Information Asymmetry and dividend pay-out policy for Dutch listed non-financial firms

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Abstract

This study investigates the relationship between Information Asymmetry and dividend pay-out policy for Dutch listed non-financial firms. A total of 621 analysts' forecasts and 65 Dutch listed non-financial firms are used to make an OLS regression analysis. Previous research indicates that for Dutch listed non-financial firms the Pecking order theory would be applicable instead of the Signalling theory. Meaning that there would be a negative relationship between Information asymmetry and Dividend pay-outs. However, no evidence was found for Dutch listed non-financial firms.

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1. Introduction

My initial interest in dividend policy comes from the decision to change the quarterly dividend pay-out by Royal Dutch Shell for the first quartile of 2020. In April 2020 Shell announced that they would change the dividend pay-out from $0.47 to $0.16. While Shell had been paying a constant dividend in the past years they argued that a change in pay-out was unavoidable. This announcement came to many investors as a shock. Shell had been famous for being a "dividend" stock, meaning that investors bought the stock expecting a constant dividend pay-out. This event made me wonder why Shell would change their dividend pay-out and what that would signal to the market. Besides, it made me wonder why investors were not expecting such a big change in dividends. During the start of COVID-19 investors could after all expect a company like Shell to be having a difficult time.

Jensen (1986) states that firm performance is about the ability to create an environment in which the firm can generate future results. Performance must be seen as something that is dynamic and cannot be described as a one-time event. Measuring performance is therefore only possible if the firm can reproduce the results in the future. As a result, Jensen (1986) defines performance as all the processes that contribute to outcomes and results. Jensen (1986) argues that by dividend pay-outs, managers can manage free cash flows better. If cash is spent on projects there is a chance of the project having a negative net present value. By spending it on dividends, agency problems are prevented. A recent study by Y. Li (2014) suggests that dividend pay-outs can indicate the future profitability of a firm.

This research investigates the effect of information asymmetry on dividend pay-out policy. The theoretical framework of this research is based on two main theories. The first one is the dividend irrelevance theory by Miller and Modigliani (1961), in which they state that dividend policy is irrelevant if certain assumptions are met. This research argues that these assumptions are not met for Dutch listed non-financial firms. The second theory used in this research is the Signalling theory. The signalling hypothesis theory states that information asymmetry between investors and managers or management does exist (K. Li & Zhao, 2008).

The research of Bhattacharya (1979), and Miller and Rock (1985) conclude that there is a positive relationship between information asymmetry and dividend pay-out policy because managers know more about the firm's performance than the investors. They conclude that managers use dividends to signal information to the market. More recent studies have looked at the relationship between information asymmetry and dividend policy (Li & Zhao, 2008) (Lin, Chen, & Tsai, 2017). Some of the previous research such as the research of La Porta, Lopez-de-Silanes, Shleifer, and Vishny (2000) looked at dividend pay-out policy for firms. Their paper researched the effect of the agency problem on the pay-out policy of firms but was not able to form a conclusion about the relevance of dividend signalling.

Their research distinguishes between common, and civil law countries. Within both categories differences existed, meaning that it is hard to formulate a general conclusion to compare countries. All of these studies were conducted on a market outside of The Netherlands, meaning that the outcome of these studies might differ for Dutch firms.

What is interesting about firms in The Netherlands compared to other countries is that firms in The Netherlands have two-tiered boards (De Jong et al., 2019). Two-tiered boards mean that there is a supervisory board and a management board. Like in other countries the management board is tasked with deciding on strategy and objectives. The supervisory board consist of outsiders and is therefore considered to be independent (De Jong, DeJong, Mertens & Wasley, 2005). Furthermore, the Dutch economy should resonate with international practices. De Jong et al. (2019) argue that because of the openness of information and the fact that The Netherlands is a price taker on global markets. Their study focuses on the dividend policy of firms in The Netherlands in the twentieth century. This study builds on their paper to gather more knowledge about dividend policy in The Netherlands.

Therefore, to form a conclusion for firms in The Netherlands about the relation between information asymmetry and dividend policy this research will focus on the Dutch listed non-financial firms.

To conduct this research, the following question is stated: *What is the relationship between information asymmetry and dividend pay-outs for Dutch listed non-financial firms?*

This study regards Dutch listed non-financial firms. In The Netherlands financial firms are subject to other regulations compared to non-financial firms, mainly based on financial reporting. As in line with the research of De Jong et al. (2019), non-financial firms are included in the sample. The period over which the multivariate analysis will be conducted concerns the years 2017, 2018, and 2019. Results of this study will contribute to the already existing research on this topic and will contribute to the knowledge about the unknown relationship between information asymmetry and dividend pay-out policy for Dutch listed non-financial firms. Furthermore, this study will help future managers to understand the relationship between information asymmetry and dividend pay-out policy, and will guide them while making critical decisions for their organisation.

2. Theoretical Framework

The book by Lease, John, Kalay, Loewenstein, and Sarig (1999) titled “Dividend Policy: Its Impact on Firm Value” suggest that dividends could be a signal of a firm’s prospects. Among the chief financial officers of large U.S. corporations, this is an accepted view. Signalling can best be described as the effect that dividend announcements can have on the market. Theories about this topic argue that a decision about dividend policies can give a credible signal to affect the overall perception of a firm (Lease et al., 1999).

Dividend policy is defined by Brealey et al. (2020) as the time pattern of dividend pay-out. The dividend policy of a firm decides the amount of dividend paid to the shareholders. The dividend is paid from the earnings of a firm. Multiple forms of dividends can be identified. Ordinary cash dividend is a regularly scheduled payment from a firm to its shareholders. The shareholder is paid based on the number of shares in his possession. A firm can also decide to pay out stock dividends, this happens when a firm decides to issue shares to its shareholders instead of cash. This study focuses mainly on ordinary cash dividends.

2.1 Dividend relevance

Miller and Modigliani (1961) published a paper stating that dividend policy is irrelevant if certain assumptions are met. These assumptions are based on an efficient capital market meaning that the economy is entirely efficient. According to their theory, once the investment policy and future prospects are known to the investor, the dividend policy has no influence on the decision of the investor. This means that if the assumptions of Miller and Modigliani (1961) are not met, dividend policy is relevant. In which case dividend policies can give a signal to the market about the firm performance (Lease et al., 1999). The assumptions for an efficient capital market made in the article of Miller and Modigliani (1961) are listed below.

2.1.1 No taxes

The model of Miller and Modigliani (1961) assumes that no taxes are existing in the capital market. Meaning that the tax rate is zero percent. In case there are taxes in the market this assumption is still valid if both the capital and dividend gains are taxed the same. Firms have to pay taxes on their profits in the Netherlands. As a result, firms try to minimize their profits, which then leads to some firms allocating their tax payment to other countries where the tax rate is more favourable. The tax paid on dividend gains is, therefore, almost always taxed on a different level.

2.1.2 Transaction costs

The second assumption made by Miller and Modigliani (1961) is that transaction costs for the purchasing and selling of securities are nil. Meaning that while trading securities no costs for transactions are made. As transaction costs affect the pricing for securities, investors are more cautious with allocating their budget. In The Netherlands, transaction costs have to be paid. Therefore, the assumptions are not met.

2.1.3 Floatation costs

Third, Miller and Modigliani (1961) state that the cost of borrowing money is equal for firms and investors. Although in some cases the cost of borrowing money is equal for firms and investors, this is not the overall trend. The interest on borrowed money often depends on the financial situation, as well as the size and many other factors. Therefore, an investor is not likely to pay the same interest as bigger firms. These assumptions are not met for the Dutch financial market, since both transaction costs and floatation costs are present.

2.1.4 Access to information

Finally, if the investor has the same access to information as a firm one can speak of symmetry of information (Miller and Modigliani, 1961). Although an environment in which information is widely available in combination with good corporate governance will lead to less information asymmetry between managers and investors (Hail et al., 2014), different levels of information asymmetry might be a problem for financial markets. Information asymmetry after all is an important factor in determining the behaviour of dividend policies (DeAngelo et al., 2009). According to the article of Barron et al. (2009), there is a dispersion between analysts' forecasts about future stock prices. According to that article, this is an indication of the level of information asymmetry between managers and investors. As a result, one cannot assume that investors and firms have the same information about the Dutch listed firms. This assumption is therefore also not met.

In conclusion, dividend policy is relevant for investors. The assumptions of Miller and Modigliani (1961) are, after all, not met for the Dutch listed firms. However, Miller and Modigliani (1961) also state that dividend pay-outs might convey information about a firm's prospects. Meaning that information asymmetry might occur. Therefore, the next part will look into the relation between dividend policy and information asymmetry.

2.2 Information asymmetry

According to the signalling theory, a decision to pay out dividends means that there is information asymmetry between the managers and the shareholders. To combine that with the moral hazard agency theory one can conclude that the more dividend paid the higher level of information asymmetry. Because of that, the excess cash cannot be spent by managers who act out of self-interest. This will be elaborated on in the following section.

The article of Miller and Modigliani (1961) suggests that dividends convey information about the firm's future earnings. In the finance literature, this event is called "information content of dividends". The managers of a given firm will use the dividend pay-out to signal information about those future earnings (Daniels et al., 1997). According to Brealey, Myers, and Allen (2020) managers are more likely to increase the amount of dividends paid when they are expecting future earnings to be less volatile and unsure. Whereas, investors are mostly looking at changes in dividend pay-out than the actual dividend being paid. Investors consider changes in dividend pay-out to be an indicator of future earnings (Brealey et al., 2020).

Akerlof (1970) theorizes the consequences of information asymmetry. If the seller has superior information about the product as the buyer, the seller will try to sell the worst quality of the product first. Furthermore, the seller will keep the good quality goods to sell these later and gain more returns. Adverse selection occurs if there is asymmetric information within the market. Meaning that investors and management have different information. Managers could have access to insider information but are not able or willing to share this with shareholders. As a result, there is a risk that one of the parties involved has no good intentions with the dividend pay-out, which Akerlof (1970) describes as a moral hazard. The moral hazard agency theory states that managers will act out of self-interest. Therefore, the shareholders will not benefit from their decisions. To counter this a firm should pay out dividends to prevent managers from spending excess cash (Easterbrook, 1984).

The research of Li and Zhao (2008) concludes that firms that are more subject to information asymmetry are less likely to pay dividends and increase dividends. They define the variable information asymmetry as the dispersion in analyst earnings forecasts. Earnings forecasts are based on the expectations of an analyst about the firm. Most of the time the analyst builds a financial model that predicts variables such as the growth and profitability of the firm. If the firm can provide enough information to the analyst he will be able to make a better estimation of the firm's value. Krishnaswami and Subramaniam (1997) also define information asymmetry as analyst earnings forecasts and conclude that the dispersion in analyst forecasts is positively related to information asymmetry within

firms. They argue that the dispersion of the consensus of the estimate of the forecast reflects the amount of information asymmetry.

2.2.1 Agency theory

Jensen and Meckling (1976) wrote about managerial behaviour and the ownership structure of a firm to explain the impact of the agency costs theory. Dividend agency problems can arise when the management (agent) of a firm does not act in the best interest of the shareholders (principals). In that case, the managers do not make decisions which are in line with shareholder expectations.

The shareholder-manager conflict or the so-called principal-agent problem occurs when managers act out of self-interest and do not act in the best interest of the shareholders (Jensen & Meckling, 1976). The research of Del Brio and De Miguel (2008) concludes that insiders often signal a firm's future prospects by altering ownership stakes. This is a prime example of the principal-agent problem. The principal-agent conflict hypothesizes that paying out dividends will reduce agency conflicts. Because of the free cash flow that will be converted into a dividend payment, managers are less prone to maximize their own wealth (De Jong et al., 2019). As a result, shareholders expect highly profitable firms to pay a higher dividend and less profitable firms to pay a lower dividend to reduce principal-agent problems (Fama & French, 2001). Based on the literature regarding agency problems this research assumes that agency problems have a positive effect on dividend pay-outs, because of the information asymmetry between managers and shareholders.

2.2.2 Signalling theory

The signalling hypothesis theory states that information asymmetry between investors and managers or management does exist. According to the study by Miller and Rock (1985) dividend payment is a way in which managers can signal information to investors. The model of Bhattacharya (1979) states that by committing to a dividend policy managers can signal the quality of a project. Any unexpected changes in dividends can therefore be interpreted as management predictions of future financial developments (Bhattacharya, 1979). The management can thus decide to release information through dividend payments (Miller & Rock, 1985). Utilizing share repurchases or dividend announcements, managers can signal to the market about the expected prospects. As a result dividend pay-outs provide an opportunity for managers to deal with information asymmetry. Any changes in dividend pay-outs should result in changes in the value of a firm on the market. These changes will follow the same direction as the change in profitability according to the dividend signalling hypothesis. This research will focus on dividends because although share repurchases might indicate the expected prospects of a firm, it represents an uncertain future return. Furthermore, an announcement of share repurchases

is not a guarantee that firms will continue with those repurchases. Dividend payments on the other hand represent a definite return (Brealey et al., 2020).

According to the signalling theory, information asymmetry may cause adverse selection. Adverse selection is the problem that is caused when buyers or sellers of a product or service use the information only known to them with to goal to maximize their outcomes. As a result, other parties involved in the transaction are negatively affected. So, adverse selection occurs when buyers have access to information that sellers do not have, or vice versa (Charoenwong et al., 2011). This also means that some shareholders will have access to more information about a firm than others. As a result, the investor with less access to information might be at a disadvantage when trying to value the stock. However, if a firm decides to use the free cash flow to pay-out dividends the effect of adverse selection disappears. This is because all investors now receive the same amount of dividend per share (Allen & Michealy, 1995).

Recent studies that have been conducted concluded that firms signal their health by increasing dividend pay-outs (Del Brio & De Miguel, 2008). Del Brio and De Miguel (2008) study the effect of the signalling theory on the Spanish market. Their research concludes that investors react negatively to dividend decreases and react positively to dividend increases. The study by Bhattacharya (1979) argues that managers tend to pay-out dividends regardless of the financial situation of the firm. After all, a dividend pay-out indicates a positive signal to investors. By doing that managers can conceal the information asymmetry.

The research of De Jong et al. (2019) concludes that, although dividend payments are considered to be the norm for Dutch listed non-financial firms, the amount of profits paid out is much smaller compared to before 1980. Dividend payments are considered to be more symbolic and only paid if the firm is doing well. Therefore, profits are more and more used to finance firm projects. As a result, the following null hypothesis is formulated:

Hypothesis 0 (H0): The greater a company's information asymmetry, the greater the dividend pay-out for Dutch listed non-financial firms.

2.2.3 Pecking order theory

Myers and Majluf introduced the pecking order theory in 1984. They suggested that a firm underinvests if asymmetric information occurs. The pecking order theory states that a firm should prefer to finance itself firstly using retained earnings. If a firm is unable to peruse this option, a firm should then try to finance itself through a new issue of debt. The last option for financing according to the pecking order theory should be the issuing of new equity (Brealey et al., 2020). Internal financing is preferred because external financing is affected by asymmetric information. If a firm decides on

external financing through the issue of equity it will indicate to investors that the value of the stock is overvalued. This would mean that there is information asymmetry between the managers and investors. Myers and Majluf (1984) state that shareholders will act on managers' actions while valuating a firm. Hence, the shareholders look at signals given about the financial situation of the firm. The issuing of new equity will not be done by a manager if they think that the stock is undervalued. Therefore, an announcement regarding the issue of new equity might indicate that shareholders are exposed to a high degree of information asymmetry. On the other hand financing through the issue of debt is considered a positive signal. The issue of debt signals confidence in an investment of the firm and would also signal that the current stock price is undervalued thus meaning a higher degree of information asymmetry (Deshmukh, 2005).

Firms which are performing worst will pay-out less dividends (Bhattacharya, 1979). This is due to the pecking order theory. The pecking order theory suggests that firms will prefer using internal financing over external financing. External financing will after all increase the degree of information asymmetry. As internal finances are already used before deciding on external financing, a lower dividend is paid. Deshmukh (2005) concluded that information asymmetry has a negative effect on dividends, and thus firms tend to pay-out less dividend if information asymmetry is higher. To test this effect can be for Dutch listed non-financial firms, the main hypothesis is formulated:

Hypothesis 1 (H1): The greater a company's information asymmetry, the smaller the dividend pay-out for Dutch listed non-financial firms.

2.2.4 Firm Risk

Firms with a high level of information asymmetry between managers and shareholders are more difficult for investors to value and are therefore perceived as firms with higher risk. As the cost of external financing consists of risk premiums and risk-free returns, investors demand higher returns because of the level of information asymmetry. The research of Kim et al. (2021) describes the effect of the variable Firm Risk on the negative effect of information asymmetry on dividend pay-out. They find in their research that firms with high information asymmetry have to pay higher costs for raising capital. As a result, these firms prefer internal capital which is reflected in a lower dividend yield. According to the study by Jensen, Solberg, and Zorn (1992) firms which feature a high degree of information asymmetry are to be considered high-(business)-risk firms. A high-risk firm is perceived by investors as they require higher returns on assets. As mentioned earlier, the cost of external financing consists of risk premiums and risk-free returns, thus meaning that investors demand higher returns because of the level of information asymmetry. As a result, high-risk firms prefer internal capital, which results in a lower dividend pay-out (Kim et al., 2021). Jensen, Solberg, and Zorn (1992) also state that increased business risk influences current and expected profitability. Therefore, the following hypothesis is formulated:

Hypothesis 2 (H2): Business risk strengthens the relationship between information asymmetry and dividend pay-out.

3. Methodology

This chapter describes the methods, models, and measurements used.

3.1 Data & Data sources

This research analyses data utilizing a multivariate analysis. In line with the research of De Jong et al. (2019), an Ordinary Least Squared (OLS) regression model is used to determine dividend pay-out. The OLS regression model is used to form a conclusion about the given research question and explains the cross-sectional variation in dividend pay-outs.

In line with the study of De Jong et al. (2019), this study includes only Dutch listed non-financial firms. Financial firms (as well as other firms with missing data) are excluded because the requirement for their financial reporting might affect their decisions regarding the pay-out of dividends. The period over which the analysis is performed includes the years 2017, 2018, and 2019. To be included in the dataset a firm is not a financial firm. Financial firms are required to report on their financial situation differently from other firms, which might also affect their decision to pay out dividends. This is in line with the research of De Jong et al. (2019).

The data concerning the included companies are gathered from both annual reports as well as from supporting websites that publish relevant information about the firm. Data concerning analysts' forecasts is retrieved from Refinitiv Eikon, and Simply Wall Street as well as from the websites of the analysts who publish forecasts. Ownership information is gathered from Annual reports. Financial information regarding dividends, profitability, M/B ratio, and firm risk is retrieved from annual reports. Finally, data concerning the firm size is based on information about capitalisation from annual reports.

OLS regression model

Previous research has looked at how dividend policy can be defined. A common way to determine dividend policy is the use of a logistic regression model (MacKinlay, 1997) (Li & Zhao, 2008). However, the dependent variable "Dividend policy" is a metric variable. Therefore, to determine the effect of information asymmetry on dividend pay-out policy an OLS regression model will be used. Also included in the model is the interaction effect. The model will be based on the following equation (MacKinlay, 1997) (Li & Zhao, 2008):

$$\begin{aligned} Dividend\ Policy_{i,t} = \alpha_0 + \beta_1 Information\ Asymmetry_{i,t-1} + \beta_2 Ownership^2{}_{i,t-1} \\ + \beta_3 Profitability_{i,t-1} + \beta_4 Market\ to\ Book\ ratio_{i,t-1} \\ + \beta_5 Firm\ Risk_{i,t-1} + \beta_6 Firm\ Size_{i,t-1} \\ + \beta_7\ Information\ Asymmetry_{i,t-1} * Firm\ Risk_{i,t-1} + \varepsilon_{i,t-1} \end{aligned}$$

3.2 Measurement of variables

The variables used in this research are explained in this part. An overview of the variables can be found in the table provided in the section econometric model (3.4).

3.2.1 Dividend policy

In line with Allen and Michealy (1995) instead of scaling dividend pay-out with market capitalization or earnings, this research will look at the dividend pay-out of company i in year t-1 (DIV). Meaning that the dependent variable is equal to the dividend pay-out of a firm. The results of the OLS regression model for the dependent variable show as a metric variable (Allen & Michealy, 1995).

Li and Zhao (2008) use the proxy variable dividend pay-out to determine if a firm has a dividend policy. Meaning that in case of dividend pay-out the firm was registered as a one. If no dividend is paid out a zero was registered. For this research, the dummy variable DIV_DUM is created to determine if a firm has a dividend policy. A zero is registered if no dividend is paid and a one is registered if dividend was paid by the firm. This will serve as a robustness check in line with the research of De Jong et al. (2019).

As mentioned earlier this research will only look at ordinary cash dividends.

3.2.2 Information asymmetry

To test the relationship between dividend pay-outs and information asymmetry, a proxy has to be formulated. The proxy for information asymmetry is defined as the dispersion between the analysts' earnings forecasts. This is defined by Li and Zhao (2008) as well as Krishnaswami and Subramaniam (1997) as the proxy to define corporate information asymmetry. Analysts' forecast is based on the future expected profitability of firms based on the information available to analysts. The dispersion between the analysts' forecasts indicates the level of information asymmetry between managers and investors (Barron et al., 2009). In line with Li and Zhao (2008) as well as Krishnaswami and Subramaniam (1997) the following formula will be used:

$$Information\ Asymmetry_{i,t-1} = \ln(1 + \frac{Standard\ deviation\ of\ analysts' forecasts}{|Median\ forecast|})$$

In line with the research of Barron et al. (2009) for a firm to be included in the sample, two or more individual analysts must have issued a forecast within 3 months before the end of year value. The end-of-year value is used to prevent analysts used information about the upcoming year to calculate their forecasts.

3.2.3 Ownership

Jensen and Meckling (1976) wrote about managerial behaviour and the ownership structure of a firm to explain the impact of the agency costs theory. Dividend agency problems can arise when the management (agent) of a firm does not act in the best interest of the shareholders (principals). In that case, the managers do not make decisions that are in line with shareholder expectations. In the model, Ownership is used as a control variable (MacKinlay, 1997).

According to the research of Farinha (2003) if the ownership concentration comes below a certain level a negative relationship between ownership and dividend pay-out is to be expected. On the other hand above that level, a positive relationship is to be expected. Because the level of ownership cannot easily be specified, Farinha (2003) proposes to compensate for this by squaring the fraction of ownership of the largest shareholder. This study identifies the largest shareholder to be the shareholder with the most direct and indirect ordinary voting shares. The largest shareholder is included in the data if its total shares are at least 3% of the total shares of the firm. If shareholders exceed the total amount of at least 3% they have to notify The Dutch Authority for the Financial Markets (AFM). If none of the shareholders exceeds 3% the variable will be excluded. Meaning that the company will be excluded from the research, therefore the ownership variable will not have a wrongful influence on the outcome. In line with the research of Truong and Heaney (2007), the ownership concentration will thus be calculated via squaring the fraction of ownership concentration of the largest shareholder. That is because Truong and Heaney (2007) conclude that there is a convex relationship between ownership concentration and dividend pay-out.

3.2.4 Profitability

According to Fama and French (2001), profitability can describe firm characteristics as an independent variable. There is a strong positive relationship between profitability and dividend pay-out. Firms with high profitability tend to pay-out more dividends. According to the signalling theory, a firm might indicate future profitability with a dividend pay-out (Fama & French, 2001). Return on assets (ROA) indicates the earnings generated before interest and taxes relative to its total assets. The Return on assets ratio indicates the asset efficiency within the firm (Damodaran, 2007). The variable profitability is used as a control variable (MacKinlay, 1997), and it will be used to determine the profitability of the firm. The following formula will be used to calculate ROA:

$$Return\ on\ Assets = \frac{Net\ Income}{\text{Book Value of Total Assets}}$$

3.2.5 M/B Ratio

According to Fama and French (2001), the M/B ratio can describe firm characteristics as a control variable. Whilst determining the dependent variable one has to consider the effect of price variations. Besides, some firms decide to pay-out dividends even though their earnings are negative. Instead of scaling dividend pay-out with market capitalization or earnings, this research will look at the dividends by book assets which are in line with Allen and Michealy (1995). Therefore, the market-to-book ratio (M/B ratio) will be used. The book value of the assets is the value of the assets on the balance sheet. It gives a good representation of the value the shareholders will get in case a firm gets liquidated. Whereas, if the total assets would have been considered leverage may give a wrong indication about the value of the firm.

3.2.6 Firm Risk

Fama and French (2001) state that Firm Risk can describe firm characteristics as a control variable. The risk of a firm is defined by Jensen, Solberg, and Zorn (1992) as the standard deviation of the operating income divided by the total assets. In line with their research, the standard deviation of the year 2019 will be calculated by using the firm risk of 2019, 2018, and 2017. For the standard deviation of the year 2018 the firm risk of 2018, 2017, and 2016 will be used. Finally, the firm risk for 2017, 2016, and 2015 will be used to calculate the standard deviation of the year 2017.

The classification of the high- and low-risk firms is based on the study by Kim et al. (2021). They define the top 30 percent of the firms with the highest firm risk. The lowest 30 percent of the firms based on firm risk are placed into the low-risk category. This study also distinguishes these two subsamples, meaning that analysis for the firms in the low-risk and high-risk categories will be made separately.

3.2.7 Firm Size

The Firm Size is determined by looking at the market capitalization of the firm (Fama & French, 2001) and can be used as a control variable in this study. Firm Size will be defined as the natural logarithm of the firm's market capitalisation in millions of euros (Baker & Kilincarslan, 2019). The model uses Firm Size as a control variable (MacKinlay, 1997).

3.3 Econometric Model

The econometric model provides an overview of all the variables.

Table 1 Econometric Model

Variable	Measurement
Dividend policy	Dividend pay-out of company i in year t-1
Information asymmetry	$\ln(1 + \frac{Standard\ deviation\ of\ analysts'\ forecasts}{\lvert Median\ forecast \rvert})$ in year t-1
Ownership	Square of the percentage of shares of the largest shareholder
Profitability	Net Income / Book Value of Assets in year t-1
M/B ratio	Market Capitalisation / Book Value of Assets in year t-1
Firm Risk	Standard deviation (Operating Income / Book Value of Assets) in year t-1
Firm Size	Natural logarithm (Market Capitalisation) in year t-1
Moderation	Information asymmetry x Firm Risk

3.4 Sample

As mentioned earlier some of the data is excluded from the research. This data did not meet the requirements to be included in the research. If for one of the variables the requirement is not met the company was removed. The data concerns the years 2017, 2018, and 2019. One firm was not listed on the Amsterdam Exchange Index during 2017 and the beginning of 2018 and was therefore removed from the sample. For the variable information asymmetry at least two or more individual analysts had to issue a forecast within 3 months before the end of year value. A total of ten companies were excluded from the research because of this reason. The variable ownership had as a requirement that to be included in the research the largest shareholder had to have at least an ownership stake of 3% as they then would have to inform The Dutch Authority for the Financial Markets (AFM). Two firms did not pass this requirement and were therefore excluded from the sample. As a result of the excluded data 52 firms have been included in the sample.

Winsorized data

All of the variables consist of metric data. Instead of removing outliers from the data, this research Winsorized the data from the variables. This is done to mitigate the effect of extreme outliers on the results of this study. Besides, the effect of making the sample size smaller could have a significant effect on the outcome. The metric data is Winsorized at the 1 and 99 percent levels.

4. Results

The next chapter will describe the performed analysis. First, the sample selection is presented. Second, the descriptive statistics of the sample will be reported. Third, the results will be presented. Finally, the outcome of the robustness tests of the sample will be reported.

4.1 Descriptive statistics

The results for the descriptive statistics after the use of the Winsorisation are shown in Table 2. For the variable Dividend policy (DIV) one can see that the mean of the firms in the sample is 0,867. As earlier mentioned this regards the ordinary cash dividends. Values of the dependent variable differ between no dividend (0,000) paid and a maximum of 4,64 Euro dividend (4.640) paid. The standard deviation is 0,990. The data suggest a positive skewness. According to Scott and Bruce (1987), this is caused by the different goals between the firms and the time they have been listed. Meaning that some of the firms have become public more recent, and therefore are less keen on paying out dividends. They are considered to be in their growth stage. The dependent variable has a size of 156 recorded samples.

For the second dependent variable (DIV_DUM) one can see that the mean of the firms in the sample is 0,789. As a firm either paid dividends or not the minimum and maximum are respectively 0,000 and 1,000. For the sub-samples, one can see that low-risk firms pay dividends more often (0,8085) than high-risk firms (0,6596). Considering the research of De Jong et al. (2019), which state that dividend payments are considered to be more symbolic and only paid if the Dutch firm is doing well, one can conclude that this conclusion is also seen in this study.

While looking at the independent variables one can see that the variable Information asymmetry (INFASY) has a mean of 0,097. The range of this variable is 0,000 and 0,338. The skewness of this variable is just like the dependent variable positive and the variation is not to be considered widespread. Previous research by Barron et al. (2009) suggests that analysts' forecasts are usually based on longer-range forecasts. As a result, the forecasts lead to greater consensus among the analysts. The second independent variable Ownership (OWN) has a mean of 0,078 and a range of 0,001 to 0,956. This variable is also positively skewed, meaning that most of the ownership percentages are on the lower side. The average ownership percentage is 20,44%. The final independent variable Profitability (ROA) has a mean of 0,078 and a range from -0,529 to 0,895. This could be caused by the different goals of the firms. A firm in the growth stage or mature phase might have a different view on dividend pay-out policies (Scott & Bruce, 1987). All of the independent variables have a sample size of 156.

Finally, the control variables are included in Table 2. The variable M/B Ratio (MB) has a mean of 1,320 and a range of 0,125 to 14,263. The second variable Firm Risk (FRISK) has a range of 0,005 to 8,900 with a mean of 0,613. A high value for Firm Risk indicates that the book value of assets changed less than the operating income did. And final, the control variable Firm Size (FSIZE) has a mean of 7,078 and a range of 2,814 to 11,615. The sample size for the control variables is 156.

Table 2 Descriptive statistics

	Full Sample					Sub-Sample		
	Min.	Max.	Mean	Std. Dev	N	Mean Low 30%	Mean High 30%	Diff. Mean
Dependent variable								
DIV	0,000	4,640	0,867	0,990	156	0,8862	0,8332	0,0530
DIV_DUM	0,000	1,000	0,789	0,410	156	0,8085	0,6596	0,1489
Independent variables								
INFASY	0,000	0,338	0,097	0,061	156	0,0944	0,1023	-0,0080
Control variables								
OWN	0,001	0,956	0,078	0,163	156	0,0755	0,0681	0,0074
ROA	-0,529	0,895	0,048	0,118	156	0,0561	0,0392	0,0169
MB	0,125	14,263	1,320	1,594	156	1,6787	1,2984	0,3803
FRISK	0,005	8,900	0,613	0,976	156	0,0771	1,5216	-1,4444***
FSIZE	2,814	11,615	7,078	1,855	156	7,8109	6,3282	1,4827***

Notes: This table reports the descriptive statistics for each variable included in this study. Outliers have been Winsorized at the 1 and 99 percent level.

4.2 Pearson's correlation

A correlation analysis is done to provide inside into the strengths and directions of the linear relationships conducted in this research. The outcome of the Pearson's correlation analysis can be found in Table 3. The results in Table 3 show no values that might cause multicollinearity. That would have been the case if the correlation values would have been between -1 and -0,7 or 0,7 and 1. The outcome of the correlation analysis shows that there is a moderately significant positive relation between Profitability and the M/B Ratio (0,360). As both values are divided by 'Book Value of Assets in year t-1' a correlation could have been expected. Furthermore, there is a significant positive relation between Dividend policy and Profitability. According to Safitri et al. (2022), one might argue that this is because firms pay out less dividends when profitability is low, and pay out a higher dividend when profitability increases. Table 3 also shows that Firm Size is significantly positively related to Dividend policy, indicating that bigger firms are tended to pay out higher dividends. Firm Size is also significantly negatively related to Firm Risk. The results show that there is a significant negative relationship between Information asymmetry and the variable Ownership as well as the variable Profitability. One can argue that the negative relationship between Ownership and Information asymmetry might be caused by the distrust of Analysts of very large shareholders. The influence of a large shareholder on the stock price can after all be large. The negative relationship between Profitability and Information asymmetry could indicate that Analysts prefer a company to reinvest profits in assets rather than pay out profits.

Table 3 Pearson's correlation matrix

		1	2	3	4	5	6	7
1	**DIV**	1	-0,095	-0,101	0,282**	0,061	0,045	0,187*
2	**INFASY**	-0,095	1	-0,176*	-0,189*	0,110	0,021	0,004
3	**OWN**	-0,101	-0,176*	1	-0,017	-0,074	-0,035	-0,042
4	**ROA**	0,282**	-0,189*	-0,017	1	0,360**	0,058	0,093
5	**MB**	0,061	0,110	-0,074	0,360**	1	-0,055	0,145
6	**FRISK**	0,045	0,021	-0,035	0,058	-0,055	1	-0,213**
7	**FSIZE**	0,187*	0,004	-0,042	0,093	0,145	-0,213**	1

*** Correlation is significant at the 0.01 level (2-tailed).*

** Correlation is significant at the 0.05 level (2-tailed).*

4.3 OLS regression analysis

To explain the level of dividend paid out by a firm Table 4 reports the results for OLS regression. Models 1 and 2 represent the outcomes for the full model. Model 1 uses no control variables. Model 2 includes all the control variables. Models 3, 4, 5, and 6 represent the outcomes for the subsamples. The outcomes for the lowest 30 percent are shown in models 3 and 4, whereas the outcomes for the highest 30 percent are shown in models 5, and 6. Models 3 and 5 did not use control variables. Models 4 and 6 include all the control variables.

For the variable Information asymmetry (INFASY), Table 4 shows a negative relationship for all the models. Firms that have a higher level of information asymmetry pay-out less dividends. This would be in line with Hypothesis 1 (H1): "The greater a company's information asymmetry, the smaller the dividend pay-out for Dutch listed non-financial firms", and would have rejected the null hypothesis. However, this relationship is not significant. Therefore, Hypothesis 1 (H1) is not supported and the null hypothesis cannot be rejected.

Considering the importance of the economic significance one can see that the adjusted R-squared for the models including all the variables is lowest for the low-risk firms with a value of 7,3%. This number indicates the model fit. On the other hand, one can see the value of 11,8% for high-risk firms. Indicating that the model is a better fit for firms with a higher risk than for firms with a lower risk. The values for the adjusted R-squared are in line with previous research (Li & Zhao, 2008).

Hypothesis 2 (H2): "Business risk strengthens the relationship between information asymmetry and dividend pay-out" predicts an effect of firm risk on the relationship between information asymmetry and dividend pay-out. The interaction variable is included in the OLS regression analysis as can be seen in table 4. The table shows that there is no significant evidence of an interaction effect. Both for high-risk as well as low-risk firms. In conclusion, there is no evidence found to suggest support for Hypothesis 2 (H2).

In Table 4, one can find that the variable Profitability (ROA) has a significant positive relationship in models 2 and 4 at the 1 and 5 percent levels. The results show that a relationship between profitability and dividend pay-out is present for low-risk firms. Therefore, the higher the profitability of a low-risk firm the higher the expected dividend pay-out. Furthermore, the variable Firm Size (FSIZE) shows a significant positive relationship at the 5 percent level, as can be seen in model 2. This indicates that the size of the company has a positive influence on the amount of dividends paid out. The last significant relationship can be found with the variable Firm Risk (FRISK) with model 4. This suggests that for low-risk firms there is a positive significant relationship between firm risk and dividend pay-out.

Table 4 OLS regression matrix

	Full Sample		Lowest 30 %		Highest 30%	
Variables	**Model 1**	**Model 2**	**Model 3**	**Model 4**	**Model 5**	**Model 6**
INFASY	-0,095	0,003	-0,012	-0,385	-0,151	0,460
	(0,240)	(0,982)	(0,936)	(0,275)	(0,312)	(0,203)
OWN		-0,094		-0,078		-0,134
		(0,234)		(0,606)		(0,353)
ROA		0,270**		0,386*		0,322
		(0,002)		(0,030)		(0,062)
MB		-0,056		-0,252		0,066
		(0,513)		(0,144)		(0,676)
FRISK		0,150		-0,069		0,489
		(0,266)		(0,829)		(0,084)
FSIZE		0,172*		0,164		0,251
		(0,033)		(0,265)		(0,092)
INFASY*FRISK		-1,250		0,593		-0,688
		(0,417)		(0,191)		(0,100)
Constant	1,015	0,171	1,015	0,334	1,072	-0,980
Adjusted Rsquared	0,003	0,088	0,003	0,073	0,001	0,118
Observations	156	156	47	47	47	47

**** Significance at the p<.001 level.*
*** Significance at the p<.01 level.*
** Significance at the p<.05 level*

4.4 Robustness check

To be able to validate the previous results a robustness check is performed. Following the research of De Jong et al. (2019), a dummy variable is created for dividend pay-out (DIV_DUM). The dependent variable Dividend policy (DIV) is replaced by the dummy variable. Although, the results above do not support evidence to accept H1 and reject the null hypothesis the Pecking order theory states that an increase in information asymmetry between managers and shareholders will lead to a decrease in the chance of dividends being paid Deshmukh (2005). Therefore, this research assumes that information asymmetry has a negative effect on the decision to pay out dividends. A robustness check is performed to test whether the results of the analysis remain the same under different circumstances. The model's estimated effect of interest is tested by implementing the dummy variable.

The robustness check indicates that an increase in information asymmetry between managers and shareholders will lead to a decrease in the chance of dividends being paid. Table 5 shows the results of the robustness check. The variable Information asymmetry (INFASY) shows a significant negative relationship for the full sample. This means that the decision to pay-out dividends is negatively influenced by the amount of information asymmetry. For high-risk firms, a significant negative relationship is also found. However, for low-risk firms, a non-significant negative relationship is found. These outcomes are in line with the expected outcomes from this study. The results from the robustness check differ from the results seen in the OLS regression analysis. Therefore, the results are not robust. The decision to pay-out dividends could be affected by the degree of information asymmetry whereas the amount of dividends paid is not.

In Table 5, one can find that the variable Profitability (ROA) has a significant positive relationship in models 2 and 4. The results show that a relationship between profitability and the decision to pay-out dividends is present for low-risk firms. Therefore, the higher the profitability of a low-risk firm the higher the chance of a dividend pay-out. The variable M/B Ratio (MB) has a significant negative relationship in de models 2 and 4, which indicates that a relationship between M/B Ratio and the decision to pay-out dividends is present for low-risk firms. Furthermore, the variable Firm Size (FSIZE) shows a significant positive relationship at the 5 percent level, as can be seen in model 2. This indicates that the size of the company has a positive influence on the pay-out decision. The last significant relationship can be found with the variable Firm Risk (FRISK) with model 2. This suggests that there is a positive significant relationship between firm risk and the decision to pay-out dividends.

In conclusion, the robustness checks yield almost similar results to the main results as the direction of the effect is the same. The main difference is the significance found during the robustness check.

Therefore, this research concludes that the decision to pay-out dividends could be affected by the degree of information asymmetry whereas the amount of dividends paid is not.

Tabel 5 OLS regression matrix: Robustness check

	Full Sample		Lowest 30 %		Highest 30%	
Variables	**Model 1**	**Model 2**	**Model 3**	**Model 4**	**Model 5**	**Model 6**
INFASY	-0,220	0,059	-0,177	-0,477	-0,454	-0,179
	0,006**	0,558	0,234	0,137	0,001***	0,608
OWN		0,120		0,127		0,144
		0,102		0,358		0,307
ROA		0,344		0,565		0,148
		0,000***		0,001***		0,372
MB		-0,232		-0,478		0,003
		0,004**		0,003**		0,983
FRISK		0,157		-0,193		0,167
		0,209		0,505		0,537
FSIZE		0,196		0,211		0,167
		0,009**		0,117		0,246
INFASY*FRISK		-0,355		0,638		-0,272
		0,014*		0,121		0,499
Constant	0,931	0,485	0,938	0,616	0,973	0,414
Adjusted Rsquared	0,042	0,220	0,010	0,242	0,189	0,159
Observations	156	156	47	47	47	47

NOTE: this table reports the unstandardized beta coefficients for the OLS regressions with the dependent variable DIV_DUM
**** Significance at the p<.001 level.*
*** Significance at the p<.01 level.*
** Significance at the p<.05 level*

5. Conclusion

This final chapter will discuss the main results presented in chapter 4. A conclusion about the hypothesis and the main research question will be stated. At last, the limitations and suggestions for future research will be discussed.

5.1 Discussion of results

This research attempts to understand the relationship between information asymmetry and dividend pay-out policy for Dutch listed non-financial firms. Therefore, the following question was formulated: *What is the relationship between information asymmetry and dividend pay-outs for Dutch listed non-financial firms?* To answer this main question two hypotheses have been formulated. This section provides a discussion of the main results.

Hypothesis 1 (H1): "The greater a company's information asymmetry, the smaller the dividend pay-out for Dutch listed non-financial firms", predicts a negative relationship between information asymmetry and dividend pay-outs for Dutch listed non-financial firms. The results of the OLS regression analysis and the correlation test show that the independent variable Information asymmetry does have an insignificant negative effect on Dividend policy. If not for the insignificant value, this would suggest that the greater the degree of information asymmetry the lower the dividend pay-out would be. This would be in line with the Pecking order theory which suggests that firms will prefer using internal financing over external financing. External financing will after all increase the degree of information asymmetry. On the other hand, internal financing will affect the amount of dividends that a firm can pay-out. A smaller dividend pay-out thus suggests a greater amount of information asymmetry. This would be in line with the research of Deshmukh (2005). However, this effect is not significant for Dutch listed non-financial firms, meaning that no evidence is found to support hypothesis 1. As a result, the null hypothesis cannot be rejected. This could be because shareholders have become more interested in stock returns as concluded by De Jong et al. (2019). The need for dividend payments has gone down. De Jong et al. (2019) concluded that the number of firms paying dividends increased in The Netherlands. According to them paying a small dividend has become the norm and more of a symbolic action. The data of this research also show that 86,7% of the Dutch listed non-financial firms pay dividends. The pay-out ratio might, therefore, not be influenced by the degree of information asymmetry anymore, as the norm is paying out a small dividend in The Netherlands.

The robustness check has tested the relationship between the decision to pay-out dividends and information asymmetry. In contrast, the relationship between the paid amount and information asymmetry is significant. Meaning that the degree of information asymmetry has a negative effect on the decision to pay-out dividends. These outcomes are in line with the expected outcomes from this

study. The results from the robustness check differ from the results seen in the OLS regression analysis. As this is in line with the Pecking order theory which states that managers prefer internal financing over external financing. By using internal financing first less room for a dividend pay-out is available, and as Deshmukh (2005) stated external financing will increase the degree of information asymmetry. Therefore, the results are not robust. The decision to pay-out dividends could be affected by the degree of information asymmetry whereas the amount of dividends paid is not.

This research covert the importance of dividends and concluded that in line with Miller and Modigliani (1961) dividend pay-outs might convey information about a firm's prospects. Meaning that information asymmetry might occur. According to the signalling theory firms signal to shareholders about their financial situation via dividend pay-outs. The pecking order theory, on the other hand, suggests that firms will prefer using internal financing over external financing. We find that information asymmetry has a non-significant negative relationship with dividend policy. Therefore, the assumptions made by the signalling theory cannot be rejected.

Hypothesis 2 (H2): "Business risk strengthens the relationship between information asymmetry and dividend pay-out" predicts an effect of firm risk on the relationship between information asymmetry and dividend pay-out. Previous research stated that firms with a high level of information asymmetry between managers and shareholders are more difficult to valuate for investors. Therefore, they are perceived to be firms with a higher risk. Research by Kim et al. (2021) described the interaction effect of the variable Firm Risk on the effect of information asymmetry on dividend pay-out. As firms pay higher costs for raising the capital they prefer internal capital which is reflected in a lower dividend yield. However, this study finds no such evidence for Dutch listed non-financial firms. The outcomes of the OLS regression analysis show that no evidence can be found to support hypothesis 2. As a result, one can conclude that the level of firm risk does not influence the effect of information asymmetry on dividend pay-out. One of the reasons for this finding could be that firms in The Netherlands have two-tiered boards. The supervisory board could prevent firms from having a high degree of firm risk as compared to the risk in other countries. To combine that with the openness of information available about Dutch firms, firms with "high risk" might not be perceived as such by external financers. That could explain the data from this research, as the variable Firm Risk does not have a significant effect in de models.

Considering the importance of the economic significance of one can see that the adjusted R-squared for the models including all the variables is lower for the low-risk firms than for high-risk firms. This indicates that the model is a better fit for firms with a higher risk than for firms with a lower risk. The values for the adjusted R-squared are in line with previous research (Li & Zhao, 2008).

In conclusion, despite previous research conducted in other countries suggesting that there is a negative relationship between Information asymmetry and Dividend pay-out policy no evidence was found for Dutch listed non-financial firms. The results of this study show that no significant relationship was found between information asymmetry and the amount of dividends paid. The data from this study show, however, that the degree of information asymmetry could have a negative effect on the decision to pay-out dividends which is in line with the Peck order theory. This difference could be explained by looking at the research of De Jong et al. (2019). They stated that paying a small dividend has become the norm for Dutch firms and therefore, more firms are paying dividends regardless of information asymmetry compared to firms in the twentieth century. So, to answer the research question this means that one can assume based on previous studies that the greater a company's information asymmetry, the greater the dividend pay-out for Dutch listed non-financial firms. However, evidence was found for a negative relationship between information asymmetry and the decision to pay-out dividends. Furthermore, there is no interaction effect of firm risk on the relationship between Information asymmetry and Dividend pay-outs.

This study contributes to the literature about the relationship between dividend policy and information asymmetry by looking at the Dutch listed non-financial firms. The outcomes add to the study of De Jong et al. (2019). We find that there is a relationship between information asymmetry and the decision to pay-out dividends for Dutch listed non-financial firms. No evidence was found for a relationship between information asymmetry and the amount of dividend paid for Dutch listed non-financial firms. Additionally, this study contributes to the variables of influence on Dutch dividend policies. The outcomes show that the level of firm risk does not influence the effect of information asymmetry on dividend pay-out. Furthermore, this study will help future managers to understand the relationship between information asymmetry and dividend pay-out policy, and will guide them while making critical decisions for their organisation. In regards to signalling and the use of internal and external financing.

5.2 Limitations and further research

The outcomes of this study will help shareholders and researchers to understand the effect of information asymmetry on dividend policy for Dutch listed non-financial firms. This study has defined the variable information asymmetry as the dispersion in analyst earnings forecasts. Although the sample covert a total of 621 analysts' forecasts further research could cover a lengthier period to include more data in the sample.

One of the reasons for a not significant outcome for the negative relationship between information asymmetry and dividend policy could be the regulations made by The Dutch Authority for the Financial

Markets (AFM). They have strict rules regarding the publication of information for listed firms, and therefore they limit the level of information asymmetry. This could mean that the level of information asymmetry is different in comparison to other countries. Therefore, the level of information asymmetry amongst different countries could be a topic to look further into. This would help better understand the matter of information asymmetry.

This study does not take into account the effect of stock splits on the level of information asymmetry. The increase in the number of shares could affect the valuation of analysts. Therefore, further research could look into this effect.

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