the variables differ in volatility. Most notable is *DPR*, where the standard error is 8.07 as an effect of the high-end of the extreme values. These high values will be further discussed following the introduction of table 4.3.

An overview of the firms in the study and their respective average values of the different variables during the studied period is presented in table 4.3 on the following page.

Table 4.3. Overview of firms in the study and their respective average values on all variables

Firm	Market cap[6]	ExcReturn	DPR	Size	BTM	Activity
AstraZeneca	718.5	0.05	1.09	26.95	0.28	0.05
ABB	474.7	0.04	0.36	26.59	0.31	0.07
Atlas Copco AB A	420.1	0.15	0.51	26.00	0.18	0.22
Atlas Copco AB B	420.1	0.14	0.51	26.00	0.18	0.06
Nordea Bank	400.1	0.04	0.52	26.43	0.81	0.16
Volvo	325.2	0.07	0.72	25.95	0.45	0.28
Investor	284.9	0.09	0.24	25.72	1.34	0.13
H & M	247.3	0.00	0.68	26.54	0.13	0.16
Swedbank	224.0	0.12	0.45	25.58	0.91	0.41
SHB	218.2	0.07	0.31	25.78	0.66	0.18
SEB	211.3	0.05	0.54	25.62	0.87	0.26
LM Ericsson	179.4	-0.06	0.89	26.19	0.59	0.26
Sandvik	179.3	0.05	0.72	25.43	0.31	0.32
Assa Abloy	178.9	0.16	0.42	25.18	0.34	0.24
Telia Company	157.5	-0.05	0.61	26.01	0.55	0.16
Autoliv	90.6	0.15	0.12	24.63	0.51	0.24
SKF	82.9	0.06	0.65	24.91	0.33	0.44
Electrolux	81.7	0.13	7.47	24.64	0.36	0.49
Alfa Laval	81.3	0.07	0.45	24.70	0.28	0.29
Kinnevik	76.7	0.12	0.56	24.54	1.28	0.20
Boliden	76.4	0.25	0.37	24.10	0.80	11.57
Skanska	67.7	0.05	0.64	24.68	0.40	0.27
SCA	60.1	0.13	0.49	25.24	0.74	0.21
Swedish Match	58.5	0.08	0.51	24.54	-0.01	0.29
Tele2	51.0	0.02	3.01	24.51	0.51	0.32
Securitas	49.6	0.06	0.58	24.08	0.35	0.28
SSAB	40.2	-0.06	0.98	23.91	1.62	0.59
Getinge	30.1	0.02	0.42	24.31	0.42	0.23
Fingerprint Cards	4.9	1.47	0.00	20.87	0.27	1.27

Average values of the 40 studied quarters for all variables and all firms, with firms sorted by market capitalization as of December 31st, 2017

[6] Market capitalization in SEKbn as of December 31st, 2017

A few notable values can be observed in table 4.3. Firstly, while most firms experienced an average excess return between -20% and 20%, Fingerprint experienced an average excess return of 147%. This is expected and in line with their lower average value on the size variable, but it is still an interesting observation.

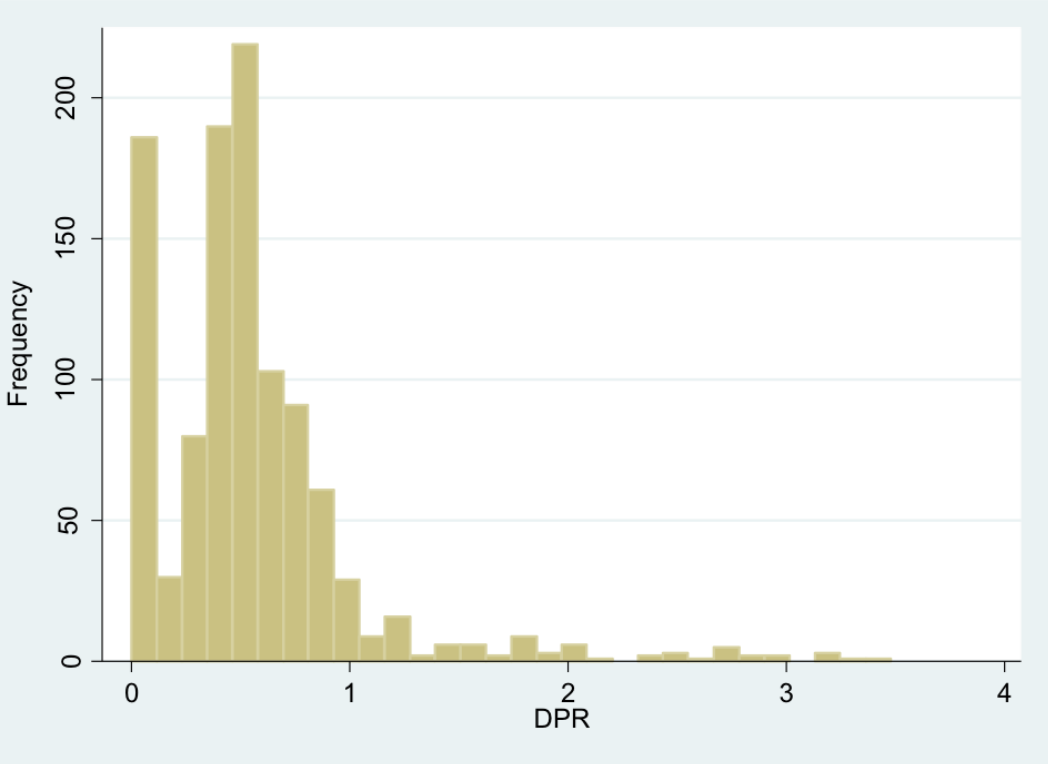
Secondly, a few companies had notable average dividend payout ratios. Electrolux, Tele2 and AstraZeneca's average dividend payout ratios were all above 1, with Electrolux having the highest value of 7.47. Observations with unnaturally high values on DPR are considered extreme values and are consequently excluded in the main regression. Further discussion regarding extreme values will be presented in section 4.3.

Furthermore, most firms had average book-to-market ratios between 0 and 1 as expected. However, SSAB, Kinnevik and Investor had book-to-market ratios above 1. Additionally, Swedish Match had a negative average book-to-market ratio due to their book value of equity being negative in many quarters.

Lastly, both Boliden and Fingerprint experienced high share turnover rates, which on average have been above 1. This will also be further discussed in section 4.3.

Figures illustrating the data shown in the tables above will be presented on the following pages.

Figure 4.1. Histogram of dividend payout ratios across the collected data[7]

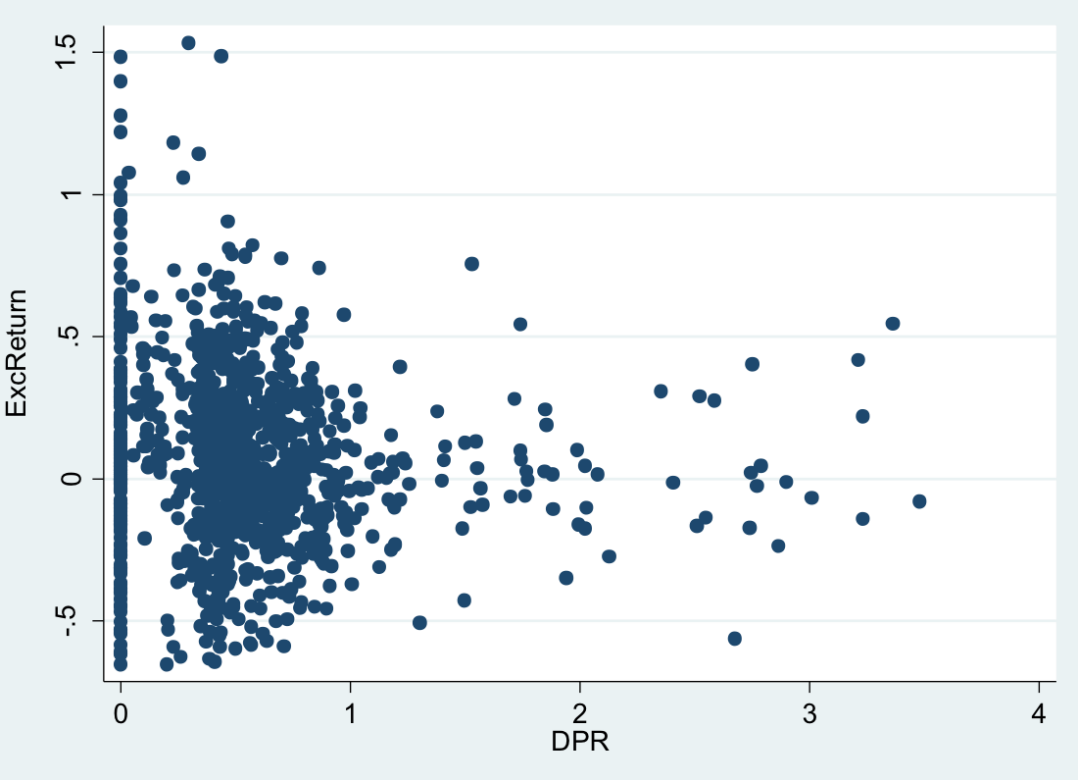


Histogram illustrating the distribution of dividend payout ratios in the data sample[7]

Figure 4.1 indicates that firms either choose to pay dividends or to not pay dividends at all and that among the firms that choose to pay dividends, the dividend payout ratios are almost normally distributed around approximately 60%. Since dividend policy decision-making is outside the scope of this study, this observed trend will not be discussed further.

[7] Excluding highest percentile of DPR for better visualization

Figure 4.2. Scatter diagram of dividend payout ratios and excess returns[8]



Excess returns plotted against dividend payout ratios for all observations in the 40 studied quarters[8]

Figure 4.2 provides an overview of the relationship between *DPR* and *ExcReturn*. The figure further shows the distribution of dividend payout ratios introduced in figure 4.1, where most firms' dividend payout ratios are either 0 or centered around approximately 60%. No clear trend regarding excess returns is observable.

[8] Excluding highest percentile of *DPR* and highest and lowest percentiles of *ExcReturn* for better visualization

4.2.2 Descriptive statistics on aggregate level

Table 4.4. Key descriptive statistics for dividend payout ratios on aggregate level

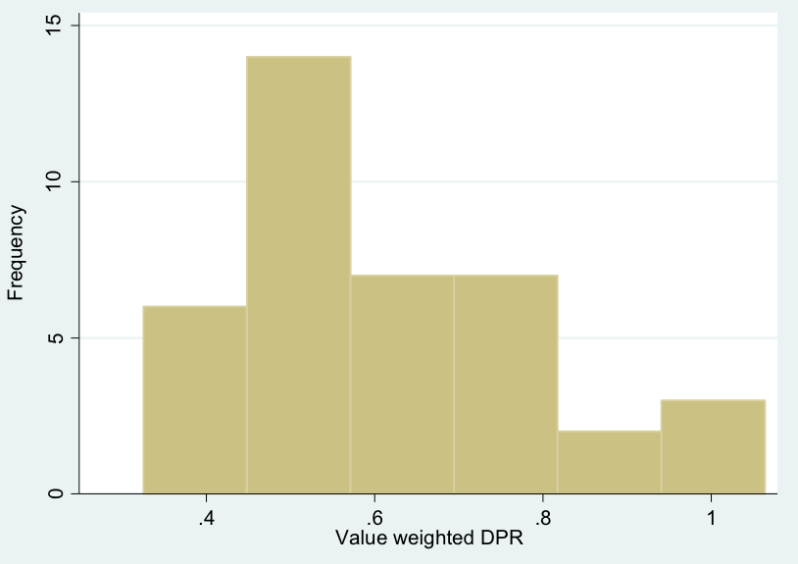
Variable	Obs.	Average	Std. Err	1st quartile	Median	3rd quartile
EWDPR	40	0.85	1.47	0.48	0.59	0.68
VWDPR	40	0.70	0.52	0.50	0.57	0.73

Key descriptive statistics for dividend payout ratios on aggregate level, both equally weighted and value weighted, during the 40 studied quarters

As can be seen in table 4.4, the volatility of dividend payout ratios has been much higher on aggregate equally weighted level than on value weighted level, which shows that smaller firms in general have had more volatile dividend payout ratios.

Figures illustrating the data shown in table 4.4 will be presented on the following pages.

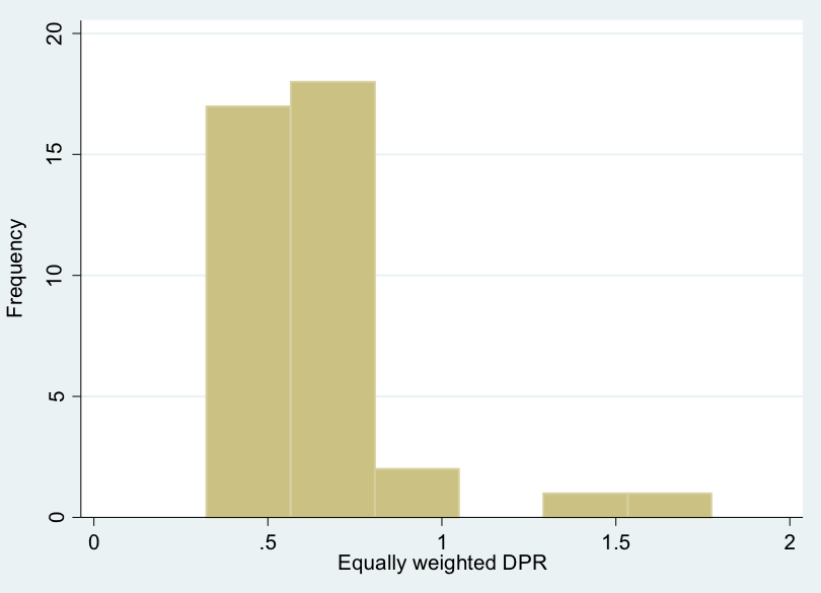
Figure 4.3. Distribution of aggregate value weighted dividend payout ratios[9]



Histogram of the distribution of value weighted aggregate dividend payout ratios for the 30 firms in the 40 studied quarters[9]

[9] Excluding aggregate dividend payout ratio in Q2 2014, which value weighted was 3.71, for better visualization

Figure 4.4. Distribution of aggregate equally weighted dividend payout ratios[10]



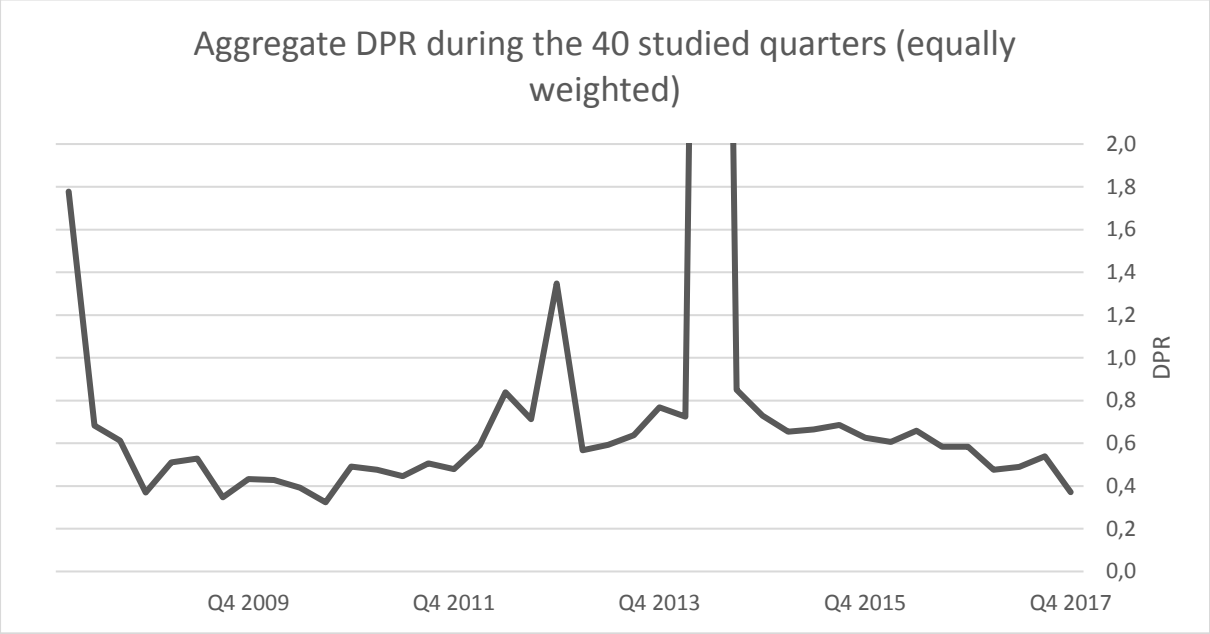
Histogram of the distribution of equally weighted aggregate dividend payout ratios for the 30 firms in the 40 studied quarters[10]

Figures 4.3 indicates the same normal distribution that was partly indicated in the histogram over dividend payout ratios for all firms (figure 4.1). However, as previously mentioned, this will not be discussed further as this is beyond the scope of this study.

To illustrate how the aggregate dividend payout ratios have fluctuated over time, time series of the aggregate data will be presented on the following page.

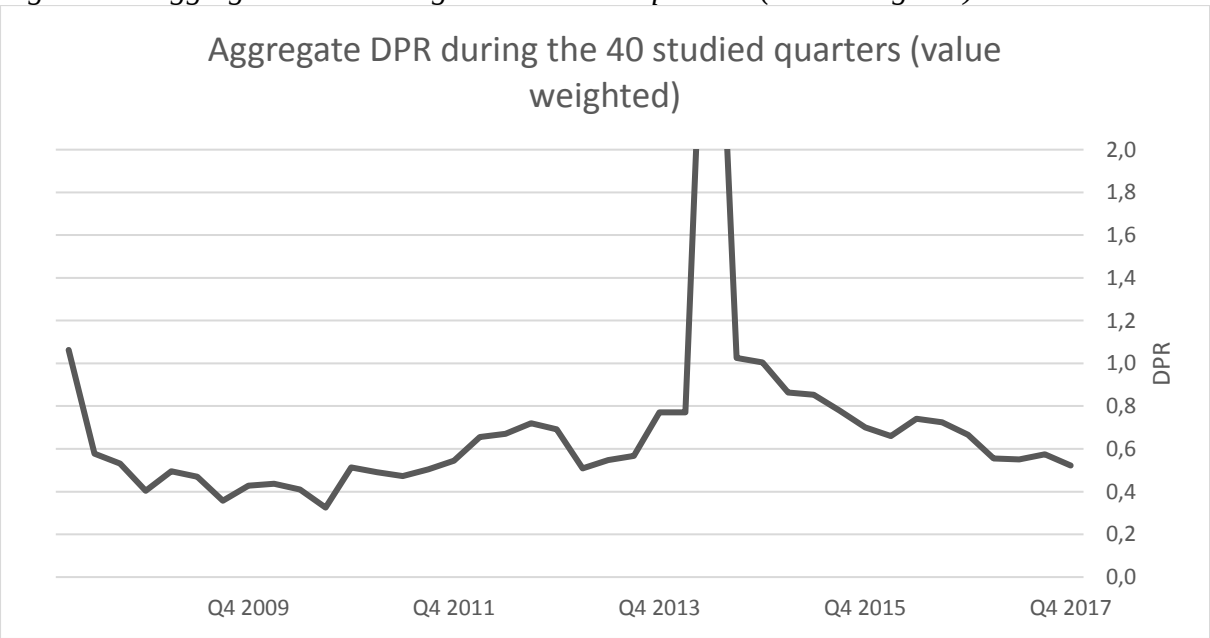
[10]Excluding aggregate dividend payout ratio in Q2 2014, which equally weighted was 9.77, for better visualization

Figure 4.5. Aggregate DPR during the 40 studied quarters (equally weighted)



Time series of aggregate equally weighted dividend payout ratio for the 30 firms during the 40 studied quarters

Figure 4.6. Aggregate DPR during the 40 studied quarters (value weighted)



Time series of aggregate value weighted dividend payout ratio for the 30 firms during the 40 studied quarters

Figure 4.5 and 4.6 show that the equally weighted aggregate level of dividend payout ratio has been more volatile over time during the 40 studied quarters. This further indicates that smaller firms in general have had more volatile dividend payout ratios. The figures also show that the average aggregate dividend payout ratio for the whole period, 0.85 equally weighted and 0.70 value weighted, is inflated by two periods with unusually high dividend payout ratios. These are the periods where Electrolux and Tele2 had unusually high dividend payout ratios.

To further analyze the data on aggregate level, table 4.5 below shows key descriptive statistics for aggregate book-to-market ratios during the studied time period.

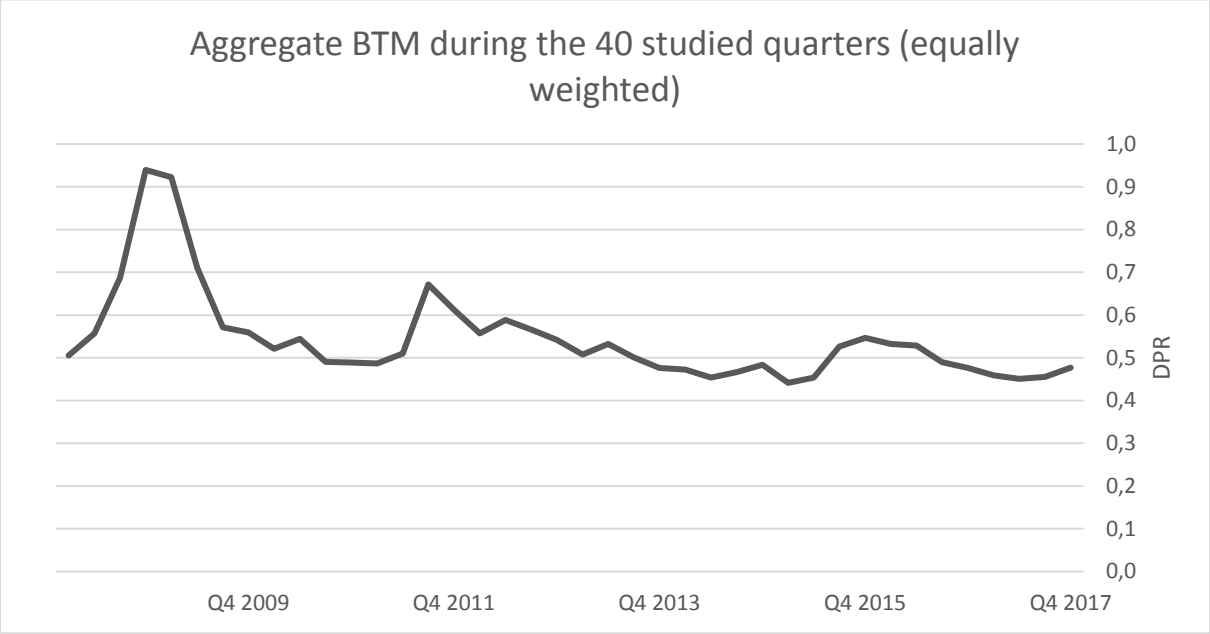
Table 4.5. Key descriptive statistics for aggregate level of BTM, both equally weighted and value weighted

Variable	Obs.	Average	Std. Err	1st quartile	Median	3rd quartile
EWBTM	40	0.54	0.11	0.48	0.52	0.56
VWBTM	40	0.47	0.06	0.42	0.44	0.49

Key descriptive statistics for book-to-market ratios on aggregate level, both equally weighted and value weighted, during the 40 studied quarters

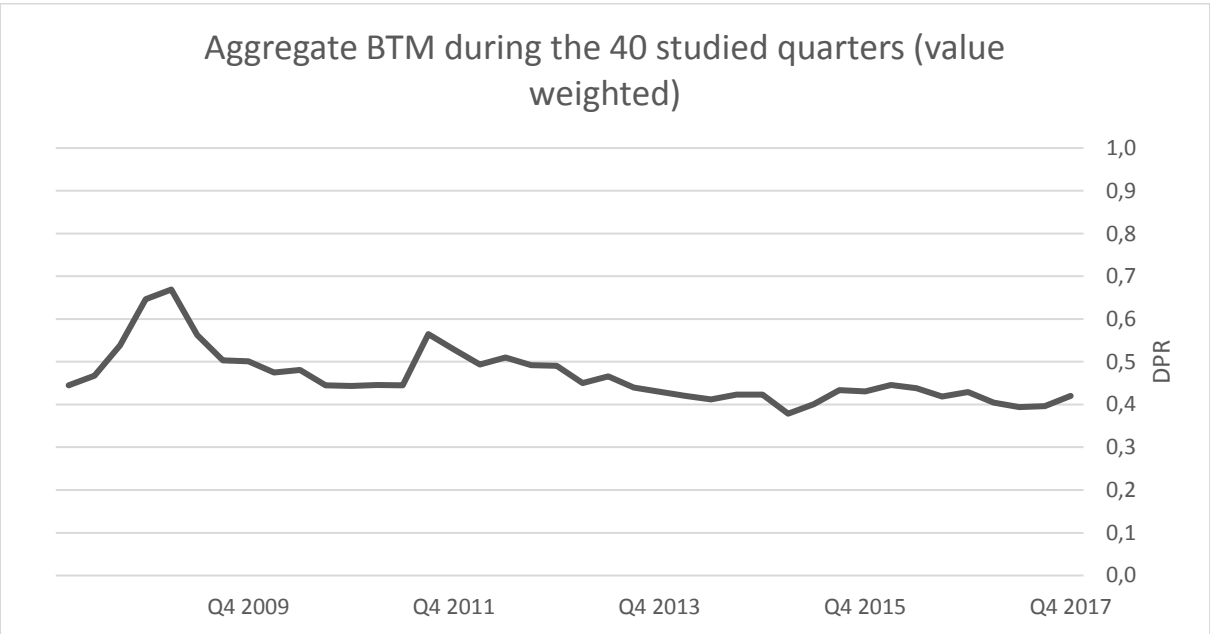
Table 4.5 shows that the same trend is observable for book-to-market ratios as for dividend payout ratios, where the value weighted aggregated book-to-market ratio has been less volatile than the equally weighted during the studied time period. However, the difference between value weighted and equally weighted volatility is smaller for book-to-market ratios than it was for dividend payout ratios. Time series illustrating the data shown in table 4.5 will be presented on the following page.

Figure 4.7. Aggregate BTM during the 40 studied quarters (equally weighted)



Time series of aggregate equally weighted book-to-market ratio for the 30 firms during the 40 studied quarters

Figure 4.8. Aggregate BTM during the 40 studied quarters (value weighted)



Time series of aggregate value weighted book-to-market ratio for the 30 firms during the 40 studied quarters

Figures 4.7 and 4.8 show the same trend as figures 4.5 and 4.6, where the value weighted aggregate levels have been less volatile than the equally weighted over time. Furthermore, the figures show that aggregate book-to-market ratios were at their highest in 2008 following the financial crisis. This will not be discussed further as it is beyond the scope of this study.

4.3 Treatment of extreme values

As presented in the walkthrough of descriptive statistics, the collected data includes observations with extreme values on certain variables. The extreme values have been adjusted according to the following criteria:

- *DPR*: Since *DPR* has already been modified to remove all negative values, the lower extreme values have already been deleted. Therefore, no further adjustments regarding the lower-end of the observations are made. However, the higher-end is adjusted by removing the highest percentile. Since earnings for a few observed quarters have been low but still positive, dividend payout ratios above 3000% have been observed. These are effectively removed when adjusting for extreme values.
- *ExcReturn*: Excess returns have been adjusted to exclude the highest and lowest percentile. This effectively removes returns above 210% and below -71%. The adjustments are made since these returns are most probably due to extreme events that are not affiliated with dividends.
- *Activity*: The highest percentile of values for *Activity* have been removed. These are all observed for Boliden, which experienced share turnover rates above 1600% in the first 11 observed quarters. These turnover rates are generally considered extremely high (Privata Affärer, 2009), and therefore they have been removed from the data set. The lowest percentile of values for *Activity* is not excluded as these values are not considered extreme values.
- *Size & BTM: Size* and *BTM* are both considered to be firm-specific factors, and since a limitation to OMX30 firms has already been made, no further adjustments which omits certain types of firms are considered necessary.

4.4 Quality of data

The quality of data is affected by several factors. Firstly, due to limitations in the data collection, where only OMX30 firms during 10 years are considered, the number of observations are quite low as they amount to 1112. The low number of observations might not be adequate for a study of this kind. When splitting the sample based on dividend payout ratio, the number of observations for each analysis becomes even lower. This reduces the ability to gain significant insights from the results. Secondly, excluding observations with negative *DPR* implies removing firm quarters with negative LTM net income. Consequently, firm quarters with poor profitability are excluded and thus the data might be slightly skewed towards firms with good profitability.

Thirdly, only top and bottom percentiles of extreme values are omitted from the data set. The limit for what is defined as extreme values is rather arbitrary and some values in the data could still be considered quite extreme. Lastly, the data is reliant on the Thomson Retuers Eikon database. Random spot-checks have been made in an attempt to find deviations from the collected data and the firms' quarterly reports, but no such cases have been found. This points towards the data being correct, however all data points have not been checked due to the large number of observations, which still leaves the data reliant on the correctness of Eikon. Several robustness checks are also made to ensure that any data quality problems do not have significant effect on the results of the study.

5. Empirical results

In this section, the results from the regressions are introduced. Initially the results from the main regression are presented, followed by robustness checks and an additional analysis. Lastly, the limitations of the results are discussed.

5.1 Results from main regression

The table below shows the results from the main regression.

Table 5.1. Coefficients from main regression

ExcReturn	Coef.	Std. Err.	z	P>|z|
DPR	-0.100	0.022	-4.51	0.000
Size	0.054	0.012	4.63	0.000
BTM	-0.238	0.033	-7.19	0.000
Activity	-0.011	0.009	-1.2	0.230
Constant	-1.101	0.298	-3.69	0.000

Coefficients from cross-sectional regression

Table 5.1 shows that the correlation between dividend payout ratio and excess return is negative and significant on a 1% level, which shows that higher dividend payout ratio implies lower excess returns. More specifically, the coefficient is -0.100 with a standard error of 0.022, which shows that a 1 p.p. higher dividend payout ratio results in a 10.00 p.p. lower excess return.

The coefficient between the analyzed firms' size and their excess return is positive and significant on a 1% level. This result contradicts the expected results mentioned in section 3.4, which was based on Fama & French's *Three Factor Model*. However, as mentioned in section 3.4, the studied firms are all part of the OMX30 Index, which means that all firms are among the largest firms on the Stockholm Stock Exchange. If the study had included smaller firms as well, the results might had been more in line with Fama & French's model. Additionally, this study focuses on short-run yearly returns while Fama & French focus on long-run returns.

The correlation between the book-to-market ratio of the analyzed firms and their excess return is negative and significant on a 1% level. This result also contradicts the expectations derived by Fama & French's *Three Factor Model*, but can also be explained by the relatively

homogeneous selection of firms when limiting to OMX30 and the study focusing on short-run yearly returns.

5.2 Robustness checks

Four robustness checks are made to test the robustness of the model and thus the robustness of the results. The first one tests an alternative treatment of negative dividend payout ratios, the second one tests an alternative measure to book-to-market ratio, and the third and fourth ones test alternative treatments of extreme values.

5.2.1 Alternative treatment of negative dividend payout ratios

In the original regression, the 48 observations with negative dividend payout ratios were excluded. The first robustness check tests whether setting the dividend payout ratios of these observations to 0 has a severe impact on the results. Thus, the same regression as earlier is executed, but now including observations with negative dividend payout ratio and adjusting their *DPR* to 0. The table below shows the results obtained from this robustness check.

Table 5.2. Coefficients from first robustness check

ExcReturn	Coef.	Std. Err.	z	P>|z|
RobustDPR	-0.096	0.021	-4.61	0.000
Size	0.042	0.010	4.31	0.000
BTM	-0.212	0.028	-7.66	0.000
Activity	-0.005	0.008	-0.57	0.566
Constant	-0.834	0.251	-3.33	0.001

Coefficients from regression including observations with negative dividend payout ratios and adjusting their DPR to 0

As can be seen in table 5.2, the coefficient for *DPR* is still negative and significant on a 1% level when including observations with negative dividend payout ratios and adjusting their *DPR* to 0. The coefficients for the control variables do not change significantly. All of this points toward the results being robust.

5.2.2. Earnings yield instead of book-to-market ratio

As discussed in the methodology section, the *BTM* variable is included to account for the fact that the market has different growth expectations for different firms in the OMX30. Low book-to-market ratio means that investors value the company's equity highly because they see growth potential in the firm. The same applies for companies with high book-to-market ratios; investors value their equity closer to or below their book value which suggests that they see less growth opportunities for those companies.

An alternative measure for investors' view on a company's growth opportunities is its earnings yield, which is earnings divided by market capitalization, i.e. inverse P/E multiple. A revised regression model is created including earnings yield instead of book-to-market ratio. The revised regression model is presented in equation (6) below:

$$ExcReturn_{it} = \beta_0 + \beta_1 DPR_{it} + \beta_2 Size_{it} + \beta_3 EarningsYield_{it} + \beta_4 Activity_{it} + \varepsilon_{it} \quad (6)$$

where *i* represents each individual firm and *t* represents each quarter in the data. The table below shows the results from running the regression with *EarningsYield* instead of *BTM* as an independent variable:

Table 5.3. Coefficients from second robustness check

ExcReturn	Coef.	Std. Err.	z	P>|z|
DPR	-0.098	0.022	-4.42	0.000
Size	0.066	0.011	6.18	0.000
EarningsYield	-0.704	0.170	-4.14	0.000
Activity	-0.008	0.009	-0.89	0.372
Constant	-1.473	0.264	-5.57	0.000

Coefficients from regression with book-to-market ratio replaced with earnings yield

As can be seen in table 5.3, the coefficient for *DPR* is still negative and significant on a 1% level when replacing book-to-market ratio with earnings yield as an independent variable. The coefficient for *EarningsYield* is greater than that of *BTM*, but is still negative which was expected. The coefficients for the other control variables do not change significantly. All of this suggest that the results are robust.

5.2.3. Alternative treatment of extreme values

The third and fourth robustness checks test the robustness of the results given other treatments of extreme values. In the original regression the observations with the largest 1% of values for *DPR*, *ExcReturn* and *Activity* were excluded, as well as the smallest 1% of *ExcReturn*. In the following robustness checks, two alternative treatments of extreme values are tested.

Firstly, fewer observations are defined as extreme values and secondly, more observations are defined as extreme values. Since negative values of *DPR* are removed, the observations that include the low-end extreme values of *DPR* are automatically omitted. Therefore, the high-end extreme values of *DPR* are still excluded when extreme values for the control variables are included. The table below shows the results obtained from running the regression with extreme values for *ExcReturn* and *Activity* included:

Table 5.4. Coefficients from third robustness check

ExcReturn	Coef.	Std. Err.	z	P>|z|
DPR	-0.203	0.055	-3.69	0.000
Size	0.113	0.028	4.09	0.000
BTM	-0.469	0.074	-6.33	0.000
Activity	0.041	0.011	3.65	0.000
Constant	-2.394	0.707	-3.39	0.001

Coefficients from regression including extreme values for ExcReturn and Activity

As can be seen in table 5.4, the results are robust. The coefficient for *DPR* is still negative and significant on a 1% level. An interesting result from this regression is that the coefficient for *Activity* becomes statistically significant when including extreme values. This can both be a result of including extreme values for *ExcReturn* and of including extreme values for *Activity*, and therefore no conclusions are drawn from this result.

In the last robustness check, the largest 2% of *DPR*, *ExcessReturn* and *Activity* and the smallest 2% of *ExcessReturn* are excluded. The following table shows the results from running the regression with more excluded observations.

Table 5.5. Coefficients from fourth robustness check

ExcReturn	Coef.	Std. Err.	z	P>|z|
DPR	-0.126	0.024	-5.28	0.000
Size	0.067	0.012	5.75	0.000
BTM	-0.203	0.032	-6.3	0.000
Activity	-0.021	0.016	-1.31	0.192
Constant	-1.437	0.298	-4.82	0.000

Coefficients from regression excluding observations with the largest 2% of values for DPR, ExcessReturn and Activity and the smallest 2% of ExcessReturn

The coefficient for *DPR* is still negative and significant on a 1% level, and the coefficients for the control variables do not change significantly. This further shows that the results from the main regression are robust.

5.3 Results from additional regressions

In the additional regressions, the sample was split into three different groups: a high dividend-paying group including firms with average dividend payout ratios above 60% for the studied time period, a medium dividend-paying group including firms with average dividend payout ratios between 60% and 45% for the studied time period, and a low dividend-paying group including firms with average dividend payout ratios below 45% for the studied time period. When forming groups according to these limits, the high dividend-paying group includes 11 firms, the medium dividend-paying group includes 10 firms and the low dividend-paying group includes 8 firms. Table 5.6 on the following page shows the results from the regression for all three groups of firms.

Table 5.6. Coefficients from the additional analysis

	High DPR (11 firms)		Medium DPR (10 firms)		Low DPR (8 firms)	
ExcReturn	Coeff.	P>|z|	Coeff.	P>|z|	Coeff.	P>|z|
DPR	-0.081	0.001	-0.178	0.004	-0.163	0.066
Size	-0.087	0.003	0.023	0.258	0.048	0.003
BTM	-0.205	0.000	-0.075	0.052	-0.351	0.000
Activity	-0.725	0.000	-0.569	0.000	-0.003	0.739
Constant	2.623	0.001	-0.221	0.675	-0.838	0.033

Coefficients from separate regressions for firms with average DPR above 60%, between 60% and 45% and below 45%

The results show that the coefficient for *DPR* is negative for all groups, but the firms with higher *DPR* have a significantly less negative coefficient than the other firms with lower *DPR*. This shows that a 1 p.p. difference in *DPR* has less impact on excess returns for firms who have higher dividend payout ratios, which is logical since a 1 p.p. change in dividend payout ratio is relatively smaller for firms with higher payout ratios and thus affects returns accordingly. Following the same reasoning, one would expect the medium *DPR* sample to have a less negative coefficient than the low *DPR* sample. However, the results in table 5.6 show that the medium *DPR* sample has a more negative coefficient than the low *DPR* sample. Since the coefficient for the low *DPR* sample is only significant on a 6.6% level, this will not be analyzed in depth further, but it does indicate that the relationship between *DPR* and *ExcReturn* is non-linear.

5.4 Limitations

There are several limitations to the regression analysis presented in this section, which should be considered when interpreting its results.

Firstly, as presented in the data section, the study is delimited to firms that are part of the OMX30 Index as of April 1st, 2018. This means that there are 30 firms included in this study, which puts an emphasis on what type of firms that are included. For example, the study includes a number of firms in the financial sector, which occasionally are excluded in academic research due to their different characteristics. Furthermore, the firms in the OMX30 Index are some of the largest firms in Sweden with regards to market capitalization, which means that the study includes a relatively homogenous group of firms in terms of size and trading activity. As only

firms in the OMX30 are included, solely Swedish corporations are part of the data set. Hence applying the results in other countries is not necessarily appropriate.

Secondly, the study is delimited to a period of 10 years, which means that the observations lie in the period between 2008 and 2018, a period that starts in the midst of a financial crisis and ends at record-high market valuations. This presents a challenge from a research point of view. The results can be applied for the whole time period but are not necessarily true for each specific quarter in the data set. Furthermore, it remains uncertain whether the results provide an accurate representation of time periods before or after the studied time horizon.

Thirdly, while it is possible to interpret a linear relationship between dividend payout ratio and stock returns from the results of the main regression, it is likely that the true relationship is non-linear as indicated by the additional regressions. This is not analyzed further, since the results from the additional regressions lack sufficient statistical significance.

Lastly, this study does not account for share repurchases. This likely skews the results since some firms tend to prefer share repurchases over dividends. Accounting for share repurchases would probably yield a more accurate relationship between payout policy and stock returns. However, due to the limited scope of this paper it was not included.

6. Discussion

This section discusses the results of the study. Firstly, the results are interpreted and evaluated. Secondly, the results are compared to existing theories and empirical studies. Lastly, suggestions for future research are given based on the results.

6.1 Interpretation of results

This study examined the relationship between dividend payout ratio and excess returns. The results of the study show that a higher dividend payout ratio has correlated with lower excess returns in the studied time period. It is important to interpret the results in the right way. Firstly, this study does not examine the causal relationship between dividend payout ratio and excess returns. Only the correlation between the two is within the scope of this study. Hence the results do not imply that a firm can increase its returns by lowering its dividend payout ratio. It simply states that firms with lower (higher) dividend payout ratios tend to experience higher (lower) excess returns.

Secondly, this study examined quarterly 1-year rolling returns. Therefore, the results can not be applied to stock returns for other time horizons. For example, many studies focus on ex-dividend first-day returns. The results from this study can not be directly compared with the results from such studies.

Lastly, only the relationship between dividend payout ratio and excess returns was examined. Consequently, any conclusions regarding the relationship between other measures of dividend policy and firm performance are not part of this study. The study does not examine how the dividend payout ratio affects earnings growth or any other measure of firm performance than stock returns.

6.2 Evaluation of results

6.2.1 Results from main regression

The results from the regression indicate a negative relationship between dividend payout ratio and excess returns. This could be explained by the relationship between total return, capital gains and dividends introduced by Miller & Modigliani (1961). Investors and managers likely consider total return the primary indicator of firm performance. This view results in a clear trade-off between dividends and price returns, which would explain the negative relationship between dividend payout ratio and excess returns found in this study.

Another possible explanation concerns the characteristics of the firms. The results indicate that firms with high dividend payout ratios experience lower excess returns. As stated in the *Pecking Order Theory*, firms with high dividend payout ratios tend to have few investment opportunities. These firms will make fewer investments and thus experience lower earnings growth, as described in the literature review. This indicates a negative relationship between dividend payout ratio and earnings growth. Since earnings growth and excess returns are two alternative measures of firm performance, this could thus also explain the negative relationship between dividend payout ratio and excess returns. This reasoning is supported by the negative coefficient on *BTM* in the main regression since *BTM* is the inverse of Tobin's *q*, a measurement of investment opportunities.

6.2.2 Results from additional regressions

The results also show that firms with smaller dividend payout ratios experience a greater decrease in excess returns for each percentage point difference in dividend payout ratio. As mentioned in the results section, this is logical since an increase or decrease of 1 percentage point in their dividend payout ratio is a bigger relative difference compared to firms with higher dividend payout ratios.

Notably, the group with the lowest average dividend payout ratios did not experience a greater decrease in excess returns for each percentage point difference in dividend payout ratio compared to the group with medium dividend payout ratios. This implies that the relationship between dividend payout ratio and excess returns is non-linear. However, due to the lack of sufficient statistical significance, this result is not discussed further.

6.3 Results compared to existing literature

As previously discussed, empirical findings on the relationship between dividend policy and firm performance contradict financial theory on the topic. The results from this study indicate that the relationship between dividend payout ratio and excess returns is more in line with financial theory than empirical research.

6.3.1 Miller & Modigliani Dividend Irrelevance Theory

The *Dividend Irrelevance Theory* brought forward by Miller & Modigliani (1961) states that there is a trade-off between dividends and capital gains, and that dividends and price returns therefore are negatively related. The results from this study are in line with this theory, since they indicate a negative relationship between dividend payout ratio and excess returns.

6.3.2 Gordon Growth Model

The *Gordon Growth Model* presented by Gordon (1959) concluded that higher dividend payout ratio implies higher firm value. The results of our study show that the relationship between dividend payout ratio and excess returns is reversed. Higher dividend payout ratio implies lower excess returns. This does not necessarily contradict the findings of Gordon. However, as price and returns are closely related the results are of great interest.

6.3.3 Pecking Order Theory

The *Pecking Order Theory* brought forward by Myers (1984) implies that firms with high (low) dividend payout ratios experience low (high) earnings growth. Consequently, our findings are in line with the theory as firms with high payout ratios experience low price growth. Myers concludes that the relationship is negative regarding earnings growth. Our study confirms that the same relationship stands between dividend payout ratio and excess returns.

6.3.4 Empirical studies

As described, no empirical study has focused on the pure relationship between dividend payout ratio and returns. Previous studies has focused on other measures of dividend policy and firm performance.

Studies on the relationship between dividend yield and stock returns has found that there exists a positive relationship between the two. Hence the results of this study show that the same positive relationship does not exist between dividend payout ratio and excess returns. This means that while firms with higher dividend yield generally experience greater returns, the same does not hold for companies with higher dividend payout ratios.

The empirical studies focusing on the relationship between dividend payout ratio and earnings growth also found a positive relationship. This means that, while firms with higher dividend payout ratio generally experience higher earnings growth according to prior empirical findings, this study can not confirm that this is reflected in greater returns.

6.4 Suggestions for future research

The results of this study and the complexity of the *Dividend Puzzle* leave room for further research within this field. As this study is rather limited in scope, additional research on the relationship between dividend payout ratio and returns could provide further insights. Examining the relationship between dividend payout ratio and long-run returns would add understanding to the long-run effects of dividend policy. While higher dividend payout ratio implies lower short-run excess returns according to this study, the long-run effects are still largely unclear.

Additional separation of the data sample to investigate the relationship between dividend payout ratio and returns within different sub groups would provide further understanding within this field. While this study shows that a significant negative relationship exists between dividend payout ratio and excess returns, this relationship may vary depending on firm and market factors. Splitting the sample by firm size, firm industry or market conditions would shed light on whether there exist significant differences between types of firms or states of the stock market. However, this would naturally require a much larger data sample.

Lastly, an interesting future research topic is to investigate the effect of changes in dividend payout ratio on future returns. This study examines the correlation between a quarterly set level of dividend payout ratio and excess returns. Research on the effects of changing dividend payout ratio on future short-run and long-run returns would provide managers with additional insights on how to handle dividend policy decision-making.

7. Conclusion

This paper set out to shed light on the relationship between dividend payout ratio and excess returns. The research question of the paper was stated as follows: *Is there a significant relationship between dividend payout ratio and excess returns in Sweden? If a significant relationship exists, is it positive or negative?*

Dividend policy and firm performance is a well examined topic in finance and many studies indicate results that contradict financial theory. However, studies on the pure relationship between dividend payout ratio and stock returns are quite rare. Therefore, this paper strived to provide additional insight on this relationship. A selection of 30 Swedish firms from the OMX30 Index were studied over a span of 10 years.

The results show that there is a statistically significant negative relationship between dividend payout ratio and excess returns. This means higher dividend payout ratio implies lower excess returns. The results could be explained by the traditional tradeoff between dividends and capital gain which implies a negative relationship. They could also be explained by the fact that, according to financial theory, firms with high dividend payout ratios experience lower earnings growth.

To gain additional insight, the sample was split into three groups based on level of dividend payout ratio. The results show that the relationship was still negative for all levels of dividend payout ratio, but the firms with low payout ratios had more negative coefficients than those with high dividend payout ratios. Hence, a 1 percentage point change in dividend payout ratio has stronger impact on excess returns for firms with lower levels of dividend payout ratios. In order to further validate the results, several robustness checks were conducted which pointed toward the results being robust.

The empirical findings on the relationship between dividend payout ratio and earnings growth almost unanimously point toward a positive relationship. The same holds for the relationship between dividend yield and stock returns. This study implies that the same relationship does not exist between dividend payout ratio and excess returns. However, the results are therefore largely in line with Myers's *Pecking Order Theory* (1984) and Miller & Modigliani's *Dividend Irrelevance Theory* (1961). Myers's theory implies a negative relationship between dividend payout ratio and earnings growth. Our results suggest that the same relationship stands between dividend payout ratio and excess returns. Regarding the *Dividend Irrelevance Theory,* the findings of our study suggest that the trade-off between dividends and capital gains introduced by Miller & Modigliani holds empirically in Sweden.

In conclusion, the *Dividend Puzzle* remains a complex issue in finance. The relationship between dividend policy and firm performance will continue to captivate both managers and investors. Additional research is required to gain full understanding of the topic. For now, this study has managed to put a small piece in the full *Dividend Puzzle*.

8. References

Allen, F. and Michaely, R., 2003, Payout policy, *Handbook of the Economics of Finance*, 337-429

Arnott, R.D. and Asness, C.S., 2003, Surprise! Higher dividends= higher earnings growth, *Financial Analysts Journal*, 59 (1), 70-87

Baker, H.K., 2009, Dividends and dividend policy, *John Wiley & Sons* (Hoboken, New Jersey), 7-8

Black, F., 1976, The dividend puzzle, *Journal of portfolio management*, 2 (2), 5-8

Black, F. and Scholes, M., 1974, The effects of dividend yield and dividend policy on common stock prices and returns, *Journal of Financial Economics*, 1 (1), 1-22

Blume, M.E., 1980, Stock returns and dividend yields: Some more evidence, *The review of economics and statistics*, 567-577

Börsguiden, 2009, Boliden klarar krisen, *Privata Affärer*, Available at: http://www.privataaffarer.se/borsguiden/va-bors/boliden-klarar-krisen-49793 (Accessed 2018-04-30)

DeAngelo, H., DeAngelo, L. and Stulz, R.M., 2006, Dividend policy and the earned/contributed capital mix: a test of the life-cycle theory, *Journal of Financial Economics*, 81 (2), 227-254

Donaldson, G., 1961, Corporate debt capacity: A study of corporate debt policy and the determination of corporate debt capacity, *Harvard University, Graduate School of Business Administration* (Boston, Massachusetts)

Fama, E.F. and French, K.R., 1993, Common risk factors in the returns on stocks and bonds. *Journal of Financial Economics*, 33 (1), 3-56

Fama, E.F. and French, K.R., 2002, Testing trade-off and pecking order predictions about dividends and debt, *The review of financial studies*, 15 (1), 1-33

Gordon, M.J., 1959, Dividends, earnings, and stock prices, *The review of economics and statistics*, 99-105

Gordon, R.H. and Bradford, D.F., 1980, Taxation and the stock market valuation of capital gains and dividends: Theory and emphirical results, *Journal of Public Economics*, 14 (2), 109-136

La Porta, R., Lopez-de-Silanes, F., Shleifer, A. and Vishny, R.W., 2000, Agency problems and dividend policies around the world, *The journal of finance*, 55 (1), 1-33

Li, G., 2016, Growth options, dividend payout ratios and stock return, *Studies in Economics and Finance*, 33 (4), 638-659

Litzenberger, R.H. and Ramaswamy, K., 1979, The effect of personal taxes and dividends on capital asset prices: Theory and empirical evidence, *Journal of Financial Economics,* 7 (2), 163-195

Miller, M.H. and Modigliani, F., 1961, Dividend policy, growth, and the valuation of shares, *The Journal of Business,* 34 (4), 411-433

Morgan, I.G., 1980, Dividends and stock price behaviour in Canada, *Journal of Business Administration,* 12 (1), 91-107

Myers, S.C., 1984, The capital structure puzzle, *The journal of finance,* 39 (3), 574-592

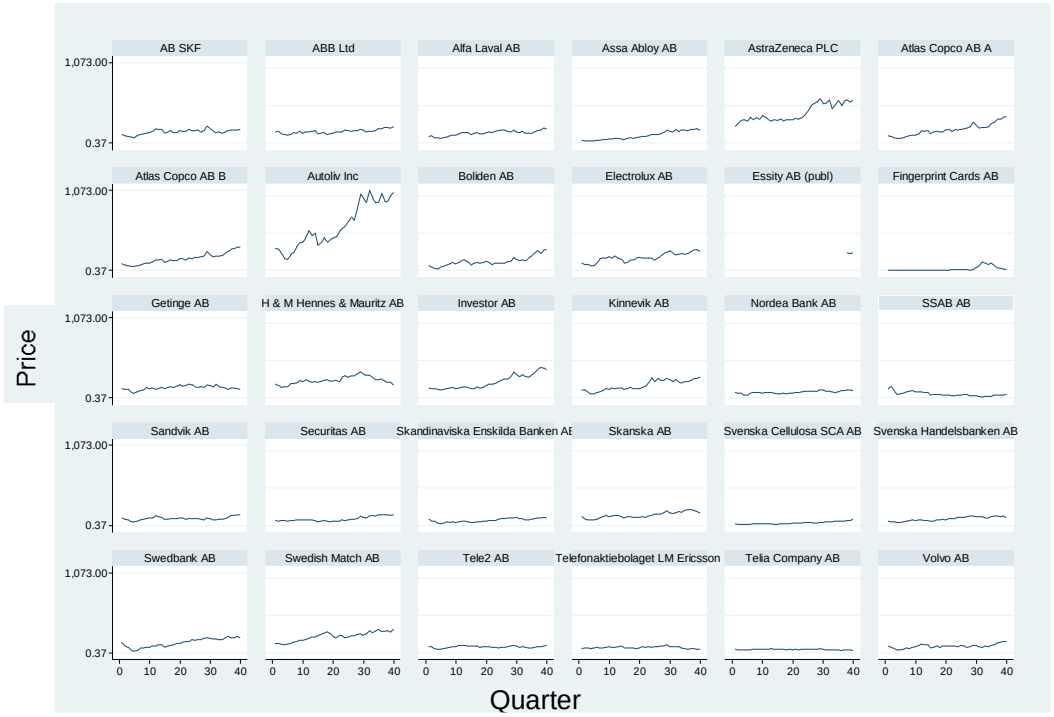
Rosenberg, B. and Marathé, V., 1979, Tests of capital asset pricing hypotheses, *Research in Finance*, 1, 115-223

Stone, B. and Bartter, B., 1979, The effect of dividend yield on stock returns: empirical evidence on the relevance of dividends, *WPE E,* 76-78

Zhou, P. and Ruland, W., 2006, Dividend payout and future earnings growth, *Financial Analysts Journal,* 62 (3), 58-69

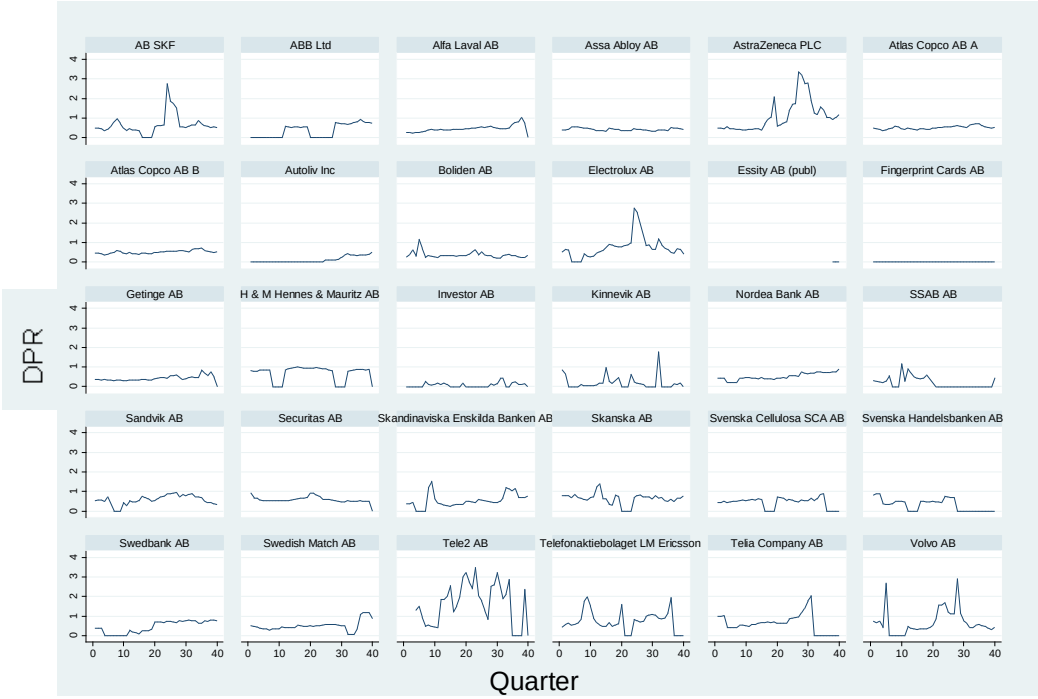
9. Appendices

Figure 9.1. Share price performance for each firm in the data set



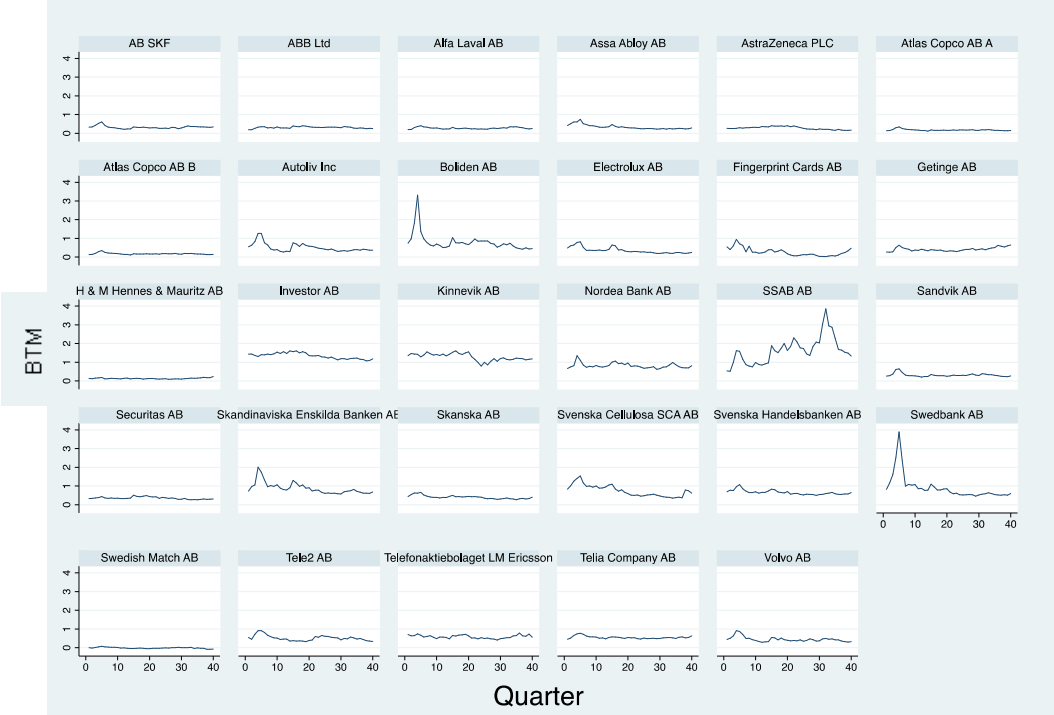
Time series of quarterly closing prices in the 40 studied quarters for each firm in the data set

Figure 9.2. Quarterly LTM DPR for each firm in the data set[11]



Time series of quarterly LTM dividend payout ratios in the 40 studied quarters for each firm in the data set[11]

Figure 9.3. Quarterly BTM for each firm in the data set[12]



Time series of quarterly book-to-market ratios in the 40 studied quarters for each firm in the data set[12]

[11] Excluding the quarters with negative dividend payout ratios and the highest percentile of dividend payout ratios for better visualization

[12] Excluding Essity for better visualization