MASTER THESIS

MSc Financial Economics

The effect of institutional ownership on payout policy in the United States

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Abstract

This research elaborates on the effect of institutional ownership on payout policies in the United States. The sample consists of publicly listed U.S. firms in the time period 1994 to 2018. First, the baseline results present a positive and significant effect of institutional ownership on repurchase payout. The effect of institutional ownership on dividends is negative and significant. The effect of institutional ownership on total payout are positive yet insignificant. Subsequently, to determine whether a causal relation exists between institutional ownership and payout, the S&P 500 indexation effect on institutional ownership and payout is determined. A difference in differences methodology is incorporated. The effect of indexation on institutional ownership is positive yet insignificant. Finally, there are positive and significant effects of indexation on all three measures of payout, dividends, repurchases and total payout. In sum, there is some supporting evidence for the positive causal effect of institutional ownership on repurchase payout. However, this evidence is not very strong because the effect of indexation on institutional ownership is positive yet not significant.

JEL classification: G32, G35

Keywords: payout policy; dividends; share repurchases; indexation; ownership structure

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1 INTRODUCTION

Institutional investors are important shareholders of today's financial markets. Because institutional shareholders control a large sum of financial assets and own large positions in many publicly traded firms they are powerful players. Institutional ownership (IO) has grown over time and accounts for 80% of equity market capitalization in the United States (U.S.) (Palmer, 2020). In the past shareholders weren't involved in the decision making process. If shareholders disagreed with the firm's policies and decisions they would vote with their feet by selling their shares. Nowadays, institutional investors use their voice instead of their feet in case of disagreement. Hence, the large positions of institutional investors create influence towards publicly traded firms. Institutional shareholders can be effective monitors and improve firm performance, but also demand higher payouts. As the size and importance of institutional ownership continues to grow, so does their influence on corporate financial policies. The power of institutional ownership is an important topic these days for academic, practitioners and policy makers. Therefore, this research examines the effect of institutional ownership on payout policy.

This study contributes to on-going debate on payout policies and institutional ownership. Where many studies only investigate the dividend policies, this research also investigates the share repurchases which is an increasingly popular form of payout (Allen & Michaely, 2003). The focus of this research is to determine whether there is a causal relation between institutional shareholders and payout policy. Therefore, the research question of this research is: *'What is the effect of institutional ownership on payout policies in the United States?'*

A combination of datasets are used to answer the research question. The data providing information about payout is drafted from Compustat. Institutional ownership data is gathered from Thomas Reuters and index constituents data is drafted from Compustat. The sample consists of 9,635 publicly listed U.S. firms in the time period 1994 to 2018. First, the baseline results are obtained to discover the relatio between institutional investors and payout. It shows that institutional ownership has a negative and significant effect on dividend payout and a positive and significant effect on repurchase payout. Institutional ownership has a positive but insignificant effect on total payout. These findings are simply correlations and do not imply causal relations. Therefore, to discover a causal relation between institutional ownership and payout, the indexation effect on institutional ownership and payout is determined. It is found in the literature that institutional investors often have large positions in indexed firms (Duggal & Millar, 1999). Hence, if indexed firms have higher payouts the year they are included to the index this can be explained

by institutional ownership. The Standard & Poor's (S&P) 500 Value is the selected index in this study. The final conclusion of this research is that institutional ownership has a positive effect of €0.858 on repurchase payout ratio in the U.S. between 1994 and 2018. However, institutional ownership has a negative effect on dividend payout ratio. S&P indexation has a positive effect on dividends, repurchases and total payout in the U.S. between 1994 and 2018. All in all, there is some supporting evidence for the positive causal effect of institutional ownership on repurchase payout. However, this evidence is not very strong because the effect of indexation on institutional ownership is positive yet not significant.

The findings of this research contribute to the literature about payout policies and attracting certain investors. The management of many firms are interesting in attracting U.S. institutional investment to improve their own position as a shareholder and the liquidity of their shares in the market (Aggarwal, Klapper & Wysocki, 2003). These results contribute to the growing literature of institutional ownership on payout policy. Unlike other research, this research tries to explain the causality of institutional ownership and payout using indexation in the S&P 500.

This thesis is organized as follows. In the next section, the existing literature is reviewed. Subsequently, in section 3 the hypotheses are formulated. In section 4, the data and methodology are presented. Section 5 provides the results. In section 6 the discussion, research limitations and avenues for future research are presented. Section 7 concludes.

2 LITERATURE REVIEW

The aim of this research is to investigate the effect that institutional shareholders have on payout policy of firms. There are plentiful research papers addressing the relation between institutional ownership and monitoring of corporate governance structures and firm performance. This chapter is dedicated to review the existing literature of payout policies and institutional investors.

2.1 Institutional investors

Organizations that invest on behalf of other individuals are called intuitional investors, such as mutual funds, pension funds and insurance companies. Institutional shareholders are considered to be more sophisticated investors and subject to fewer restrictive regulations compared to individual investors (Chen, 2020). Institutional investors often retain substantial blocks of securities which makes them powerful players in the field. There are different kind of institutional investors. On the one hand, active institutions are specialized in the market of securities of publicly traded firms, for example investment funds, hedge funds and pension funds (Almazan, Hartzell &

Starks, 2005). Active institutions are more likely to monitor and to interfere in the decision-making process, in order to achieve higher returns on their investments (Chen, Harford & Li, 2007). On the other hand, passive institutions are less active in monitoring the management of the firms they invest in and using their voting power (Brickley, Lease, & Smith, 1988). Examples of passive institutional investors are insurance companies, banks, trust funds and research firms. Appel, Gormley and Keim (2016) argue that passive investors are not passive owners in the U.S. They find that the influence of passive mutual funds on the firm's governance is still high due to their large voting blocks. The main distinction between active and passive institutional investor is that active institutions have no potential business relations with the firms in which they are invested. Hence, all kind of investors favor a maximum aligned interest between the firm's management and the shareholders, but active institutions will exert more effort to monitor and achieve this. Institutional investors are influential shareholders due to their large positions which increases their voting power and their ability to monitor the firms management.

2.2 Monitoring

Institutional investors manage large pools of funds. Due to the large positions they hold they are incentivized to monitor firms. Moreover, institutional shareholders are classified as good monitors due to the fact that they are professional investors with specialized expertise in evaluating firms' performance, management skills and governance (Crane, Michenaud & Weston, 2016). Jensen (1986) highlights the monitoring role of institutional investors and that this involvement is related to interference in payout policy. The agency theory implies that higher institutional ownership results in higher payouts, ceteris paribus. Firms favor institutional ownership due to the monitoring role, which can increase the value of the firm (Shleifer & Vishny, 1986). Furthermore, institutional ownership results in more shareholder activism compared to other shareholders (Karpoff, 2001). Edmans and Holderness (2016) agree with this statement and emphasize that institutional shareholders are more demanding towards the firm's management. A monitoring shareholder base is likely to influence the payout policy by demanding higher payouts (Crane et al., 2016). Or managers decide to pay dividends to prevent intervention of their monitors. Greater institutional ownership should decrease coordination costs and improve incentives to monitor relative to individual investors (Shleifer & Vishny, 1986; Admati, Pfleiderer & Zechner, 1994). Better monitoring can result in pressure to firm's management to payout dividends in order to limit agency costs. Grinstein and Michaely (2005) show that institutional shareholders select dividend paying firms to invest in, but also note that institutional investors do not cause the payout. Gaspar et al. (2013) demonstrate that firms owned by long-run focused institutions are influenced to adjust their payout policies. However, they also note that empirical findings are varied because

institutional ownership might select stocks based on payout instead of the other way around. All in all, the literature states that institutional investors monitor the firm's management and subsequently demand more payout.

2.3 Payout policy

In order to investigate payout policy it is important to understand what it is, what the different forms of payout are and why it is relevant. The payout policy is determined by the firm's management. The goal of the payout policy is to distribute wealth to the firm's shareholders. The firm can decide to do this by paying dividends and share repurchases. Dividends are payments to the firm's shareholders, that represent a portion of historical equity returns (Crane et al., 2016). When a firm buys its own stock from the market or offers its shareholders to sell their shares directly to the firm it is a share repurchase (Banton, 2020). This means that the firm either retires shares or counts the shares as the firm's treasury stock, which decreases the number of stock outstanding (Allen & Michaely, 2003). The result is that these shares lose their voting and cashflow rights. Moreover, a repurchase has influence on the market share price and demand. Therefore, some countries regulate or restrict share repurchases. In the U.S. share repurchases are regulated by the anti-manipulative provisions of the Securities Exchange Act of 1934. The Securities Exchange Committee (SEC) established regulation on how to arrange share repurchases and how firms can avoid SEC investigation. Finally, the payout policy is relevant because the substantial amount of financial resources involved and its repetitive character (Allen & Michaely, 2003). Although, the term payout policy implies a consistent strategy over time, the payout structure and frequency can vary often. Payout policy is relevant for many financial and investment decisions firms and investors make. All in all, the payout policy can either consist of dividends, repurchases or both and is relevant due to the substantial amount of financial resources involved.

2.4 Relevance of payout policy

The previous section stated that payout policy is relevant as it involves a substantial amount of financial resources. However, this doesn't tell anything about how investors value payout. Modigliani and Miller (1961) provide us with the irrelevance payout theory, which states that dividends are irrelevant in perfect and complete capital markets. Two assumptions for this perfect world are that there are no taxes or transaction costs. Modigliani and Miller (1961) claim that in this perfect world, payout does not affect the wealth of shareholders. They argue that if an investor wishes to receive cash flows that exceed the dividend received from the firm, the investor can achieve this by selling shares of the firm. This so called 'home made' dividend aims at reaching the preferred cash flow level. This theory implies that shareholders should be indifferent between

collecting dividends and retained earnings by the firm. In sum, the irrelevance payout theory states that dividend policy is irrelevant, because dividend policy does not add to shareholder's wealth under the assumptions of perfect and complete capital markets.

When the assumptions of the perfect and complete capital markets of Modigliani and Miller (1961) are relaxed, the relevance of payout policy to shareholders becomes clear. Lintner (1956) established the dividend theory, which explains changes in dividend payout policies. This theory implies that payout policies are relevant. Linter (1956) states that the firm's management set their payout policy in such a way that changes in earning are not affecting dividend payment in the short term. This causes managers to be hesitant to alter the dividend policy that could be reversed in the near future. There are several differences between dividend payouts and share repurchases, for example taxation, signaling and the degree of flexibility. Share repurchases gained more popularity over the past decennia (Allen & Michaely, 2003). The number of share repurchases exceed dividend payouts to shareholders and there has been a decrease in dividend payouts towards the end of the millennium (Grullon & Michaely, 2002; Fama & French, 2001). This trend represents a significant shift from historical patterns in share repurchases and dividend payout policies of firms. On the contrary, Brav, Graham, Harvey and Michaely (2005) find that the firm's management think that institutional investors do not have strong preferences between dividends and repurchases. All in all, there are three important aspects to take into account considering the payout policy decision, namely taxation, signaling and flexibility. In the upcoming sections these three aspects will be discussed.

2.5 Taxation

Literature on payout policy is directly linked to taxation, as dividends and capital gains influence the taxable income of shareholders. Dividend policy is relevant due to the to the fact that taxes make capital markets imperfect, thus Modigliani and Miller's theory does not hold here. First of all, share repurchases are from a taxation perspective more attractive than dividends (La Porta, Lopez-de-Silanes, Shleifer & Vishny, 2000). Considering the history and current state of the U.S. tax system, the maximum tax rates on dividends are higher than the maximum tax rates on capital gains of share repurchases. Bagwel and Shoven (1989) state that the decline in dividend payouts is directly caused by the upcoming share repurchases because share repurchases are in a lower tax regime, namely capital gains, compared to dividends. Farrar and Selwyn (1967) state that when taxes on personal income are higher than taxes on capital gains, the optimal dividend policy is to pay no dividends. In this case it seems irrational for firms to pay dividends unless this has other advantages, such as attracting certain investors. Miller and Scholes (1978) argue that investors have

options to diversify the tax effect, as they do not discover a tax effect in their research. Dhaliwal, Erickson and Trezevant (1999) conclude that dividend initiations attracts more institutional investors, especially in the case of tax-exempt or tax-deferred investors. This implies that dividends are mainly appreciated by tax-exempt or tax-deferred investors, and to a lesser extent by tax paying investors. Finally, payout models that are based on relative taxation or research that states that dividends are a better signaling tool do not assume nor imply that share repurchases and dividend are perfect substitutes (Allen & Michaely, 2003). This means that firms with a higher level of asymmetric information and agency problems will use dividends rather than share repurchases. All in all, taxation influences how investors value payout. Repurchases are in a better tax-regime than dividends but other factors also influence the decision of payout form.

2.6 Signaling

In general, it is true that managers have more information about the current state of the firm and its future prospects compared to the market, i.e. also their shareholders. This causes information asymmetry between the firm's management and its shareholders, to mitigate this effect paying dividends can help. The signaling theory of dividend policy argues that dividends can be used to signal the quality of the firm in case of information asymmetry (Miller & Rock, 1985; John & Williams, 1985). Dividends can communicate information without revealing too much detail of the inside information to outsiders, such as competitors. The information content of dividends can point to two different directions. In general, increased dividends are associated with good firms prospects, and decreased dividends are associated with poor future prospects. Nevertheless, this way of signaling is only trustworthy if poor future prospect firms can't copy this signal in the same way as positive future prospect firms (Frankfurter, Wood & Wansley, 2003). On average, the market values repurchases, dividend initiations and increases as a positive signal and dividend omissions and decreases as a negative signal (Allen & Michaely, 2003). The signaling theory of John and Williams (1985) states that using cash dividends as a signaling tool is more effective than stock repurchases.

However, stock repurchases can also be used as a tool to signal information to the market. Stock repurchases are found to be very pro-cyclical, while dividends increase steadily along with time (Jagannathan, Stephens & Weisbach, 2000). Many dividend theories are also true for share repurchases. For example, the signaling theory of Miller and Rock (1985) states that firms signal information about the firm's quality by repurchasing. In order to signal firm quality, two types of cost arise (Allen & Michaely, 2003). First, payout of cash might require external financing, which is more expensive than internal funds. Both for repurchases as dividends these costs are relevant

if internal funds are not sufficient. Second, repurchases make the manager's portfolio become riskier compared to paying dividends. When dividends are paid, the firm's manager has a portion of his wealth in cash. When repurchases are done his portfolio becomes riskier, assuming that the manager does not tender his shares. This implies that the signaling costs of repurchases are higher. Subsequently, managers will prefer repurchases because this points at higher future firm prospects than perceived by the market. Repurchases signal that the share price is attractive and perhaps even lower than the fundamental value according to the firm. Although, research of Grullon and Michaely (2004) reveals that share repurchases do not indicate future firm performance. If the difference in signaling effect to the market between repurchases and dividends is not significant large, the firm's management will payout dividends. According to Allen and Michaely (2003) repurchases send a more powerful signal to the market compared to dividends. All in all, dividend and repurchases are both signaling tools with their own strengths and limitations.

2.7 Flexibility

Flexibility is the measure of ease and speed to alter the payout policy. According to Brav et al., (2005) managers prefer share repurchases over dividends due to their flexibility. It is easier for firms to adjust their share repurchases quickly than to adjust their dividends (Chu, 2018). Other research confirms the flexibility argument, by showing that more than only tax reasons are required to explain choices in payout policy in practice (Jagannathan, Stephens & Weisbach, 2000). Due to the flexibility of share repurchases this way of wealth distribution shows more pro-cyclical behavior than dividends. During financial distress periods the payout strategy of firms is often adjusted. Dividends are more likely to be sticky compared to share repurchases. Firms prefer to payout using repurchases rather than dividends in uncertain periods. Bliss, Li and Skinner (2015) find that there is a substantial decrease in payouts in the U.S. during the subprime crisis around 2008, this is true for dividends and even to a greater extent for repurchases. Due to worsened internal liquidity and more difficult external cash acquiring, firms want to reduce payouts during financial distress periods (Floyd, Li & Skinner, 2015). Altogether, share repurchases are more volatile than dividends (Allen & Michaely, 2003). The literature seems to be in favor of share repurchases over dividends when it comes to flexibility of payout policy. The section 2.5, 2.6 and 2.7 discovered the payout policy decision between dividends and repurchases by considering taxation, signaling and flexibility. The conclusion that can be drawn is that repurchases seem to be more favorable than dividends when considering taxes and flexibility.

2.8 Indexation

This section discovers the literature on the relation between indexation and institutional ownership. Fund managers of institutional investors are often compensated by performance-based pay, which is based on a benchmark index (Aggarwal et al., 2003). This makes the benchmark index very important. Investment managers do not want to underperform their benchmark and this might lead to partly mimic the benchmark index. Institutional investors select stocks to replicate a market index (Kochhar & David, 1996). This creates a link between institutional ownership and indices. When a firm is included to an index this should be an information-free event, because inclusion doesn't represents information about the firm's future prospects (Denis, McConnell, Ovtchinnikov & Yu, 2003). However, the well-documented positive stock price many firms experience when they are indexed suggests differently. An explanation for this is the higher demand for firms in an index due to investors buying shares of indexed firms to replicate the index. Program trading is used by many institutional investors to automatically sell or buy shares at a prespecified level to replicate an index (Madura, 2020). Companies that are included to the in S&P 500 show better expected earnings per share than their peers (Denis et al., 2003). Therefore, inclusion in S&P 500 is associated with increased earnings. Many institutional investors offer fund choices that mainly mimic the S&P 500 index. The goal is to match or beat the index. Hence, it makes sense that Duggal and Millar (1999) find a higher institutional stake in S&P 500 firms. All in all, there seems to be a strong link between firms that have institutional owners and firms that are indexed.

2.9 Institutional ownership and payout policy

The literature about ownership structure and payout policies is quite extensive. Some scholars argue that firms aim to increase their institutional ownership, and try to achieve this through their payout policies (Shleifer & Vishny, 1986). Previous research reveals that payout policy has an effect on institutional ownership. In a study about institutional investors reaction to dividend events, Binay (2001) finds that there is a significant decrease in institutional ownership when firms omit dividends and an increase in institutional ownership after dividend initiations. Wen and Jia (2010) find that there is a negative relation between institutional investors and dividend payout in the United States. Appel, Gormley and Keim (2016) find some suggesting evidence that passive institutional ownership might be associated with higher dividends. Others find more convincing evidence that institutional ownership causes firms to pay more dividends, actually that a one percentage point increase in institutional shareholders results in a 8% increase in dividend payout (Crane et al., 2016). As found in the literature, institutional ownership is often related to payout

decisions. However, the nature of the relation is still somewhat ambiguous. Taken all into account, the majority of research supports the positive effects of institutional ownership on payout.

3 HYPOTHESES

In this section hypotheses will be formulated based on the reviewed literature in order to answer the research question. First, the research question is presented. Subsequently, the hypotheses are introduced.

3.1 Hypotheses

As the existing literature is in need for more evidence to explain the relation between institutional investors and payout, the research question of this study is: '**What is the effect of institutional ownership on payout policies in the United States?**' To answer the research question, seven hypotheses are formulated and tested by the models presented in section 4.

Theory and previous empirical research shows us that institutional shareholders are better monitors and as incentives increase with the stake they have in a firm, a positive relation is likely to exist between institutional ownership and payout. Grinstein & Michaely (2005) find that institutional investors avoid firms that do not payout dividends. According to previous research in the United Kingdom, there has been found a positive relation between dividend payout and institutional ownership (Short, Zhang & Keasey, 2002). The researchers suggest this could be explained through the monitoring role of active institutional investors. Additionally, Crane et al. (2016) find that institutional shareholders cause firms to pay more dividends. Subsequently, the following hypothesis has been formulated.

H1: *Institutional ownership increases the dividend payout ratio of U.S. firms.*

Previous research shows that the repurchase decisions of firms is influenced by the interaction between corporate governance mechanisms and ownership of institutional investors (Huang, Wang, Lin & Jhao, 2010). Ikenberry, Lakonishok and Vermaelen (1995) state that underpriced shares are the best explanation for the management to decide to repurchase, and that often repurchasing has a positive influence on long-term performance. As institutional owners are often interested in the long-run, repurchases are likely to be perceived as positive signal by institutional investors. There is also evidence that long-run-oriented institutions have an effect on payout (Gaspar et al., 2013). Ultimately, Crane et al. (2016) find evidence that institutional ownership leads to higher total payout and share repurchases. Therefore, the second hypothesis has been formulated.

H2: *Institutional ownership increases the share repurchase payout ratio of U.S. firms.*

Dividends and share repurchases might be substitutes as well as complements to firms to distribute wealth to their shareholders. In order to take into account that firms use different strategies concerning their payout policy, the total payout is examined. As it is hypothesized that dividends and share repurchases are increased by institutional ownership it is also expected that the total payout is positively related to institutional ownership. The third hypothesis has been formulated.

H3: *Institutional ownership increases the total payout ratio of U.S. firms.*

To discover the causal relation between institutional ownership and payout this study will use indexation to discover the causal relation. As found in the literature indexation results in more institutional ownership. For example, Duggal and Millar (1999) report a higher institutional ownership among S&P 500 firms. The S&P 500 Value is a market-capitalization-weighted index of the 500 largest U.S. publicly traded firms, and is used due it is representativeness and stability (Kenton, 2020; Aghion, Van Reenen & Zingales, 2013). The S&P500 avoids companies that are at risk of bankruptcy and prefers to include large firms with good past performance. As a company is indexed to the S&P500 this means it has grown to a mature and stable firm. Many firms experience a positive shock to their share price when indexed to the S&P 500. This can be explained by the increased demand for stocks of indexed firms. This leads to the following hypothesis that has been formulated.

H4: *S&P500 Value indexation increases the institutional ownership of U.S. firms.*

Finally, random index inclusion can have key effect on the economic behavior of publicly listed firms (Grullon, Michenaud & Weston, 2012). Additionally, institutional ownership causes firms to disgorge cash and ownership structure affects payout. This leads to the following three hypotheses that have been formulated.

H5: *S&P500 Value indexation increases the dividend payout ratio of U.S. firms.*
H6: *S&P500 Value indexation increases the repurchase payout ratio of U.S. firms.*
H7: *S&P500 Value indexation increases the total payout ratio of U.S. firms.*

The main goal of these hypotheses are to determine whether institutional ownership affects payout policy in the past 25 years in the United States. To determine causality, the effect of S&P 500 indexation on payout will be examined. The next chapter will elaborate on the research strategy by explaining the data and methodology used in this study.

4 DATA AND METHODOLOGY

In this research the effect of institutional ownership on payout over the past 25 years in the United States will be investigated. This research will also elaborate on the effect of S&P indexation on payout and institutional ownership. First, the data sources and construction are determined. Subsequently, the variables and methodology are presented.

4.1 Data

The institutional ownership data is drafted from Thomson Reuters Institutional 13F Holdings Stock Ownership Summary using Wharton Research Data Services (WRDS). 13F Holdings refers to data of firms that file 13F, this is a requirement from the SEC for all institutions with $100 million or more assets under management. This institutional ownership data is matched to firm fundamentals data, such as corporate characteristics and payout, obtained from Compustat North America Daily. The period 1994 to 2018 is investigated. This 25 year sample starts in 1994 to capture sufficient time before the dot-com bubble started rising in 1998. The most current institutional ownership data is available until beginning 2019. Hence, the sample periods ends in 2018.

It is important to define inclusion and exclusion criteria of firms in the dataset. Within the sample period, it is required for firms in the dataset to have at least two years of data available. With only one year of data per firm available it is not possible to test the effect of institutional ownership on payout policy over time. Financial and utility firms are excluded from the dataset using Standard Industrial Classification (SIC) codes. Therefore, the financial structures of these firms are different due to capital requirements and government regulations following Chu (2018). The payout of financial and utility firms will significantly differ and, consequently, bias the results. Besides, all observations with missing key variables such as cusip codes, dividend and repurchase information are excluded. For the variable research and development (R&D) expenses all missing values are replaced with zero. Because many firms do not report R&D expenses in case of zero expenses, this would result in too high average R&D expenses. If any observation reports higher dividends than sales this observation is deleted following La Porta et al. (2000). This procedure produces a sample of 76,686 firm-years over 25 years. The dataset consists of 9,635 unique U.S. companies,

which all meet the abovementioned criteria. Finally, the Index Constituents database from Compustat is drafted to obtain data about firm indexation. This results in a merged sample with 5,346 S&P indexed firm-years, in which there are 634 unique firms that are at least S&P indexed for one period.

4.2 Variables

The literature shows that there are many aspects that may affect the payout policy. The selection of explanatory and control variables in this research is based on the available literature of existing empirical research concerning payout policies and the available data.

4.2.1 Dependent variables

The payout ratio is used to show how much of the firms' total earnings is distributed to the shareholders per share. This research uses three measures of payout. First, *DividendPayoutRatio* represents total dividends scaled by market capitalization following Chu (2018). Second, *RepurchasePayout Ratio* is constructed as the share repurchase scaled by market capitalization. Third, the *TotalPayoutRatio* which is defined as the sum of total dividends and share repurchases scaled by market capitalization. This research uses market capitalization to scale payout following Chu (2018) and Grullon & Michaely (2002). According to Allen and Michaely (2003) market capitalization is the best measure to scale, compared to other measures such as the change in number of share outstanding which might understate the actual amount of repurchases due to possible distribution of shares to the public or employees. Grinstein and Michaely (2005) used book value of assets to scale repurchases, but they also reported that there are no significant different results when the repurchases are scaled by market capitalization, ebitda or net earnings.

4.2.2 Explanatory variables

In this study the effect of institutional ownership is examined as explanatory variable in relation to payout. Institutional ownership (IO_{it}) measures the percentage of shares outstanding held by institutional investors. Duggal and Millar (1999) find a positive relation between institutional investors and the S&P. Thus, the dummy variable SP_{it} is used as explanatory variable. This variable represents whether a company is S&P 500 Value indexed or not in a specific year. Subsequently, IO_{it} is also used as dependent variable when the effect of indexation on institutional ownership is determined. To check the robustness a different measure of institutional ownership is introduced. The top 5 institutional ownership ($Top5IO_{it}$) is the proportion of shares held by the top five largest institutional investors. Top5IO is used as a proxy for institutional ownership concentration following Reddy and Bather (2013).

4.2.3 Control variables

Institutional investors prefer to invest in firms and funds with specific characteristics. Hence, control variables are included to the regression equation to recognize this relation in the analysis and to limit omitted variable bias. For example, research shows that instructional investors are interested in certain characteristics, such as return on assets and to invest in firms that recently performed better than average (Gompers & Metrick, 2001). To isolate the effect of institutional ownership on payout ratios, this research controls for several factors that have been shown to influence payout in previous research.

The first control variable is the $Size_{it}$ of the firm, here the natural logarithm of total assets is used as a measure for size. Chu (2018) states that total assets are an important determinant of payout policy. Second, to control for the company the performance, ROA_{it} is incorporated and represents the return on assets measured as net income divided by total asset. Third, MTB_{it} is included to the regression as the market to book ratio following Crane et al. (2016). Fourth, $Leverage_{it}$ represents the financial leverage following Almazan, Hartzell and Starks (2005). As a firm has more debt, the management is under higher scrutiny of creditors. This might lead to reduced payout due to high levels of leverage. $Tangibility_{it}$ represents the tangibility of the assets of the firm following the measures of Crane et al. (2016). As a firm has more tangible assets this can serve as collateral meaning that a firm is able to payout more. $Capex_{it}$ is included to control for the capital expenditures of the firm, such as funds used for additions to property, plant and equipment following Chu (2018). RD_{it} represents the research and development (R&D) expenses that are incurred during the year that relate to the development of new products and services following Jiang, Kim and Zhou (2011). The final control variable is $Liquidity_{it}$, the firm's liquidity measured by total assets over total liabilities. Following research of Kochhar and David (1996) size, leverage, liquidity and R&D expenses are included as control variables.

4.3 Methodology

To examine the relation between institutional ownership and payout this research uses firm-year panel regressions. With that, a difference-in-differences methodology is used to draw causal inferences. Using the firm-year panel data the following baseline regression has been drafted.

$$Y_{it} = \alpha_t + \alpha_i + \beta X_{it} + \varepsilon_{it} \quad (1)$$

Y_{it} represents the payout of firm i in year t, a_t are the year and a_i are the firm fixed effects. β is the estimate for the effect of X_{it}, the (control) variables. ε_{it} is the error term. To discover if indexation

can support the causal explanation between institutional ownership and payout, it is necessary to determine if indexation has effect on institutional ownership. Therefore, the following regression has been drafted.

$$Y_{it} = \alpha_t + \alpha_I + \delta lagSP + \varepsilon_{it} \quad (2)$$

Y_{it} represents the institutional ownership percentage (IO_{it}) of firm i in year t. *LagSP* is the lagged variable of SP_{it}, is a dummy variable which is included to the regression that equals one if firm i is indexed in the S&P 500 Value in year t and zero if the firm is not indexed in year t. Subsequently, relation between indexation and payout is investigated. The following regression equation has been drafted.

$$Y_{it} = \alpha_t + \alpha_i + \beta X_{it} + \delta SP_{it} + \varepsilon_{it} \quad (3)$$

Y_{it} represents the three different measures of payout, respectively dividend payout ratio, repurchase payout ratio and total payout ratio. Where SP_{it} is a dummy variable which is included to the regression that equals one (1) if firm i is indexed in the S&P 500 Value in year t and zero (0) if the firm is not indexed in year t. X_{it} represents the lagged control variables. Lagged variables of all control variables are incorporated to compare two time periods. This methodology controls for fixed differences between S&P indexed firms and firms that are not indexed in the S&P in year t via the firm fixed effects. The estimate for the S&P index effect is δ. For example, the effect of the S&P indexation of GameStop Corp. in 2009 is examined to discover the changes on institutional ownership and payout policy compared to a control firm that is similar in characteristics to GameStop Corp. but not indexed in 2009.

4.4 Fixed effects

To account for unobserved and unmeasurable factors that influence our research, the models include year, industry and firm fixed effects. In the regressions fixed effects are included by a dummy variable that describes the unique effects of each year, industry or firm. The fixed effects control for time invariant and industry or firm-specific factors. This eliminates the omitted variable bias caused by these factors and absorbs time trends in the U.S. that may affect payout policies. Therefore, the model better captures effects that are invariant over time, which results in a better estimation of the effect of institutional ownership on payout.

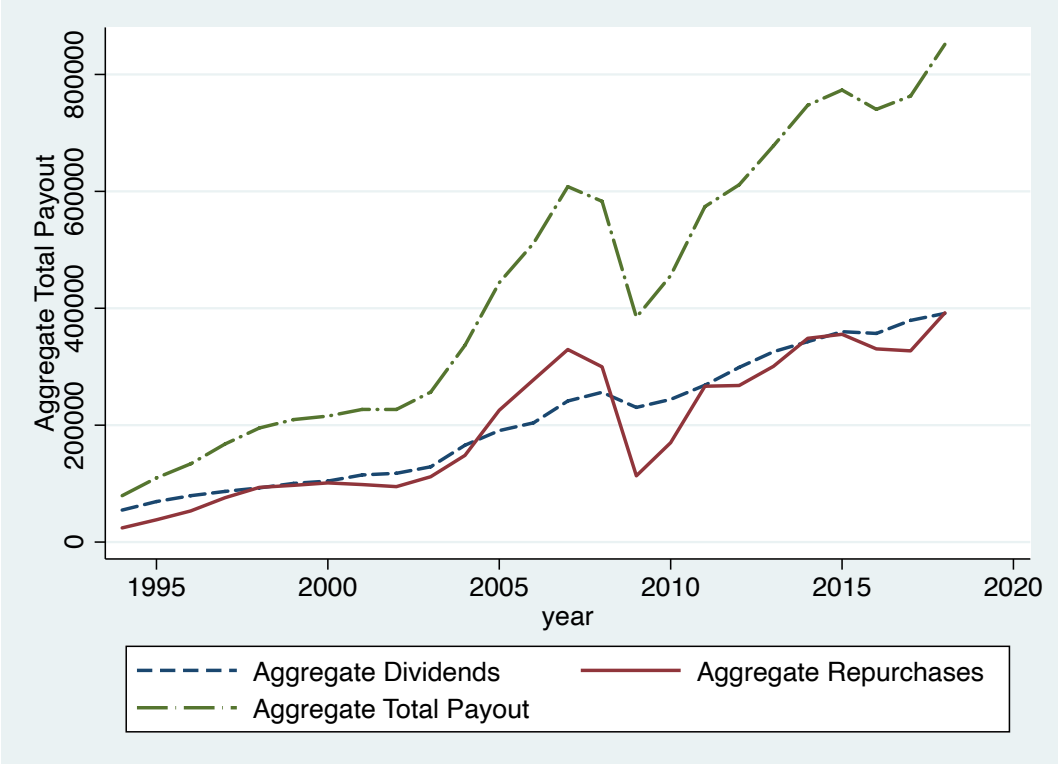
5 RESULTS

In this section the results are presented. First, the aggregate payouts and institutional ownership percentages are discussed to give an overview how these changed over the years. Subsequently, the descriptive statistics will be presented. Finally, the regression results are stated and the hypotheses are tested.

5.1 Aggregate payout and institutional ownerships

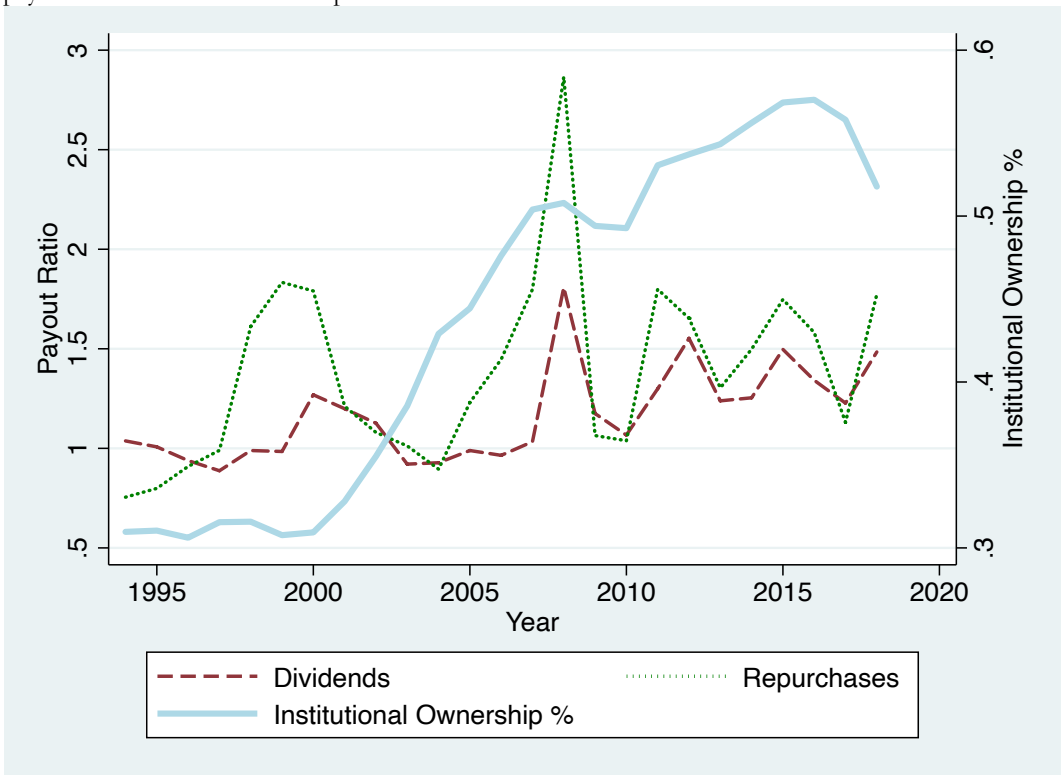
Figure 1 shows the development of aggregate payout over the years. There has been an overall upward trend among all three measures of payout in the investigated 25 years. This figure shows that between 2002 and prior to the subprime mortgage crisis starting in 2008, the aggregate payout has increased substantially. This is in line with findings of Bliss et al. (2015). The peak of total aggregate payout is mainly driven by the repurchase volume. During the crisis the aggregate payout drops radically. Again, this drop is mostly caused by repurchase volume. Aggregate repurchase declined by 62% between 2008 and 2009. Compared to aggregate dividends which only declined by 10% between 2008 and 2009. These insights are consistent with Daniel, Denis and Naveen (2012), who report that most companies do not reduce their dividend payout despite the cash squeeze caused by the crisis.

Figure 1
Aggregate Dividends, Repurchases and Total Payout
The aggregate absolute total payout is expressed in millions.



To illustrate the growing ownership of institutional investors the solid line in Figure 2 shows the percentage of institutional investors throughout the years 1994 to 2018. The institutional ownership has risen from below 35% before 2000 to more than 50% in recent years. This is approximately 50% growth in 15 years. Additionally, the payout ratios of firms are shown in the Figure 2. As shown in Figure 2, the repurchase payouts are often higher than dividend payout. In 17 out of 25 sample years the repurchase payout ratio is higher than the dividend payout ratio. In the first part of the sample between 1994 and 1996 dividends are more popular and in the years 2002, 2004, 2009, 2010 and 2017. This figure confirms the findings in the literature that repurchases are more flexible and volatile than dividends (Brav et al., (2005); Allen & Michaely, 2003). And that repurchases have become more popular towards the end of the millennium (Grullon & Michaely, 2002; Fama & French, 2001). Figures 1 and 2 give an overview of payout and institutional ownership developments over the years. In the next section the descriptive statistics will be presented.

Figure 2
Dividends, Purchases & Percentage of Institutional Ownership.
Institutional ownership (solid line) has increased tremendously since 2000. Since 2010 institutional investors have on average more than 50% ownership in publicly listed U.S. companies. Note that financial and utility firms are left out in this sample. Repurchases (dotted line) and Dividends (dashed line) are presented as a payout ratio based on market capitalization.



5.2 Descriptive statistics

Table 1 shows the descriptive statistics, presenting the number of observations, the mean, the standard deviation, the minimum and the maximum value of all the variables incorporated in the empirical analysis. The table reports that the average institutional ownership is 43%, this is below findings of the Russell 1000 sample of Crane et al. (2016). Firms indexed in the Russel 1000 are larger by definition and thus, expected to have higher institutional ownership. In the final eight years of the sample the institutional ownership has always been above 50% as shown in Figure 2. A firm in this sample has on average 118 million shares outstanding and pays on average a total of $67 million dividends to its shareholders per year. This results in almost $0.26 average dividend payout per share. The average total repurchases are $64 million on a yearly basis. The average total payout is almost $142 million annually. The average total assets are worth $3,459 dollars. On average there are 13 years of data per firm included in this data set, with a minimum of two years of data and a maximum of 25 years. Lastly, the sample exists of 9,635 U.S. firms.

Table 1
Descriptive Statistics

This table shows an overview of all variables used to analyze the effect of institutional investors on payout policy. Statistics are shown for publicly listed U.S. firms for the years 1994-2018. Financial firms (SIC 6000-6799) and utility firms (SIC 4900-4999) are eliminated from the sample. All continuous variables are winsorized at 1% and 99%. (M) or ($M) notes that the variable is expressed in millions or million dollars. Payout represents the absolute payout that is calculated by the sum of total dividends and share purchases. For a detailed list of the calculations of the variables, see Appendix A.

Variables	N	Mean	Std. Dev.	Min	Max
IO (%)	76,686	0.431	0.327	8.00e-05	1
Instown (M)	76,686	42.94	105.9	0.00162	753.8
Top5instown (M)	76,686	17.03	37.24	0.00162	255.3
DividendPayoutRatio ($M)	75,986	1.159	2.732	0	19.29
RepurchasePayoutRatio ($M)	75,986	1.391	3.291	0	20.19
TotalPayoutRatio ($M)	75,986	2.710	5.173	0	34.15
DPS	76,526	0.259	0.561	0	3.185
EPS	76,414	2.606	3.632	-2.489	19.09
Dividend ($M)	76,686	67.87	286.8	0	2,226
Repurchase ($M)	76,686	64.44	269.2	0	2,051
Payout ($M)	76,686	141.9	549.6	0	4,159
Assets	76,685	3,459	11,079	1.123	81,812
Equity	76,631	1,301	4,190	-222.4	31,316
Liabilities	76,552	2,064	6,814	0.607	50,142
Leverage	76,540	0.537	0.408	0.0470	3.202
Size	76,673	5.762	2.282	0.139	11.31
Shares (M)	76,532	118.1	318.8	1.480	2,297
Shareprice	76,103	21.62	24.69	0.0600	136.7
Marketcap ($M)	75,987	3,880	12,743	1.411	93,705
Ebitda	76,572	477.6	1,630	-94.39	12,172
Net_income	76,684	174.8	695.8	-512.8	5,106
PPE ($M)	76,582	1,054	3,592	0.00500	25,765
ROA	76,671	-0.0652	0.394	-2.853	0.311
Sale	76,682	2,863	8,827	0	63,963
RD	47,592	0.0670	0.122	0	0.841
Capex	75,455	0.0919	0.178	0	1.245
Liquidity	76,546	3.081	3.090	0.304	21.19
Tangibility	76,570	0.263	0.233	0.000750	0.902
MTB	73,572	1.910	2.139	0.277	15.27

5.3 Institutional ownership and payout

In this section the results of the examination of the relation between of institutional ownership and payout are presented. To answer the hypotheses 1, 2 and 3 firm-year panel regressions are executed. Three different measures of payout are investigated, respectively dividends, repurchases and total payout. Table 2 presents the results of the regressions that estimate the effect of institutional ownership on dividend payout ratio. Hypothesis 1 states that institutional ownership increases the dividend payout ratio of U.S. firms. To accept the hypothesis the coefficient IO must

be positive and significant at the 1% level. However, the signs of the coefficients are in all four models negative. The fourth column shows the most strict model, where year and firm fixed effects are included, the coefficient institutional ownership is smaller than in column 1 to 3. An one-percentage-point increase in IO is associated with a €0.616 decrease in dividend payout ratio that is statistically significant at the 1% level. This suggests that higher IO levels result in lower dividend payout ratios. This is contradicting to hypothesis 1. Therefore, hypothesis 1 is rejected.

Table 2
Institutional ownership and dividend payout
This table shows estimates of panel regressions of institutional ownership on dividend payout for publicly listed U.S. firms for the years 1994-2018. The dependent variable is the Dividend Payout Ratio as described in Appendix A. The main independent variable is institutional ownership (IO). Model 1 reports estimates of a firm year pooled OLS, model 2 reports a panel with year fixed effects. Model 3 reports estimates of a panel with year panel with industry fixed effects. Model 4 reports estimates of a panel with year fixed effects and firm fixed effects.

	Dependent variable: **dividend** payout ratio.			
Variables	(1)	(2)	(3)	(4)
IO	-1.025***	-1.109***	-1.017***	-0.616***
	(0.0358)	(0.0381)	(0.0388)	(0.0742)
Size	0.207***	0.196***	0.168***	-0.0797***
	(0.00602)	(0.00596)	(0.00622)	(0.0202)
ROA	0.230***	0.271***	0.296***	0.0347
	(0.0495)	(0.0348)	(0.0348)	(0.0402)
MTB	-0.0413***	-0.0382***	-0.0236***	-0.0357***
	(0.00549)	(0.00545)	(0.00553)	(0.00641)
Leverage	0.587***	0.565***	0.504***	0.154***
	(0.0556)	(0.0352)	(0.0352)	(0.0432)
Tangibility	0.490***	0.582***	0.432***	-0.608***
	(0.0757)	(0.0646)	(0.0786)	(0.135)
Capex	0.849***	0.819***	0.871***	1.650***
	(0.202)	(0.0824)	(0.0832)	(0.0947)
RD	0.464**	0.395***	0.692***	0.767***
	(0.189)	(0.0955)	(0.0988)	(0.113)
Liquidity	-0.00185	-0.00357	-0.00131	0.00227
	(0.00347)	(0.00398)	(0.00401)	(0.00472)
Constant	-0.184***	-0.0862*	0.0347	1.571***
	(0.0555)	(0.0469)	(0.0486)	(0.122)
Observations	45,642	45,642	45,641	45,416
R-squared	0.072	0.076	0.096	0.520
Year fixed effects	No	Yes	Yes	Yes
Industry effects	No	No	Yes	No
Firm effects	No	No	No	Yes

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 3 shows the relation between institutional ownership and repurchase payout. Hypothesis 2 states that IO increases the repurchase payout ratio of U.S. firms. To accept the hypothesis the coefficient IO must be positive and significant at the 1% level. In all four models IO has a positive and significant effect at the 1% level. Although, the coefficient in model 4 is the smallest in magnitude compared to model 1 to 3, it has a positive and significant effect. An one-percentage-point increase in IO is associated with a €0.858 increase in repurchase payout ratio. This evidence shows that institutional ownership increases the repurchase payout ratio of U.S. firms. Thus, hypothesis 2 is supported.

Table 3
Institutional ownership and repurchase payout

This table shows estimates of panel regressions of institutional ownership on repurchase payout for publicly listed U.S. firms for the years 1994-2018. The dependent variable is the Repurchase Payout Ratio as described in Appendix A. The main independent variable is institutional ownership (IO). Model 1 reports estimates of a firm year pooled OLS, model 2 reports a panel with year fixed effects. Model 3 reports estimates of a panel with year panel with industry fixed effects. Model 4 reports estimates of a panel with year fixed effects and firm fixed effects.

	Dependent variable: **repurchase** payout ratio.			
Variables	(1)	(2)	(3)	(4)
IO	1.562***	1.523***	1.397***	0.858***
	(0.0539)	(0.0551)	(0.0565)	(0.129)
Size	0.0873***	0.0857***	0.116***	0.00291
	(0.00761)	(0.00864)	(0.00906)	(0.0351)
ROA	0.390***	0.405***	0.328***	0.244***
	(0.0478)	(0.0504)	(0.0506)	(0.0700)
MTB	-0.0742***	-0.0741***	-0.0636***	-0.114***
	(0.00571)	(0.00789)	(0.00806)	(0.0112)
Leverage	0.332***	0.334***	0.337***	0.0845
	(0.0443)	(0.0510)	(0.0513)	(0.0753)
Tangibility	0.161	0.225**	0.0301	1.005***
	(0.0982)	(0.0935)	(0.114)	(0.235)
Capex	0.257*	-0.0261	-0.238**	0.336**
	(0.154)	(0.119)	(0.121)	(0.165)
RD	0.276*	0.00134	0.294**	0.615***
	(0.151)	(0.138)	(0.144)	(0.197)
Liquidity	0.00501	0.00351	0.0153***	-0.00212
	(0.00484)	(0.00577)	(0.00585)	(0.00823)
Constant	0.148**	0.205***	0.0570	0.957***
	(0.0608)	(0.0679)	(0.0709)	(0.212)
Observations	45,642	45,642	45,641	45,416
R-squared	0.052	0.070	0.080	0.303
Year fixed effects	No	Yes	Yes	Yes
Industry effects	No	No	Yes	No

Firm effects	No	No	No	Yes

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 4 shows the regressions to examine the relation between institutional ownership and the total payout. Hypothesis 3 states that IO increases the total payout ratio of U.S. firms. To accept the hypothesis the coefficient IO must be positive and significant at the 1% level. All four models show a positive effect of IO on total payout ratio. However, only model 1 to 3 are significant at the 1% level. In model 4 the coefficient is not significant. In model 4, where year and firm fixed effects are included, IO has the smallest effect compared to the models 1 to 3. In column 1 to 3, the effect of IO is positive and significant. Namely, in column 3 an one-percentage-point increase in IO is associated with a €0.407 increase in total payout ratio. However, column four is not significant. An one-percentage-point increase in IO is associated with a €0.158 increase in total payout ratio, but this finding is not significant. Hence, hypothesis 3 is not supported.

Table 4
Institutional ownership and total payout

This table shows estimates of panel regressions of institutional ownership on total payout for publicly listed U.S. firms for the years 1994-2018. The dependent variable is the Total Payout Ratio as described in Appendix A. The main independent variable is institutional ownership (IO). Model 1 reports estimates of a firm year pooled OLS, model 2 reports a panel with year fixed effects. Model 3 reports estimates of a panel with year panel with industry fixed effects. Model 4 reports estimates of a panel with year fixed effects and firm fixed effects.

	Dependent variable: **total** payout ratio.			
Variables	(1)	(2)	(3)	(4)
IO	0.574***	0.441***	0.407***	0.158
	(0.0767)	(0.0806)	(0.0826)	(0.179)
Size	0.277***	0.265***	0.268***	-0.102**
	(0.0116)	(0.0126)	(0.0132)	(0.0487)
ROA	0.764***	0.826***	0.772***	0.382***
	(0.0977)	(0.0737)	(0.0740)	(0.0970)
MTB	-0.116***	-0.112***	-0.0835***	-0.147***
	(0.0105)	(0.0115)	(0.0118)	(0.0155)
Leverage	1.126***	1.106***	1.045***	0.410***
	(0.101)	(0.0746)	(0.0750)	(0.104)
Tangibility	0.556***	0.723***	0.320*	0.213
	(0.154)	(0.137)	(0.167)	(0.326)
Capex	2.126***	1.785***	1.573***	2.787***
	(0.356)	(0.174)	(0.177)	(0.228)
RD	1.502***	1.123***	1.803***	2.152***
	(0.345)	(0.202)	(0.210)	(0.272)
Liquidity	0.00787	0.00421	0.0199**	0.00160
	(0.00756)	(0.00844)	(0.00854)	(0.0114)
Constant	-0.0357	0.125	0.0844	2.679***
	(0.106)	(0.0994)	(0.104)	(0.294)
Observations	45,642	45,642	45,641	45,416

R-squared	0.057	0.071	0.082	0.375
Year fixed effects	No	Yes	Yes	Yes
Industry effects	No	No	Yes	No
Firm effects	No	No	No	Yes

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

5.4 S&P indexation and payout

In the previous sections the baseline results analyzed the relation between institutional ownership and payout. Unfortunately, endogeneity issues arise between these two factors. Several measures are taken to limit the endogeneity issues. First, control variables are included to the regressions to avoid omitted variables. Second, firm and year fixed effects are included to control for firm specific or time invariant factors. However, the presented relation between institutional ownership and payout is only a correlation. There are no causal relations established. To show a causal relation indexation is incorporated. Indexation has a causal effect on IO, while indexing has no causal effect on payout (Duggal & Millar, 1999). When a firm is included to the index this is not the reason why the payout policy changes. However, indexation attracts institutional investors that are able influence payout policy.

In this section the results of the effect of S&P indexation on payout are presented. First, the relation between indexation and institutional ownership will be examined and elaborated on hypotheses 4. Subsequently, the effect of indexation on payout will be determined and hypotheses 5, 6 and 7 are tested. Lagged variables of all control variables are incorporated. These tests are conducted to elaborate on the causality between institutional ownership and payout.

First, the link between indexation and institutional ownership is determined. Table 5 shows a positive correlation between institutional ownership and indexation of 0.241. Subsequently, hypothesis 4 states that S&P500 Value indexation increases the institutional ownership of U.S. firms. To accept the hypothesis the coefficient $lagSP_{it}$ must be positive and significant at the 1% level. In Table 6, the effect of indexation on institutional ownership has a small positive effect. However, this effect is not significant. If a firm is S&P indexed the shareholder base of this firm has on average 0.000384 percentage point more institutional investors than firms that are not indexed. This shows a positive yet insignificant relation between S&P indexation and institutional ownership. Hence, hypothesis 4 is not supported.

Table 5
Matrix of correlations between indexation and institutional ownership
This matrix of correlations shows a positive correlation between institutional ownership and indexation of 0.241.

Variables	IO	lagSP
IO	1.000	
lagSP	0.241	1.000

Table 6
Indexation and institutional ownership
This table shows estimates of panel regressions of S&P 500 Value indexation on institutional ownership for publicly listed U.S. firms for the years 1994-2018. All models include year fixed effects and firm fixed effects.

	(1)
Variables	IO
lagSP	0.000384
	(0.00329)
Constant	0.457***
	(0.000526)
Observations	65,407
R-squared	0.885

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 7 presents the difference in differences regressions that estimate the effect of S&P indexation on the three payout ratios, respectively dividends, repurchases and total. For each payout ratio measure there are two models. The first model includes no lagged control variables. The second model includes lagged control variables.

According to hypothesis 5, S&P500 Value indexation increases the dividend payout ratio of U.S. firms. To accept the hypothesis the coefficient SP_{it} must be positive and significant at the 1% level. In Table 7, column 1 and 2, S&P indexation has a positive and significant effect at the 1% level. If a firm is indexed in the S&P this results in an increase in the dividend payout ratio of €0.296. Therefore, hypothesis 5 is accepted.

The sixth hypothesis argues that S&P500 Value indexation increases the repurchase payout ratio of U.S. firms. The coefficient SP_{it} must be positive and significant at the 1% level to accept the hypothesis. Column 3 and 4 of Table 7 show that S&P indexation has a positive and significant effect at the 1% level. If a firm is indexed in the S&P this results in an increase in the repurchase payout ratio of €0.818. Thus, hypothesis 6 is accepted.

Table 7
Indexation and payout

This table shows estimates of panel regressions of S&P 500 Value indexation on respectively dividend payout ratio, repurchase payout ratio and total payout ratio for publicly listed U.S. firms for the years 1994-2018. Model 1 and 2 report the effect of indexation on dividend payout ratio. Model 3 and 4 report the effect of indexation on repurchase payout ratio. Model 5 and 6 report the effect of indexation on total payout ratio. In all models year fixed effects and firm fixed effects are included.

Variables	(1) Dividend Payout Ratio	(2) Dividend Payout Ratio	(3) Repurchase Payout Ratio	(4) Repurchase Payout Ratio	(5) Total Payout Ratio	(6) Total Payout Ratio
SP	0.286***	0.269***	0.836***	0.818***	1.130***	1.060***
	(0.0526)	(0.0574)	(0.0776)	(0.104)	(0.114)	(0.141)
lagSize		-0.0177		0.452***		0.443***
		(0.0195)		(0.0353)		(0.0481)
lagROA		-0.179***		-0.0109		-0.199*
		(0.0446)		(0.0807)		(0.110)
lagMTB		-0.0247***		-0.0328***		-0.0642***
		(0.00679)		(0.0123)		(0.0167)
lagLeverage		-0.0656		-0.483***		-0.552***
		(0.0486)		(0.0880)		(0.120)
lagTangibility		-0.265*		-0.390		-0.802**
		(0.144)		(0.260)		(0.354)
lagCapex		0.281***		-1.362***		-0.846***
		(0.105)		(0.191)		(0.260)
lagRD		0.0867		0.159		0.312
		(0.130)		(0.235)		(0.320)
lagLiquidity		0.00402		0.0454***		0.0572***
		(0.00503)		(0.00910)		(0.0124)
Constant	1.139***	1.085***	1.333***	-0.847***	2.632***	0.317
	(0.00819)	(0.130)	(0.0121)	(0.235)	(0.0178)	(0.319)
Observations	75,905	38,881	75,905	38,881	75,905	38,881
R-squared	0.525	0.539	0.289	0.321	0.378	0.385

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

According to hypothesis 7, S&P500 Value indexation increases the total payout ratio of U.S. firms. To accept the hypothesis the coefficient SP_{it} must be positive and significant at the 1% level. In both models, S&P indexation has a positive and significant effect at the 1% level. If a firm is indexed in the S&P this results in an increase in the total payout ratio of €1.06. In Table 7, column 5 and 6 provide supporting evidence for hypothesis 7. Hence, hypothesis 7 is accepted.

In all six models of Table 7 the effect of S&P indexation has a positive and significant on payout. If a firm is indexed in the S&P this results in an increase in the dividend payout ratio of €0.269, an increased repurchase payout ratio of €0.818 and an increased total payout ratio of €1.06. In conclusion, hypothesis 5, 6 and 7 are accepted, thus, indexation has a positive effect on payout. The following section will check whether the results are robust.

5.5 Robustness

This section will elaborate on the robustness of the results. The goal of the robustness check is to see whether the findings hold if other measures are incorporated. In this study a different measure of institutional ownership is used. The top five institutional ownership ($Top5IO_{it}$) is the proportion of shares held by the top five largest institutional investors as a proxy for institutional ownership concentration. Following Reddy and Bather (2013), $TOP5IO_{it}$ is the number of shares held by five largest institutional shareholders divided by the total outstanding number of shares times 100%. This measure also captures ownership concentration as it incorporates the five largest institutional investors concentration of holdings. Reddy and Bather (2013) presume that the top five institutional investors will have significant investment in firms that authorize them to be active monitors. They find that firms with a large institutional investor base have greater financial performance. As found in the literature, investors that hold more shares in a firm often have more power and monitor more effectively (Hartzell, Sun & Titman, 2014). Moreover, greater institutional ownership should improve incentives to monitor (Shleifer & Vishny, 1986; Admati et al., 1994). Subsequently, higher institutional ownership concentration might interfere in payout policy decisions. A robustness check makes findings more strong and validated.

Table 8 presents the results of the relation between institutional ownership measured as Top5IO and payout. This section determines if the acceptance or rejection of hypothesis 1, 2 and 3 according to the robustness check in Table 8 are similar to the original findings of Table 2, 3 and 4. In the first column of Table 8, the sign of the TOP5IO coefficient is negative and significant at the 5% level. This is in line with the original findings shown in Table 2. The original and the robustness check results reject hypothesis 1. Note that in the original results the coefficient is

significant at the 1% level. In the second column of Table 8, the sign of the TOP5IO coefficient is positive and significant at the 1% level. This is in line with the original findings shown in Table 3. Hypothesis 2 is supported by the original and the robustness check. In the third column of Table 8, the sign of the TOP5IO coefficient is positive and significant at the 1% level. In the original findings the sign is also positive, however not significant in column 4 of Table 3. This represents an inconsistency between the original and robustness check results. In the original results hypothesis 3 is not supported but the robustness check supports hypothesis 3. To conclude, the same results are found for hypothesis 1 and 2, a rejection of hypothesis 1 and support for hypothesis 2. However, for hypothesis 3 different results are found in the original results and robustness check results. Thus, in two out of three times the robustness check provides the same decision for the hypothesis support or rejection.

Table 8
Institutional ownership measured as Top5IO and payout
This table shows estimates of panel regressions of institutional ownership measured as Top 5 Institutional Investors (Top5IO) on payout for publicly listed U.S. firms for the years 1994-2018. The dependent variables are the Dividend Payout Ratio, Repurchase Payout Ratio and Total Payout Ratio as described in Appendix A. All models include year fixed effects and firm fixed effects.

	Dependent variables:		
Variables	Dividend Payout Ratio	Repurchase Payout Ratio	Total Payout Ratio
Top5IO	-0.00269**	0.0243***	0.0250***
	(0.00123)	(0.00213)	(0.00295)
Size	-0.139***	0.0362	-0.146***
	(0.0188)	(0.0326)	(0.0452)
ROA	0.0466	0.250***	0.406***
	(0.0402)	(0.0699)	(0.0969)
MTB	-0.0420***	-0.108***	-0.148***
	(0.00637)	(0.0111)	(0.0153)
Leverage	0.167***	0.0958	0.441***
	(0.0433)	(0.0752)	(0.104)
Tangibility	-0.632***	0.952***	0.116
	(0.135)	(0.235)	(0.326)
Capex	1.717***	0.288*	2.822***
	(0.0944)	(0.164)	(0.227)
RD	0.776***	0.598***	2.144***
	(0.113)	(0.196)	(0.272)
Liquidity	0.00216	-0.00154	0.00214
	(0.00473)	(0.00822)	(0.0114)
Constant	1.697***	0.629***	2.466***
	(0.122)	(0.211)	(0.293)
Observations	45,416	45,416	45,416
R-squared	0.519	0.305	0.376

Year fixed effects	Yes	Yes	Yes
Firm effects	Yes	Yes	Yes

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

6 DISCUSSION

This section will discuss the results and highlight the main limitations of this study. Finally, avenues for future research are outlined.

6.1 Discussion of the results

The first finding is that an increase in institutional ownership is associated with a decrease in dividend payout ratio that is significant. This is contradicting to the main body of the reviewed literature and hypothesis 1. However, it is in line with findings of Wen and Jia (2010). In their research a negative relation between institutional investors and dividend payout in the U.S. is found. They argue that dividend are used to avoid agency problems. Additionally, they state that dividends can be substitutes for corporate governance mechanisms to limit the issues between agents and principals. This could be interpreted that institutional ownership makes dividend payout less necessary. For example, due the monitoring role of institutional investors the agency problems are reduced. Another explanation could be explained by the findings of Grinstein and Michaely (2003) who find that institutional investors prefer among dividend-paying firms the ones that pay fewer dividends. This in line with the theory that investors prefer repurchases over dividends, for example due to taxation and flexibility. The second finding is that institutional ownership increases the repurchase payout ratio of U.S. firms. This is line with the literature and hypothesis 2. The third finding is that there is no conclusive evidence that institutional ownership increases the total payout ratio of U.S. firms. This is in contrast to hypothesis 3. The findings of this research are less strong compared to findings of Crane et al. (2016), who find significant evidence that institutional ownership results in higher total payout. Although, the findings are overall very similar to the research of Crane et al. (2016), this study does not present significant results concerning total payout. An explanation for this could be the fact that the evidence for the relation between institutional ownership and dividend payout is contradicting to hypothesis 1. As hypothesis 3 followed from hypothesis 1 and 2, it makes sense that the evidence for hypothesis 3 is not significant due to the unexpected outcome of hypothesis 1.

Gaspar et al. (2013) find that it is difficult to demonstrate that institutional investors drive payout, because at the same time institutions investors select stocks based on payout. This creates fundamental endogeneity. Therefore, S&P indexation is included in this research to elaborate on causality between institutional ownership and payout. First, the correlation between S&P

indexation and institutional ownership is positive. However, the effect of indexation on institutional ownership is positive yet not significant. This might be caused by omitted variables. Additionally, the relation between indexation and payout is determined. These findings show that S&P indexation significantly increases the dividends, repurchases and total payout ratio of U.S. firms. These findings provide evidence to prove the causality between institutional ownership and payout.

6.2 Limitations

All studies have limitations, it is important to recognize these limitations and elaborate on the potential avenues for future research. In this section the limitations are emphasized and in the next section future research opportunities are proposed. The first limitation is that this research solely focusses on the United States. Due to the country specific factors the results can be totally different for other countries. Moreover, the effect of indexation is investigated by the S&P 500 Value index. This index is limited to only 500 U.S. firms. Although, indexation in other indices can also greatly influence payout. Another limitation is the potential of omitted variable bias. Although control variables and fixed effects are included to limit this, the omitted variable bias is reduced but might still be affecting the results. An example of an omitted variable is the company risk. Risk is an firm specific factor but not constant over the years. Risk is one of the key factors in determining returns (Campbell, 1996). This can result in shareholders demanding payout due to the fact that shareholders want to be compensated for risk. Finally, this study is subject to reversed causality problems. High payout firms might draw attention of institutional investors to invest in these firms, instead of institutional investors increasing payout policies. The limitations provide opportunities for future research, the next section will elaborate on these.

6.3 Future research

Future research should focus on the effect of indices on payout. It is interesting to expand the indices and examine the effect of indexation in other indices that influence payout such as growth indices or the S&P 1500. Additionally, it could be interesting to define institutional investors into more specific groups such as active versus passive or block holder versus non-block holder. Research shows that repurchasing firms are younger than firms that pay dividends (Grullon & Michaely, 2002). This might lead to the disappearance of dividends in the future. It would be helpful to discover new methods and measures to investigate the different effects between young and old firms on their preferred payout policies. Moreover, the differences between long term and short term institutional investment are interesting to determine with respect to payout policy this important aspect is emphasized by Gaspar et al. (2013). Finally, Figures 1 and 2 in this study show

that crises have a lot of impact on payout, especially on repurchases. Therefore, it will be very interesting to replicate this research in the future to investigate the effects of payout and liquidity of firms during the current Covid-19 crisis.

7 CONCLUSION

This section will provide a short conclusion of this research and highlight its main findings. The main goal of this research is to determine what the effect of institutional ownership is on payout policies in the United States. This research contributes to existing literature because it elaborates on causality using indexation in the S&P 500. The sample consists of publicly listed U.S. firms in the time period 1994 to 2018. The data is drafted from Compustat and Thomas Reuters.

The results show that the expected positive relation between IO and payout is not true for dividends. IO has a negative and significant effect on dividend payout. This results in rejection of hypothesis 1. However, the expected positive relation between IO and payout is true repurchases and total payout. The relation between IO and repurchases is positive and significant and this supports hypothesis 2. The relation between IO and total payout is positive but not significant. Hence, hypothesis 3 is not supported.

Subsequently, to determine causality indexation is examined. The results show a positive correlation between indexation and institutional ownership. The effect of indexation is positive but yet not significant. Hence, hypothesis 4 is not supported. Additionally, the effect of indexation on payout is determined. The results are completely in line with the hypotheses. Hypotheses 5, 6 and 7 are supported. Hence, indexation has a positive and significant effect on all payout measures.

The research question of this study is: *What is the effect of institutional ownership on payout policies in the United States?* Based on all findings, the final conclusion is that institutional ownership has a positive effect of €0.858 on repurchase payout ratio in the U.S. between 1994 and 2018. However, institutional ownership has a negative effect on dividend payout ratio. S&P indexation has a positive effect on dividends, repurchases and total payout. All in all, there is some supporting evidence for the positive causal effect of institutional ownership on repurchase payout. However, this evidence is not very strong because the effect of indexation on institutional ownership is positive yet not significant.

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Table 1
Descriptive Statistics

This table shows an overview of all variables used to analyze the effect of institutional investors on payout policy. Statistics are shown for publicly listed U.S. firms for the years 1994-2018. Financial firms (SIC 6000-6799) and utility firms (SIC 4900-4999) are eliminated from the sample. All continuous variables are winsorized at 1% and 99%. (M) or ($M) notes that the variable is expressed in millions or million dollars. Payout represents the absolute payout that is calculated by the sum of total dividends and share purchases. For a detailed list of the calculations of the variables, see Appendix A.

Variables	N	Mean	Std. Dev.	Min	Max
IO (%)	76,686	0.431	0.327	8.00e-05	1
Instown (M)	76,686	42.94	105.9	0.00162	753.8
Top5instown (M)	76,686	17.03	37.24	0.00162	255.3
DividendPayoutRatio ($M)	75,986	1.159	2.732	0	19.29
RepurchasePayoutRatio ($M)	75,986	1.391	3.291	0	20.19
TotalPayoutRatio ($M)	75,986	2.710	5.173	0	34.15
DPS	76,526	0.259	0.561	0	3.185
EPS	76,414	2.606	3.632	-2.489	19.09
Dividend ($M)	76,686	67.87	286.8	0	2,226
Repurchase ($M)	76,686	64.44	269.2	0	2,051
Payout ($M)	76,686	141.9	549.6	0	4,159
Assets	76,685	3,459	11,079	1.123	81,812
Equity	76,631	1,301	4,190	-222.4	31,316
Liabilities	76,552	2,064	6,814	0.607	50,142
Leverage	76,540	0.537	0.408	0.0470	3.202
Size	76,673	5.762	2.282	0.139	11.31
Shares (M)	76,532	118.1	318.8	1.480	2,297
Shareprice	76,103	21.62	24.69	0.0600	136.7
Marketcap ($M)	75,987	3,880	12,743	1.411	93,705
Ebitda	76,572	477.6	1,630	-94.39	12,172
Net_income	76,684	174.8	695.8	-512.8	5,106
PPE ($M)	76,582	1,054	3,592	0.00500	25,765
ROA	76,671	-0.0652	0.394	-2.853	0.311
Sale	76,682	2,863	8,827	0	63,963
RD	47,592	0.0670	0.122	0	0.841
Capex	75,455	0.0919	0.178	0	1.245
Liquidity	76,546	3.081	3.090	0.304	21.19
Tangibility	76,570	0.263	0.233	0.000750	0.902
MTB	73,572	1.910	2.139	0.277	15.27

Table 2
Institutional ownership and dividend payout

This table shows estimates of panel regressions of institutional ownership on dividend payout for publicly listed U.S. firms for the years 1994-2018. The dependent variable is the Dividend Payout Ratio as described in Appendix A. The main independent variable is institutional ownership (IO). Model 1 reports estimates of a firm year pooled OLS, model 2 reports a panel with year fixed effects. Model 3 reports estimates of a panel with year panel with industry fixed effects. Model 4 reports estimates of a panel with year fixed effects and firm fixed effects.

	Dependent variable: **dividend** payout ratio.			
Variables	(1)	(2)	(3)	(4)
IO	-1.025***	-1.109***	-1.017***	-0.616***
	(0.0358)	(0.0381)	(0.0388)	(0.0742)
Size	0.207***	0.196***	0.168***	-0.0797***
	(0.00602)	(0.00596)	(0.00622)	(0.0202)
ROA	0.230***	0.271***	0.296***	0.0347
	(0.0495)	(0.0348)	(0.0348)	(0.0402)
MTB	-0.0413***	-0.0382***	-0.0236***	-0.0357***
	(0.00549)	(0.00545)	(0.00553)	(0.00641)
Leverage	0.587***	0.565***	0.504***	0.154***
	(0.0556)	(0.0352)	(0.0352)	(0.0432)
Tangibility	0.490***	0.582***	0.432***	-0.608***
	(0.0757)	(0.0646)	(0.0786)	(0.135)
Capex	0.849***	0.819***	0.871***	1.650***
	(0.202)	(0.0824)	(0.0832)	(0.0947)
RD	0.464**	0.395***	0.692***	0.767***
	(0.189)	(0.0955)	(0.0988)	(0.113)
Liquidity	-0.00185	-0.00357	-0.00131	0.00227
	(0.00347)	(0.00398)	(0.00401)	(0.00472)
Constant	-0.184***	-0.0862*	0.0347	1.571***
	(0.0555)	(0.0469)	(0.0486)	(0.122)
Observations	45,642	45,642	45,641	45,416
R-squared	0.072	0.076	0.096	0.520
Year fixed effects	No	Yes	Yes	Yes
Industry effects	No	No	Yes	No
Firm effects	No	No	No	Yes

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 3
Institutional ownership and repurchase payout

This table shows estimates of panel regressions of institutional ownership on repurchase payout for publicly listed U.S. firms for the years 1994-2018. The dependent variable is the Repurchase Payout Ratio as described in Appendix A. The main independent variable is institutional ownership (IO). Model 1 reports estimates of a firm year pooled OLS, model 2 reports a panel with year fixed effects. Model 3 reports estimates of a panel with year panel with industry fixed effects. Model 4 reports estimates of a panel with year fixed effects and firm fixed effects.

	Dependent variable: **repurchase** payout ratio.			
Variables	(1)	(2)	(3)	(4)
IO	1.562***	1.523***	1.397***	0.858***
	(0.0539)	(0.0551)	(0.0565)	(0.129)
Size	0.0873***	0.0857***	0.116***	0.00291
	(0.00761)	(0.00864)	(0.00906)	(0.0351)
ROA	0.390***	0.405***	0.328***	0.244***
	(0.0478)	(0.0504)	(0.0506)	(0.0700)
MTB	-0.0742***	-0.0741***	-0.0636***	-0.114***
	(0.00571)	(0.00789)	(0.00806)	(0.0112)
Leverage	0.332***	0.334***	0.337***	0.0845
	(0.0443)	(0.0510)	(0.0513)	(0.0753)
Tangibility	0.161	0.225**	0.0301	1.005***
	(0.0982)	(0.0935)	(0.114)	(0.235)
Capex	0.257*	-0.0261	-0.238**	0.336**
	(0.154)	(0.119)	(0.121)	(0.165)
RD	0.276*	0.00134	0.294**	0.615***
	(0.151)	(0.138)	(0.144)	(0.197)
Liquidity	0.00501	0.00351	0.0153***	-0.00212
	(0.00484)	(0.00577)	(0.00585)	(0.00823)
Constant	0.148**	0.205***	0.0570	0.957***
	(0.0608)	(0.0679)	(0.0709)	(0.212)
Observations	45,642	45,642	45,641	45,416
R-squared	0.052	0.070	0.080	0.303
Year fixed effects	No	Yes	Yes	Yes
Industry effects	No	No	Yes	No
Firm effects	No	No	No	Yes

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 4
Institutional ownership and total payout

This table shows estimates of panel regressions of institutional ownership on total payout for publicly listed U.S. firms for the years 1994-2018. The dependent variable is the Total Payout Ratio as described in Appendix A. The main independent variable is institutional ownership (IO). Model 1 reports estimates of a firm year pooled OLS, model 2 reports a panel with year fixed effects. Model 3 reports estimates of a panel with year panel with industry fixed effects. Model 4 reports estimates of a panel with year fixed effects and firm fixed effects.

	Dependent variable: **total** payout ratio.			
Variables	(1)	(2)	(3)	(4)
IO	0.574***	0.441***	0.407***	0.158
	(0.0767)	(0.0806)	(0.0826)	(0.179)
Size	0.277***	0.265***	0.268***	-0.102**
	(0.0116)	(0.0126)	(0.0132)	(0.0487)
ROA	0.764***	0.826***	0.772***	0.382***
	(0.0977)	(0.0737)	(0.0740)	(0.0970)
MTB	-0.116***	-0.112***	-0.0835***	-0.147***
	(0.0105)	(0.0115)	(0.0118)	(0.0155)
Leverage	1.126***	1.106***	1.045***	0.410***
	(0.101)	(0.0746)	(0.0750)	(0.104)
Tangibility	0.556***	0.723***	0.320*	0.213
	(0.154)	(0.137)	(0.167)	(0.326)
Capex	2.126***	1.785***	1.573***	2.787***
	(0.356)	(0.174)	(0.177)	(0.228)
RD	1.502***	1.123***	1.803***	2.152***
	(0.345)	(0.202)	(0.210)	(0.272)
Liquidity	0.00787	0.00421	0.0199**	0.00160
	(0.00756)	(0.00844)	(0.00854)	(0.0114)
Constant	-0.0357	0.125	0.0844	2.679***
	(0.106)	(0.0994)	(0.104)	(0.294)
Observations	45,642	45,642	45,641	45,416
R-squared	0.057	0.071	0.082	0.375
Year fixed effects	No	Yes	Yes	Yes
Industry effects	No	No	Yes	No
Firm effects	No	No	No	Yes

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 5
Matrix of correlations between indexation and institutional ownership

This matrix of correlations shows a positive correlation between institutional ownership and indexation of 0.241.

Variables	IO	lagSP
IO	1.000	
lagSP	0.241	1.000

Table 6
Indexation and institutional ownership

This table shows estimates of panel regressions of S&P 500 Value indexation on institutional ownership for publicly listed U.S. firms for the years 1994-2018. All models include year fixed effects and firm fixed effects.

	(1)
Variables	IO
lagSP	0.000384
	(0.00329)
Constant	0.457***
	(0.000526)
Observations	65,407
R-squared	0.885

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 7
Indexation and payout

This table shows estimates of panel regressions of S&P 500 Value indexation on respectively dividend payout ratio, repurchase payout ratio and total payout ratio for publicly listed U.S. firms for the years 1994-2018. Model 1 and 2 report the effect of indexation on dividend payout ratio. Model 3 and 4 report the effect of indexation on repurchase payout ratio. Model 5 and 6 report the effect of indexation on total payout ratio. In all models year fixed effects and firm fixed effects are included.

Variables	(1) Dividend Payout Ratio	(2) Dividend Payout Ratio	(3) Repurchase Payout Ratio	(4) Repurchase Payout Ratio	(5) Total Payout Ratio	(6) Total Payout Ratio
SP	0.286***	0.269***	0.836***	0.818***	1.130***	1.060***
	(0.0526)	(0.0574)	(0.0776)	(0.104)	(0.114)	(0.141)
lagSize		-0.0177		0.452***		0.443***
		(0.0195)		(0.0353)		(0.0481)
lagROA		-0.179***		-0.0109		-0.199*
		(0.0446)		(0.0807)		(0.110)
lagMTB		-0.0247***		-0.0328***		-0.0642***
		(0.00679)		(0.0123)		(0.0167)
lagLeverage		-0.0656		-0.483***		-0.552***
		(0.0486)		(0.0880)		(0.120)
lagTangibility		-0.265*		-0.390		-0.802**
		(0.144)		(0.260)		(0.354)
lagCapex		0.281***		-1.362***		-0.846***
		(0.105)		(0.191)		(0.260)
lagRD		0.0867		0.159		0.312
		(0.130)		(0.235)		(0.320)
lagLiquidity		0.00402		0.0454***		0.0572***
		(0.00503)		(0.00910)		(0.0124)
Constant	1.139***	1.085***	1.333***	-0.847***	2.632***	0.317
	(0.00819)	(0.130)	(0.0121)	(0.235)	(0.0178)	(0.319)
Observations	75,905	38,881	75,905	38,881	75,905	38,881
R-squared	0.525	0.539	0.289	0.321	0.378	0.385

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 8
Institutional ownership measured as Top5IO and payout

This table shows estimates of panel regressions of institutional ownership measured as Top 5 Institutional Investors on payout for publicly listed U.S. firms for the years 1994-2018. The dependent variables are the Dividend Payout Ratio, Repurchase Payout Ratio and Total Payout Ratio as described in Appendix A. All models include year fixed effects and firm fixed effects.

	Dependent variables:		
Variables	Dividend Payout Ratio	Repurchase Payout Ratio	Total Payout Ratio
Top5IO	-0.00269**	0.0243***	0.0250***
	(0.00123)	(0.00213)	(0.00295)
Size	-0.139***	0.0362	-0.146***
	(0.0188)	(0.0326)	(0.0452)
ROA	0.0466	0.250***	0.406***
	(0.0402)	(0.0699)	(0.0969)
MTB	-0.0420***	-0.108***	-0.148***
	(0.00637)	(0.0111)	(0.0153)
Leverage	0.167***	0.0958	0.441***
	(0.0433)	(0.0752)	(0.104)
Tangibility	-0.632***	0.952***	0.116
	(0.135)	(0.235)	(0.326)
Capex	1.717***	0.288*	2.822***
	(0.0944)	(0.164)	(0.227)
RD	0.776***	0.598***	2.144***
	(0.113)	(0.196)	(0.272)
Liquidity	0.00216	-0.00154	0.00214
	(0.00473)	(0.00822)	(0.0114)
Constant	1.697***	0.629***	2.466***
	(0.122)	(0.211)	(0.293)
Observations	45,416	45,416	45,416
R-squared	0.519	0.305	0.376
Year fixed effects	Yes	Yes	Yes
Firm effects	Yes	Yes	Yes

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

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Figure 1
Aggregate Dividends, Repurchases and Total Payout
The aggregate absolute total payout is expressed in millions.

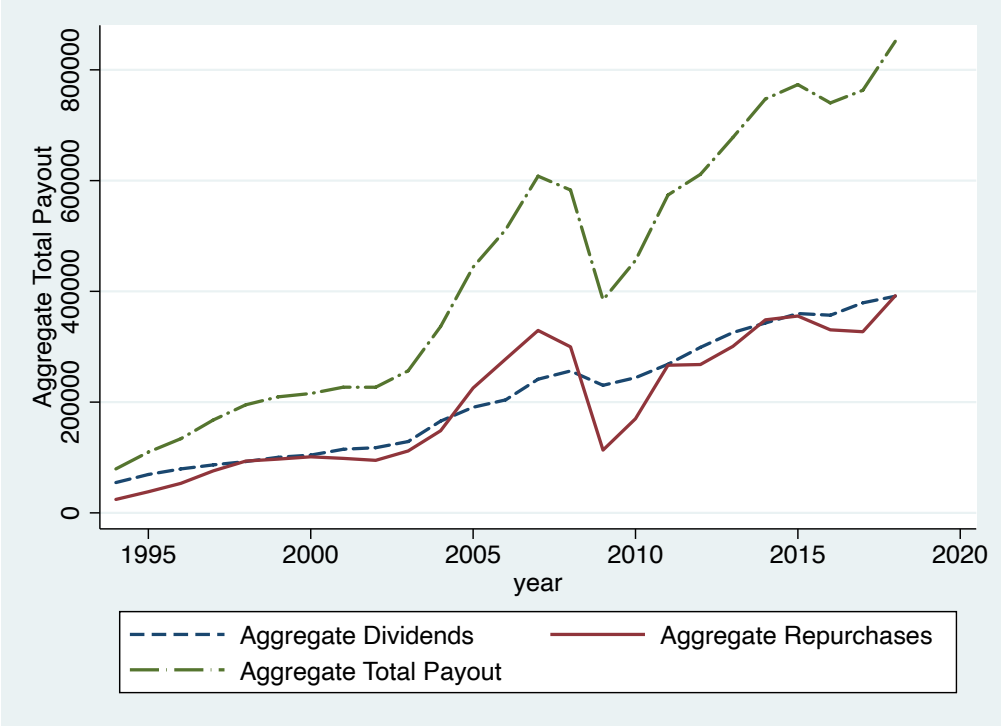
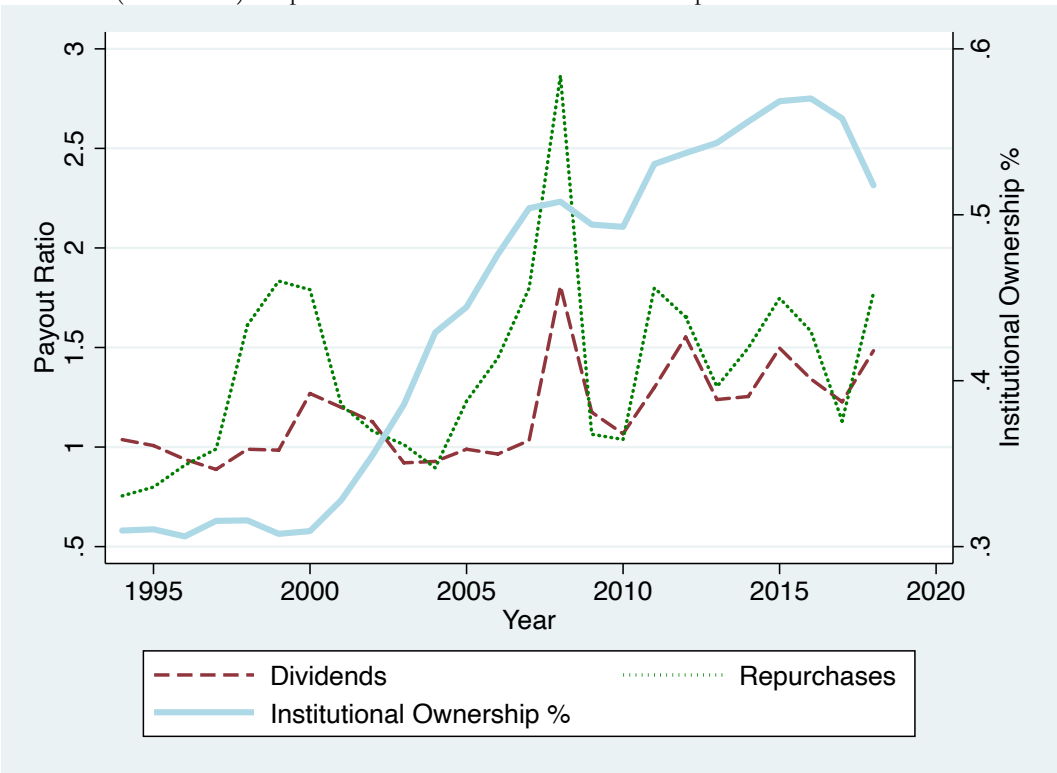


Figure 2
Dividends, Purchases & Percentage of Institutional Ownership.
The institutional ownership (solid line) has increased since 1994. Since 2010 institutional investors have on average more than 50% ownership in publicly listed U.S. companies. Repurchases (dotted line) and Dividends (dashed line) are presented as a ratio based on market capitalization.



APPENDICES

Appendix A: Detailed variable descriptions

Variable	Description	Database
Total dividend	DVT Total dividends (in millions) is the total amount of dividends declared on all equity capital. This measure excludes payouts of stock dividends.	Firm fundamentals data from Compustat
Total repurchases	PRSTKC Purchase of common and preferred stock (in millions).	Firm fundamentals data from Compustat
Payout	DVT + PRSTKC The sum of total dividends and purchase of common and preferred stock (in millions).	Firm fundamentals data from Compustat
Marketcap	PRCC_F*CSHO Market capitalization (in millions).	Firm fundamentals data from Compustat
Dividend Payout Ratio	(DVT)/(Marketcap)*100% (in millions)	Firm fundamentals data Compustat
Repurchase Payout Ratio	(PRSTKC)(Marketcap) *100% (in millions)	Firm fundamentals data from Compustat
Total Payout Ratio	(DVT+PRSTKC)/(Marketcap) *100% Total payout scaled by market capitalization (in millions).	Firm fundamentals data from Compustat

IO_{it} Institutional ownership (%)	Total institutional ownership, the percentage of shares outstanding held by institutional investors.	Thomson Reuters Institutional 13F Holdings Stock Ownership Summary
$TOP5IO_{it}$ Top 5 institutional ownership	The sum of the five largest institutional ownerships defined as a percentage of the firm's total shares outstanding. This variable is a proxy for institutional ownership concentration.	Thomson Reuters Institutional 13F Holdings Stock Ownership Summary
$SIZE_{it}$ Natural logarithm of total assets	Firm size, measured as the natural logarithm of total assets (AT).	Firm fundamentals data from Compustat
CEQ Total common equity	Total common equity (CEQ) (in millions).	Firm fundamentals data from Compustat
CSHO Total shares outstanding	Total share outstanding (CSHO) (in millions).	Firm fundamentals data from Compustat
$EBITDA_{it}$ EBITDA	Earnings Before Interest Tax Depreciation Amortization (in millions).	Firm fundamentals data from Compustat
LT Total liabilities	Total liabilities (LT) (in millions).	Firm fundamentals data from Compustat
NI Net income	Net income (loss) (NI) *actual number*.	Firm fundamentals data from Compustat

SALE Sales	Net gross sales.	Firm fundamentals data from Compustat
DPS Dividend per share	Dividend per share is generated by DVT divided by CSHO.	Firm fundamentals data from Compustat
EPS Earnings per share	Earnings per share is generated by EBITDA divided by CSHO.	Firm fundamentals data from Compustat
ROA_{it} Return on assets	Return on assets measured as net income (NI) divided by total assets (AT).	Firm fundamentals data from Compustat
$Leverage_{it}$ Financial leverage	Financial leverage measured as total liabilities (LT) divided by total assets (AT).	Firm fundamentals data from Compustat
$Tangibility_{it}$	Net property, plant and equipment (PPENT) scaled by total assets (AT)	Firm fundamentals data from Compustat
$Liquidity_{it}$	Firm's liquidity, total assets over total liabilities.	Firm fundamentals data from Compustat
$R\&D_{it}$	Research and development expenses (XRD) scaled by Marketcap and if missing replaced with zero.	Firm fundamentals data from Compustat

$Capex_{it}$	Capital expenditures (CAPX) scaled by Marketcap.	Firm fundamentals data from Compustat
MTB_{it}	Market equity (PRCC * CSHPRI) + debt (DLC+DLTT) + preferred stock (PSTKL), minus deferred taxes (TXDC), all scaled by book value of total assets (AT) following Crane et al. (2016).	Firm fundamentals data from Compustat
SP_{it}	S&P 500 Value indexed dummy variable which equals one if firm i is indexed in the S&P 500 Value in year t and zero if the firm is not indexed in year t.	Index Constituents database from Compustat