UNIVERSITY OF EXETER

Essays on Stock Return Predictability and Corporate Payout Policy

by

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Declaration of Authorship

Submitted by Pedro Angel Garcia Ares, to the University of Exeter as a thesis for the degree of Doctor of Philosophy in Finance, September 2014.

I certify that all material in this thesis which is not my own work has been identified and that no material has previously been submitted and approved for the award of a degree by this or any other University.

Signed: ____

"In every end, there is also a beginning"

Libba Bray, A Great and Terrible Beauty

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Abstract

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This dissertation studies the effect of the changes in corporate dividend policy on the predictability of stock returns. The first two chapters re-visit the question of what drives stock returns after controlling for these market-wide changes in the cross-sectional profile of dividend paying firms, and the third chapter studies the nature of these changes across different industry groups, stock market indexes, size and age.

There have been several significant changes in the nature of corporate payout policy of US firms over the last several decades. We focus our work on the effect of two of these changes, using the present value model, into the question of what drives stock returns-cash flows or discount rate news. Chapter 1 studies the effect of the large decrease in the proportion of dividend paying firms in changes in expected cash flows and/or discount rates by focusing on portfolios of dividend paying firms rather than aggregate portfolios of all listed firms. Our results, from Chapter 1, imply that the relatively importance of cash flows and discount rate news is intimately related to the cross-sectional variation in the patterns of dividend payers in the stock market and provide an intuitive explanation for the contradictory results documented in the existing literature.

Chapter 2 builds on Chapter 1 and tries to reconcile and explain why results using the return and the book-to-market decomposition differ for the post-WW II period. It also provides with an alternate explanation different from dividend smoothing for the apparent absence of dividend growth predictability in post-WW II U.S. data. We find that predictive regressions based on the return on equity decomposition are sensitive to the way in which firm-level data is aggregated. Specifically we find that when firm-level data is weighted by value both decomposition methods -the Campbell-Shiller and the Voulteenaho return decompositions provide strong support for cash flow news as a driver of stock returns in post-WW II data. We also find that, in post-WW II data, the existence of cash flow news is driven by the fact that the biggest firms by market capitalization are not always those that generate the biggest earnings or pay the largest dollar dividends.

In Chapter 3, the final part of this work, we investigate the anatomy of corporate payouts. Specifically, we use firm-level data to understand which firms drive the changing patterns of payouts over time and in the cross-section. Our work extends the current literature by studying firms payouts based on industry sectors, firm age and other attributes. Our main finding is that we find support for our conjecture - in Chapter 2, that the biggest firms by market capitalization are not always those that generate the biggest earnings or pay the largest dollar dividends.

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A special thanks to my family and specially to to my mother, my father and my brother for all of the sacrifices that they have made on my behalf. So I dedicate this project to them, without whose love, affection and encouragement this work would not have been possible.

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Chapter 1

What do Dividend Paying Firms tell us about the Return Decomposition?

1.1 Introduction

The question of what drives stock returns - changes in expected cash flows or discount rates is central to finance theory and has attracted much research attention. Campbell and Shiller (1988) and Campbell (1991), using a stock return decomposition and estimations based on VARs, find that discount rate news is more important than news about cash flows. In contrast, at the firm-level (Vuolteenaho, 2002), cash flows news dominates news about expected discount rates. However, Chen, Da, and Zhao (2013) using an alternate estimation method find that cash flow news, in contrast to prior research, is as important as discount rate news especially after 1985. These papers use either an aggregate market index or large samples of listed stocks. We know from Fama and French (2001) that the proportion of firms that pay and do not pay dividends has changed considerably over time. In this paper, we explore what drives stock returns focusing on investible portfolios that include only firms that pay dividends. These portfolios have real world counterparts in for example the S&P 500 Dividend Aristocrat Index and in mutual funds that invest in either dividend paying or non-dividend paying stocks. Using these portfolios, we are able to focus on the component of the aggregate market that is relevant for constructing an adjusted dividend price ratio. This adjusted ratio reduces the noise introduced in to the denominator due to the significant and changing proportion of firms that do not pay dividends and for whom the return decomposition is not defined. Using sub-periods based on observed changes in the patterns of dividend payments we are able to provide an intuitively appealing rationale for the relative importance of cash flow and discount rate news documented in the data.

Figures 1.1 and 1.2 provide the motivation for studying portfolios of firm disaggregated on their dividend payments. It depicts the proportion of firms traded on US stock exchanges over the period 1926-2011, using the four categories in Fama and French (2001); dividend payers and non payers, those that never paid and those that always paid dividends. The pattern is striking. If we focus on dividend payers (the non-payers are a mirror image of this proportion) we find that prior to WW II (till 1938) there was a huge drop in dividend payers from about 60% in prior to the Great Depression to half that figure in the early 1930s. This proportion recovered by 1938 reaching again the level achieved during the early 1920s. Subsequently (after considering the spikes due to the addition of AMEX stocks in 1961 and NASDAQ in 1973 to the CRSP data base) this proportion remained between 60-80% and started falling during the 1980s to reach about 30% by 1990. However, the period after 1990 also saw a dramatic rise in the number of firms that always paid dividends from less than 5% to more than 20% of all CRSP firms. These changes, albeit for different reasons prior to 1938 and after 1990 lie behind the relative changes in the role of cash flow and discount rate news.

Our main results are as follows. First, we find, different from the literature, that after the WW II period there have been two distinct periods; from 1938-1990 when discount rate news is more important than cash flow news and after 1990 when cash flow news is more important than DR news. Next, we confirm earlier results that prior to WW II cash flow news dominates discount rate news as a driver of stock returns. Finally, we find that the underlying cause of the changes in what drives stock returns is not dividend smoothing but rather market-wide changes in the cross-sectional profile of dividend paying firms.

The rest of the Chapter is organized as follows. Section 2 reviews the existing literature. Section 3 describes the data and methodology. Section 4 presents the empirical results and results of robustness tests. Section 6 concludes the paper.

1.2 Prior Related Research

A large literature (comprehensively reviewed in Koijen and Nieuwerburgh (2011)) has used the stock return decomposition proposed in Campbell and Shiller (1988) and Campbell (1991) to study the relative contribution of news about expected cash flows and discount rates to innovations in expected stock returns. For example, Campbell and Ammer (1993), using data on NYSE and AMEX stocks over the 1952-1987 period, find that excess returns on the aggregate stock market portfolio are driven largely by news about expected returns (70%) as compared to news about future cash flows (15%). Vuolteenaho (2002), using annual data from 1954-1996 for NYSE, AMEX, and NASDAQ stocks, estimates cash flow news and discount rate news at the firm-level. He finds, in contrast to the decomposition using aggregate market returns, that at the individual firm level CF news accounts for 70-80% of stock return variance. Voulteenaho shows that firm-level cash flow news is largely idiosyncratic and is diversified away in aggregate portfolios. As a result, discount rate news remains important at the portfolio level.

Chen and Zhao (2009) however, find that the stock return decomposition obtained using VARs can be sensitive to the choice of the predictive state variables used. They also claim that it therefore matters whether the discount rate news is modeled (via expected returns) or whether cash flow news is estimated as a residual. Engested, Pederson, and Tanggaard (2011) argue that for the decomposition to be valid the asset price needs to be included as a state variable in the VAR. Specifically, if in estimating equity return decompositions the dividend-price ratio is included then it does not matter whether a component is directly estimated or backed out as a residual. In this paper, we follow this advice and use the dividend-price ratio as a state variable in the VAR model.

In order to avoid issues related to the specification of the VAR, Chen, Da, and Zhao (2013) estimate the implied cost of capital from analysts' forecasts. They then define cash flow news as the price change calculated by holding the implied cost of capital constant. Their results cover a shorter period from 1985-2010 when data on analyst's forecasts is available. They find that, over their 1985-2010 period, there is a significant amount of cash flow news at both short and long horizons. This holds for both at aggregate and firm level.

Campbell, Giglio, and Polk (2013) use quarterly data, over the 1929-2010 period, to estimate the relative magnitudes of discount rate and cash flow news. They use unrestricted VARs and VARs with restrictions imposed by an intertemporal CAPM. They find that the Great Depression, the recession of 1937-1938 and the financial crises of 2007-2009 are largely driven by bad news about future cash flows. However some episodes such as the market downturn in 2000-02 are largely driven by discount rates news.

Our paper builds on the corporate finance literature on changes in patterns of dividends payouts at the firm and aggregate level both over time and across the cross-section of listed firms. Fama and French (2001) are the first to document a large decline over 1978-1999 in the proportion of industrial firms that pay dividends. They find that this dramatic change is due both to changes in the population of firms that are now publicly held and to a reduced propensity to pay dividends. It is important to note that Fama and French (2001) emphasize that their results show a reduction in the number and percent of dividend paying firms rather than the notion that dividends themselves are disappearing.

DeAngelo, DeAngelo, and Skinner (2004) confirm this radical transformation in corporate dividend practices and also report that it does not indicate that dividends are disappearing. They find that dividends paid by industrial firms actually increased over 1978-2000, both in nominal and in real terms (by 224.6% and 22.7% respectively) although there was a more than 50% decline in the number of payers. They suggest two reasons for this; the first is that the reduction in payers occurred almost entirely among firms that paid very small dividends. Hence the loss of these firms' dividends has only a small impact on the aggregate supply of dividends. Second, the amount of dividends paid increased substantially among the largest payers reflecting a marked increase in their real earnings.

In short, the increase in real dividends paid by firms at the top of the dividend distribution was much larger than the dividend reduction associated with the loss of many small payers at the bottom. They show that these secular changes reflect high and increasing dividend concentration.

Fuller and Goldstein (2011) further examine whether portfolios of dividend-paying firms outperform those of non-dividend-paying firms. They find that dividend-paying firms outplay non-dividend-paying firms by more when the market declines than when the market is increasing. Floyd, Li, and Skinner (2013) also study the payout polices of US firms over the 1980-2010 period. They find a strong rise in payouts for both industrials and financials starting in 2001. Of interest to our study is their creation of portfolios of firms in six different payer groups: firms that only pay dividends, firms that pay both dividends and repurchases, firms that only pay repurchases, firms that do not pay dividends or repurchases (non-payers), all firms that pay dividends, and all firms that pay repurchases. Floyd, Li, and Skinner (2013) find (similar to Fama and French (2001)) that the fraction of industrials paying dividends declines steadily over time, from a high of 57% in 1980 to a low of 15% in 2002. Further they find that the fraction of firms that only pay dividends declines from 57% in 1980 to a low of 7% in 2000. After this, however, the decline reverses; the fraction of dividend-payers increases from 15% in 2002 to 23% in 2006 to 2008 before declining slightly to 22% in 2009 and is back to 25% in 2010. Floyd, Li and Skinner also document that repurchases are of any significance only after 1980 and hence we also use this as the date after which study the role of repurchases and dividends together.

To sum up, we bring together in this paper the literature on return decomposition and that in corporate finance by focusing on portfolios of firms that pay dividends. It turns out that at various periods beginning from 1926 the proportion of firms that pay dividends and those that do not pay dividends at all has changed dramatically over relatively short time periods. We use these changes to determine data driven episodes to which we apply the return decomposition to estimate the relative role of cash flows news and discount rates. Since we use dividend paying firms we can remove from the sample non-dividend payers to whom the return decomposition does not apply. This allows us to reduce the noise in the data and to get a clearer picture of what drives stock returns.

1.3 Methodology

1.3.1 The Return Decomposition framework

Campbell and Shiller (1988) provide a convenient framework for analyzing cash-flow and discount-rate shocks. They develop a loglinear approximate present-value relation that allows for time-varying discount rates. Linearity is achieved by approximating the definition of log return on a dividend-paying asset, $r_{t+1} \equiv \log(P_{t+1} + D_{t+1}) - \log(P_t)$, around the mean log dividend-price ratio, $\overline{(d_t - p_t)}$, using a first-order Taylor expansion. Above, P denotes price, D dividend, and lower-case letters log transforms. The resulting approximation is:

$$r_{t+1} \simeq \kappa + \rho p_{t+1} + (1-\rho)d_{t+1} - p_t \tag{1.1}$$

where ρ and κ are parameters of linearization defined by $\rho \equiv \frac{1}{(1+\exp^{(d_t - p_t)})}$ and κ is a linearization constant $\kappa \equiv -\log(\rho) - (1-\rho)log(\frac{1}{\rho-1})$. When the dividend-price ratio is constant, then $\rho = \frac{P}{(P+D)}$, the ratio of the ex-dividend to the cum-dividend stock price.

This approximation replaces the log sum of price and dividend with a weighted average of log price and log dividend, where the weights are determined by the average relative magnitudes of these two variables. Solving equation (1.1) by iterating forward, imposing the "no-infinite-bubbles" terminal condition that $\lim_{j\to\infty} \rho^j p_{t+j} = 0$, taking expectations, and subtracting the current dividends, results in:

$$p_t - d_t = \frac{\kappa}{(1-\rho)} + E_t \sum_{j=0}^{\infty} \rho^j [\Delta d_{t+1+j} - r_{t+1+j}] \tag{1.2}$$

where Δd denotes log dividend growth. Equation (1.2) says that the log price-dividend ratio is high when dividends are expected to grow rapidly, or when stock returns are expected to be low. It needs to be noted that the above equation is an accounting identity rather than a behavioral model. Intuitively, if the stock price is high today, then from the definition of the return and the terminal condition that the dividend-price ratio is non-explosive, there must either be high dividends or low stock returns in the future. Campbell (1991) extends the loglinear present-value approach to obtain a decomposition of returns. Substituting (1.2) into the approximate return equation gives

$$\begin{aligned} r_{t+1} - E_t r_{t+1} &= (E_{t+1} - E_t) \sum_{j=0}^{\infty} \rho^j \Delta d_{t+1+j} - (E_{t+1} - E_t) \sum_{j=0}^{\infty} p^j r_{t+1+j} \\ &= e_{CF,t+1} - e_{DR,t+1} \end{aligned} \tag{1.3}$$

where N_{CF} denotes news about future cash flows (i.e dividends or consumption), and N_{DR} denotes news about future discount rates (i.e expected returns). This equation says that unexpected stock returns must be associated with changes in expectations of future cash flows or discount rates. In other words, an increase in expected future cash flows is associated with a capital gain today, while an increase in discount rates is associated with a capital loss today. This is because with a given dividend stream, higher future returns can only be generated by future price appreciation from a lower current price. If this decomposition is applied to the returns on the investor's portfolio then these return components can also be interpreted as permanent and transitory shocks to the investor's wealth. Since neither expected cash flows nor discount rates are observable, the procedure most often used in the literature and the one we rely on, is to predict cash flows and discount rates as functions of the predictive variables using VAR estimates. We will see later that this mechanism is subject to estimation errors

1.3.2 The VAR model

Campbell (1991) uses vector vector autoregressive (VAR) model to estimate the cash-flow-news and discount-rate-news series. This method first estimates the terms $E_t r_{t+1}$ and $(E_{t+1} - E_t) \sum_{j=0}^{\infty} p^j r_{t+1+j}$ and then uses realizations of r_{t+1} and Equation (1.3) to back out the cash-flow news. It is assumed that the data are generated by a first-order VAR model

$$z_{t+1} = a + \Gamma z_t + u_{t+1} \tag{1.4}$$

where z_{t+1} is a m-by-1 state vector with r_{t+1} as its first element, a and Γ are m-by-1 vector and m-by-m matrix of constant parameters, and u_{t+1} an i.i.d. m-by-1 vector of shocks. Of course, this formulation also allows for higher-order VAR models via a simple redefinition of the state vector to include lagged values. Provided that the process in equation (1.4) generates the data, $t+1$ cash-flow and discount-rate news are linear functions of the $t+1$ shock vector:

$$\begin{aligned} N_{DR,t+1} &= e_1' u_{t+1} \\ N_{CF,t+1} &= (e_1' + e_1\lambda) u_{t+1} \end{aligned} \tag{1.5}$$

Above, $e1$ is a vector with first element equal to unity and the remaining elements equal to zeros. The VAR shocks are mapped to news by λ, defined as $\lambda = \rho\Gamma(I - \rho\Gamma)^{-1}$. $e1\lambda$ captures the long-run significance of each individual VAR shock to discount-rate expectations. The greater the absolute value of a variable's coefficient in the return prediction equation (the top row of Γ), the greater the weight the variable receives in the discount-rate-news formula. More persistent variables should also receive more weight, which is captured by the term $(I - \rho\Gamma)^{-1}$.

To measure the relative importance of returns news and dividend news in explaining the variability of return innovations, usually the variances and covariances of each of the components (1.5) are computed. Due to the covariance term such variance ratios may be difficult to interpret, so instead one can orthogonalize the components using a Cholesky decomposition. The drawback of orthogonalizing, however, is that the Cholesky decomposition is not independent of the ordering of the variables and it is not clear whether returns or dividends should be ordered first. In the literature one can find both unorthogonalized and orthogonalized decompositions, and with various orderings of the variables. Our results are based on a unorthogonalized decomposition including the covariance term of returns news and dividend news.

There are a number of issues in estimation of the unobservable cash flow and discount rate news using this VAR methodology as indicated Campbell (1991) and Campbell and Ammer (1993). In recent work, Chen and Zhao (2009) find that the VAR-based decompositions are sensitive to the variables included in the VAR. Engested, Pederson, and Tanggaard (2011) underline the requirements needed for VAR decompositions to be valid. They suggest, first that if the decomposition is for excess returns an extra news component appears in addition to cash flow news and excess return news, namely interest rate news. Second, in order for the decomposition to be valid the asset price needs to be included as a state variable in the VAR. They also observe that for equity return decompositions the dividend-price ratio is the theoretically correct variable to include. Finally, they note that if the VAR system is properly specified it does not matter whether cash flow news or discount rate news are computed directly or one of them is backed out as a residual. Due to the sensitivity of DR and CF news to the choice of sample periods or predictive variables there is a growing literature that explores some alternative methods of CF and DR news estimation that do not rely entirely on predictive regressions and try to use direct expected cash flow measures (e.g Chen, Da and Zhao (2013) and Da, Jagannathan and Shen (2014)). In the same line, Chapter 2 also shows that the choice of different definitions of the "market" portfolio influence the role of CF and DR news over time when using predictive regressions.

1.4 Data

1.4.1 Sample Selection

We use the full sample of firms in the Center for Research in Security Prices (CRSP) monthly master file excluding American Depository Receipts (ADRs) (share code 3), for the period 1926-2011. We do this in order to mimic the CRSP value weighted index which is used as a proxy for the return on the stock market. For each firm, we collect its monthly return, share volume and prices data. We exclude from the sample all companies without a valid price, share volume or return. It is common in the literature to exclude utility and financial forms as well as foreign firms and ADRS (see example Skinner (2008) among others). We therefore report also results separately for industrial firms. We find that they are qualitatively similar to those using our larger sample.

1.4.2 Portfolio Construction

We follow Fama and French (2001) in forming portfolios of dividend and non dividend paying stocks. We use data on all NYSE, AMEX and NASDAQ listed stocks with data in CRSP over the period from January 1926 to December 2011 except for ADRs. We define a firm as a dividend payer in calendar year t if its with-dividend return exceeds its without dividend return in any month of year t (ret and retx codes in the CRSP monthly master file). We consider all regularly scheduled dividend payments (monthly, quarterly, and yearly) when classifying firms as dividend-paying. We have also tried using other dividend schedules but these produce qualitatively similar results.

Next, for each month we classify firms as either dividend-paying or non-dividend paying. Following Black and Scholes (1974) and Kalay and Michaely (2000), we define a stock as a dividend-paying stock if that firm has paid dividends in the past and is expected to continue paying on a regular basis. Hence, if a firm pays a quarterly dividend in a month, it is classified as a dividend-paying firm. Further we also classify the months between quarterly-dividend payments as dividend-paying months. In the case of yearly dividend payments, we follow a similar classification in regard to the months between the payments. In the case where firm does not pay dividends but then begins paying it later we classify it as a non-dividend paying firm until the month the dividend is paid. We do this in all cases except where a firm has paid dividend in its first year in which case it is considered as a dividend firm.

In order to facilitate replication of our work we now provide specific illustrations of how we have classified firms in our sample in various dividend categories. First, for example, consider a firm listed on January 2000 that does not pay any dividend until September 2002. We classify this as a non-dividend firm during the period January 2000 to August 2002. After September 2002 we classify it as a dividend-paying firm till the time the firm stops paying a dividend, or is delisted or the sample period ends. In cases where a firm pays a dividend and then stops paying it, we classify it as a dividend-paying firm until the month after the scheduled dividend. For example, if a firm is lists in January 2000 and starts paying a dividend in March 2001 and then stops paying it in June 2003 we regard it as a non-dividend company for the period January 2000 to February 2001, a dividend-paying firm for the period March 2001 to March 2003 (the month of the last quarterly dividend in this case), and a non-dividend paying firm for the period April 2003 until it is either delisted, pays a dividend again, or the sample period ends. Finally, in some cases a firm may reduces its scheduled dividend payment scheme. In such cases we consider the firm to be a dividend-paying firm up until the month of the new scheduled dividend scheme. If in the subsequent year the firm announces a new dividend scheme or continues with the previous scheme, we again consider it as a dividend firm. For example, suppose a firm lists in January 2000 and begins paying a quarterly dividend as of March 2001 but stops paying in December 2003. In this case we treat it as a non-dividend company from January 2000 through April 2003, a dividend-paying firm from March 2001 to September 2003 and a non-dividend till the end of 2003. If the firm starts paying a quarterly dividend in 2004 we again treat it as a dividend-paying company again.

To sum up, each firm is classified as either dividend-paying or non-dividend paying for every month of the sample period in which data is available, resulting in a total of 3,551,386 firm months in our sample period, of which 1,700,986 firm months are dividend-paying firm months and 1,850,400 are non-dividend-paying firm months. When forming portfolios we use both value and equal weighting and report results for each case separately.

1.4.3 Estimation of the Cash Flow and Discount Rate News

We use a VAR to estimate the relative importance of CF and DR news. Our VAR is specified as suggested in Engested, Pederson, and Tanggaard (2011) for the decomposition to be valid. The first element in the VAR when using the aggregate market is the log real return on the market usually calculated as the difference between the monthly log return on the Center for Research in Security Prices (CRSP) value-weighted stock index and the log return on the Consumer Price Index. In our paper we also use value and equally weighted portfolios of dividend payers, as outlined earlier, when we study the decomposition for these categories of firms.

The second element in the VAR is the term yield spread (TY), provided by Global Financial Data and computed as the yield difference between ten-year constant-maturity taxable bonds and short-term taxable notes, in percentage points. This last variable is only available until 2002, from that year until the end of the sample we compute the TY series as the difference between the yield on the 10-Year US Constant Maturity Bond (IGUSA10D) and the yield on the 1-Year US Constant Bond (IGUSA1D). The third variable is the CRSP log dividend-price ratio (DP), that is the difference between the log of the cumulative dividends received within the year without reinvestment, and the log of the price of the monthly CRSP value weighted index (excluding dividends). Finally, we use the small-stock value spread (VS), which we construct using the data made available by Professor Kenneth French on his web site. These portfolios, which are constructed at the end of each June, are the intersection of two portfolios formed on size (market equity, ME) and three portfolios formed on the ratio of book equity to market equity (BE/ME). We generate intermediate values of VS by accumulating total returns on the portfolios in question.

The motivation for the use of these variables is the following. Term yield spread tracks the business cycle, as pointed out by Fama and French (1988), and there are several reasons why we should expect aggregate returns to be correlated to the business cycle. Second, the dividend-price ratio is included, following Campbell and Shiller (1988) and Fama and French (1988), because it should reflect any changes that may occur in future expected returns, and also because it is the theoretically correct variable to include in the VAR. Finally, the small-stock value spread is included given the evidence that relatively high returns for small growth stocks predict low aggregate returns in the market.

1.5 Empirical Results

We begin by describing Figures 1.1-1.3 that depict, over our full sample period 1926-2011, the changes in four portfolios classified following Fama and French (2001) as including firms; that pay dividends, do not pay dividends, always paid and never paid dividends. Next, we describe the results of the variance decomposition of returns on the aggregate market portfolio and separately for portfolios of firms sorted on the basis of their dividend-payment history. We compare our results to those reported in the literature in Campbell (1991) and Chen, Da, and Zhao (2013) using similar sample periods. Next, we turn to our results using the three sub-periods or regimes seen in the data. In all periods we report results of variance decompositions for the aggregate market benchmark and other dividend category portfolios. Finally, we describe the determinants of changes in the relative weights of the components of the expression we use to compute the long-run news components. These weights provide further insights in to the determinants of the cash flow and discount rate components of the return decomposition.

1.5.1 Preliminary Data Analysis

Figure 1.1 is an updated version of the stylized facts first reported in Fama and French (2001). It depicts the proportion, over the period 1926-2011, of CRSP firms in four different dividend categories from 1926 to 2011. Our sample includes all firms in the CRSP universe (excluding only ADRs) that are constituents of the CRSP Indices. We use this sample in order to reflect the fact that aggregate market index commonly used in this literature also consists of this set of firms. Following the literature in corporate finance we separately report results for a sample where we exclude financial firms, utilities as well as foreign firms and ADRS (following Skinner (2008)). We find that the pattern seen over time of this smaller sample of firms is qualitatively similar. In interpreting Figures 1.1-1.3 it should be noted that there are sharp shifts upwards in the number of firms in 1961 when AMEX stocks were included in the CRSP and in 1973 when NASDAQ stocks were added to the CRSP (see for example Figure 1.3).

We first comment on, in Figure 1.1, the variation over time between the proportion of firms that are dividend payers and those that are non payers. These two groups have seen dramatic shifts during first and the third of our sub-periods: 1926-1938, 1938-1990 and 1990-2011. For example, during the period 1926-1938 (or prior to WW II) the proportion of dividend payers fell from over 60% to just over 30%. It rose again between 1932 and 1938 back to over 60%. After 1938 up till 1990, there were no large changes and this proportion was between 50-70%. After the mid-1970s this proportion started falling steadily. Similar to the pre-WW II period, after 1990 there have been large variations in this proportion from 50% to between 30-40% in first decade of this century. The proportion of firms that have been non-payers is a mirror image over time of the pattern for firms that were payers and shows again the large changes prior to WW II and after 1990.

Figure 1.1 also shows that there is a marked change prior to WW II and after 1990 in the number of firms that never paid dividends and those that always paid dividends. Specifically, prior to WW II, there was a steady fall in the number of firms that never paid dividends from a level of about 15% in 1926 to less than 5% after 1938. This proportion rose with the addition of AMEX stocks and NASDAQ stocks to about 20% of the CRSP firms. However it rose dramatically during the 1980s and by 1990 almost 40-50% of all firms had never paid dividends. The period after 1990 has also seen a rise in the proportion of firms that always paid dividends from under 10% prior to 1990 to around 20% by the end of the sample period in 2011.

Figure 1.2 shows the evolution over time from 1926 to 2011 of the market value of all CRSP firms in the four dividend portfolios. It clearly shows that little attention has been given to the constituents of the aggregate market portfolio whose relative number has changed over time. These changes affect directly the computation of cash flow and discount rate news as well as the dividend yield. We see, from this graph, that there are three distinct regimes. Specifically, between the start of the sample and prior to WW II (1938) there was a huge drop in the market values of dividend payers (from above 90% to less than 70%). The market value of dividend payers again increased during the 1930s to a level of about 75% in 1938. Then from 1938 to about 1990, the market value of dividend payers did fluctuated but remained at between 80-95% of the market capitalization. However after 1980, the market value of dividend payers started falling. The decade after 1990 saw a dramatic fall and rise in the market value of dividend payers reaching a low of about 50% and rising again to around 80% by 2011. Again, the market capitalization of non-payers is a mirror image of these changes in value of dividend paying firms. We find that in the 1930s the market value of dividend paying firms decreased as firms either stopped paying dividends or were de-listed due to the Great Depression and the recession of 1937-38. In contrast in the 1990s the decrease appears to be due to the emergence of new firms with large market capitalization that never paid dividends during the technology boom. Figure 1.3 confirms this point as it depicts the evolution of the number of firms in different dividend payer categories.

The take away from this exploratory data analysis is the following. It is clear that using measures of the aggregate market for computing the dividend yield masks the nature of dividend patterns in the constituent firms. This does not matter for the computation of dividend growth which is based on the actual cash paid out by all the firms included in the sample whether they pay or do not pay dividends. However, as seen above the full sample of all firms includes firms to whom the dividend decomposition does not apply since the firms do not have any dividend payments at all. Thus, the dividend yield obtained using the market value of all firms does not reflect the actual dividend yield since not all stocks in the "market" portfolio pay dividends. The noise introduced in the dividend yield computation by the use of the aggregate market value rather than data on firms that pay dividends turns out to be important for the variance decomposition. This is because the return decomposition is not defined for firms that do not pay dividends. We now turn to our results for the variance decomposition using the return on the market as a benchmark and compare results using portfolios of firms that paid dividends and the extreme case of firms that always paid dividends.

1.5.2 Variance decomposition

We first report results for the full sample period we use (1927-2011) and our three sub-periods: Pre-WW II, 1938-1990 and 1990-2011. Next we report results using time periods similar to Campbell (1991) and Chen, Da, and Zhao (2013) for comparison.

1.5.2.1 Results for 1926-2011 sample period

Table 1.1 reports results of the return decomposition for the full sample period i.e. 1927:1-2011:12 and for the three sub-periods that we find based on Figure 2, to have different regimes and patterns for the cross-sectional distribution of dividend payment characteristics of firms. We report results for our benchmark case i.e. value weighted portfolios of all firms or the market index used in the prior literature and then using a portfolio of dividend paying firms and firms that have always paid dividends. We see that for the benchmark case i.e. in effect the value weighted CRSP index CF news (36%) and DR news (31%) are equally important for the full sample period 1926-2011. These results echo those reported in Campbell (1991) and Campbell and Ammer (1993). Again for the full sample period, in the case of dividend paying firm our results are similar to those for all firms. This is due to the fact that dividend paying firms, on average, play a dominant role across the full sample period. Finally, in the case of firms that always pay dividends the CF news component is twice that for the discount rate. This is as expected since focusing on this portfolio of firms gives a dominant role to cash flow news.

We now turn to our main results based on our subperiods; 1927-1938, 1938-1990 and 1990-2011. In our first sub-sample period, i.e. prior to WW II, CF news (78%) is much more important than DR news (6%) for the sample of all firms. We note that these results are similar to those in Campbell, Polk and Giglio (2013). This period was marked by the Great Depression and the recession of 1937-38 where investors were particularly impacted by (bad) cash flow news.

Subsequently, during the period from 1938-1990, we see that this pattern is completely reversed. Now DR news (96%) dominates CF news (15%). Except for the spikes in the data due to the addition of AMEX and NASDAQ firms this entire period did not see large changes in either the number or market value of dividend paying firms. However, in the most recent sub-period (1990-2011), again characterized by large swings in dividend payment patterns, discount rate news becomes less important and now contributes only half of the variation seen in period 2 while the cash flow component increases to about 25% from 15%.

Using portfolios of dividend payers and firms that always paid dividends we find results that are dramatically different from those for the aggregate market return. During the first sub-period, compared to the all firms benchmark sample, CF news is much more important than DR news (91%) for dividend payers. In the case of firms that always pay dividends almost all the variation now comes only from cash flow news. The economic intuition for these results lies in the large fall in the proportion of firms that stopped paying dividends around 1930 and the rapid reversal of this within a few years leading up to 1938. In addition firms that still paid out dividends reduced the amount of their dividend payments. There is further support for this fact in the data when we look at changes in dividend growth in this sub-period. We see a large fall in dividend growth around the 1930s and a subsequent positive spike in the late thirties. The effect of these volatile changes in dividend payments resulted in the predominant role for cash flow news in determining innovations to real returns.

During, the second sub-period 1938-1990, in contrast to the pre-WW II period, the market value of dividend payers did not fluctuate much and remained around 80-90% of the total market capitalization. During this sub-period, there is a reversal in the relative importance of the two news components. Now, for the full sample, for the aggregate market return discount rate news dominates (96%) compared to cash flow news (15%). Remarkably, in the case of dividend payers discount rate (92%) dominates cash flow news (15%). Even in the case firms that have always paid dividends, discount rate news is still dominant but is slightly less at 76% with cash flow news at 25%. The intuition for these results is based on the fact that, unlike in the first period, there is little variation in the proportions of firms paying dividends and thus the contribution to return variation comes largely from discount rate changes. Further, compared to the first period, dividend growth is also much less volatile through this whole period again emphasizing the role of discount rates in contributing to innovation in real returns.

Now we turn to the third and most recent sub-period from 1990-2011. In the benchmark case i.e. all sample firms discount rate news still dominates (51%) but this is only half of that in the previous period. The average results of all firms however mask an interesting change in the relative contribution of discount rate and cash flow news. In the case of dividend paying firms, cash flow news (48%) is more important than DR news (28%). This is in complete contrast to the results when all firms are included in the sample. For the firms that always paid dividends the cash flow component increases dramatically and now 71% of variation is from CF news and only 27% from discount rate news. We see that this period is marked by a large increase in the proportion of firms that never paid dividends from a level of about 10% to over 40% of all firms. In contrast the proportion of firms that paid dividends was fairly stable at around 40-50% of all firms in the market. A consequence of this was that the market value of firms that paid dividends decreased dramatically from 90% to less than 60% over a short period of time. In the last few years of the sample, there is also a fall in the number of firms that never paid dividends resulting in an increase in market value of payers.

Finally, figure 1.4 depicts graphically the weights used to construct the discount-rates for the full sample period and for the three sub-periods that are suggested to have different regimes and patterns for the cross sectional distribution characteristics of firms. As in the Figures described earlier the weights vary significantly both, across sample periods and across portfolios. The weight corresponding to the dividend price ratio is quantitatively the largest but it also varies depending on the sample or the type of portfolios used in the VAR. Overall, the predominance of DR news coincides with a larger weight assigned to the residual from the dividend price ratio and the low value or negative valued weight on the real return. We note here that the return innovation and the return news component are computed directly while the CF or dividend news component is obtained as a residual.

The change on the weights from the first to the second period is behind the dramatic reversals in the CF and DR variances for all portfolio categories. The real return and term yield spread weights become smaller while the weight for the dividend yield weight increases dramatically and the value spread weight is negative. Only in the case of always dividend companies is the weight on the dividend yield smaller resulting in the higher DR variance and lower CF variance than in the other two periods. Finally, in the last period we find that CF variance dominates for the case of dividend and always dividend firms in contrast to the aggregate market case. This is due to the lower value of the weight on the dividend price ratio for dividend companies. We also note, in passing, the following intuitive explanation arising from the analysis of the weights: a) the term yield tracks the business cycle. It is large in the first period (great depression) and almost zero during the second period and is large and important during the period 1990-2011 b) the value spread is only positive during the first sub-period of the 30s with the exception of all dividend companies and c) the dividend yield variable is important and is related to dividend growth and return predictability.

1.5.2.2 Comparison with Campbell (1991)

In Table 1.2, we report the results of the variance decomposition using sample periods similar to that in Campbell (1991); the full period 1927-1988 and sub-periods 1927-51 and 1952-1988. We find, over the full Campbell sample period, results that are similar when using the full sample of firms. Also we find, during the 1927-1951 and 1952-88 sub-periods that the pattern of CF news and DR news are similar.

1.5.2.3 Comparison with Chen, Da and Zhao (2013)

In Table 1.3 we divide the full sample period, 1927-2011, in the following sub-periods following Chen, Da and Zhao (2013); 1927-2011, 1952-2011 and 1985-2011 to facilitate comparison with Tables 2 and 4 of their paper. Table 3 shows that for the benchmark portfolio of all firms and dividend paying firms CF news and DR news are equally important drivers of real stock returns. However in the case of always dividend paying firms CF news (43%) is more important than DR news (21%). Using a VAR methodology Chen, Da and Zhao report, for a similar time period, that CF contributes 79% and DR news 21% for their longest horizon of 28 quarters. We note that our results are for an infinite horizon. During the 1952-2010 sub-period we find that DR news (53%) is more important than CF news (18%). This holds true also for dividend payers as well as firms that always paid dividends. Our results here are similar to those reported Chen, Da and Zhao (2013) using a VAR and reporting results for a 20 quarter horizon. Finally, we find that for the period 1985-2010, that DR news is more important than CF news for the benchmark aggregate portfolio. However for dividend payers the importance of DR news is lower and in the case of firms that always pay dividend CF news (54%) is more important than DR news (43%). Using their implied cost of capital method, Chen, Da and Zhao's main result is that CF news (59%) is more important than DR news(41%).

1.6 Conclusions

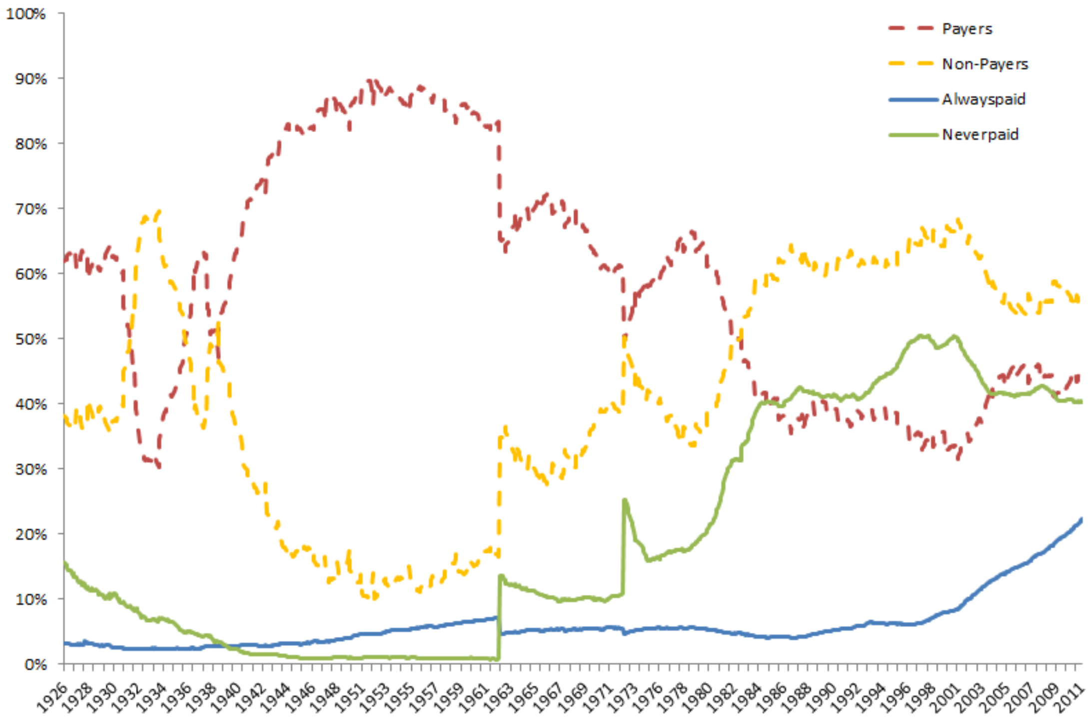
A central question in finance is to understand, using a simple present value model, to what extent asset prices are driven by news about future cash flows or news about future discount rates or risk premia. The variation of expected returns or alternately the time variation in the price-dividend ratio is intimately linked to time variation in expected dividend growth rates through the Campbell and Shiller (1988) return identity. In this paper, we study for the first time, as far as we are aware, return decompositions of stock returns using portfolios of dividend paying firms and excluding non-dividend payers in whose case the return decomposition is not defined.

Our main result is that the relative importance of cash flows and discount rate news is intimately related to the cross-sectional variation in the pattern of dividend payers in the stock market. During periods when there are rapid changes in this composition are marked by a larger importance for cash flow news while during periods that do not see much change discount rate news matters more. Specifically we find that in the pre-WW II period stocks returns were driven by investor's concerns over cash flow rather than discount rate news. During the period following WW II and till 1990, discount rate news played a dominant role. In the period after 1990, again cash flow news is gaining importance reflecting the uncertain environment rising from recession and the financial crises of 2007-2009.

The empirical analysis in this Chapter is based on U.S market data and in the environment of the U.S. financial system. These results are based therefore on the largest equity market in the world. If a similar analysis is done on smaller markets, e.g like one the European Union markets, the results are likely to be different mainly due to the smaller size of these markets, the domination of these market by few large firms, the importance of the bank system in some countries and other legal and institutional differences in trading and stock market regulations. An avenue for future work could be to do a similar analysis of other national stock markets and compared and contrast the results with those of the U.S market. There are also other limitations to the empirical analysis in this Chapter. First, the data pertains to the period which is available on the WRDS database. There are also other pre-1920s data in other sources and the results we have obtained may be not be possible to generalize to other time periods. Another limitation is that we have relied largely on the Campbell and Shiller return decomposition. However, there are other methods that rely on different decompositions. As a consequence, my results are limited to pros and cons of using the Campbell and Shiller decomposition which are well known and refereed to earlier in the Chapter. In addition, the same issues as explored in this Chapter can also be based on alternative approached like the Implied Cost of Capital.

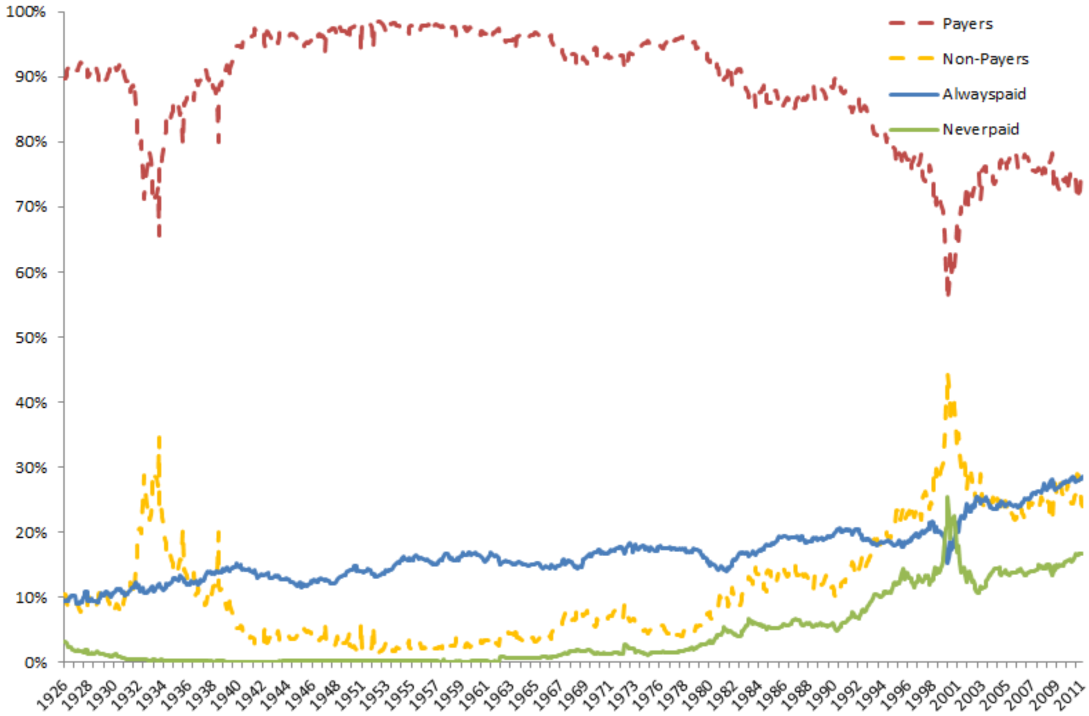
1.7 Figures and Tables

FIGURE 1.1: The percentage of CRSP firms in different dividend groups



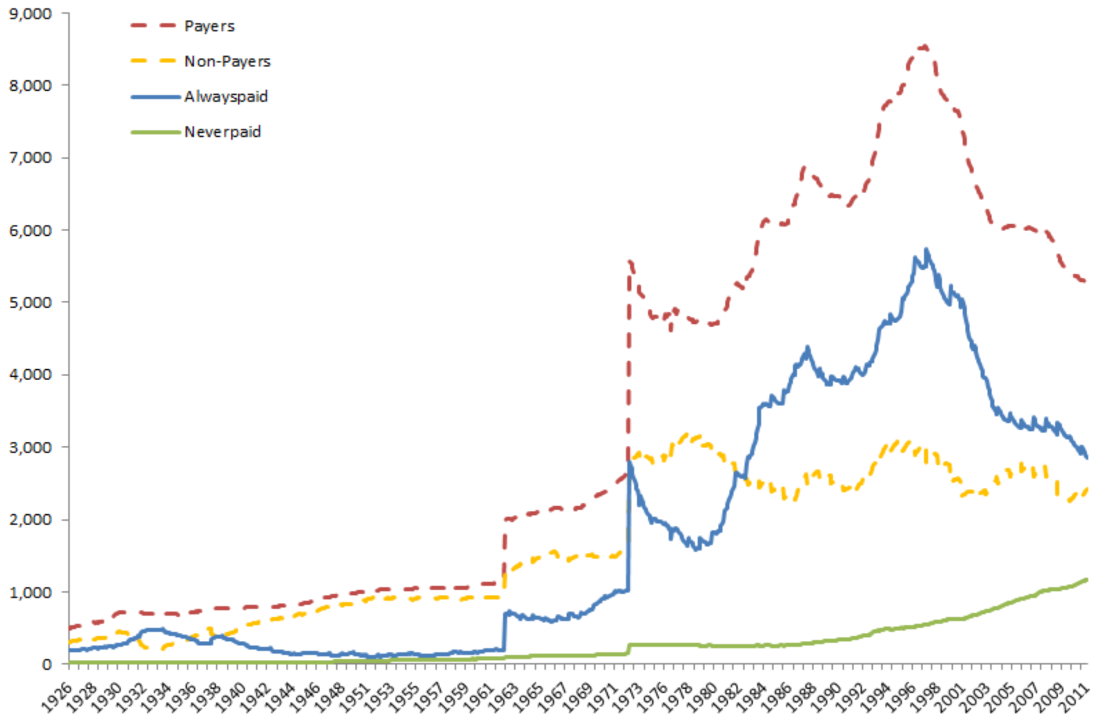
Note: The CRSP monthly sample includes all available NYSE, AMEX, and Nasdaq securities except for ADRs since 1926. A firm is defined as a dividend payer in calendar year t if its with-dividend return exceeds its without dividend return in any month of year t. Following Black and Scholes (1974) and Kalay and Michaely (2000), we define a stock as a dividend-paying stock if that firm has paid dividends in the past and is expected to continue paying in a regular basis. We therefore classify IBM, as a dividend paying stock for all 12 months, not just for the four months of the year a dividend is paid. The two subgroups of payers and non-payers are firms that have always and never paid dividends

FIGURE 1.2: The market value of CRSP firms in different dividend groups



Note: The CRSP monthly sample includes all NYSE, AMEX, and Nasdaq securities since 1926. We define a stock as a payer if that firm has paid dividends for all months, not just for the month that paid dividend. Following the definition of the CRSP value-weighted index, we have calculated the value weighted of the different dividend groups as the sum of the market value of each group of stocks at the end of the previous trading period, divided by the total market value of all stock in the CRSP sample that trading period. The two subgroups of payers and non-payers are firms that have always and never paid dividends

FIGURE 1.3: The Number of CRSP Firms in Different Dividend Groups



Note: The CRSP monthly sample includes all available NYSE, AMEX, and Nasdaq securities except for ADRs since 1926. A firm is defined as a dividend payer in calendar year t if its w ith-dividend return exceeds its without dividend return in any month of year t. Following Black and Scholes (1974) and Kalay and Michaely (2000), we define a stock as a dividend-paying stock if that firm has paid dividends in the past and is expected to continue paying in a regular basis. We therefore classify IBM, as a dividend paying stock for all 12 months, not just for the four months of the year a dividend is paid. The two subgroups of payers and non-payers are firms that have always and never paid dividends

Figure 1.4: Weights used to transform residuals into discount rate-news

Note: This Figure depicts graphically the weights used to construct the discount-rates for the full sample period and for the three sub-periods that are suggested to have different regimes and patterns for the cross sectional distribution characteristics of firms. Breakpoints are chosen following the patterns showed in figure (1.2)

TABLE 1.1: Variance decomposition for US Real Stock Returns

	Value − Weighted Portfolios											
	1927 : 01 − 2011 : 12			1927 : 01 − 1938 : 03			1938 : 04 − 1990 : 01			1990 : 02 − 2011 : 12		
	CF	DR	Cov	CF	DR	Cov	CF	DR	Cov	CF	DR	Cov
All firms	0.36	0.31	0.33	0.78	0.06	0.16	0.15	0.96	−0.11	0.25	0.51	0.24
Dividend firms	0.34	0.29	0.37	0.91	0.04	0.05	0.15	0.92	−0.08	0.48	0.28	0.24
Always Dividend firms	0.43	0.21	0.36	0.99	0.03	−0.02	0.25	0.76	−0.04	0.71	0.27	0.02

Note: The CRSP sample includes all NYSE, NASDAQ, and AMEX firms on CRSP except for ADRs (share code 3) following the CRSP value weighted index construction. Breakpoints are chosen following the patterns showed in figure (1.2).

Table 1.2: Variance decomposition for US Real Stock Returns using Chen, Da, Zhao (2012) breakpoints

	Value − Weighted Portfolios								
	1927 : 01 − 2010 : 12			1952 : 01 − 2010 : 12			1985 : 01 − 2010 : 12		
	CF	*DR*	*Cov*	*CF*	*DR*	*Cov*	*CF*	*DR*	*Cov*
All firms	0.32	0.35	0.32	0.18	0.53	0.29	0.21	0.64	0.15
Dividend firms	0.35	0.28	0.37	0.22	0.43	0.35	0.35	0.48	0.17
Always Dividend firms	0.43	0.21	0.36	0.28	0.40	0.32	0.54	0.43	0.04

Note: The CRSP sample includes all NYSE, NASDAQ, and AMEX firms on CRSP except for ADRs (share code 3) following the CRSP value weighted index construction. Breakpoints are chosen following Chen, Da and Zhao (2013) VAR analysis.

TABLE 1.3: Variance decomposition for US real stock returns using Campbell (1991) breakpoints

	$Value-Weighted\ Portfolios$								
	1927 : 01 – 1988 : 12			1927 : 01 – 1951 : 12			1952 : 01 – 1988 : 12		
	CF	DR	Cov	CF	DR	Cov	CF	DR	Cov
$All\ firms$	0.28	0.38	0.35	0.47	0.27	0.26	0.09	0.76	0.14
$Dividend\ firms$	0.27	0.35	0.37	0.50	0.22	0.28	0.10	0.75	0.15
$Always\ Dividend\ firms$	0.37	0.26	0.37	0.63	0.14	0.23	0.21	0.78	0.01

Note: The CRSP sample includes all NYSE, NASDAQ, and AMEX firms on CRSP except for ADRs (share code 3) following the CRSP value weighted index construction. Breakpoints are chosen following Campbell (1991) VAR analysis.

Chapter 2

What Drives Stock Returns? New Evidence from Post-WW II U.S. Markets

2.1 Introduction

Empirical research on return predictability based on the Campbell-Shiller return decomposition finds that, in post-WW II U.S. data, the dividend yield can predict aggregate returns, but not dividend growth. In other words, during this period stock return variation is largely driven by changes in discount rates rather than changes in cash flows. In contrast, in pre-WW II U.S. data dividend growth is strongly predictable by the dividend yield. It has been suggested that this dramatic change is due to dividend smoothing policies adopted by firms in the post-WW II period. This conclusion is based on predictive regressions that rely on the Voulteenaho book-to-market ratio decomposition that uses earnings rather than dividends data. In this Chapter we find using standard predictive regressions based on both decompositions, in contrast to prior work, that cash flow also drives stock return variation during the post-WW II period. Our result has important implications for asset pricing theory as well as for the related literature in corporate finance. As Cochrane (2008) notes, "Excess return forecastability is not a comforting result. .... If all market price-dividend ratio variation comes from varying expected returns and none from varying expected growth in dividends or earnings, much of the rest of finance still needs to be rewritten."

To place our results in perspective we note that Chen (2009) is the first to report that there is a tale of two periods - dividend growth predictability in the pre-WW II period and evidence supporting return predictability in the post-WW II period. He also studies whether this reversal arises from dividend payout policies by using the earnings-based book-to-market return decomposition of Vuolteenaho (2002). However, he finds results similar to those using the Campbell-Shiller return decomposition that employs dividend data. He conjectures that changing dividend payout policies seem unlikely to fully explain why there is a reversal of predictability. On the other hand, Chen, Da and Zhao (2013) using the same book-to-market decomposition report that cash flow explains 34% of annual return variance in the post-WW II period. Their evidence implies that cash flow news is important in driving stock returns at the aggregate level when measures of cash flow different from dividends are used.

In this Chapter, we re-visit these conflicting results. We show that predictive regressions based on the book-to-market decomposition are sensitive to the way in which firm-level data is aggregated i.e. whether the aggregate series are value-weighted or not. Chen, Da and Zhao (2013), as we describe later, use market value weights to create the aggregate series used in estimating their predictive regressions. In a different context but in a similar spirit, Rangvid, Schmeling and Schrimpf (2013) use country market value weights to construct global aggregate series that they then use in standard predictive regressions. This value weighting differs from that used in Chen (2009) which is similar to that implicitly used in the literature when aggregate data like the CRSP VW index are used to construct the aggregate dividend growth and dividend yield series. Our main contribution in this Chapter is the following. We use firm-level data to construct the aggregate series used in predictive regressions: the dividend yield, the dividend growth and the aggregate return using three different weighting schemes. The first is to calculate total amounts of dividends and market values and calculate annual aggregate returns, dividend growth and dividend yield. It is common to create dividends from the CRSP series. On the other hand, the second and the third weighting method compute firm-level annual dividend growth, dividend yield and returns and collapse them into value-weighted and equally-weighted aggregate annual time series. We find that using the value-weighting, as in Chen, Da and Zhao (2013), predictive regressions applying the Campbell-Shiller and the Vuolteenaho (2002) return decompositions show that in post-WW II data both dividend growth and the ROE are strongly predictable. Hence, predictive regressions are affected by the way the aggregated data is constructed and changing dividend policies seem unlikely to fully explain why there is a reversal of predictability because predictability results from using dividends and/or earnings are similar when the aggregate variables are weighted in a similar manner. We also show that these differences in predictability are driven by the weighting implicitly used to aggregate firm-level data, in the current literature, where the aggregate dividend growth series is influenced by the firms that are the largest dividend payers. This specific weighting scheme has offsetting effects on the dividend price ability to predict future dividend growth because, in the data for the post-WW II period, we show that it is not always the largest firms by market capitalization that pay the largest dividends. Hence, this reversal in predictability is likely caused by the phenomenon seen in the cross-section of firms and does not arise from dividend smoothing by firms in this period.

The rest of this Chapter is organized as follows. We begin with a review of selected related research in Section II. Next, in Section III, we outline the standard methodology of predictive regressions. Here we also provide details of the data and the construction of the aggregate return on equity and book-to-market series. Section IV describes our empirical results. In Section V we report results of tests of robustness. Section VI presents the results from Monte-Carlo simulations, and Section VII concludes the Chapter.

2.2 Prior Related Research

The literature on stock return predictability is vast and we refer interested readers to recent surveys by Goyal and Welch (2008), Koijen and Nieuwerburgh (2011) and Rapach and Zhou (2013). In this brief review we focus on prior work that uses the present value model to study the predictive ability of dividend yield for dividend growth and returns. We next outline related work in corporate finance on changes over time and across the cross-section in dividend payment patterns of US firms.

The stock return decomposition of Campbell and Shiller (1988) and Campbell (1991) has been widely used to explore the relative contribution of news about future cash flows and discount rates to innovations in expected stock returns. For example, in early work, Campbell and Ammer (1993) find that excess returns on the aggregate stock market portfolio are driven largely by news about expected returns (70%) as compared to news about future cash flows (15%). Using a decomposition of the book-to-market ratio, that allows for firm-level analysis, Vuolteenaho (2002) finds that cash flow news accounts for 70-80% of stock return variance. This difference is attributed to the diversification away of firm-level cash flow news when forming portfolios leading to the dominance of discount rate news at the aggregate level.

We now turn to work that is directly related to this Chapter and on which we build. Chen (2009), using U.S. market data from 1872-2005, finds a dramatic reversal of return predictability between the pre-WW II and post-WW II data. In the period prior to WW II cash flow news matters but in the post-WW II period discount rate news dominates. He considers several likely explanations for this reversal. He finds that the reversal is not due to either a smaller number of firms in the stock market during the 1872-1926 period nor due to firms in specific industry sectors like railroads. He then uses the Vuolteenaho book-to-market/return on equity decomposition but finds that this evidence is similar to that using the dividend data i.e. that "changing dividend policies seem unlikely to fully explain why there is a reversal of predictability". Finally, he also reports that "reduced cash flow volatility (in THE post-WW II period) is also unlikely to be the direct source of the reversal of predictability".

Chen, Da and Priestley (2012) focus on explaining why cash flow news is unimportant in driving stock returns during the post-WW II period. They find using variants of the Lintner model a dramatic increase in dividend smoothing by managers during the post-WW II period relative to the prior period. They conclude that ". as such, dividends are a poor measure of future cash flows, and it becomes pointless to infer cash flow predictability from dividend predictability". They use a net payout and a book-to-market decomposition - since these may be affected by firm-level dividend smoothing - and estimate the implied predictive regressions. They apply the net payout decomposition (follows Larrain and Motohiro (2008)) to aggregate annual dividends, repurchases, and new issue in dollars and book equity obtained by summing these up across all firms. They then obtain, using the clean surplus formula, earnings data for each firm year. This data is then used to create an annual aggregate data series that they term "...the market portfolio... (over) the period 1928-2006".

Our work is closely related to Chen, Da and Zhao (2013). The main focus of this paper is to estimate an implied cost of capital for firms using earnings forecasts by analysts. Here we describe only the part of their work that uses predictive regressions and is relevant to our work. They also use aggregate data i.e. data aggregated from firm-level data in predictive regressions (again following Larrain and Motohiro (2008)), based on the net equity payout (dividend plus repurchase minus issuance) similar to Chen, Da and Priestley (2012). They conclude that there is no reversal in the importance of cash flow news. Next, they use the Vuolteenaho book-to-market decomposition and find that cash flow news accounts for 34% of return variation. We note, in the context of our Chapter, that here they use aggregate returns, return on equity and book-to market ratios using value-weighted firm-level data (see their footnote 7, page 21). We also notice that Chen, Da and Priestly (2013) use the same value weighting scheme for calculating the aggregate implied cost of capital.

We note here, that an alternate to standard predictive regressions is to use filtering techniques, relying on the present value model, to extract expected returns and dividend growth rates using the whole history of these series. Koijen and Binsbergen (2010) find that expected returns and dividend growth rates are good predictors of realized returns and dividend growth rates with R-squares ranging from 8.2% to 8.9% for returns and

13.9% to 31.6% for dividend growth rates. Kelly and Pruitt (2013) propose a three-step regression method to incorporate information in the cross-section of firm valuation ratios. They find that both returns and cash flow growth are highly predictable by the dividend yield. Our work is related to Kelly and Pruitt (2013), in that we also use the information in the cross-section of stocks but rely on standard predictive regression methods.

Finally, our work is closely linked to the literature in corporate finance that studies the time series and cross-sectional patterns in dividend payout. For example, DeAngelo, DeAngelo and Skinner (2004), following up on Fama and French (2001), report that dividends paid by industrial firms increased over the 1978-2000 period, both in nominal and in real terms (by 224.6% and 22.7% respectively), although there was a 50% - plus decline in the number of payers. They show that these secular changes reflect high and increasing dividend concentrations. We build on this work and analyze the relationship between firm payouts and market capitalization over time and link this to the use of market value and equal weighting methods in estimating standard predictive regressions. Boudoukh et al. (2007) and Skinner (2008) find that after the 1990s repurchases have become a very important method of returning cash to shareholders. Hence, in our analysis, we also account for the effect of repurchases when studying the relation between payouts and firm size over time. Our work is also related to Rangvid, Schmeling and Schrimpf (2013) who find that aggregate dividend growth is highly predictable by dividend yields in medium-sized and smaller countries but not in larger equity markets like the U.S. In aggregating country-level data to global quantities they also weight the country markets by market capitalization. This weighting is thus analogous to the intra-country value weighting by firm market capitalization that we use in creating our aggregate data. We note that Chen, Da and Zhao (2013) also use the same weighting criteria in their work as indicated earlier.

To sum up, prior research finds that using standard predictive regressions that expected returns rather than cash flows matter in the variation of post-WW II U.S. market returns. On the other hand, filtering methods used to extract the same series from the entire past history and incorporate cross-sectional information finds that cash flows do matter. In addition, research in corporate finance finds that there is considerable variation, across firms, of the proportion of aggregate dividend that individual firms pay. We reconcile these conflicting results by using predictive regressions based on equal and value weighting schemes. We are able to then account for the fact that the largest market capitalization firms are not always the firms that pay the largest dollar dividends. As a result, our predictive regressions are now "balanced" i.e. all variables entering it are weighted in a similar way. We now turn to a short description of the present value based predictive regression.

2.3 Data and Methodology

2.3.1 Methodology

The traditional approach to understand the relative importance of cash flow and discount rate news is to estimate predictive regressions based on the Campbell and Shiller (1988) return decomposition. This decompositions provides the underlying framework to study the predictive ability of dividend yield for stock returns and dividend growth.

$$p_t - d_t = \frac{\kappa}{(1-\rho)} + E_t \sum_{j=0}^{\infty} \rho^j [\Delta d_{t+1+j} - r_{t+1+j}] \tag{2.1}$$

Equation 2.1 shows that the dividend-price ratio should predict future returns and/or dividend growth. It also implies that the current log dividend-to-price ratio (d-p) is positively correlated with future log returns (r) and the future dividend yield at time t + k and negatively correlated with future log dividend growth (Δd). Equation 2.1 motivates some of the earliest empirical work in the stock return predictability literature which regresses returns on the lagged dividend-price ratio.

$$(r_{t+1} - \overline{r}) = b_r(d_t - p_t) + \epsilon^r_{t+1} \tag{2.2}$$

$$(\triangle d_{t+1} - \overline{d}) = b_d(d_t - p_t) + \epsilon^d_{t+1} \tag{2.3}$$

where $\overline{r}$ is the log-run mean return and ϵ^r is a mean-zero innovation. However, the logic of Equation 2.1 suggests that the dividend-price ratio could predict future dividend growth rates instead of, or in addition to, future returns. Testing for dividend growth predictability would lead one to estimate equation 2.3, where $\overline{d}$ denotes the long-run mean log dividend growth. Thus, Cochrane (2008) argues that studying the joint distribution of both the return and dividend coefficients provides a more powerful statistical test than studying them separately. By definition, the variation of the dividend yield must reflect revisions of expected dividend growth and/or expected returns. Therefore, a null of no return predictability must mean dividend growth predictability and vice versa. Further, combining the present-value relation with the standard predictive regressions above and $\rho^K(d_{t+K} - p_{t+K}) = a^K_{dp} + b^K_{dp}(d_t + p_t) + \epsilon^{dp}_{t+k}$, the identity involving the predictability coefficients associated with the dividend yield (d-p) at horizon K is:

$$b_r = 1 - \rho\phi + b_d \tag{2.4}$$

The above equation can also be interpreted as a variance decomposition for the log dividend yield. Here, the predictive coefficients b_r^K, b_d^K and b_{dp}^K represent the fraction of the variance of current d-p attributable to return, dividend growth and dividend yield predictability respectively.

The general conclusion of the literature, using predictive regressions, is that in the post-WW II period the dividend-price ratio (i.e., dividend yield) can predict aggregate returns, but not dividend growth. As indicated earlier, this finding has led to the widely accepted view that almost all the variation in the dividend yield is driven by the variation in discount rates (Cochrane 1992, 2008, 2011; Campbell and Ammer 1993). However, Chen (2009) shows that dividend growth is strongly predictable by the dividend yield in 1872-1945, but this predictability completely disappears in the post-war period. This finding raises an interesting paradox because conclusions regarding asset price variations based on the relative dividend growth/return predictability findings are diametrically opposite for the pre- and post-war periods.

In Campbell and Shiller (1988) predictive regressions data on dividend growth is used. It is possible that the pattern of aggregate dividends may be affected due to dividend smoothing policies followed by firms (Lintner, 1956). Such policies might make dividend growth unpredictable in the post-war period. One way to avoid using dividend data is to study earnings predictability rather than dividend growth predictability since earnings are less affected by corporate payout policies (see also Ang and Bekaert, 2007). Specifically, Vuolteenahoo (2002) shows that one can express the book-to-market ratio as

$$b_t - m_t = constant + \sum_{j=1}^{\infty} \rho^j [r_{t+j-1} - roe_{t+j-1}] \tag{2.5}$$

where $b_t - m_t$ is the log book-to-market ratio, r_t is the stock return, and roe_t is the log return on book equity (ROE) defined as

$$roe_t = ln\left(\frac{E_t}{B_{t-1}}\right) \tag{2.6}$$

where the ROE is the earnings over the last period's book equity. Equation (5) indicates that we can repeat the earlier predictive regressions by replacing the dividend yield by the book-to-market ratio and the dividend growth rate by the ROE. Chen (2009) and Chen, Da and Zhao (2013) use these regressions to avoid any dividend data but arrive at different results. In the next section we show that their differing results arise from the way the aggregate data is constructed and that dividend smoothing policies seem unlikely to fully explain why there is a reversal of predictability.

In our work, we follow Cochrane (2008, 2011) and estimate direct unweighted long-horizon regressions for both, the Campbell and Shiller (1988) and the Vuolteenahoo (2002) return decompositions. For brevity, we only present here the method to estimate direct un-weighted long-horizon regressions of future log returns, log dividend growth and the log dividend-to-price ratio on the current dividend-to-price ratio:

$$r_{t,t+k} = a_r^K + b_r^K(d_t - p_t) + \epsilon_{t+k}^r \tag{2.7}$$

$$\triangle d_{t,t+k} = a_d^K + b_d^K(d_t - p_t) + \epsilon_{t+k}^d \tag{2.8}$$

where $r_{t,t+k}$ and $d_{t,t+k}$ denote either the unweighted or weighted (by ρ^{j-1}) sum of one period returns and dividend growth, respectively from period t to t+k. The use of overlapping data implies that the errors, ϵ_{t+k}^r and ϵ_{t+k}^d have a moving average structure of order k-1 by construction. It is standard to rely on Newey and West (1987) adjusted errors with k-1 lags. However, following Ang and Bekaert (2007) we only report Hodrick (1992) standard errors as these retain the correct size in small samples. We also report results using a first-order VAR model as an alternative to direct multi-period predictive regressions. The decomposition based on this approach differs from the variance decomposition implied by direct long-horizon regressions in that the long-horizon coefficients are not estimated directly but are those implied by the VAR estimates. We note that if a first order VAR does not fully capture the dynamics of the data generating process for r, d-p, and Δd then this variance decomposition may be a poor approximation of the true decomposition. On the other hand, a VAR may have better finite-sample properties i.e. there may be a trade off here between power and misspecification.

2.3.2 Data Construction

We estimate the predictive regressions using annual data for the 1928-2012 period. For the return and ROE predictability exercises below, we combine the Compustat annual tape with the CRSP data following Vuolteenaho (2002) and Cohen, Polk, and Vuolteenaho (2003). The definition of book equity follows Cohen, Polk, and Vuolteenahoo (2003), and the book equity data for the earlier years are from Davis, Fama, and French (2000). Earnings for each firm-year are obtained through the clean surplus formula.[1]

$$E_{i,t} = B_{i,t} - B_{i,t-1} + D_{i,t} \tag{2.9}$$

[1] This calculation can potentially include stock repurchases and issuance. We calculate an alternative ROE following the adjustment in Cohen, Polk, and Vuolteenahoo (2003) and find this does not change our conclusions.

That is, earnings at time t are equal to the change of book equity (e.g. retained earnings) plus dividends payout. The main advantage of the clean surplus earnings is that it allows us to extend COMPUSTAT with BE data from Davis, Fama and French (2000) and estimate cash flows starting in 1928.[2] We assume that accounting information becomes public in June to ensure that earnings become public information before we measure future returns. Book-to-market equity is then calculated as the year-end book equity divided by market equity at the end of June. We delete firms with zero or negative book equity and control for outliers as in Vuolteenaho (2002). Our main results on this Chapter are based on excluding firms with clean surplus earnings more negative than the market capitalization of stocks (see e.g. Chen, Da and Priestly, 2012).

The specific weighting of firm level ratios has an important impact on the results using aggregate predictability regressions with earnings as the main cash flow measure. The following options are available. The first is to calculate the total amounts of earnings, dividends, book equity and market values and calculate annual aggregate returns, aggregate book-to-market ratios and the aggregate ROE. This mechanism, similar to the standard one used for total returns, aggregate dividend yield and aggregate dividend growth, is the one used by e.g. Chen (2009) and implicitly assumes a specific weighting of firm-level ratios. Specifically in this case, the aggregate ROE gives a role to the biggest firms in terms of book equity whereas the aggregate book-to-market gives the same role to the biggest market capitalization firms. From now, we will refer to this weighting option as the standard weighting.

The aggregate ROE is computed as follows:

$$ROE_t = \frac{\sum_{i=1}^{N} e_{i,t}}{\sum_{i=1}^{N} b_{i,t-1}} = \frac{e_{1,t}}{b_{1,t-1}} \times \frac{b_{1,t-1}}{\sum_{i=1}^{N} b_{i,t-1}} + \ldots + \frac{e_{n,t}}{b_{n,t}} \times \frac{b_{n,t}}{\sum_{i=1}^{N} b_{i,t-1}} \tag{2.10}$$

where $e_{n,t}$ is the clean surplus earnings of the nth firm in the index at time t and $b_{n,t-1}$ is last period's book equity of the same firm.

It is clear from the above that here the largest book equity firms influence the behavior of the aggregate ROE. This contrasts to the aggregate book-to-market ratio in which the largest market capitalization firms influence the behavior of the aggregate book-to-market ratio:

$$BM_t = \frac{\sum_{i=1}^{N} b_{i,t}}{\sum_{i=1}^{N} MV_{i,t}} = \frac{b_{1,t}}{MV_{1,t}} \times \frac{MV_{1,t}}{\sum_{i=1}^{N} MV_{i,t}} + \ldots + \frac{b_{n,t}}{MV_{n,t}} \times \frac{MV_{n,t}}{\sum_{i=1}^{N} MV_{i,t}} \tag{2.11}$$

[2] The earnings data in most tests is calculated using the clean surplus formula. This approach helps to increase our sample length and allows more firms, thus representing the market better. For robustness, we construct the following alternative: starting from 1950 (the starting year of COMPUSTAT) we only include those firm years with earnings data available from COMPUSTAT; before 1950 we still use the clean surplus formula to calculate earnings. We find that our main conclusions remain unchanged.

The second option is to calculate these variables at a firm level and collapse them into value-weighted aggregate annual time-series (see Chen, Da and Zhao (2013) footnote 7, page 21). Following this procedure all the firm variables receive the same kind of weights based on market values. We will refer to this weighting option as the value weighted (VW) method. The aggregate ROE is now computed as:

$$ROE_t = \frac{\sum_{i=1}^{N} e_{i,t}}{\sum_{i=1}^{N} b_{i,t-1}} = \frac{e_{1,t}}{b_{1,t-1}} \times \frac{MV_{1,t-1}}{\sum_{i=1}^{N} MV_{i,t-1}} + \ldots + \frac{e_{n,t}}{b_{n,t}} \times \frac{MV_{n,t}}{\sum_{i=1}^{N} MV_{i,t-1}} \tag{2.12}$$

where $e_{n,t}$ is the clean surplus earnings of the nth firm in the index at time t, $b_{n,t-1}$ is last period's book equity of the same firm and $MV_{n,t-1}$ is its market value.

The aggregate book-to-market ratio is similar to that when using the standard weighting but now we weigh firm-level variables using last year's market values to avoid a look-ahead bias:

$$BM_t = \frac{\sum_{i=1}^{N} b_{i,t}}{\sum_{i=1}^{N} MV_{i,t}} = \frac{b_{1,t}}{MV_{1,t}} \times \frac{MV_{1,t-1}}{\sum_{i=1}^{N} MV_{i,t-1}} + \ldots + \frac{b_{n,t}}{MV_{n,t}} \times \frac{MV_{n,t-1}}{\sum_{i=1}^{N} MV_{i,t-1}} \tag{2.13}$$

Finally, we can give the same weight or importance to each firm in the market. The weights in this case are given by the total number of firms each year. This specific weighting is used for example in Vuolteenahoo (2002) VAR analysis and we will refer to it as the equally weighted (EW) method.

We will use these three specific weighting methods (standard, value-weighted and equally weighted) and test for aggregate returns and dividend growth predictability. We use the full sample of firms in the CRSP monthly master file excluding American Depository Receipts (ADRs) (share code 3). We do this in order to apply the value and equal weights to our firm-level variables. For each firm, we collect its monthly return, share volume and prices data. We exclude from the sample all companies without a valid price, share volume or return. In empirical work, a monthly firm-level dividend is obtained from the holding period return (ret) and the holding period return without dividends (retx):

$$d_{i,t} = (ret_{i,t} - retx_{i,t})MV_{i,t} \tag{2.14}$$

where MV_t is the market value of firm i at time t.

These firm-level monthly dividends have a strong seasonal pattern. In order to de-seasonalize the data, the standard solution when using annual data, is to aggregate the dividends paid out over the year. Three methods have been used in the literature.[3] The

[3]See e.g. Chen (2009) or Koijen & van Binsbergen (2010) for details.

first is to reinvest them at a zero rate i.e. the dividends in the current month and over the previous eleven months are simply added up. The second is to reinvest dividends at the risk free rate. The third option is to reinvest the dividends at the cum-dividend stock market return. For simplicity, our results are based on the risk free rate reinvestment of dividends.[4]

2.4 Empirical Results

We now present our main results in three parts. We first show that predictive regressions based on the return on equity decomposition are sensitive to the way in which firm-level data is aggregated thus explaining differing results in Chen (2009) and Chen, Da, Zhao (2013) using the ROE methodology. We will also try to reconcile these results using value weighted and equally weighted methods for the Campbell and Shiller (1988) return decomposition. This is related to Rangvid, Schmeling and Schrimpf (2013) but instead of focusing on comparing predictability results among global weighted country markets we analyze the intra-country predictability differences across different weighted schemes into the U.S. stock market. This will also allow us to explore how heterogeneity in firm-level dividend payment patterns matters for return and dividend growth predictability.

2.4.1 Aggregate Book to Market Decomposition

We present, in Table 2.1, 'direct' multi-period unweighted predictive regressions using the return on equity decomposition. Panel A of Table 2.1 reports results of multiperiod regressions of future ROE and future returns on the lagged log book-to-market ratio for the 1928-2012 period. In the case of return predictability using the book-to-market, our findings for the standard weighting scheme reflects the findings in the literature that uses U.S. data and the return decomposition (see for example Chen, 2009). Specifically, there is evidence of return predictability at some time horizons but the p-values do not allow strong rejections of the null of no predictability. We find similar results when we use the VW method. Interestingly, there is no evidence of return predictability at any horizon when applying the equally weighted method. Moreover, the estimated long-run return coefficients are negative in many of the horizons with very low R^2 and large p-values (bigger than $> 20\%$ at all time horizons). On the other hand, there is strong evidence of ROE predictability for all the three weighting methods considered. This is particularly

[4] Cochrane (2008, 2011) uses the annual CRSP VW index levels to obtain the annual dividend yield and dividend growth series. This method implicitly assumes that the dividends are reinvested at the market rate of return. Chen (2009) and Koijen & van Binsbergen (2010) claim that this method is problematic because it imparts some of the properties of returns to cash flows.

relevant for the case of the equal and value weighting methods. As for the case of return predictability, results from the ROE predictability are in line with the current literature. In Panel B of Table 2.1, when analyzing the post-WW II, is where we find the most striking differences among the different weighting schemes. Specifically, the return coefficients are very large and significant for the standard and the VW scheme. It is interesting that the predictability of total returns remains insignificant using the equally weighted method. The ROE coefficients are large and significant using the VW and the EW method with the exception of the very long 20-year horizon in the case of the value-weighted firm-level analysis. If we use the standard weighting method there is only some weak evidence of ROE predictability at the longest horizons.

The differences between the standard and the value-weighted scheme in the post-WW II period could explain some of the contradictory results in the current literature. For example, Chen (2009) using clean surplus earnings finds that the evidence using the ROE data is similar to that using dividends, that is, dividend growth is strongly predictable in the pre-war periods but this predictability disappears in the post-war years. On the other hand, Chen, Da and Zhao (2013) find that when using the ROE as the cash flow measure, cash flows explains 34% of annual return variance. Table 2.2 helps us to understand this divergence in results. It reports VAR regressions and hypothesis testing using book-to-market and return on equity (ROE) for both the whole 1928-2012 and the post-WW II period and for the three aggregate weighting methods described earlier. Starting from the standard weighting scheme, we find strong evidence of ROE predictability for 1928-2012. Moreover, the t-statistic of the ROE coefficient (-3.00) is much larger than that of the return coefficient (1.89) in magnitude. Together, the share of the book-to-market variation due to long-run movements in expected ROE is around 25%. In contrast to that, the ROE coefficient is -0.00 and insignificant for the 1950-2012 period. Accordingly, only 2% of the book-to-market variation is associated with expected ROE rates. This is in line with the Chen (2009) results regarding the role of earnings as the main cash flow measure. He claims that changing dividend policies seem unlikely to fully explain why there is a reversal of predictability. Hence, if we rely on the standard procedure to account for the aggregate measure of dividend growth or ROE, we could conclude that dividend smoothing seems unlikely to fully explain why there is a reversal of predictability in the post-WW II period because the estimated coefficients from both dividend growth and the ROE are very small and insignificant.

In the case of the VW method results are very similar for the full sample and the post-WW II period. For example, the return coefficient is around 0.14 in both sample periods although the t-statistic is much larger in the 1950-2012 period (1.94 vs. 2.34). On the other hand, the ROE coefficient is highly significant in both sample periods and similar in magnitude (around -0.07). This implies that now ROE accounts for around

34% of annual return variance in both sample periods. These results are similar to those reported by Chen, Da and Priestly (2013) using their value-weighted aggregate annual time-series. Focusing only on this specific result we might conclude that, using an alternative cash flow measure that is less subject to dividend smoothing, we arrive at a conclusion consistent with Chen, Da and Priestly (2013) i.e. that cash flow news plays an important role in price variations in the post-WW II period. However, the key point here is that results depend on the firm-level weighting methods used. For that reason, in the next section we present results of dividend growth and return predictability using VW and EW schemes and compare these results with results based on the aggregate ROE decomposition.

2.4.2 Campbell and Shiller (1988) Decomposition

In order to analyze the importance of the weighting of individual securities for the outcome of predictability regressions using the return decomposition and to allow the comparison with the ROE decomposition results, we apply the three weighting schemes to the Campbell and Shiller (1988) decomposition using the CRSP monthly master file. The advantage of using the EW and VW methods is that we can explore what drives return and dividend growth predictability for small and large firms. Moreover, in our VW method we use dynamic weights for all the variables, such that a firm that grows in size relative to another firm will also be given a larger weight. On the other hand, our EW method gives the same weight to each firm in the market.

Table 2.3 shows the descriptive statistics for total returns, dividend growth and the average dividend yield for the different market portfolios. We report these separately for the full (1928-2012) and the post-WW II (1950-2012) sample periods. There are large differences in the average dividend growth rates across the different portfolios. For instance and over the full sample period, we find the highest average (annual) dividend growth rates using the VW scheme (13.00%), whereas the lowest average dividend growth rates is found using the standard weighting method (6.00%). At the same time, we see that the standard deviation during the full sample is similar among all weighting schemes (ranging from 12% in the EW to 14% in the VW). During the post-WW II period, the mean of the (annual) dividend growth is very similar to the full sample using the three different weights, whereas the standard deviation decreases more when we use the standard and the EW scheme than using the VW method (9% in the case of the VW compared to 7% in both the EW and the standard methods). The other feature of the data is the persistence (first order autocorrelation) of dividend growth in the different portfolios. During the full sample period, the first order autocorrelation for all the three weighting schemes is similar (0.31 in the EW, 0.30 in the standard and 0.29 in the VW).

In the post-WW II period the VW aggregate dividend growth series is twice as highly positively autocorrelated (0.49) compared to the standard aggregate dividend growth series (0.21) and it is similar to the EW aggregate dividend growth (0.41).

2.4.2.1 Full-Sample (1928-2012) results

We first report results, in Table 2.4, for "direct" unweighted multi-period predictive regressions using Eqs.(5) and (6) respectively. We only report results for the case of the risk free rate of reinvestment of dividends. In the Internet Appendix we report results for the two other re-investment strategies: reinvest monthly dividends at zero rate and at the market rate of return.

In the case of return predictability our findings for the standard weighting mechanism, in Table 2.4, resemble the results obtained using applying the ROE decomposition. Specifically, there is some evidence of return predictability at some time horizons but the p-values do not allow strong rejections of the null of no predictability (p-values lie in the interval 6-15%). We find similar results when we use our VW method. There is also no sign of return predictability in the case of the equally weighted scheme (EW) at any horizon. Moreover, the estimated long-run return coefficients are negative in many of the horizons with very low R^2 and large p-values (bigger than $>$ 20% at all time horizons).

Table 2.4 also reports results for multi-period long horizon regressions for dividend growth. The results are striking: using value-weights (VW) we reject the null that the predictive coefficients are zero (p-values ranging from 0.34% to 2.71%) implying that dividends are strongly predictable by the dividend yield. The extent to which the dividend yield resulted from the VW method predicts future dividend growth rates is noteworthy with estimated $\overline{b_{d,k}}$ values of around -0.16. The R^2 are also important and around 22%. When we increase the horizon over which we measure dividend growth (increase k) we see from Table 4 that the associated p-values remain similar. Hence, the dividend predictability we document using value-weights is large at all horizons with very high estimated coefficients and R^2s. As an example, the estimated coefficient for the 20-year horizon is -0.862 with p-value of 9.34 and R^2 of 21.81%.

There is, however, no strong evidence for dividend growth predictability using the standard weights. Dividend growth is predictable at the 1-year and the 15 and 20 year horizons; the estimates of $\overline{b_{d,k}}$ are negative and highly significant (p-values smaller than 5%). However at the intermediate horizons (5, 10 years) there is no evidence supporting dividend growth predictability. Our findings for the standard weighting method reflect the general findings in the literature - dividend growth is not highly predictable for the whole sample period. In contrast, using our alternate value-weights we find striking and strong evidence for the predictability of dividend growth. The large differences between the results using the value-weighted and the standard method arise from the larger weights given to the biggest firms in the VW scheme in contrast to the larger weights given to the largest dividend payers in the standard method. It is interesting that the predictability of dividend growth is insignificant when using equal-weights. With the exception of the 1-year horizon, the estimated coefficients are very low, with very high p-values and low R^2.

Several authors (for example, Cochrane, 2008, 2011) report results using implied multi-period regressions to infer long-horizon predictability from first-order VAR models. One issue with this approach is that if a first order VAR does not fully capture the dynamics of the data generating process for r, d-p, and $\triangle d$, then this variance decomposition will be a poor approximation of the true decomposition for the dividend yield. On the other hand VAR coefficient estimates may have better finite-sample properties, that is, there might be a trade off between power and misspecification. While several studies report that the results using direct and implied long-horizon regressions estimates are qualitatively similar we do not find this in our sample. In results (not reported in the interests of brevity) we find that, in our data, the implied long horizon return coefficients are much smaller than their direct counterparts. Further, in the case of long run unweighted dividend growth coefficients we see a similar pattern. These results emphasize that care is needed in drawing long-horizon implications from low-order VAR models.

In view of the above discussion we report in Table 2.5 results for infinite-horizon VARs of returns and dividend growth to carry out joint null hypothesis tests of either $b_r^{lr} = 0$, $b_d^{lr} = -1$ or $b_r^{lr} = 1$, $b_d^{lr} = 0$. In the case of the VW method we do not reject the null of no return predictability with a t-value of 1.17. On the other hand, we strongly reject the null of no dividend growth predictability (t-value of -3.92). As outlined in Section 3, Cochrane (2008) shows that - in the same spirit as a variance decomposition - the long run coefficient b_r^{lr} measures the fraction of dividend-yield variation due to long-run movements in expected future returns while b_d^{lr} measures the fraction of variation due to long-run movements in expected dividend growth rates. The share of the dividend-yield variation due to long-run movements in expected dividend growth rates is 77% of the dividend price variation with returns accounting for the remaining 23%. Hence, variance shares support our conclusion about the importance of dividend growth predictability using value-weights for the full sample period. Turning to the EW method, we do not find evidence of both return and dividend growth predictability.

2.4.2.2 Results for the Post-WW II (1950-2012) period

Table 2.4 also reports results of direct long horizon regressions for the post-WW II period i.e. 1950-2012. In contrast to the full sample period, we find in Table 2.4, evidence supporting return predictability except in the case of the EW method. In the case of the standard and the VW schemes, the estimated coefficients are very high and larger than 1 at the 15 and 20 year horizons with p-values generally smaller than 5%. Consistent with Chen (2009) we find that there is a reversal in return predictability; returns are unpredictable for the full sample period but become predictable during the post-WW II period (1950-2012).

We now turn to results from dividend growth predictability which provide, as in the case of the full sample period, strong evidence of dividend growth predictability using value-weights. Dividend growth is strongly predictable with the "right sign" with p-values lower than 5% and very high R^2s. On the other hand, results using standard weights give a completely different picture for dividend growth predictability; dividend growth is not predictable except perhaps at the very short (1-year) horizon (p-values are significant at around the 9% level) and at the very long (20-year) horizon (p-values around the 6% level). For all the other horizons dividend growth is largely unpredictable. It is interesting that dividend growth is also predictable using equal-weights with the exception of the 5-year horizon. The strong evidence of dividend growth predictability in the weighted portfolios is also supported by variance shares as seen in Table 2.5. The share of unexpected return variance due to changes in expected dividends is around 40% using the VW and EW methods. On the other hand, using standard weights the share due to dividend growth variation is less than 20%. Moreover, we strongly reject the null of no return predictability for all the portfolios. Finally, we also reject the null of no dividend growth predictability when using value-weights (t-value of -2.84) in contrast to using standard weights in where the t-value is only -1.39.

Based on the standard method, there seems to be a reversal in predictability in the post-WW II period that could not to be explained by changes in payout policies due to the fact that both dividend growth and the ROE are not predictable in the post-WW II period. This is exactly the conclusion reached by Chen (2009) when using both decompositions based on these standard aggregate weights. On the other hand, dividends are strongly predictable by the dividend yield using value-weights during the full sample (1928-2012) and the post-WW II period. This is in line with results obtained when applying the ROE decomposition to value-weighted aggregate time series as in Chen, Da and Zhao (2013)). We argue, that results from the ROE decomposition using these value-weighted aggregate time series should be compared to results from applying the return decomposition to an aggregate VW portfolio. Doing that, we find that in the post-WII period dividend growth and the ROE are highly significant compared to the standard weighting method, suggesting that corporate payout policies may not have a major effect on the predictability of stock returns.

2.4.3 Firm Size and Dividend Payments

We have shown that predictive regressions are affected by the way the aggregate data is constructed and that changing dividends seem unlikely to fully explain why there is a reversal of predictability because predictability results from using dividends and/or earnings are similar when the aggregate variables are weighted in a similar manner. We will now show that the differences in predictability between using standard and value-weights are driven by the weighting implicitly used to aggregate firm-level dividends in the current literature, where the aggregate dividend growth series is influenced by the firms that are the biggest dividend payers. This specific weighting has offsetting effects on the dividend price ability to predict future dividend growth because it happens that not always the largest firms by market capitalization pay the largest dividends, which is specially significant in the post-WW II period. We will now demonstrate this fact in the data and its effect onto predictability results by forming size portfolio sorts and more formally by predictive regressions.

We use, for each sample period, all the firms in the CRSP monthly master file excluding American Depository Receipts (ADRs) (share code 3). We do this in order to replicate the CRSP value-weighted index that excludes these firms from the index construction. Following Fama and French (1992), the quintile portfolios are constructed at the end of each December using previous December market values i.e. we avoid any look-ahead bias. For each quintile, we construct the three variables (i.e. returns, dividend yield and dividend growth) following the standard methodology used in the literature and described earlier. Here Q1 denotes to the highest market capitalization quintile and Q5 the lowest market capitalization firms. Our main purpose is to demonstrate the different behavior of highest and smallest market capitalization firms with respect to dividend payments and their relation to the weighting used in constructing the standard dividend growth series. To avoid clutter we report results using only the zero rate re-investment strategy. In untabulated results we find that results are qualitatively similar for the other two dividend re-investment strategies described earlier.

We begin by depicting in Figures 2.1, 2.2 and 2.3 the times series of the percentage of total dividends paid, the dividend growth and the dividend yield over our full sample period 1928-2012. Our graph shows only Q1 and Q5 for ease of exposition. Next, we describe the results of using standard predictability regressions for each of the quintiles in relation to the benchmark regressions using the full sample of all firms.

Figure 2.1 depicts the percentage of total dividends paid in firms in the largest size quintiles Q1 and Q2 (Q1+Q2) clubbed together compared to the smallest size quintiles Q4 and Q5 (Q4+Q5). We see that the percentage of the total dividends paid by firms in two largest size quintiles (Q1+Q2) and the two smallest size quintiles (Q4+Q5) has changed considerably over time. If the biggest dividend payers are also the largest market capitalization firms we would expect that dividends paid in the Q1 and Q2 quintiles together would be higher than 40%. On the other hand, we would also expect the opposite to be the case for the quintiles Q4 and Q5 with the smallest market capitalization firms. However, Figure 1 shows that this is not the case over the 1928-2012 period. For example, both in the pre- and post-WW II period and particularly during the late 90s the total dividends paid by the biggest market capitalization firms decreased substantially. However, at the same time the smallest market capitalization firms increased their share of the total dividends paid. This does not however imply that the total amount of dividends paid decreased during that period. DeAngelo, DeAngelo and Skinner (2004) report that while the number of firms paying out dividends has decreased the total amount of dividends paid out has actually increased during the 1978-2000 period. These facts of the data are important for the study of dividend growth predictability. It is possible however, that this pattern might arise due to the largest market value firms repurchasing shares instead of paying dividends. We will, in a later section, report results where also we account for both dividends as well as repurchases and obtain similar results.

Next, Figures 2.2 and 2.3 depict changes in the log dividend growth and log dividend yield series, over the 1928-2012 period, for all firms - the benchmark sample - and for firms in Q1 (largest market cap) and Q5 (the smallest market cap). We see that during the earlier part of the sample period both the log dividend yield and dividend growth series vary in a similar way for the quintiles and the full sample of firms. However their behavior differs dramatically starting in the early 1980s. There is in particular, during the 1990s, a large fall in the dividend price ratio for the Q1 portfolio and for the portfolio consisting of all sample firms while the Q5 dividend price ratio remains flat. During the most recent period in the sample- around 2011 - we find that the dividend price ratio for the Q1 and for the full sample rise to reach the level seen in the 1980s. This is due to the increase of the percentage of total dividends paid by firms in Q1. We note here that all quintiles contain the same percentage of the total market value. Thus the reason why the Q1 level is the same as for Q5 is due to the increase in the percentage of total dividends paid by the biggest market capitalization firms. Finally, the return decomposition implies that for Q1 and for the portfolio containing all firms the low dividend price ratios in the 1990s should forecast a dividend increase i.e. prices high relative to current dividends should mean that future dividends will be higher. We see, in Figure 3, that this only happens for the Q1 portfolio after the 1990s. This is due to the weighting of dividends that results in the dividend growth from all firms to behave like the dividend growth of Q5 i.e. relatively low and stable during this period.

We now report in Table 2.6, to provide a more formal analysis of the discussion about Figures 2.1, 2.2 and 2.3 earlier, results of univariate predictive regressions using annual data for the full sample of firms and for each of the market capitalization quintile portfolios separately for the full sample 1928-2012 and the post-WW II (1950-2012) period. We estimate using annual data:

$$(r_t - \overline{r}) = \kappa_r(dp_{t-1} - \overline{dp}) + \eta_t^r \tag{2.15}$$

$$(\triangle d_t - \overline{d}) = \kappa_d(dp_{t-1} - \overline{dp}) + \eta_t^d \tag{2.16}$$

where r_t and $\triangle d_t$ denote one-period returns and dividend growth, $\overline{r}$ and $\overline{d}$ the long-run mean return and dividend growth, and η_t^r, η_t^d mean-zero innovations. We also report the long-run coefficients $\widehat{b}^{lr}$ and $\widehat{b}^{ld}$ (based on a VAR(1)), which can be interpreted as the fraction of the variance of dividend yields that can be attributed to time-varying expected returns and to time-varying expected dividend growth respectively. We confirm the current finding in the literature that for the full sample of firms in the post-WW II period the dividend price ratio predicts aggregate returns but not dividend growth. We find that, under the no-reinvestment assumption, the return predictability coefficient κ_r is 0.123 for the 1950-2012 period, with a t-stat of 2.31 and an R^2 of 8.74%. Otherwise, the point estimate for the dividend growth coefficient κ_d is -0.035 with a t-stat of -1.79 and a R^2 of 5.35%. In fact, expected returns explains a much larger fraction of the variance of dividend yields during the post-WW II period as measured by the estimated $\widehat{b}^{lr}$ coefficient ($\widehat{b}^{lr}$=0.778).

We find, in Table 2.6, dramatically different results for predictive regressions when using quintile portfolios. Based on these quintile regressions we are able to go behind the results reported for the aggregate market and uncover the size portfolios that drive results seen for the aggregate market portfolio. We find that the results for dividend growth predictability regressions for the 1950-2012 period are highly significant for 3 out of the 5 market value quintiles (Q1, Q2 and Q5). The dividend growth point estimate κ_d for the Q1 is -0.075 with a t-stat of -2.90 and an R^2 of 11.75%. On the other hand, Q2 dividend growth point estimate (-0.757) is also significant with a t-stat of -2.81 and the R^2 is 9.41%. Finally, in the case of Q5 the dividend growth point estimate (-0.062) is also significant with a t-stat of -2.31 and the R^2 is 6.01%. This is also translated into the long-run coefficient $\widehat{b}^{ld}$. Almost half of the variation in the dividend yield can be accounted by long-run movements in expected dividend growth rates in the Q1 ($\widehat{b}^{ld}$=-0.414) compared to the case of all firms where $\widehat{b}^{ld}$ is only -0.222.

Overall this evidence supports the view that the predictability of dividend growth is affected by the way dividends are weighted to form aggregate series. While dividend growth is not predictable for the full sample of all firms, we find that it is highly predictable for the biggest and the smallest market capitalization quintiles. In these cases, as we have shown, the signal coming from the dividend growth series is not blurred by the differences between biggest market capitalization firms and biggest payers. These findings suggest that the fact that not always the largest firms by market capitalization pay the largest dividends is affecting aggregate returns and dividend growth predictability. These dynamics explain the differences between predictability results from using standard and value-weights.

2.5 Additional Results

In this section, we conduct several robustness checks to the main empirical results.

2.5.1 Allowing for Stock Repurchases

We now turn to the question of whether allowing for share repurchases, which are particularly important after 1990, affect our finding about the fact that not always the largest firms by market capitalization pay the largest dividends, which is especially significant in the post-WW II period. It might be argued that the reduction in the percentage of dividend paid by the firms in the largest two market capitalization quintiles is due to the largest market value firms turning to share repurchases instead of paying dividends.

We use the most straightforward estimate of shares repurchased by a firm as the decrease in shares outstanding reported by CRSP, adjusted for other activities that affect the number of shares outstanding, such as stock dividends and stock splits. We do not offset monthly decreases in shares outstanding with increases in other months because increases can occur for a variety of reasonsincluding new stock issues, the distribution of shares to employee benefit plans, or the exercise of stock options. Since these increases are unrelated to repurchase activity and bias repurchase estimates downward, we record monthly increases in shares outstanding as a zero decrease. If repurchases and distributions of shares occur in the same month, however, they will offset each other, and the monthly decrease in CRSP shares outstanding will understate actual shares repurchased. We recognise that there are alternative methods of calculating share repurchases. For example, Fama and French (2001) and Skinner (2008) use the changes in Treasury stocks from COMPUSTAT to proxy for share repurchases. However, the advantage of the method employed in the paper is that it allows us to have monthly cumulative data for repurchases for a longer period of time. We have also tried alternative methods of share repurchases using COMPUSTAT cash flow and balance sheet statements and our results are qualitative similar.

We define repurchases, following Chen, Da and Priestley (2012), as:

$$rp = \frac{P_{t+1}}{P_t} \times [1 - min(\frac{n_{t+1}}{n_t}, 1)] \tag{2.17}$$

Here rp denotes the repurchase return. Also when there is a repurchase $\frac{n_{t+1}}{n_t} < 1$ and $[1-min(\frac{n_{t+1}}{n_t}, 1)]$ is the proportional repurchase. As in the case of dividends, we calculate repurchases in dollars for each firm month and then sum them across months to get the annual dollar amount for each firm.

Figure 2.4 depicts the time series of the percentage of total dividends paid including repurchases for quintiles Q1 and Q2 together compared to Q4 and Q5 together. We focus on these two combinations of quintiles (Q1+Q2) and (Q4+Q5) to avoid clutter. We clearly see that including repurchases does not change the time series behavior noted earlier in Figure 2.2 including for the late 90s period. In fact, we now see a more pronounced effect: payouts from the Q1 and Q2 together are reduced to about 10% at the end of 1999 while after the year 2000 firms in Q1 and Q2 shows higher dividends plus repurchases than seen for the quintiles Q4 and Q5.

We now turn to Table 2.7, which reports predictive regressions and quintile portfolios for the full sample and the post-WW II period. We find that, for the full sample of firms, we reproduce the standard result reported in prior literature; dividend growth in the post-WW II period is unpredictable. We see that although the point estimate for dividend growth is -0.128 and the R^2 is large (7.75%), the standard error is too large for statistical significance at conventional levels (t-stat of -1.44). In contrast, when we look at Q1 (the highest market capitalization firms) the dividend growth coefficient is -0.135 with a t-stat of -3.24 and a R^2 of 11.19%. For comparison - in the case without repurchases in Table 7 - we find that the Q1 dividend growth coefficient is -0.075 with a t-stat of -2.90 and a R^2 of 11.75%. After allowing for repurchases our evidence using our alternate dividend growth series is that we continue to find dividend growth predictability for Q1 firms. In fact the evidence is stronger than when using only dividends as the cash flow measure. However, this is not the case now with Q2 portfolio which has an estimated coefficient of -0.106, a t-stat of -1.18 and R^2 of 3.83%.

An important result in Table 2.7 is that dividend growth is highly predictable by the repurchases-adjusted dividend price ratio for the smallest market capitalization quintiles. The Q4 coefficient is -0.289 with a t-stat of -2.24 and R^2 of 19.00%; the Q5 coefficient is -0.214 with a t-stat of -2.34 and R^2 of 16.47%. Considering the results from long-run horizon regressions, a significant proportion of the variation in the dividend yield for the smallest market capitalization quintiles can be accounted for by the estimated $\widehat{b}^{ld}$. In the results for Q4, news about future dividends clearly dominate as the main driver of the variation in dividend yields, now twice as high than when considering only dividends as the cash flow measure. This is also the case for the Q3 and the Q5 where $\widehat{b}^{ld}$ changes from -0.194 to -0.405 and from -0.329 to -0.492, respectively. On the other hand, Q1 and Q2 point estimates do not see a change when a broader definition of dividends is used. These results imply that accounting for repurchases affects predictability results more for the smallest market capitalization firms than those for the largest market capitalization quintiles. Further it also explains why there is no significant improvement in the predictability of dividend growth during the post-WW II period when repurchases are taken into account.

2.5.2 Dividend Yield Portfolios

We now use portfolios sorted on dividend yield, available from Kenneth French's webpage, and estimate predictive regressions using these. We do this as an alternative to our market capitalization or size quintile portfolio regressions in order to show that our results are not driven by the way our data is sorted. These dividend yield portfolios exclude firms with zero dividends and unlike the Fama-French size portfolios contain almost equal proportions of the total market capitalization in each quintile. For example, the average market capitalization of the Fama-French size portfolio containing the bottom 30% of stocks (denoted by L) for the 1928-2012 period is 3.73% and 4.44% for the post-WW II period. On the other hand, the average market capitalization for the portfolio with the top 30% of stocks (H) is 83.92% for our full sample period and 82.25% for the post- WW II (1950-2012) sub-period. Hence, using size portfolios makes any comparison of dividend yields and dividend growth impracticable because the H-portfolio contains the major proportion of the total market value.

We again focus attention on the lowest and the highest dividend yield quintiles which clearly shows the contrast compared to the the all-firm portfolio. The average market capitalization of the lowest 20% dividend yield portfolio is 24.49% of the total value of all firms for the 1928-2012 period and 23.53% for the post-WW II sub period. The highest 20% dividend yield portfolio contains on average 13.22% of the total market of all firms for the entire sample period and 14.62% for the 1950-2012 sub period. As in

Cochrane (2008), we construct the annual dividend-price ratio and dividend growth by combining the series on total return and return without dividends.

Figures 2.5 and 2.6 depict the annual log dividend price ratios and dividend growth rates over the period 1928-2012 for the lowest 20% and the highest 20% dividend yield portfolios. We focus attention on the last part of the sample period where both variables - log dividend growth and log dividend yield - differ dramatically. We see that in the 1990s there is a large fall in the dividend price for the lowest 20% quintile compared to the relatively stable behavior of the highest 20% quintile. This is consistent with the behavior of Q1 and Q5 in our market capitalization-based quintile analysis. While the biggest market capitalization firms have a very low dividend price ratio, the dividend yield from the smallest capitalization firms remains flat during this time period. We note here that each of our quintiles contains the same percentage of total market equity. Hence, the low dividend price ratio only affects the biggest firms and this also hold for the lowest 20% dividend yield portfolio. As indicated earlier, the return decomposition implies that the low dividend yield for the lowest 20% portfolio in the late 1990s should forecast a dividend increase. We see, in Figure 2.8 that this is what happens after the 1990s. Again, this is consistent with the behavior of Q1. On the other hand, the stable dividend price ratio in the highest 20% portfolio is accompanied by a flat dividend growth in the 2000s.

2.5.3 Only Dividend Paying Firms Portfolios

We now report results for return and dividend growth predictability using portfolios that consist only of dividend payers. We construct portfolios of "dividend payers" following Fama and French (2001) and Kelly and Pruitt (2013). We define a firm as a dividend payer in calendar year t if its with-dividends return exceeds its return without dividends in some month of year t (ret and retx codes in the CRSP monthly master file). We consider all regularly scheduled dividend payments (monthly, quarterly, and yearly) when classifying firms as dividend-paying. We know that in the standard construction of dividend yield and aggregate returns all firms - even those that do not pay dividends and for whom these ratios are not defined- are included. As a result, using portfolios that consist only of dividend paying firms can help us to focus on predictability regressions that do not include the confounding effects of non-payers. We also exclude dividend initiations and omissions imposing the company to pay dividends for at least two years. Including these observations do not alter our main conclusions.

We report results only for "direct" multi-period regressions and long-run horizon VARs under the risk free rate of reinvestment. Our results, in Table 2.8, using "direct" multi-period return predictive regressions show that during both, the full sample (1928-2012) and the post-WW II periods, the estimated return coefficients are significantly higher for dividend payers than for the whole sample of all firms. This is especially important in the post-WW II period. For example, the 1-year estimated return coefficients for the standard and value-weighted methods are around 0.17 compared to 0.12 in the case of all firms. It is even more significant when using equal-weights. When non-dividend payers are excluded, this 1-year estimated coefficient moves from 0.08 to 0.26. Moreover, we now find that all the return coefficients in the EW method are now positive and even significant at the 10% level in the post-WW II period (with the exception of the very long 20-year horizon). These results using equal-weights are related to the dividend disappearing phenomena first reported by Fama and French (2001). The reason why this improvement is more significant in the case of the EW method is due to the fact that this important decline in the fraction of firms that paid dividends is substantially smaller when weighted by market capitalization. The evidence for return predictability during the whole sample period is slightly stronger over all the time horizons and particularly for the shorter ones, although the p-values do not allow for strong rejections of the null of no predictability. For some time-horizons it is possible to find estimate coefficients significant at the 10% level and with high R^2. On the other hand, results for the post-WW II period reinforces the evidence for return predictability found using all firms with p-values smaller than 3% for all the horizons for the standard and the VW methods. Returns using equal-weights are also significant in the post-WW II period as we mentioned before.

We also find, in Table 2.8, an important improvement with respect to dividend growth predictability. This also affects the behavior using the standard aggregation method in where we find estimated dividend growth coefficients and R^2 much higher than when using portfolios containing all firms. In spite of that, this enhancement is not translated to the p-values that instead of improving get worse at most of the time horizons. On the other hand, forming portfolios of only dividend payers clearly reinforces the results obtained using value-weights and especially for the post-WW II period where the declining number of dividend payers has been more pronounced. This can be applied to all the time-horizons (p-values are always smaller than 4%) with the exception of the very long 20-year dividend growth coefficient in the post-WWII period. In this case, the estimated dividend growth coefficient is only -0.255 with a very high p-value of 26.27% and a very low R^2 of 0.52%. The behavior of this 20-year time-horizon is similar to the case of using the ROE decomposition and contrast to using standard weights where the estimated coefficient is high and significant. Results using equal-weights are also affected when using only dividend payers showing that dividend growth predictability is high and important and particularly for the post-WW II period.

Finally, Table 2.9 reports results for long-horizon VARs of returns and dividend growth to carry out joint null hypothesis tests of either return or dividend growth predictability. Again, the main picture for Table 2.9 is that dividend growth is very important for both the whole and the post-WWII period and for the EW and VW weighting schemes compared to the standard weighting method. Around 80% of the dividend price variation is associated with dividend growth predictability in the full sample period and nearly 50% in the post-WII period when using value-weights. Moreover, we cannot reject the null of no return predictability for the whole sample period but we reject both nulls of no dividend growth and no return predictability for the case of the 1950-2012 period. The same happens when using equal-weights although the percentage of the dividend yield variance explained by dividend growth is slightly higher for the full sample period and smaller for 1950-2012. In the case of the standard method, the null of no dividend growth predictability is still not rejected and the variance explained by dividend growth is less than 20%. To sum up we find that our main results are strengthened further when using a sample of only dividend paying firms, that is, dividend growth is strongly predictable during the post-WW II period but this predictability is hidden by the way market portfolios are constructed in the current literature.

2.6 Monte Carlo Simulations

In this section, we conduct a Monte-Carlo simulation to analyze the size and power of the asymptotic t-statistics for the return and dividend growth predictive coefficients of the aggregate VW and EW portfolios based on the first-order VAR estimated in the previous section.

Equation (2.4) implies that we can infer the data, coefficients, and errors of any one equation from those of the other two. In other words when we want to test, for example $b_r = 0$, we have to change the dividend growth coefficient b_d or the dividend price ratio autocorrelation coefficient (ϕ) accordingly. We thus have to choose two variables to simulate and then the third follows from the identity in equation (2.4). Here, we simulate the dividend growth and dividend-yield system using the different definitions of our market portfolios. Our null hypothesis takes the form:

$$\begin{bmatrix} d_{t+1} - p_{t+1} \\ \Delta d_{t+1} \\ r_{t+1} \end{bmatrix} = \begin{bmatrix} \phi \\ \rho\phi - 1 \\ 0 \end{bmatrix} \left(\begin{array}{c} d_t - p_t \end{array} \right) + \begin{bmatrix} \epsilon^{dp}_{t+1} \\ \epsilon^{d}_{t+1} \\ \epsilon^{d}_{t+1} - \rho\epsilon^{dp}_{t+1} \end{bmatrix} \tag{2.18}$$

We follow Cochrane (2008) and draw the VAR residuals assuming they are jointly normally distributed. The dividend yield for the base period $d_0 - p_0$ is drawn from the unconditional density $d_0 - p_0 \sim N[0, \sigma^2(\varepsilon^{dp})/(1-\phi^2)]$. We then draw ϵ^d_t and ϵ^{dp}_t as random normals and simulate the system forward (10,000 times). For the multiperiod returns and dividend growth rates, we follow a similar simulation procedure, but now we compute $r_{t,t+1}$ and Δd_t from the simulated data and regress these onto $d_t - p_t$, and collect the coefficients. Then, we compute the fractions of simulated estimates for the return/dividend growth coefficients that are higher than the estimates found in the data, that is, $p(b_{r,k} > \overline{b_{r,k}})$ and $p(b_{d,k} > \overline{b_{d,k}})$. We also calculate the joint probabilities, $p(b_{r,k} > \overline{b_{r,k}} \textit{ and } b_{d,k} > \overline{b_{d,k}})$.

Table 2.10 shows, for the whole sample 1928-2012 and the post-WW II period, the term-structure of the probabilities that the return coefficients are higher than the corresponding estimates under the null of no return predictability. We also report the probabilities that both slopes are jointly higher than the corresponding samples estimates at each horizon. The marginal distribution of the return-forecast coefficient b_r provides weak evidence against the unforecastable-return null for the standard and the value-weighted methods; producing coefficients larger than the sample estimate, as seen in the Table, between 18% and 40% for all the time horizons. Taken on its own, we cannot reject the hypothesis that the return-forecasting coefficient b_r is zero at the conventional 5% level. In contrast to that, in the case of using equal-weights the probability of finding return coefficients higher than the corresponding estimates is very high ranging from 40% to 90%. This is not strange when the estimated coefficients in the EW method are negative in most of the time horizons and hence, it is very easy to find simulated coefficients higher than the estimated ones.

The null of no return predictability must assume that dividend growth is forecastable. As a result, almost all simulations should give a large negative dividend growth forecast coefficient b_d. In the case of the standard market method, the probability of finding simulated coefficients higher than the direct estimates is very low with the exception of the 15 and 20 year horizons with simulated dividend growth coefficients 17% and 33% larger than their sample estimates. In contrast to that, using value-weights the probability of finding simulated coefficients larger than their sample estimates is very high with p-values bigger than 30% for the long run horizons. It is also important to note that the estimated coefficients in the case of the VW method are much bigger for all the time-horizons compared to the standard method. Therefore, even in those cases where the probability of finding dividend growth coefficients bigger than the sample estimates is not very high, the sample estimated coefficients are high and strongly significant compared to using standard weights. The 5-year long-run dividend growth coefficient is a clear example of this situation. The estimated coefficient for the standard portfolio is only -0.154 with a p-value of 14.23%, and the probability of finding simulated coefficients bigger than this -0.15 is 0%. On the other hand, the 15-year long run estimated coefficient using value-weights is more than two times bigger (-0.402) with a p-value of 2.71%. We can find simulated coefficients bigger than this -0.402 in more than 4% of the cases. On the other hand, the probability of finding simulated dividend growth coefficients using equal-weights is very low and never bigger than 20%. Finally, the differences among the joint probabilities for the different weighting schemes is also significant and particularly important in the VW method.

To sum up, the presence of dividend forecastability using value-weights gives far stronger statistical evidence in favor of the null than does the presence of return forecastability for the period 1928-2012. On the other hand, results using standard weights are similar to those in Cochrane (2008). The lack of dividend forecastability in the data gives far stronger statistical evidence against the null than does the presence of return forecastability. This fact is used by Cochrane (2008) to conclude that the absence of dividend growth predictability gives stronger evidence than does the presence of return predictability. He claims that if returns are not predictable, dividend growth must be predictable, to generate the observed variation in dividend yields. In contrast to that, we have shown that dividend growth is strongly predictable when using the value-weights.

In the case of the post-WW II 1950-2012 period and similar to the full sample, the marginal distribution of the return-forecast coefficient b_r does not lead to strong rejections of the null hypothesis of return unpredictability using standard and value-weights. The Monte Carlo draw produces a coefficient larger than the sample estimate around 20%-40% of the time. However, under that null and similar to the full sample period, we must have dividend growth predictability of sufficient magnitude. The simulated dividend growth forecasting coefficients using the standard method are only significantly larger than their estimated values at the very long 20-year horizon (p-values around 50%). For the rest of the time-horizons, we do not find dividend growth forecasting coefficients larger than their sample estimates. These results show that the lack of dividend growth forecastability in the data using standard weights in the post-WW II period gives far stronger statistical evidence against the null than does the presence of return forecastability. Again as in the case of the full sample period and in line with the current literature, when the post-WW II data is considered the absence of dividend growth predictability gives stronger evidence than does the presence of return predictability.

On the other hand, we find that the joint hypothesis testing framework provides much stronger evidence in favor of the null of no return predictability when using market-value weights. The simulated dividend growth forecasting coefficients are always larger than their estimated values for more than 60% of the time with the exception of the 1 and 5-year horizons. As in the case of the full sample period, it is important to note that although the probabilities of finding simulated values bigger than the sample estimates for the case of the 1 and 5 year horizon are relatively small, the estimated coefficients are very high and significant. Compared to standard weights, the 1-year coefficient is around 6 times bigger and the 5-year coefficient more than 30 times. The joint probability is also quite high with p-values bigger than 10% for all the horizons with the exception of the k=1 year.

To sum up, we find strong evidence for dividend growth predictability in the data for the post-WW II period when using the value-weighted scheme. This cast doubt on studies that find stronger evidence for the absence of dividend growth predictability. We find that this is driven by the way firm-level variables are weighted into aggregate annual series rather than due to the absence of dividend growth predictability.

2.7 Conclusion

The question of whether stock returns are predictable is important not only for academics but also for practitioners. Not surprisingly, it has attracted a large amount of research. In this Chapter we focus on the dramatic difference, reported in the literature, between pre- and post-WW II periods; in the former period divided growth is predictable where as in the latter period dividend growth is largely unpredictable. Thus cash flow growth does not seem to explain variation in stock returns which appear to be driven mainly by changes in the discount rate. This finding is disconcerting and if it holds has major consequences for finance theory and practice as highlighted by Cochrane (2008).

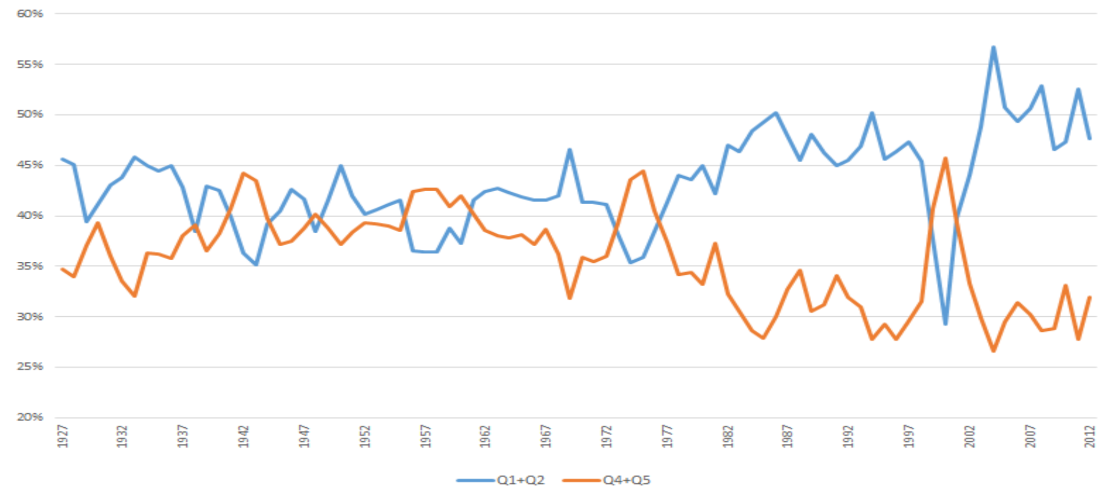
In this Chapter we revisit these important issues and find evidence, in contrast to prior work, that in fact cash flow growth matters in the post-WW II period or that dividend growth has predictive ability for dividend yield. We find that the key issue is the manner of aggregation of firm-level data used in estimating predictive regressions based on both the Campbell-Shiller and the Vuolteenaho decompositions. Indeed the implicit value weighting of aggregate series used in previous work based on the Vuolteenaho decomposition while not using this method in constructing series used in the Campbell-Shiller approach lies at the heart of the different results. We reconcile this and find that when we use value-weights both decompositions lead to similar results i.e. in post-WW II data cash flow growth is also important. We then investigate what drives these results and why the manner of aggregation matters. We find that in the data, during the post-WW II period the largest market capitalization firms are not those that pay the largest dollar dividends or report the largest dollar earnings. Once the aggregation method takes these stylized facts of the data into account and is reflected in the aggregate series, predictive regressions yield compatible results dismissing the effect of dividend smoothing policies followed by firms in the predictability of dividend growth during the post-WW II period. Our evidence is also similar to that reported in recent work using innovative filtering techniques. It also finds stronger evidence for dividend growth predictability by including information available in the cross section and past history of returns and dividends.

In this Chapter, we take a first stab at identifying what drives this dividend growth predictability. Consensus on these empirical issues is important for both theory and practice in asset pricing and corporate finance. However much work still remains to be done in this area using other relevant return decompositions but we leave this for the future.

The empirical analysis in this Chapter is based on U.S market data and in the environment of the U.S. financial system. These results are based therefore on the largest equity market in the world. If a similar analysis is done on smaller markets, e.g like one the European Union markets, the results are likely to be different mainly due to the smaller size of these markets, the domination of these market by few large firms, the importance of the bank system in some countries and other legal and institutional differences in trading and stock market regulations. An avenue for future work could be to do a similar analysis of other national stock markets and compared and contrast the results with those of the U.S market. There are also other limitations to the empirical analysis in this Chapter. First, the data pertains to the period which is available on the WRDS database. There are also other pre-1920s data in other sources and the results we have obtained may be not be possible to generalize to other time periods. Another limitation is that we have relied largely on the Campbell and Shiller and the book-to-market decompositions. However, there are other methods that rely on different decompositions. As a consequence, these results are limited to pros and cons of using these return decompositions which are well known and referred to earlier in the Chapter. In addition, the same issues as explored in this Chapter can also be based on alternative approached like the Implied Cost of Capital.

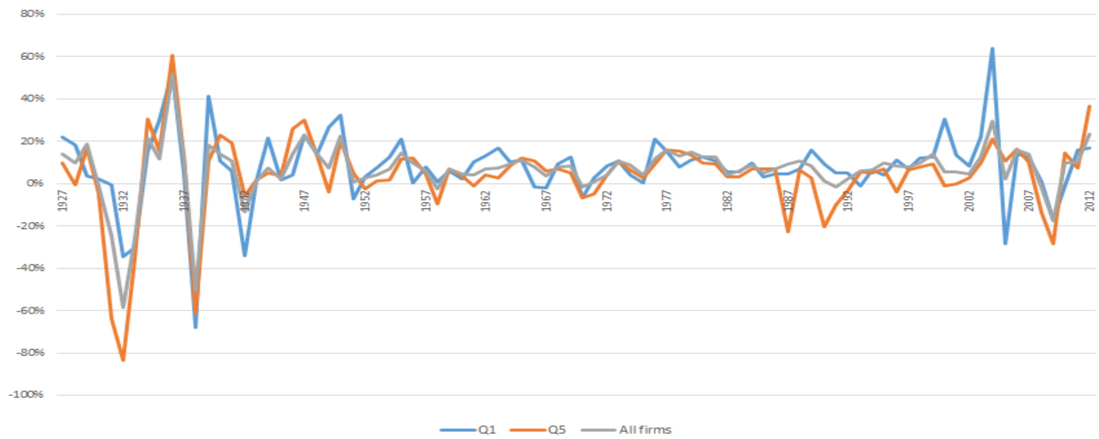
2.8 Tables and Figures

FIGURE 2.1: The fraction of aggregate dividends paid by size quintiles, 1928-2012



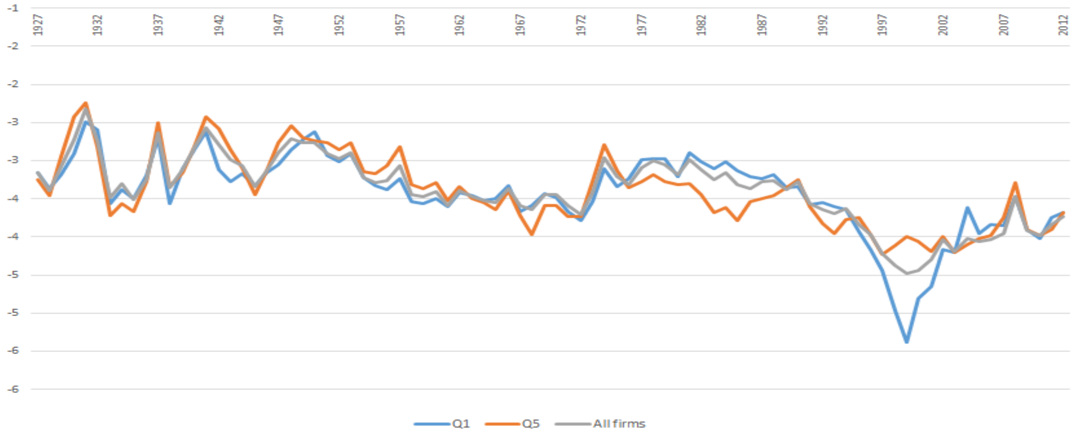
Note: We have depicted the percentage of total dividends pais by firms into the biggest size quintiles Q1 and Q2 (Q1+Q2) clubbed together compared that to the smallest size quintiles Q4 and Q5 (Q4+Q5). Following Fama and French (1992), the quintile portfolios are constructed at the end of each December using previous December market values i.e. we avoid any look-ahead bias.

FIGURE 2.2: Log dividend growths by size quintiles



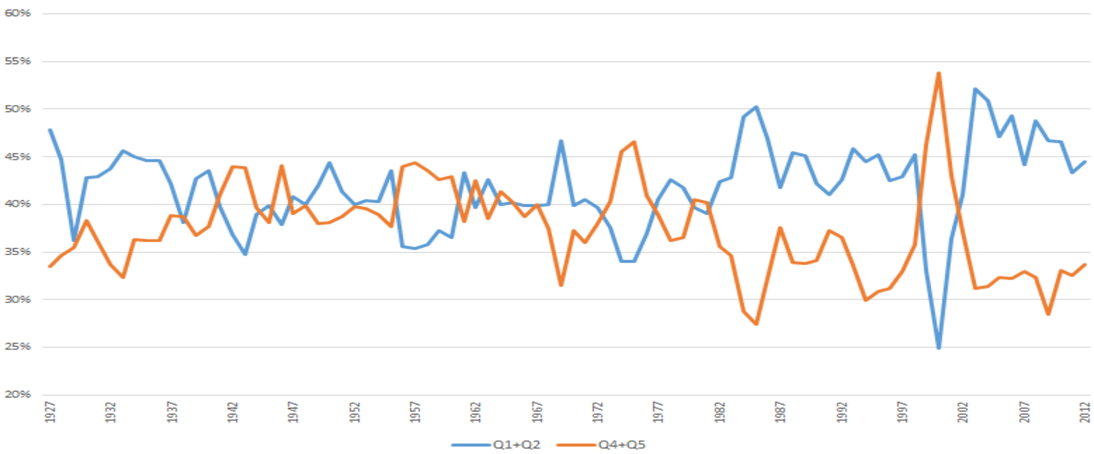
Note: We have depicted the log dividend growth series for the biggest size quintiles Q1 and Q2 (Q1+Q2) clubbed together compared that to the smallest size quintiles Q4 and Q5 (Q4+Q5) and the full sample of all firms. Following Fama and French (1992), the quintile portfolios are constructed at the end of each December using previous December market values i.e. we avoid any look-ahead bias.

FIGURE 2.3: Log dividend yields by size quintiles



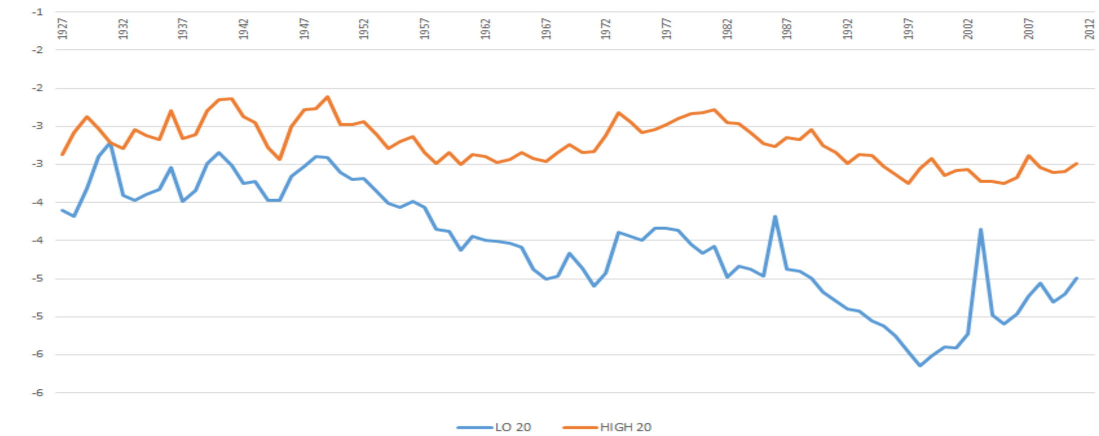
Note: We have depicted the log dividend yield series for the biggest size quintiles Q1 and Q2 (Q1+Q2) clubbed together compared that to the smallest size quintiles Q4 and Q5 (Q4+Q5) and the full sample of all firms. Following Fama and French (1992), the quintile portfolios are constructed at the end of each December using previous December market values i.e. we avoid any look-ahead bias.

FIGURE 2.4: The fraction of aggregate payouts by size quintiles, 1928-2012



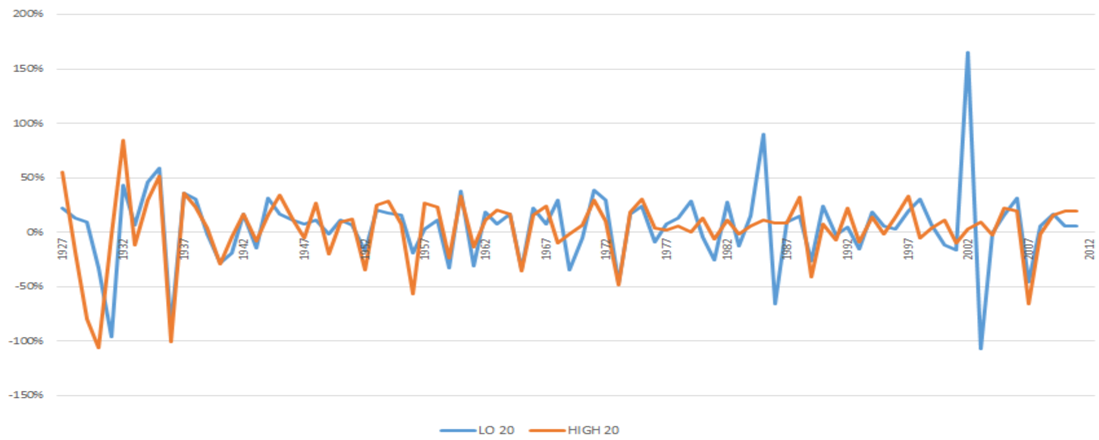
Note: We have depicted the percentage of total dividends and repurchases paid by firms into the biggest size quintiles Q1 and Q2 (Q1+Q2) clubbed together compared that to the smallest size quintiles Q4 and Q5 (Q4+Q5). Following Fama and French (1992), the quintile portfolios are constructed at the end of each December using previous December market values i.e. we avoid any look-ahead bias.

Figure 2.5: Log dividend yields using Fama and French dividend yield quintiles



Note: We have depicted the log dividend yield series for the corresponding lowest and highest Fama and French dividend yield quintiles using Kenneth R. French data library.

Figure 2.6: Log dividend growths using Fama and French dividend yield quintiles



Note: We have depicted the log dividend growth series for the corresponding to lowest and highest Fama and French dividend yield quintiles using Kenneth R. French data library

Table 2.1: Multiperiod Unweighted Direct Regressions for returns and ROE predictability

Panel A: 1928 – 2012									
	Standard			*VW*			*EW*		
k	$\widehat{b}_{r/ROE,k}$	P_H	R^2	$\widehat{b}_{r/ROE,k}$	P_H	R^2	$\widehat{b}_{r/ROE,k}$	P_H	R^2
Total Returns									
1	0.143	10.06	6.38	0.147	11.13	7.18	0.054	28.64	1.23
5	0.394	4.56	18.63	0.372	5.63	17.58	0.100	35.12	1.62
10	0.510	8.20	18.82	0.443	10.11	14.91	−0.108	38.02	1.28
15	0.777	4.92	26.61	0.671	6.56	21.98	−0.131	38.27	1.29
20	0.989	1.76	33.33	0.854	2.66	28.36	−0.184	32.02	1.76
ROE									
1	−0.048	1.08	21.54	−0.076	0.57	21.70	−0.132	0.00	41.89
5	−0.186	0.20	21.83	−0.298	0.00	40.36	−0.585	0.00	49.15
10	−0.325	0.00	22.97	−0.504	0.00	39.44	−1.033	0.00	42.69
15	−0.506	0.00	28.35	−0.670	0.18	29.89	−1.369	0.00	37.92
20	−0.460	0.00	20.94	−0.411	4.41	8.59	−1.548	0.00	30.55
Panel B: 1950 – 2012									
	Standard			*VW*			*EW*		
k	$\widehat{b}_{r/ROE,k}$	P_H	R^2	$\widehat{b}_{r/ROE,k}$	P_H	R^2	$\widehat{b}_{r/ROE,k}$	P_H	R^2
Total Returns									
1	0.137	1.84	9.76	0.142	1.79	9.96	0.100	7.44	2.96
5	0.487	4.80	30.63	0.542	5.19	29.70	0.209	25.13	3.31
10	0.811	5.35	47.47	0.821	5.67	44.96	−0.086	44.13	0.25
15	1.168	2.61	51.80	1.226	2.43	53.33	−0.365	29.20	2.74
20	1.423	0.95	49.30	1.476	0.91	50.09	−0.382	30.85	1.73
ROE									
1	−0.003	42.45	0.00	−0.071	1.58	11.82	−0.220	0.00	27.22
5	−0.037	27.56	1.94	−0.336	0.30	32.66	−1.023	0.00	49.05
10	−0.157	14.73	4.20	−0.583	0.68	34.85	−1.908	0.00	42.32
15	−0.391	1.11	53.18	−0.821	0.79	23.60	−2.417	2.91	32.70
20	−0.297	4.24	48.00	0.025	47.25	0.00	−2.115	0.00	14.37

Note: This table shows results for multiperiod regressions, post-WW II period (1950-2012), of future ROE and future returns on the lagged (log) book-to-market for the U.S. market and two portfolios, namely the value-weighted or the equally-weighted market portfolio. Dividends are assumed to be reinvested at the zero rate of return. We report the long-run coefficient, from one to 20 years, of regressing returns and the ROE on the lagged log book-to-market ratio ($b_{d,k}$), the one-sided p-value using Hodrick (1992) standard errors (P_H) and the R-squared (R^2).

Table 2.2: Joint Hypothesis Tests for returns and ROE predictability

		$\widehat{b}$	$t(\widehat{b})$	$\widehat{b^{lr}}$	$t_{b^{lr}=0}$	$t_{b^{lr}=1}$
		Panel A : 1928 − 2012				
Standard						
	r	0.143	1.89	0.748	8.19	−2.75
	roe	−0.048	−3.00	−0.252	8.19	−2.75
VW						
	r	0.147	1.94	0.660	6.63	−3.42
	roe	−0.076	−3.87	−0.340	6.62	−3.42
EW						
	r	0.054	0.71	0.290	1.40	−3.43
	roe	−0.132	−6.95	−0.710	1.40	−3.43
		Panel B : 1950 − 2012				
		$\widehat{b}$	$t(\widehat{b})$	$\widehat{b^{lr}}$	$t_{b^{lr}=0}$	$t_{b^{lr}=1}$
Standard						
	r	0.137	2.25	0.980	11.89	−0.25
	roe	−0.003	−0.18	−0.020	11.89	−0.25
VW						
	r	0.142	2.34	0.669	5.38	−2.66
	Δd	−0.071	−2.19	−0.331	5.38	−2.66
EW						
	r	0.100	1.44	0.313	1.81	−3.96
	roe	−0.220	−7.15	−0.687	1.81	−3.96

Note: This Table reports results for long horizon VAR regressions and joint hypothesis tests for the U.S. market and two portfolios, namely the value-weighted or the equally-weighted market portfolio constructed from aggregating all the firms in the CRSP monthly master file excluding American Depository Receipts (ADRs) over the full sample (1928-2012) and the post war period (1950-2012). The variables in the VAR are the log stock return (r), log roe (*roe*), and log book-to-market ratio (bm). b^{lr} denote the long-run coefficients (infinite horizon). t(b^{lr}=0) and t(b^{lr}=1) denote the t-statistics associated with the null hypothesis H_0 : $b^{lr}_r = 0$, $b^{lr}_r oe$=-1 and $H_0 : b^{lr}_r$=1, $b^{lr}_r oe$=0, respectively.

Table 2.3: Descriptive Statistics for the market strategies

Panel A: 1928 – 2012									
	Returns			*Dividend Yield*			*Dividend Growth*		
	Mean	*Stdev.*	$\rho(1)$	*Mean*	*Stdev.*	$\rho(1)$	*Mean*	*Stdev.*	$\rho(1)$
Standard	0.11	0.20	0.04	−3.38	0.45	0.86	0.06	0.13	0.30
VW	0.11	0.20	0.04	−3.33	0.43	0.84	0.13	0.14	0.29
EW	0.17	0.27	0.04	−3.49	0.45	0.77	0.10	0.12	0.31
Panel B: 1950 – 2012									
	Returns			*Dividend Yield*			*Dividend Growth*		
	Mean	*Stdev.*	$\rho(1)$	*Mean*	*Stdev.*	$\rho(1)$	*Mean*	*Stdev.*	$\rho(1)$
Standard	0.12	0.17	−0.09	−3.53	0.41	0.90	0.07	0.07	0.21
VW	0.12	0.17	−0.09	−3.46	0.39	0.87	0.14	0.09	0.49
EW	0.19	0.24	−0.10	−3.61	0.38	0.79	0.10	0.07	0.43

Note: This table reports descriptive statistics for the log market return (r), log dividend-to-price ratio (d-p), log standard dividend growth (Δd) and log market value weighted dividend growth ($\overline{\Delta d}$) under the risk free rate of reinvestment. The sample corresponds to annual data for the 1928-2012 period and post-WW II 1950-2012. $\rho(1)$ designates the first-order autocorrelation.

TABLE 2.4: Multiperiod Unweighted Direct Regressions for returns and dividend growth predictability

Panel A : 1928 – 2012									
	Standard			*VW*			*EW*		
k	$\widehat{b}_{r/d,k}$	P_H	R^2	$\widehat{b}_{r/d,k}$	P_H	R^2	$\widehat{b}_{r/d,k}$	P_H	R^2
Return Predictability									
1	0.055	14.46	1.53	0.046	19.70	1.25	0.014	39.65	0.00
5	0.329	6.19	14.09	0.334	6.51	14.06	0.169	21.57	2.82
10	0.508	9.85	19.03	0.505	10.39	18.16	−0.127	36.88	1.54
15	0.762	6.05	21.15	0.743	6.75	19.23	−0.127	40.62	1.00
20	0.740	7.44	14.81	0.707	8.24	12.56	−0.273	33.73	3.32
Dividend Growth Predictability									
1	−0.114	1.73	14.63	−0.155	0.38	21.83	−0.108	0.64	15.41
5	−0.154	14.23	4.49	−0.402	2.71	24.69	−0.085	21.89	1.79
10	−0.225	15.83	45.42	−0.687	1.59	44.15	−0.116	24.33	2.99
15	−0.435	4.61	11.31	−0.865	0.48	33.72	−0.244	10.59	8.93
20	−0.505	3.01	15.27	−0.862	0.34	21.81	−0.302	11.24	14.81
Panel B : 1950 – 2012									
	Standard			*VW*			*EW*		
k	$\widehat{b}_{r/d,k}$	P_H	R^2	$\widehat{b}_{r/d,k}$	P_H	R^2	$\widehat{b}_{r/d,k}$	P_H	R^2
Return Predictability									
1	0.122	1.47	8.66	0.122	1.57	7.84	0.076	15.23	1.53
5	0.461	3.72	33.81	0.484	3.41	33.56	0.113	34.10	0.89
10	0.781	5.13	48.06	0.844	4.23	49.59	−0.239	32.07	2.70
15	1.110	2.74	43.77	1.183	2.30	46.85	−0.410	29.00	5.04
20	1.098	2.59	24.45	1.192	1.79	27.33	−0.821	15.68	11.46
Dividend Growth Predictability									
1	−0.026	9.13	2.79	−0.084	2.25	11.95	−0.055	0.83	10.17
5	−0.006	47.75	0.00	−0.383	4.67	27.71	−0.086	16.93	3.73
10	−0.083	36.15	3.37	−0.773	2.02	47.09	−0.268	2.85	27.33
15	−0.226	22.90	12.75	−0.767	1.98	21.99	−0.340	3.68	31.26
20	−0.457	6.34	38.16	−0.650	2.32	7.62	−0.522	1.93	51.17

Note: Panel A shows results for multiperiod regressions over the full sample period (1928-2012), of future returns and future dividend growth on lagged (log) dividend yield for the U.S.. market and two portfolios, namely the value-weighted or the equally-weighted market portfolio constructed from aggregating all the firms in the CRSP monthly master file excluding American Depository Receipts (ADRs). Panel B reports results for the post-WW II period (1950-2012) for the same market portfolios. We report the long-run coefficients, from one to 20 years, of regressing returns and dividend growth on the lagged log dividend yield ($b_{r/d,k}$), the one-sided p-value using Hodrick (1992) standard errors (P_H) and the R-squared (R^2).

Table 2.5: Joint Hypothesis Tests for returns and dividend growth predictability

	$Panel\ A:\ 1928-2012$								
	$Standard$			VW			EW		
	$\widehat{b^{lr}}$	$t_{b^{lr}=0}$	$t_{b^{lr}=1}$	$\widehat{b^{lr}}$	$t_{b^{lr}=0}$	$t_{b^{lr}=1}$	$\widehat{b^{lr}}$	$t_{b^{lr}=0}$	$t_{b^{lr}=1}$
r	0.324	1.57	-3.27	0.230	1.17	-3.92	0.000	0.00	-1.65
Δd	-0.676	1.57	-3.27	-0.770	1.17	-3.92	-1.000	0.00	-1.65

	$Panel\ B: 1950-2012$								
	$Standard$			VW			EW		
	$\widehat{b^{lr}}$	$t_{b^{lr}=0}$	$t_{b^{lr}=1}$	$\widehat{b^{lr}}$	$t_{b^{lr}=0}$	$t_{b^{lr}=1}$	$\widehat{b^{lr}}$	$t_{b^{lr}=0}$	$t_{b^{lr}=1}$
r	0.825	6.52	-1.39	0.593	4.13	-2.84	0.582	2.26	-1.62
Δd	-0.175	6.52	-1.39	-0.407	4.13	-2.84	-0.418	2.26	-1.62

Note: This Table reports results for long horizon VAR regressions and joint hypothesis tests for the U.S. market and two portfolios, namely the value-weighted or the equally-weighted market portfolio constructed from aggregating all the firms in the CRSP monthly master file excluding American Depository Receipts (ADRs) over the full sample (1928-2012) and the post-WW II period (1950-2012). The variables in the VAR are the log stock return (r), log dividend growth (Δd), and log dividend-to-price ratio (d-p). b^{lr} denote the long-run coefficients (infinite horizon). t(b^{lr}=0) and t(b^{lr}=1) denote the t-statistics associated with the null hypothesis $H_0 : b^{lr}_r = 0$, b^{lr}_d=-1 and $H_0 : b^{lr}_r$=1, b^{lr}_d=0, respectively.

Table 2.6: Univariate predictive regressions for the quintile portfolios

	Panel A: Return Predictability							
	1928 − 2012				1950 − 2012			
	κ_r	$t-stat$	R^2	$\widehat{b}^{lr}$	κ_r	$t-stat$	R^2	$\widehat{b}^{lr}$
All Firms	0.057	1.00	1.68	0.330	0.123	2.31	8.74	0.778
$Q1$	0.074	1.37	3.57	0.388	0.106	1.90	8.94	0.586
$Q2$	0.068	1.27	2.55	0.387	0.158	3.05	13.05	0.735
$Q3$	0.063	1.20	2.45	0.358	0.113	2.05	8.74	0.806
$Q4$	0.044	0.76	0.98	0.264	0.109	2.08	7.29	0.789
$Q5$	0.037	0.55	0.49	0.177	0.127	2.37	5.89	0.671
	Panel B: Dividend Growth Predictability							
	1928 − 2012				1950 − 2012			
	κ_d	$t-stat$	R^2	$\widehat{b}^{ld}$	κ_d	$t-stat$	R^2	$\widehat{b}^{ld}$
All Firms	−0.115	−2.14	14.69	−0.670	−0.035	−1.79	5.35	−0.222
$Q1$	−0.116	−2.68	12.56	−0.612	−0.075	−2.90	11.75	−0.414
$Q2$	−0.108	−2.68	15.70	−0.613	−0.057	−2.81	9.41	−0.265
$Q3$	−0.113	−2.23	16.54	−0.642	−0.027	−1.36	5.81	−0.194
$Q4$	−0.122	−2.11	14.37	−0.736	−0.029	−1.28	2.14	−0.211
$Q5$	−0.170	−2.29	17.64	−0.823	−0.062	−2.31	6.01	−0.329

Note: Panel A reports the standard univariate regressions of annual log returns on the lagged log dividend yield for the whole sample of all CRSP firms except for ADRs and for the market value quintiles over the full sample 1928-2012 and the 1950-2012 period. Panel B reports the standard univariate regressions of log dividend growth on the lagged log dividend yield over the same sample periods and equity portfolios. In each panel, the first column reports the regression coefficient, the second column the Newey West t-statistic, the third column the R-square and the fourth column the dividend growth and total returns long-run predictive coefficients ($\widehat{b}^{lr}$ and $\widehat{b}^{ld}$) based on a VAR (1).

Table 2.7: Univariate Regressions for the repurchases adjusted series.

	Panel A: Return Predictability					
	1928 – 2012			1950 – 2012		
	κ_r	$t-stat$	R^2	κ_r	$t-stat$	R^2
All firms	0.102	1.26	2.49	0.205	2.94	10.71
$Q1$	0.123	2.27	6.16	0.148	2.66	10.80
$Q2$	0.125	1.92	4.64	0.229	3.67	16.14
$Q3$	0.102	1.39	2.89	0.188	3.05	9.91
$Q4$	0.032	0.36	0.22	0.147	1.81	5.01
$Q5$	0.073	0.78	1.07	0.221	2.86	9.60
	Panel B: Dividend Growth Predictability					
	1928 – 2012			1950 – 2012		
	κ_d	$t-stat$	R^2	κ_d	$t-stat$	R^2
All firms	−0.278	−3.15	25.82	−0.128	−1.44	7.75
$Q1$	−0.123	−3.86	19.90	−0.135	−3.24	11.19
$Q2$	−0.202	−2.59	14.18	−0.106	−1.18	3.83
$Q3$	−0.298	−3.44	26.40	−0.129	−1.50	6.36
$Q4$	−0.413	−4.34	34.98	−0.289	−2.46	19.00
$Q5$	−0.364	−3.61	32.41	−0.214	−2.34	16.47

Note: Panel A reports the standard univariate regressions of annual log returns on the repurchases adjusted lagged log dividend yield for the whole sample of CRSP firms excluding American Depository Receipts (ADRs) and for the market value quintiles over the full sample 1928-2012 and the 1950-2012 period. Panel B reports the standard univariate regressions of the repurchases adjusted log dividend growth on the repurchases adjusted lagged log dividend yield over the same sample periods and equity portfolios. In each panel, the first column reports the regression coefficient, the second column the Newey West t-statistic and the third column the R-squared.

Table 2.8: Multiperiod Unweighted Direct Regressions for portfolios of only dividend payers

	Panel A: 1928 – 2012								
	Standard			*VW*			*EW*		
k	$\widehat{b}_{r/d,k}$	P_H	R^2	$\widehat{b}_{r/d,k}$	P_H	R^2	$\widehat{b}_{r/d,k}$	P_H	R^2
	Total Returns								
1	0.067	12.44	1.85	0.054	18.45	1.16	0.051	29.65	0.58
5	0.369	5.31	14.32	0.368	5.68	13.49	0.453	5.95	12.26
10	0.547	9.73	17.92	0.527	10.44	15.63	0.302	26.19	4.81
15	0.792	6.57	20.89	0.746	7.42	18.37	0.444	22.19	8.89
20	0.744	8.95	15.22	0.681	10.19	12.81	0.209	35.89	2.08
	Dividend Growth								
1	−0.127	1.48	17.25	−0.198	0.21	25.20	−0.247	0.46	25.13
5	−0.168	14.84	5.73	−0.536	2.07	26.18	−0.234	17.45	3.75
10	−0.263	10.51	22.97	−0.940	1.18	38.86	−0.332	15.50	4.43
15	−0.443	5.46	14.46	−1.058	0.77	26.08	−0.602	3.24	7.87
20	−0.529	3.06	21.43	−0.909	1.21	12.82	−0.809	1.72	9.95
	Panel B: 1950 – 2012								
	Standard			*VW*			*EW*		
k	$\widehat{b}_{r/d,k}$	P_H	R^2	$\widehat{b}_{r/d,k}$	P_H	R^2	$\widehat{b}_{r/d,k}$	P_H	R^2
	Total Returns								
1	0.171	0.32	11.91	0.166	0.33	10.57	0.262	0.34	11.28
5	0.613	1.41	42.56	0.642	1.14	42.49	1.077	0.30	37.09
10	1.020	2.59	59.71	1.100	1.73	61.86	1.064	2.62	37.40
15	1.354	1.71	54.92	1.416	1.35	57.65	0.955	7.17	28.51
20	1.152	2.93	27.31	1.204	2.18	28.99	0.243	30.75	1.79
	Dividend Growth								
1	−0.037	5.46	4.20	−0.133	0.78	14.20	−0.134	1.99	9.26
5	−0.017	44.36	0.17	−0.607	2.37	27.64	−0.146	18.23	0.93
10	−0.113	32.59	3.38	−1.176	0.97	37.63	−0.441	2.92	3.17
15	−0.207	26.26	7.45	−0.932	3.07	12.14	−0.463	2.03	2.08
20	−0.426	8.71	20.48	−0.255	26.27	0.52	−0.692	0.00	3.28

Note: This Table shows results for multiperiod regressions, over the full sample (1928-2012) and the post war period (1950-2012), of future dividend growth on lagged (log) dividend yield for the U.S. market and two portfolios, namely the value-weighted or the equally-weighted market portfolio constructed from aggregating all the firms in the CRSP monthly master file excluding American Depository Receipts (ADRs). Dividends are assumed to be reinvested at the zero rate of return. We report the long-run coefficient, from one to 20 years, of regressing dividend growth on the lagged log dividend yield ($b_{d,k}$), the one-sided p-value using Hodrick (1992) standard errors (P_H) and the R-squared (R^2).

Table 2.9: Joint Hypothesis Tests for portfolios of only dividend payers

		$\widehat{b}$	$t(\widehat{b})$	$\widehat{b^{lr}}$	$t_{b^{lr}=0}$	$t_{b^{lr}=1}$
		Panel A: 1928 – 2012				
Standard						
	r	0.067	1.03	0.346	1.79	−3.39
	Δd	−0.127	−2.38	−0.654	1.79	−3.39
VW						
	r	0.054	0.78	0.215	1.23	−4.48
	Δd	−0.198	−3.52	−0.785	1.23	−4.48
EW						
	r	0.051	0.48	0.171	0.84	−4.04
	Δd	−0.247	−3.60	−0.829	0.84	−4.04
		Panel B: 1950 – 2012				
		$\widehat{b}$	$t(\widehat{b})$	$\widehat{b^{lr}}$	$t_{b^{lr}=0}$	$t_{b^{lr}=1}$
Standard						
	r	0.171	2.93	0.822	7.88	−1.71
	Δd	−0.037	−1.73	−0.178	7.88	−1.71
VW						
	r	0.166	2.97	0.555	4.31	−3.47
	Δd	−0.133	−2.22	−0.445	4.31	−3.47
EW						
	r	0.262	3.57	0.661	5.42	−2.78
	Δd	−0.134	−2.22	−0.339	5.42	−2.78

Note: This Table reports results for long horizon VAR regressions and joint hypothesis tests for the U.S. market and two portfolios, namely the value-weighted or the equally-weighted market portfolio constructed from aggregating all the firms in the CRSP monthly master file excluding American Depository Receipts (ADRs) over the full sample (1928-2012) and the post war period (1950-2012). Dividends are assumed to be reinvested at the zero rate of return. The variables in the VAR are the log stock return (r), log dividend growth (Δd), and log dividend-to-price ratio (d-p). b^{lr} denote the long-run coefficients (infinite horizon). t(b^{lr}=0) and t(b^{lr}=1) denote the t-statistics associated with the null hypothesis H_0 : $b_r^{lr} = 0$, b_d^{lr}=-1 and H_0 : b_r^{lr}=1, b_d^{lr}=0, respectively.

Table 2.10: Monte Carlo Simulation Results for returns and dividend growth predictability

	Panel A: 1928 − 2012								
	Standard			*VW*			*EW*		
k	$b_r > \bar{b}_r$	$b_d > \bar{b}_d$	$b_r > \bar{b}_r$ $b_d > \bar{b}_d$	$b_r > \bar{b}_r$	$b_d > \bar{b}_d$	$b_r > \bar{b}_r$ $b_d > \bar{b}_d$	$b_r > \bar{b}_r$	$b_d > \bar{b}_d$	$b_r > \bar{b}_r$ $b_d > \bar{b}_d$
1	30.66	2.18	1.43	36.09	13.28	6.80	65.42	0.00	0.00
5	20.27	0.12	0.12	20.28	4.34	3.73	43.61	0.00	0.00
10	24.48	1.91	1.90	25.06	30.66	21.19	85.70	0.15	0.15
15	18.07	17.47	12.66	19.70	53.86	19.66	86.41	6.19	6.19
20	28.67	33.29	23.85	31.09	60.31	30.90	92.35	19.22	19.22
	Panel B: 1950 − 2012								
	Standard			*VW*			*EW*		
k	$b_r > \bar{b}_r$	$b_d > \bar{b}_d$	$b_r > \bar{b}_r$ $b_d > \bar{b}_d$	$b_r > \bar{b}_r$	$b_d > \bar{b}_d$	$b_r > \bar{b}_r$ $b_d > \bar{b}_d$	$b_r > \bar{b}_r$	$b_d > \bar{b}_d$	$b_r > \bar{b}_r$ $b_d > \bar{b}_d$
1	16.78	0.00	0.00	19.29	0.57	0.49	32.10	0.00	0.00
5	20.10	0.03	0.03	20.62	12.51	10.00	59.58	0.00	0.00
10	18.96	1.88	1.78	18.06	57.78	18.05	89.62	5.81	5.81
15	12.36	17.30	8.94	12.75	62.55	12.75	93.91	26.80	26.80
20	22.98	50.23	21.87	21.31	64.17	21.27	97.67	57.55	57.55

Note: This Table shows the simulated p-values for joint tests of multi-period returns and dividend growth rates under the null of no return predictability over the full sample (1928-2012) and the post-WW II period (1950-2012). We follow Cochrane (2008) and draw the VAR residuals assuming they are jointly normally distributed. The dividend yield for the base period $d_0 - p_0$ is drawn from the unconditional density $d_0 - p_0 \sim N[0, \sigma^2(\varepsilon^{dp})/(1-\phi^2)]$. We then draw ϵ_t^d and ϵ_t^{dp} as random normals and simulate the system forward (10,000 times). For the multiperiod returns and dividend growth rates, we follow a similar simulation procedure, but now we compute $r_{t,t+1}$ and Δd_t from the simulated data and regress these onto $d_t - p_t$, and collect the coefficients. Then, we compute the fractions of simulated estimates for the return/dividend growth coefficients that are higher than the estimates found in the data, that is, $p(b_{r,k} > \overline{b_{r,k}})$ and $p(b_{d,k} > \overline{b_{d,k}})$. We also calculate the joint probabilities, $p(b_{r,k} > \overline{b_{r,k}}\ and\ b_{d,k} > \overline{b_{d,k}})$.

Chapter 3

Exploring the Anatomy of Firm Payouts: Who Pays, How Much and When?

3.1 Introduction

The pattern of payouts by firms, both over time and across firms has attracted much attention. In a classic paper, Lintner (1956) proposed a time series model for dividend payouts. More recently, the focus of empirical research on dividends has been on analyzing not just cash dividends but all payouts including shares repurchases and new issues. For example in an important paper Fama and French (2001) provide evidence that the number of listed U.S. firms paying cash dividends declines dramatically after 1978, and that this can only be partly attributed to changes in the characteristics of publicly-held firms. DeAngelo, DeAngelo and Skinner (2004) revisit the Fama and French (2001) results and suggest that while many fewer firms paid dividends in the late 1990s that did in the mid-1970s, aggregate dividends increased over that period, both in nominal and in real terms. Hence, it is not that dividend themselves were disappearing but they were concentrated in a fewer number of firms. In subsequent work, Boudoukh et al. (2007) and Skinner (2008) report that after the 1980s repurchases have become a very important method of returning cash to shareholders. The advantages of stock repurchases over dividends led to suggestions in the popular press that the disappearance of dividends would be just a matter of time. However, recent work by Floyd, Li and Skinner (2013) that compares payout policies of U.S. industrial and financial firms reports that dividends have bounced back strongly thus reviving the dividend puzzle (Black, 1976).

The strong growth of total payouts-dividends and repurchases over the past decade is also related to the fact that U.S. corporations are holding record-high amounts of cash. A close look at the balance sheets of publicly trade U.S. firms show that their cash holdings increased dramatically since the mid-1990s except for a slowdown around the financial crisis. The two explanations most frequently given for the growth in cash pertain to fiscal policy and structural factors. Fiscal policy is related to the tax cost for public firms to bring their overseas profits back to the U.S. and the uncertainty about the increase on future taxes. Other explanations point to gradual changes in the nature of the operations of a firm. Firms hold cash and equivalent liquid assets because they provide the flexibility that firms need in their transactions. Two factors interact directly with this proposed explanation: uncertainty and credit constraints. Firms facing uncertainty about future transactions, either due to firm-specific or aggregate factors, may find it beneficial to pile up significant amounts of cash as a cushion. For example, a firm may want to hold cash to be able to act fast when an acquisition is possible. A firm may also hold cash and postpone investment until uncertainty about fiscal policies is resolved. Recent research suggests that the behavior of firms in sectors more intensive in R&D is crucial to understanding cash holdings. Although it is not the purpose of this Chapter, the fact that firms are distributing the bulk of their earnings to stockholders means that they aren't investing in the equipment or undertaking the research that leads to future improvements in productivity, earnings and job creation.

In this Chapter we build on recent payout policy research but we offer a more detailed analysis than that available in the current literature by analyzing the anatomy of US firms' payouts using novel ways of classifying firms and over a long period from 1927 (the start of the CRSP database) up till 2012. Thanks to this detailed analysis of corporate payouts we have been able to consider the impact of sample composition changes thanks to the analysis of the different industries, indexes and years since the firm was included into thee CRSP database. We begin by replicating and updating previous work that analyzes patterns in the time series and cross-sectional behavior of payouts by U.S. firms. This also facilitates comparison with our work. We then turn to our main contribution and study dividend and repurchases patterns across industry groups including the most recent crisis period. Based on the SIC classification of industries we sort firms available in the CRSP into different industry groups. To our knowledge this level of detail has not been analyzed previously using U.S. market data for the sample period we cover. We do this for all firms in the CRSP database including those traded on the NYSE, NASDAQ, AMEX, ARCA and other exchanges. Finally, we also track payout policy from the perspective of firm age i.e. from the time the firm is first listed in our CRSP database.

Our main conclusions are as follows. First, we find that after 1990, the following industry groups: Chemicals, Communications and Depository Institutions together paid about half of all dividends paid by US firms. However during the recent financial crisis the fraction of dividends paid by Depository Institutions fell to less than 5%, while Communications also reduced its share to less than 7% but Chemicals maintained its position as the largest payer at around 15%. Despite the effect of the financial crisis, the concentration of industrials dividends reported by DeAngelo, DeAngelo and Skinner (2004) extends to industry groups. In short, while in the 1930s and the 1940s four Manufacturing groups were paying between 10% and 15% of all dividends, after the 1990s we only find one group (Chemicals) paying between 10% and 15% of all dividends. The concentration of industrial firms' dividends reported by DeAngelo, DeAngelo and Skinner (2004) extends to repurchases although they are undertaken by a more diverse group of industries. This is also the case for financials in where dividends are mainly paid by Depositary Institutions, while stock repurchases are distributed among a more diverse group of financials.

Second, we find that payouts are concentrated in firms listed in certain specific years. For example, we find that after the year 2000, firms listed in 1926 and 1973 paid around 20% and 35% of the total dividends paid. Third, we confirm the results of Floyd, Li and Skinner (2013) and find that it is the youngest and the oldest firms who are mainly responsible for the growth of dividends and repurchases after 2001. Specifically, we find that prior to the current financial crisis, the youngest firms (those listed after 1986) mainly drive the growth of dividends. After the crisis (2009) the growth of dividends is mainly by both younger (listed after 1989) and also by older firms (listed after 1963). The growth of repurchases however, after 2000 and during the financial crises comes mainly from the same younger firms that are also driving the growth in dividends.

This chapter is organized as follows. We begin with a review of selected related research in Section 2. Section 3 replicates the main findings of recent US payout policy. Section 4 looks closely at aggregate payouts from the perspective of firm type, market index and firm age. Section 5 reports evidence on several aspects of payout policy and how it changes over time from the perspective of firm size. Finally, Section 6 concludes the Chapter.

3.2 Literature Review

Why, when and in what form do firms pay dividends? This is one of the most important and enduring research questions in corporate finance. It has attracted extensive attention - see Farre-Mensa and Michaely (2014) for a recent review. In this brief review, we however focus specifically on the literature that analyzes patterns in the the time series and cross-sectional behavior of payouts by U.S. firms.

In their classic work Miller and Modigliani (1961) observed that in a world without taxes and other frictions, dividends should be indifferent to investors and firms. Firms that pay dividends offer less price appreciation but must provide the same total return to stockholders, given their risk characteristics and the cash flows from their investment decisions. Thus, if there are no taxes, or if dividends and capital gains are taxed at the same rate, investors should be indifferent to receiving their returns in dividends or price appreciation. But also why firms pay dividends is difficult to explain when dividends are normally taxed at a higher rate than capital gains and put dividend paying firms at a competitive disadvantage since they have a higher cost of equity than firms that do not pay.

In an important recent study, Fama and French (2001) document the disappearing dividends phenomena: from the mid-1970s to the late 1990s, the fraction of U.S. companies that paid dividends fell from about two-thirds to one-fifth. Their analysis indicates that this dramatic change in the patterns of dividend payments is in part due to both an increasing tilt of publicly traded firms that do not pay dividends combined with a reduced propensity to pay dividends by firms that in the past would distribute cash to stockholders. Although Fama and French (2001) carefully state that their findings show only a reduction in the number and percent of dividend-paying firms, their evidence is commonly interpreted as indicating that dividends themselves were disappearing. DeAngelo, DeAngelo and Skinner (2004) revisited Fama and French (2001) results and suggested that while many fewer firms paid dividends in the late 1990s than did in the mid-1970s, aggregate dividends increased over that period, both in nominal and in real terms. Hence, it is not that dividends themselves were disappearing but they were concentrated in a fewer number of firms. The combination of a decreased number of payers and increased aggregate dividends reflected high and increased earnings concentration.

In subsequent work, Boudoukh et al. (2007) and Skinner (2008) report that after the 1980s repurchases have become a very important method of returning cash to shareholders. According to Skinner (2008), there are, in the period since 1980, two groups of firms that pay out cash to stockholders: firms that both pay dividends and make repurchases and firms that only make repurchases. He finds that the larger, more profitable, and more mature firms that previously paid dividends now pay both dividends and repurchases, that managers of these firms coordinate their payouts decisions, and that overall payouts are well-explained by earnings. He also finds that managers have become increasingly reluctant to increase dividends, apparently because the emergence of repurchases provides them with an alternative way of distributing earnings increases. Finally, he reports that aggregate repurchases reached approximately the same magnitude as aggregate dividends. In fiscal 2004 (net) repurchases for U.S. industrials were \$155 billion while dividends were around \$135 billion.

It is important to note here that repurchases enjoy several advantages with respect to dividends. Dividends are taxed as income at investors's marginal tax rate, which is usually substantially higher than the long-term capital gains rate that would be relevant if investors sold into a repurchase as well as share repurchases being more flexible because they do not commit companies to keep making more repurchases in the future as in the case of dividends. These advantages drove many to think that the disappearance of dividends would be just a matter of time. Moreover, if dividends are an inferior payout mechanism and in long-run decline, the economic shock associated with the global financial crisis (the largest economic shock since the Great Depression) should hasten their demise. But based on recent research by Floyd, Li and Skinner (2013), which compare the payout policies of U.S. industrial and financial firms, dividends have bounced back strongly, fueling a massive surge in overall payouts and reviving the dividends puzzle. After sluggish growth in the 1990s, aggregate dividends have more than doubled in real terms over the same period, from \$134 billion in 2002 to \$276 billion in 2012 (these are 2012 constant dollars). One of the reasons dividends survive is that the commitment involved is beneficial and it disciplines management investment decisions. For industrials, dividends grow in aggregate, are increasingly smooth, and are concentrated among a relatively small group of large mature firms, consistent with a free cash flow explanation. In contrast, the majority of financials pay dividends, which increase robustly over the past 20 years, consistent with the signaling theory.

In the case of repurchases, they find that managers's use of repurchases has systematically changed since the 1980s while early repurchases were strategically timed to take advantage of low valuations, the use of repurchases a payout vehicle has made them strongly pro-cyclical. Moreover, the concentration of industrial firms's dividends has continued to increase and extends to repurchases. Finally, they find that repurchases increase strongly for both sets of firms, pushing aggregate payouts to historic levels that raise questions about aggregate investment.

This evidence is also related to recent literature (for example Floyd, Li and Skinner (2013)) which shows that dividends, as opposed to repurchases or total payouts, matters to investors, and that managers are strongly reluctant to reduce dividends, as originally proposed by Lintner (1956). Leary and Michaely (2011) observe that managers's tendency to smooth dividends has become steadily more pronounced over the past century, a trend that predates the availability of repurchases. They find that smoothing is more prevalent among large mature firms with large free cash flows. Finally, Michaely and Roberts (2012) provide evidence that public firms smooth dividends more than private firms, consistent with the importance of dividends being linked to public listing status.

3.3 Data Description

Our data is from CRSP and covers the period 1927-2012. Following Fama and French (2001) we sample CRSP firms incorporated in the U.S. (share codes of 10 or 11 in the CRSP monthly master file). Our sample consists of all firms incorporated in the U.S. including financials or utilities. Fama and French (2001) and other work on payout policy focus only on industrial firms. However, Floyd, Li and Skinner (2013) also include financial firms. In our study we consider financials as well as utilities. This coincides with our objective in this Chapter to provide a more detailed analysis, than available in the current literature, by partitioning firms on the basis of: size, age, stock market index and industry group.

In order to be included in our sample, a firm must have market equity data (price and share outstanding) for December of year t to be in the sample that year. We assume, for convenience, that an annual firm level dividend amount is being obtained using firm monthly data. For that reason, we require non-missing monthly lagged ex-dividend price and cum-dividend and ex-dividend returns to compute monthly firm dividends.

$$D_t = (R_t - RX_t)P_t \tag{3.1}$$

We use the most straightforward estimate of shares repurchased by a firm as the decrease in shares outstanding reported by CRSP, adjusted for other activities that affect the number of shares outstanding, such as stock dividends and stock splits. We do not offset monthly decreases in shares outstanding with increases in other months because increases can occur for a variety of reasonsincluding new stock issues, the distribution of shares to employee benefit plans, or the exercise of stock options. Since these increases are unrelated to repurchase activity and bias repurchase estimates downward, we record monthly increases in shares outstanding as a zero decrease. If repurchases and distributions of shares occur in the same month, however, they will offset each other, and the monthly decrease in CRSP shares outstanding will understate actual shares repurchased. We are aware that there are alternative methods of calculating share repurchases. For example, Fama and French (2001) and Skinner (2008) use the changes in Treasury stocks from COMPUSTAT to proxy for share repurchases.

However, the advantage of the method employed in the paper is that it allows us to have monthly cumulative data for repurchases for a longer period of time. We have also tried alternative methods of share repurchases using COMPUSTAT cash flow and balance sheet statements and our results remain robust.

We define repurchases in the CRSP database following Chen, Da and Priestly (2012) as:

$$rp = \frac{P_{t+1}}{P_t} \times [1 - min(\frac{n_{t+1}}{n_t}, 1)] \tag{3.2}$$

When there is a repurchase, $\frac{n_{t+1}}{n_t} < 1$ and $[1 - min(\frac{n_{t+1}}{n_t}, 1)]$ is the proportional repurchase; rp then captures the repurchase return. As in the case of dividends, we calculate repurchases in dollars for each firm month, and we sum them across months to the get the annual numbers for each firm.

3.4 Replication of Selected Prior Work

We begin with Fama and French (2001) who document that, from the mid-1970s to the late 1990s, the fraction of U.S. companies that paid dividends fell from about two-thirds to one-fifth. Their analysis indicates that this dramatic change in dividend practices from the mid-1970s to the late 1990s was due both to changes in the population of firms that were publicly held in that time, and to a reduced propensity to pay dividends by firms whose characteristics would have led them to distribute cash to stockholders. We will start our payout policy analysis by updating their work.

Fama and French (2001) use data from 1927 to 1996. We extend this up to 2012. Figure 3.1 replicates and extends the Fama and French (2001) analysis by plotting the fraction of payers and non payers from 1927 until 2012. For simplicity, we have only considered two groups of firms: payers and non-payers. Payers pay dividends in time t; non-payers do not. A firms in the CRSP sample is defined as a dividend payer in calendar year t if its with-dividend return exceeds its without-dividend return in any month of year t. Figure 3.1 is very similar to Figure 3.2 in Fama and French (2001) although we have not excluded utilities and financials firms from the sample and we have placed different requirements on the data (e.g. firms must stay in the market for at least two years). Despite these differences, we can arrive at the same conclusions as Fama and French (2001) when looking at the same sample period from 1927 to 1996. There is an important decline in the incidence of dividend payers among NYSE, AMEX and NASDAQ firms after 1978. Their analysis indicate that this dramatic change in dividend practices was in part due to both an increasing tilt of publicly traded firms towards the characteristics of firms that never paid dividends, and to a reduced propensity to pay dividends by firms whose characteristics historically would have led them to distribute cash to their stockholders.

We find by extending the sample period to 2012, similar to Floyd, Li and Skinner (2013), the following: First, after 2002 the percentage of payers among public U.S. firms has started to grow up again. Second, although it was affected by the financial crisis in 2007, the percentage of dividend payers has also continued to increase after 2009. At the end of 2012, our sample tells that 45% of all firms are dividend payers compared to 2002 where only 32% of all firms were paying dividends. We are not the first to document this upsurge in the percentage of dividend payers in the last 12 years and Floyd, Li and Skinner (2013) is a very recent example of this renewed interest in US payout policy. The importance of this increase in the percentage of dividend payers for the reviving of the dividend puzzle has led some authors to call this the "reappearing dividend phenomena" to compare it to Fama and French (2001) findings.

DeAngelo, DeAngelo and Skinner (2004) revisited Fama and French (2001) results and suggested that while many fewer firms paid dividends in the late 1990s than did in the mid-1970s, aggregate dividends increased over that period, both in nominal and in real terms. Figure 3.2 analyzes this and tracks aggregate dividends and repurchases for all firms incorporated into the US over 1927-2012. It is divided into two subgraphs (1927-1977 and 1978-2012) in order to closely analyze the disappearing dividend phenomena after 1978 described by Fama and French (2001), and the irruption of stock repurchases in the early 1980s as documented by Skinner (2008). This figure shows not only that aggregate dividends increased steadily over the full sample period despite the fact that the number of dividend payers decreased by over 50% as Fama and French (2001) documented and we showed in Figure 3.1, but also that stock repurchases emerged as a significant payout mechanism in the early 1980s, which increased noticeably in the late 1990s. We find by extending the sample up to 2012 that since 2001 not only has there an increase in the number of payers as we showed in Figure 3.1, but also these dividend payers have increased payouts (dividends and repurchases) to the massive levels before, and more recently after the financial crisis, although repurchases have not reached yet the pre-crisis levels. Finally, dividends have shown strong resilience during the financial crisis in comparison to repurchases that were cut aggressively as it is reported in Figure 3.3, which plots aggregate dividends and aggregate payouts growth. Moreover, it shows that repurchases have been actively growing since the 1990s with the exception of 1991, 2001 and the financial crisis, while dividends have been doing it since 2000.

Looking closely at the effect of the financial crisis, we see that from a peak of $273 billion in 2007, dividends declined to $262 billion in 2008 and to $236 billion in 2009 (by 20% overall). Aggregate dividends subsequently increased to $261 billion in 2010, $261 billion in 2011 and then to \$330 billion in 2012. This important increase in dividend payments during the last year of our sample coincides with an upsurge of dividend payers during 2012 after 5 years of constant reduction. The number of payers declined from 1615 in 2007 to 1364 in 2011, but from 2011 to 2012 has increased again to 1492 payers. In strong contrast, U.S. firms cut repurchases from \$526 billion in 2007 to \$394 billion in 2008 and then to \$149 billion in 2009 (by 70% overall). Aggregate repurchases rebound to \$279 billion in 2010 and then to \$397 billion in 2011, well in excess of dividends again. The strong growth of dividends during 2012, together with the reduction in stock repurchases left both payout figures at the same level of \$329 billion in 2012.

The strong irruption of stock repurchases in the payout policy picture drove some authors to examine the relationship between dividend payers and firms making repurchases. Skinner (2008) found that since the emergence of repurchases in the 1980s two groups of payers appear: firms that both pay dividends and make repurchases and firms that only make repurchases. We follow him and we first plot in Figure 3.3 the fraction of firms in four different payer groups. We also plot, now in Figure 3.4, the fraction of total payouts (dividends and repurchases) by the same payer groups. Skinner (2008) divided the entire sample of firms into four groups or categories: (1) firms that pay both dividends and repurchases, (2) firms that pay only dividends, (3) firms that pay only repurchases, (4) firms that do not pay out cash to stockholders. As Skinner (2008) stated, this approach understates the number of firms that both pay dividends and make repurchases (group (1)) and overstates the number of firms that only pay dividends (group (2)) if firms with an ongoing policy of paying dividends and repurchases do not make repurchases in every year.

Figure 3.4 plots the fraction of firms in the different payout categories. It is similar to Figure 3.1 where we plotted payers and non-payers. Payers in Figure 3.4 are contained Groups A and B, while non-payers includes Groups C and D. Thanks to this figure, we can have a better picture of the drivers of payouts in the US stock market. Similar to Figure 3.1, we find that the number of firms that pay only dividends - Group B - has experienced an important decline over time. They were the most important group until 1983, when they were surpassed by Group D- firms that do not pay out cash to stockholders. After 2000 where they reached their minimum, the number of firms into Group B has stabilized and it has been moving between 10% and 17% of all firms for the last 12 years. On the other hand, firms that do not pay cash out to stockholders were significant as a consequence of the shock produced by the 1930s crisis. At that point in time, this group represented more than 60% of all firms in 1933. After that, and since the 1940s paying dividends was very common for US firms and non-payers dropped significantly representing less than 10% of all firms during the 1950s. We needed to wait for the NASDAQ and AMEX inclusion into the CRSP sample to find an upsurge in the number of non-payers, and specially to the late 1970s for the so called "Dividend Disappearing Phenomena" documented by Fama and French (2001). During the 1990s, the percentage of non-payers stabilized around 40%. It is from the late 1990s where the percentage of non-payers has started to decline. It went from 46% in 1999 to only 27% in 2012. It seems that this decline is due to the increasing importance of firms making only repurchases - Group C - and at the end of the sample for the increasing importance of firms paying dividends and making repurchases - Group A. The irruption of Group C coincides with the emerge of repurchases in the early 1980s and it was increasing at the same time as non-payers until the end of the 1990s. Since then, it has to continue to increase (despite some drops between 1998-1999 and 2002-2003) and at the end of 2012 these firms constituted more than 27% of all firms into the market. It is worth mention that despite the big drop in the total amount of repurchases, the number of firms making only repurchases increased from 2007 to 2008. Finally, Figure 3.4 shows that since the 1990s firms that pay both dividends and repurchases - Group A - accounts for more than 20% of all firms. Moreover, although the financial crisis impacted them heavily - the percentage of firms in Group A decreased from 30% in 2007 to 21% in 2009- they have recovered their previous levels very fast and at the end of 2012 29% of all firms were paying dividends and making repurchases.

Figure 3.5 plots the fraction of aggregate payouts (dividends and repurchases) represented by firms in different payer categories from 1927 to 2012. Here we see the increased dominance of firms that both pay dividends and make repurchases. At the end of 2012, they are responsible for 80% of all cash payouts. As we discussed above, this group of firms never represents more than 30% of all firms in the market. However, since the emergence of repurchases in the early 1980s, this set of firms dominates aggregate payouts. Beginning in 1984, these firms account for between 50% and 85% of all payout dollars, with lows (of just 50%) in the early 1990s recession years and highs of more than 80% over 2004-2008. Thus, these are the firms largely responsible for the explosive growth of payouts during the 2000s. Before the mid-1980s, dividend-payers dominate the overall supply of cash payouts (e.g. from 1950 to 1970 this Group paid more than 80% of all cash payouts). After the 1970s, however, there is a significant transition, with the proportion of total payout attributable to dividend-payers dropping sharply (in 2007 they paid less than 5% of all cash payouts) while the proportion attributable to firms paying both increasing aggressively.

It is also interesting to analyze the behavior of these firms during the financial crisis. The resilience of dividends and the big drop in repurchases help to explain why only dividend payers moved from paying less than 5% of all dividends in 2007 to around 20% in 2009, and firms paying both decreased from paying around 85% to 70% in 2009. After the crisis, firms have continued to increase dividends and repurchases and at the end of 2012 80% of payouts are coming from firms paying both, and the remaining 20%, is divided half between firms that only make repurchases and firms that only pay dividends. Although it is true that repurchases have become an important payout mechanism and it has surpassed dividends many times during the last years, if we consider only the fraction of aggregate dividends paid in each of these groups we will see that firms that pay both, dividends and repurchases, are also those that pay the majority of dividends. At the end of the sample, 80% of all dividends were paid by these firms and the remaining 20% by only dividend payers.

At this point, some authors try to dismantle aggregate dividends and repurchases for different types of firms. It is common to focus on industrials but recent papers have also included financial firms because of their increasing importance after the 1990s. We have also decided to include financials together with utilities into the sample. We restrict our attention to the period between 1978 and 2012 in order to make our results comparable to other studies. Before that, the majority of dividends were paid by industrials firms and the same conclusions as in Figure 3.2 apply. Figure 3.6 plots dollar values of aggregate dividends on the left hand side and aggregate repurchases on the right hand side for industrials, financials and utilities, respectively from 1978-2012. Our findings are similar to Floyd, Li and Skinner (2013), which use the Compustat North America annual data from 1980 to 2011 in real terms. Looking first at industrials, aggregate dividends increased in modest terms over the 1990s (around 45% overall) at the same time as the number of dividend-payers declined (see Figure 3.1), consistent with DeAngelo, DeAngelo and Skinner (2004) results on increased dividend concentration. But what is relevant during the 1990s is the growth of repurchases (around 166% from 1990 to 1999), from levels well below dividends to levels at or above them by the end of the decade. After declining in 2001 due to the recession, aggregate stock repurchases increased dramatically until the financial crisis in 2007 (more than 325% from 2001 to 2007). Aggregate dividends paid by industrials also increased significantly during this period and nearly doubled the 2001 numbers with the exception of 2004-2005 in where they decreased by 15% in one year as it is shown in Figure 3.7, which plots yearly dividend and payouts growth. This drop could be explained by the incidence of the special dividend paid by Microsoft during 2004. We will see later that this special dividend represented around 20% of all aggregate dividends paid in 2004. This big increase in dividends payments during the 2000s explains why industrials kept paying between 60% and 70% of all dividends during these years as it is shown in Figure 3.8, which plots fractions of aggregate payouts for industrials, financials and utilities. On the other hand, as the financial crisis took hold in 2007, industrials reduced dividends modestly as we can see in the same Figure 3.7. While aggregate dividends decreased by 20% between 2007 and 2009, industrials reduced dividends only from 2008 to 2009 and by 2%. Moreover, from 2007 to 2008 not only dividends did not decrease by they grew by 1%. Hence, it seems that financials and/or utilities are responsible for the big drop in aggregate dividends during the financial crisis. On the other hand, repurchases were cut aggressively. From levels far above dividends in 2007, they were reduced to levels below aggregate dividends in 2009 (by around 70% overall). This drop is similar to what we found for the case of aggregate repurchases. In the recent years, repurchases increased significantly after 2009 but have not reached the same impressive levels found before the financial crisis. Moreover, during 2012 stock repurchases have started to decrease again from $340 billion to $268 billion (by around 30%). Finally, aggregate dividends paid by these firms subsequently increased after 2009 (by 50% overall until 2012) to reach similar levels as repurchases in 2012 ($264 billion vs. $268 billion).

We next discuss payouts -dividends and stock repurchases - for financials. Compared to industrials, these firms increased dividends significantly during the 1990s (by 185% from 1991 to 2000) and the 2000s (by 128% from 2001 to 2007). This drove financials to pay around 30% of all dividends during the 2000s as it is shown in Figure 3.8. Moreover, the big increase in the fraction of dividends paid by financials since the 1990s is not at the expense of industrials that were constantly paying between 60% and 70% of all dividends, but it affected the fraction of dividends paid by utilities whose dividends did not grow significantly during these years as it is shown in Figure 3.7. However, in contrast to the case of industrials, the growth for repurchases is not as important and is similar to that of dividends from 2001 to 2007 (by 180% overall). Despite of this smaller growth, financials accounted for around 30% of all stock repurchases during the late 1990s and the first years of the 2000s. Financials also reduced their payouts in the wake of the financial crisis but in ways different from those of industrials: They cut aggregate dividends sharply between 2008 and 2009 by 63%. This big drop is the main driver of the decrease in aggregate dividend payments between 2007 and 2009 as we shown in Figure 3.2. To get an idea of the importance of this sector, we found before that in 2007 30% of all dividends were coming from these financial firms. After the financial crisis, in 2009 less than 10% of all dividends were attributable to the financial sector. This likely reflects the financial circumstances of many of these firms and the regulatory intervention to control dividend payments (they started to reduce dividends significantly in 2009 rather than 2008). As we would expect, and similar to what we see for industrials, financials cut repurchases aggressively during the financial crisis (around 76% from 2007 to 2009). After that, and similar to industrials, there has been a rebound in stock repurchases. From 2010 to 2012, stock repurchases by both, financials and industrials, have increased by 120%. Moreover, in contrast to industrials, during 2012 stock repurchases went up by 6%. Finally, in the case of utilities, aggregate dividends are relatively stable over the 1990s and the financial crisis (dividends even increased by 13% from 2007 to 2009). On the other hand, utilities cut repurchases aggressively during the financial crisis by more than 91% from 2007 to 2009. In sum, while the drop in dividends is under the responsibility of financial firms as it is clearly shown in Figure 3.7, the cut in repurchases was similar among all types of firms. This is the reason why repurchases were so seriously affected by the financial crisis. On the other hand, the rebound in dividends and stock repurchases after 2009 is shared between both, industrials and financials, but with financial firms a bit more active.

3.5 A Closer Look at Aggregate Payouts

3.5.1 Aggregate Payouts and Firm Type

Until now, we have replicated some of the main analysis by recent papers in payout policy. From now, we will get deeper into these aggregate tendencies found from Figures 3.1 to 3.5. For that reason, we will start by using the SIC divisions and major groups used in the United States Department of Labor. We will follow their letters and numbers notation for the rest of the paper to allow for comparison and replication. The SIC manual consists of J divisions: The Division A corresponds to Agriculture, Forestry, and Fishing; Division B to Mining; Division C to Constructing; Division D to Manufacturing; Division E to Transportation, Communications, Electric, Gas, and Sanitary Services; Division F to Wholesale Trade; Division G to Retail Trade; Division H to Finance, Insurance, and Real Estate; Division I to Services; and finally, Division J to Public Administration. As it was the case with the other figures, Figure 3.9 plots dollar values of aggregate dividends (on the left hand side) and aggregate repurchases (on the right hand side) for all the previous divisions. On the other hand, Figure 3.8 reports the fraction of dividends and repurchases paid on each division in order to analyze the contribution of each of the divisions to the total amount of payouts.

Figure 3.9 shows some clear similarities with Figure 3.6 where we divided all firms into industrials, financials and utilities. For example, division H corresponds to our financials variable in Figure 3.6, and Division E contains, among others, the major group 49: Electric, Gas, And Sanitary Services which we considered as utilities in the same Figure 3.6. Industrials would consist of all the rest of the divisions where Division D: Manufacturing; the remaining major groups of Division E: Transportation, Communications; Division I: Services; and Division G: Retail Trade stand out in terms of total dividends paid as it is shown in Figure 3.10. We will avoid describing the behavior of firms in Division H because the same conclusions as in the case of financials, and reported in Figures 3.6 , 3.7 and 3.8, can be applied to them.

According to Figure 3.9, the main contributor for dividend payments is the manufacturing division. Moreover, dividends paid by manufacturing companies have increased steadily over time - during the 1990s dividends paid in this Division increased by 56% and from 2000 to 2007 by 44% - and were reduced modestly as a consequence of the financial crisis in 2007. From 2007 to 2009 dividends in the Manufacturing Division decreased by only 7%. It is also true that for the whole group of industrials dividends increased by 1% during the financial crisis. This behavior contrasts to the case of repurchases that these firms reduced dramatically after the financial crisis (by around 65%). Both, dividends and repurchases, follow similar patterns to the ones shown in Figure 3.6 when we were analyzing the whole group of industrials. In sum, and according to Figure 3.10, Division D is the main contributor to the total amount of dividends and repurchases paid. This division was paying more than 60% of total aggregate dividends until the 1970s in where financials (Division H) started to be much more significant in aggregate terms (the financials division payed more than 30% of total dividends and around 24% percentage of repurchases in 2006 right before the financial crisis). Starting from the first years of the 1980s where stock repurchases emerged as an important payout mechanism, the Manufacturing Division accounts for between 37% and 76% of all aggregate repurchases, with lows (of 37%) in the early 2000s and highs of more than 70% over the late 1980s. Finally, the contribution of the Manufacturing Division to the whole amount of repurchases has been stable and around $40\% - 50\%$ during the last 10 years of our sample.

On the other hand, it is important to note that division E: Transportation, Communications, Electric, Gas, And Sanitary Services is also an important contributor for aggregate dividends and repurchases. At the beginning of the sample and according to Figure 3.10, 30% of total dividends were paid by this division. It was the second contributor after manufacturing for total dividends paid until the mid-1990s when financials increased their payouts significantly. The financials crisis helped Division E to recover its second position, not only because financials cut aggregate dividends sharply, but also because the financial crisis did not affect dividend payments from this Division. From 2007 to 2009 they increased by more than 40% and were only affected by the posterior economic crisis decreasing by 11% from 2009 to 2010. After 2010, they have increased again by around 20% in 2 years. In contrast to the case of dividends, repurchases were heavily affected by the financial crisis and decreased by more than 84% between 2007 and 2009. Aggregate repurchases rebound in 2010 and at the end of 2012 they have increased by more than 320% in Division E. This division was responsible for around 10% of the total amount of repurchases in 2012. It is important to note that this Division includes what we have defined as utilities in previous Figures.

Finally, it is worth looking at the behavior of dividends paid by Division I. This Division experienced a big increase in 2004 due to the effect of the special dividend paid by Microsoft. To get an idea of the the impact of this special dividend, in 2004 Division I paid around 20% of all aggregate dividends. Moreover, dividends paid in this Division increased by 647% from 2003 to 2004. The magnitude of this special dividend helps to explain why dividends paid by industrials decreased by 15% from 2004 to 2005, while dividends paid by the manufacturing Division were increasing by more than 10%. This short-lived dividend heavily affected dividends paid by Division I, which decreased by more than 80% from 2004 to 2005. Despite of this special dividend, at the end of 2012 Division I was paying more than 8% of all dividends into our sample of public U.S. firms. On the other hand, this division was also important in terms of repurchases before the financial crisis. In 2006 more than 15% of all stock repurchases were made by this division as it is shown on the right hand side of Figure 3.10. Moreover, at the end of 2012 it accounted for more than 10% of all the aggregate repurchases.

Based on the importance of Divisions D, E and H into the total amount of dividends paid and repurchases made, and thanks to the SIC Manual, we are able to divide these divisions into major groups with the objective of isolating the origin of these patterns in total aggregate dividends and repurchases. We will start by analyzing the different major Groups of Division D: Manufacturing. In the SIC Manual, this Division consists of 20 major Groups: from Group 20 to Group 39. Our approach to the analysis of these groups starts by plotting the dollar value of aggregate dividends from 1927 to 2012. As we did for Figure 3.2 and for clarity, we divided the whole sample into two sub-graphs from 1927 to 1977 and from 1978 to 2012. The result of this can be seen in Figure 3.11. Together with this, we have also calculated the fraction of dividends paid on each division with respect to the total amount of all aggregate dividends (left hand side of Figure 3.12) and to the total sum of dividends in Division D (right hand side of Figure 3.12). Figure 3.11 shows that there are several major groups that are driving the behavior of this division over time, with Group 29: Petroleum and Refining and Related Industries standing out from the 1950s to the late 1980s and Group 28: Chemicals and Allied Products from the late 1980s until the end of the sample period. On the other hand, Figure 3.10 reflects high and increasing dividend concentration in fewer groups. It seems that not only dividends have been concentrated in fewer firms as it was documented by DeAngelo, DeAngelo and Skinner (2004), but also that this concentration can be applied to Major Groups of firms. In short, during the 1930s and the 1940s four major groups are paying between 10% and 15% of all dividends and between 15% and 25% of the total dividends paid in Division D. After the 1990s, we only find one Major Group (Group 28) that is paying between 10% and 15% of all dividends and between 20% and 35% of the total dividends paid in Division D. Moreover, it is far from the second Major Group (Group 29), which is paying less than 8% of total aggregate dividends and around 15% of the total dividends paid in Division D.

Group 37: Transportation Equipment stands out at the beginning of the sample paying more than 15% of all dividends in 1927 and 1937. It is later replaced by Group 29 since 1950, which was paying around 15% of all dividends and 20% of the total dividends paid by firms in Division D. This group was predominant in the Manufacturing Division for more than 30 years and it was paying nearly 20% of total aggregate dividends right before the oil crisis in the 1970s as it is reported in Figure 3.12. For example, from 1950 until 1984 dividends increased in this group by more than 1200%. It is important to note that this group was clearly benefited by the oil crisis in the 1970s. In the 70s decade, the aggregate dividends paid by that group nearly double. During the late years of the 1980s, this group reduced dividends significantly but this did not last long, and in the 1990s they recovered the same levels paid in the first years of the 1980s. Since then, dividends paid in this group have been constantly increasing and were not affected at all by the financial crisis in 2007. This was not enough to reach again the first position in terms of dividend payments because of the strong growth experienced by Group 28. Finally, at the end of 2012 Group 29 paid more than 7% of all dividends and more than 10% of all the dividends paid in the Manufacturing Division.

At the beginning of the 1990s, the group 28 replaced Petroleum as the main contributor for dividends payments in the Manufacturing division. Moreover, it has continuously been the main provider of manufacturing dividends until the end of 2012 where this group contributed with around 15% of total dividends paid and 20% of all dividends paid in the Manufacturing division. The financial crisis also affected this group but only from 2008 to 2009 where dividends paid by this group were reduced by around 10%. But from 2010 to 2012 dividends paid have increased by 24%, consistent with the rebound documented by Floyd, Li and Skinner (2013) for the entire group of industrials after the crisis.

Another three major groups are worth mentioning in this brief analysis: Group 20: Food and Kindred Products; Group 35: Industrials and Commercial Machinery and Computer Equipment; and Group 36: Electronic and Other Electrical Equipment and Components. Food and Kindred Products contributed providing 5% of total dividends in 2012 and more than 7% of all the dividends paid in the Manufacturing Division according to Figure 3.12. It is also important to mention how the different crisis impact this Group. For example, these companies were not only affected by the shock produced by the financial crisis in 2007, but also by the posterior economic crisis in 2010. This is different from the picture drawn for the whole group of industrials where after 2010 they experienced an important rebound. Industrials, Commercial Machinery and Computer

Machinery also show a peculiar behavior. It ended 2012 being the second contributor for dividend payments in the Manufacturing Division (more than 11% of the dividends paid in the entire Division) and paying more than 7% of all dividends in 2012. It was between 2006 and 2007 right before the crisis where it moved from being the sixth contributor in dividends to reaching the second position. In just one year, dividends paid by this group increased by more than three times. The financial crisis also impacted this group and the reduction in dividends only lasted for two years from 2008 to 2010. From 2010 to 2012 dividends paid by this group increased significantly, as it is the case for the whole division of industrials. Finally, the Electronic and Other Electrical Equipment and Components group is worth a mention. In 2012 it contributed with around 5% of total dividends paid and more than 7% into the Manufacturing Division. It is relevant in this group that the big decrease in dividends payments happened right before the crisis between 2006 and 2007 where they reduced dividends by around 60%. Since then, dividends paid by this group has modestly increased until the last year of the sample in where dividends increased more than 40%.

We follow the same procedure when analyzing stock repurchases but we start from 1978 instead of 1927 following the emergence of stock repurchases in the 1980s. Figure 3.13 plots dollar values of repurchases in each of the Major Groups of Division D. On the other hand, Figure 3.14 reports the fraction of repurchases made in each of the groups with respect to the total value of aggregate repurchases (left hand side of Figure 3.14) and to the total amount of repurchases made in Division D (right hand side of Figure 3.14). There are 4 major groups that drive the impressive growth in total repurchases seen in the industrials group right before the financial crisis and mainly during the 2000s. In contrast to the case of dividends, we do not see an increasing concentration of repurchases over time in any specific major group. This also differs from the higher concentration found in total aggregate repurchases by Floyd, Li and Skinner (2013). It is worth noting that none of these Groups coincide in the year in where they reach their maximum dollar value of repurchases and start their decline. It is the Electronic and Other Electrical Equipment and Components Group that reaches its maximum before and back to 2004, in where this Group contributed with more than 24% of all repurchases made that year and more than 40% into the Manufacturing Division. After 2004, it experienced a dramatic decrease and only started to recover slightly after 2010. After this Group, the Chemicals and Allied Products Major Group reaches its maximum value of repurchases made in 2006. After that, repurchases declined only for two years until 2009. Moreover, the decline in this Group was the least dramatic compared to other groups where stock repurchases were close to disappearing during the financial crisis as it is shown in Figure 3.12. Repurchases in this Group declined by 58% overall in these two years. Compared to the next Group, Industrials and Commercial Machinery and Computer Equipment, the decline was much less dramatic. The Industrials and Commercial Machinery and Computer Equipment Group reached its maximum value of repurchases made in 2007. The value of repurchases was also similar to the Industrials and Commercial Machinery and Computer Equipment. The main difference is that the amount of repurchases made in this group was reduced by more than 80% in two years from 2007 to 2009. Finally, the growth of repurchases in the Petroleum Group is also significant, reaching similar values as the two previous groups. In this case, the maximum is reached in 2008 but the decline is very similar to the Industrials and Commercial Machinery and Computer Equipment Group. On the other hand, its rebound after 2010 is significant but it is not enough to reach the previous maximum levels. Finally, as was the case for the whole group of industrials, repurchases decreased in the majority of groups of the Manufacturing Division from 2011 to 2012.

Figures 3.15 to 3.18 report similar information to the previous figures apart from Division E. This division is made up of 10 Major Groups from Group 40 to Group 49. According to Figure 3.1), Communications (Group 48) and Electric, Gas and Sanitary Products (Group 49) are the main drivers for dividend payments in this Division since the 1980s. Before that, Railroad Transportation was also important in terms of payments until the 1950s. Moreover, at the beginning of the sample it was paying more than 20% of all dividends. As we discussed before, the Electric, Gas and Sanitary Products Major Group corresponds to what we have called utilities in Figures 3.6, 3.7 and 3.8. This Group is also the main contributor to dividend payments with the exception of 2009 where communications reached its maximum value of dividend payments. Utilities are usually excluded from these analysis because of their unstable payout policy compared to other sectors. Even so, we find in the data that dividends paid by this group seem not to be affected by the financial crisis at all (we saw before that dividends increased by 13% from 2007 to 2009 in the Utilities Group). On the other hand, dividends from these firms show an erratic behavior during the 1990s but since then, they have experienced a continuous growth until the end of the sample. This is not the case for repurchases, which were seriously affected by the financial crisis in 2007 as is the case for other divisions and groups. The Communications Group is worth mentioning in this analysis as it is also part of what we defined as industrials before. This Major Group experienced an impressive growth in dividend payments since 1984. That year it only represented 5% of all dividends paid in that Division. In 2009 it paid more than 50% of all dividends paid in the same division. Moreover, it accounted for more than 12% of all dividends paid that year. It also seems that the shock produced by the financial crisis in 2007 did not affect this Group because dividends paid by the Communications Group increased by 80% from 2007 to 2009. It was between 2009 and 2010 when it was affected by the posterior economic crisis and the need of these firms to reduce dividends in order to balance their accounts. At the end of 2012, this Group contributed with around 8% of all dividends paid that year. In contrast, repurchases made by this group were seriously affected by the financial crisis after reaching its maximum in 2007. Despite this, at the end of 2012 they recovered their 2007 levels making around 8% of all repurchases in 2012.

We now move to the financials division. This division is divided into 8 Major Groups from Group 60 to Group 67. Figures 3.19 to 3.22 offer the same analysis as in Division D and E. First, Figure 3.19 shows us that the Group responsible for the impressive growth of dividends into the financial sector in the late 1990s and specially during the 2000s relies on the Depositary Institutions Major Group. Thanks to the impressive increase in dividends payments by the this Major Group, the financial division paid in 2007 30% of the total dividends. As an example, from 1992 to 2007 dividends paid by depositary institutions increased more than 2462%. If this increase is impressive, the reduction in dividends payments after 2007 is also worth to mention. From 2007 to 2010 dividends paid by depositary institutions decreased nearly 90%. In only two years, dividends paid by this group returned to the late 1990s levels. Based on these numbers, it is easy to understand how the financial sector went from paying 30% to less than 10% of all dividends in less than 3 years as it is shown in Figure (3.20). It is also interesting to analyze the behavior of Group 67: Holding and other Investment Offices before the mid 1990s. This Major Group was the main contributor for dividend payments until the irruption of Depositary Institutions. Moreover, according to Figure 3.20 for more than 10 years since the mid 1980s this division contributed with more than 10% of all dividends paid. Later on, not only was it replaced by the impressive payments made by the depositary institutions, but also it started to reduce its dividends significantly. If 10% of total dividends were coming from this Group in the 1990s, now it is less than 1%. This helps us to get an idea of the decline of this Group during the last 30 years.

The case of repurchases is also significant although it shows some important differences with respect to dividends as it is seen in Figures 3.21 and 3.22. First of all, we do not find as high a concentration as in the case of dividends because not only depositary institutions were responsible for the growth of repurchases, but also the Insurance Carriers Group with an even bigger growth than Depositary Institutions; the Security and commodity brokers, dealers, exchange, and services Group; and finally the non-depositary Credit Institutions Group to a lesser extent. While these groups did not increase their dividends payments, they used repurchases extensively. For that reason, total repurchases made by financials experienced a much bigger growth than dividends. If we only consider depositary institutions, which are responsible for the bulk of dividends in the 2000s, the amount of repurchases they made in 2007 was much smaller than the dividends they paid that year. Hence, while this group was mainly responsible for dividend payments, repurchases were used by other groups and this explains why repurchases were affected so heavily by the financial crisis. Finally, it is also important to mention that in 2012 insurance carriers have recovered their previous dollar values of repurchases. This helps them to be responsible for 10% of all the repurchases made in 2012.

We have not yet considered in our analysis the role of the different theories about the existence and importance of dividends. One possibility is that dividends, because they represent an ongoing commitment to pay out cash, are useful in resolving the agency costs of free cash flow (Jensen (1986); LaPorta et al.,2000). Alternatively, the ongoing commitment inherent in dividends could signal managers' confidence in their firms' underlying profitability (Miller and Rock, 1985; Baker and Wurgler, 2012), or that managers are responding to the preferences of certain investors for cash dividends (Baker, Nagel, and Wurgler, 2007; Grinstein and Michaely, 2005; Shefrin and Statman, 1984). Recent research by Floyd, Li and Skinner (2013) concludes that the behavior of industrial firms fits more with the cash flow explanation, while financial firms are more consistent with signaling. Based on the behavior of the different Divisions and Major Groups with respect to dividends and stock repurchases this drives us to believe that the answer about the existence and the role of dividends is not as simple as it could be when analyzing the whole group of industrials and financials. As in the case of Floyd, Li and Skinner (2013), we will use the crisis as a shock to help differentiate these stories by comparing the payout policies of the different Divisions and Major Groups rather than focusing on the whole group of industrials and utilities. We will leave this analysis for a near future.

3.5.2 Aggregate Payouts and Stock Market Indexes

Figure 3.23 plots aggregate dividends (left hand side of Figure 3.23) and repurchases (right hand side of Figure 3.23) paid by each of the indexes contained in the CRSP sample: NYSE, AMEX, NASDAQ, ARCA and other exchanges. By contrast, Figure 3.24 reports the fraction of payouts represented by firms in the different indexes. As it is shown in Figure 3.23, the majority of dividend payments are coming from firms in the NYSE. In 1964 the AMEX index was included in the CRSP sample but dividend payments from this group never exceed the maximum value of 6% of total dividends paid in 1964. In 1973 the NASDAQ index was included in the CRSP sample. Dividend payments made by this index were continuously increasing until paying more than 20% of all dividends in 2004. For example, during the 1990s dividends paid by firms in the NASDAQ index increased by 24% and from 2000 to 2007 by more than 288%. Moreover, in only one year, from 2003 to 2004, firms into this index increased their dividend payments by more than three times. This lasted for one year because from 2004 to 2005 dividends were reduced by 60%. On the other hand, the financial crisis did not affect this index at all because firms reduced dividends only by 5% from 2007 to 2009. In the last year of the sample, dividends paid by firms into the NASDAQ index have increased significantly (108% from 2010 to 2012) helping this index to contribute with around 20% of total aggregate dividends paid at the end of 2012.

In the case of the NYSE, dividends paid by this index have been continuously increasing over time until the financial crisis in 2007. Like NASDAQ firms, these firms increased their dividend payments significantly during the 1990s (by 61% overall between 1990 and 1999) and the 2000s (by 94% from 2000 to 2007). NYSE firms also reduced their dividends in the wake of the financial crisis. From 2007 to 2009 dividends decreased by more than 20%. Finally, after 2009 dividends have increased by 40% from 2009 to 2012. On the other hand, Figure (3.22) shows that NYSE firms have always been paying between 80% and 100% of all aggregate dividends, with lows (of 80%) in 2004 and 2012 as a consequence of the strong growth of dividends paid by NASDAQ firms before and after the financial crisis. Thus, we find that not only NASDAQ firms increased their dividend payments significantly more than NYSE firms before (since 2000 because during the 1990s NYSE firms increased their dividends more extensively) and after the financial crisis, but also that their dividends were much more resilient during the global financial crisis.

Since the 1990s, repurchases have been distributed uniformly with the NYSE index making around 80% and the NASDAQ the remaining 20%. Although repurchases made by the NYSE index increased significantly more during the 2000s than in the case of the NASDAQ (from 2000 to 2007 repurchases made by NYSE firms increased by 313% compared to 217% in the case of NASDAQ firms), the financial crisis in 2007 affected repurchases in a similar way because in both indexes repurchases were reduced by around 70% from 2007 to 2009. On the other hand, after 2009 and until 2012 repurchases have again upsurged with an increase of 127% for NYSE firms and 100% for NASDAQ firms.

3.5.3 Aggregate Payouts and Firm Age

The following figures track payout policy from the perspective of firm age. We have defined firm age as the time since the date of its inclusion in into the CRSP sample. We are aware of the limitations of this definition of age but this is what the data has allowed us to do. The main purpose of this Chapter is to analyze the main patterns of corporate payout polices by analyzing the anatomy of U.S. firms' payouts. In the future we will try to get deeper into the specific set of CRSP firms that drive the behavior of dividends and stock repurchases.

Figure 3.25 reports annual aggregate dividends by groups of firm age and Figure 3.26 the fraction of dividends represented by the same firm age groups. Figures 3.27 and 3.28 do the same but for the case of stock repurchases. In contrast, Figure 3.29 tries to analyze the concentration of dividend and repurchases on these age groups. We have built 9 age groups in order to track the behavior over time for the different firms into the market.

Starting from Figure 3.25, we see that over time the oldest firms are increasing their dividend payments during the whole sample period. The way we have defined these age groups, together with the increasing payments from the oldest firms explain why we see those increasing "waves" in Figure 3.25. At the end of each age group (each age group lasts for 10 years with the exception of the ¿80 age group), the oldest firms get into the following group until we have covered the 9 age groups at the end of the sample. If for example none of the dividends were coming from the oldest firms, we would not see any drop in dividend payments at the end of each of the age groups. The fact that this is not happening in the data, together with the growth of dividends as long as we move forward in each of the oldest age groups show the importance of the oldest firms into the total aggregate payments over time.

On the other hand, we also see in Figure 3.26 that the fraction of dividends paid by the oldest firms is decreasing over time because new firms are getting into the market and starting to pay dividends. For example, at the beginning of our sample when we move from 1936 to 1937 we see that firms that stayed in the market for less or equal to 10 years went from paying 100% of all dividends to only 28%. These mean that the oldest firms (those that are 10 years old in 1937) accounted for more than 70% of all payments while new firms (less or equal to 10 years of life) accounted for the remaining 30%. Moreover, the age group > 10 <= 20 keeps increasing its fraction of dividends as long as we move into the sample and it is including younger firms into it (those firms between 10 and 20 years old). On the other hand, dividend payments into the <= 10 age group decrease until they stabilize in the 1940s containing around 14% of all dividends. This pattern is maintained in our figure every ten years when we are considering new groups of firms based on age and shows the importance of the oldest firms in the aggregate payouts over time. If all groups of age firms were paying the same percentage of dividends every 10 years, the oldest firm age groups should decrease their fraction of payments in order to distribute the same amount over all age firm groups. Despite of the importance of these oldest firms, it is also true that the fraction of dividend paid by these firms is decreasing over time with the exception of the late 1990s. The cutting point in 1987 and 1997 is similar (around 20%) for the $> 60 <= 70$ and the $> 70 <= 80$ groups showing that the rest of the firms that are in the market during those years are not able to replace the dividend payments by the oldest firms that year.

The last years of the sample are of special importance for our analysis. We have mentioned many times that dividends have been increasing robustly over the last 10 years. Based on Figures 3.25 and 3.26, we will be able to find which age groups are responsible for this strong growth. According to Figure 3.25, it is of special importance the behavior found in the case of the relatively younger firms, between 10 and 20 years, in terms of dividend payments during the first years of 2000s (these firms are born in the 1980s). For example, in 2004 this group paid more than 30% of all dividends compared to the oldest firms that paid less than 20%. It is also important to mention the contribution during these years of those firms born between 30 and 40 years (these firms are included in the CRSP sample in the 1970s). In 2007 their payments exceed 24%. These firms were also the main contributors for dividend payments in the late years of the 1990s. At that point in time, they were placed in the $> 20 <= 30$ age group and paid more than 20% of all the dividends from 1994 to 2000. These age groups, together with the oldest firms, which paid between 20% and 25% of all dividends during the first years of 2000s (the width of the wave is bigger for these firms), were the main contributors for these dividends reappearing. On the other hand, the main drivers for the dividend reviving after the financial crisis are mainly the same age firms with the inclusion of the youngest ones. At the end of 2012, the oldest firms (¿80 years into the market) provided around 20% of all dividend payments. After them, we can find the 20-30 age group with more than 15% of all dividend payments. Moreover, the youngest firms (less than 20 years into the market) were paying more than 20% of all dividends.

We turn next to repurchases. As before, we start from 1978 following the emergence of stock repurchases in the 1980s. Figure 3.27 plots dollar values of repurchases in each of the age groups. On the other hand, Figure 3.28 reports the fraction of repurchases in each of these age groups. According to both Figures, stock repurchases seem to be much more homogenously distributed among the different age groups than dividends, specially during the 2000s and after the global financial crisis. Moreover, the youngest firms are very active in terms of stock repurchases (58% in 1980; 39% in 1983; 28% in 1992; 24% in 2000; 23% in 2009). On the other hand, the same age groups that stand out for the dividend reappearing in the 2000s are also important in terms of stock repurchases. For example, we found before that during the late 1990s those firms aged between 20 and 30 years were the main contributors for dividend payments. It is also the same for the case of stock repurchases. For example, these firms made more than 36% of repurchases in 1997. After them, we find that the youngest firms were responsible for around 20% of all repurchases during the late 1990s. The strong growth in repurchases seen right before the financial crisis also relies on the same age groups that drove the growth in dividends. For example, the oldest firms are making more than 30% of all stock repurchases in 2003. After them, firms aged between 10 and 20 years are responsible for more than 25% of all stock repurchases from 2001 to 2002 and from 2004 to 2007. We also find that firms aged between 30 and 40 years are contributing with amounts exceeding 20% in 2004. In addition to them, we find that the youngest firms (with 20% of all repurchases in 2001) and firms aged between 20 and 30 years (with 20% in 2002 and 2003) are also big contributors for the increase in repurchases, even when their dividend payments were not very significant during these years. As the financial crisis takes hold, all age groups reduced repurchases significantly. Among the 9 age groups, 6 of them reduced stock repurchases between 70% and 80%. The biggest drops are seen in those firms that drove the growth in repurchases. In contrast, the youngest firms reduced stock repurchases by 60%; the oldest firms by 46% and finally those firms aged between 60 and 70 years only by 39%. The upsurge in stock repurchases seen after 2009 is shared among several age groups. It is especially significant for the youngest and the oldest firms (both groups making more than 20% each in 2009).

We perform a very simple analysis to test for dividends and stock repurchases concentration on firm age. Figure 3.29 plots the cumulative sums of the fraction of dividends (left hand side) paid and repurchases (right hand side) made on each age group. Looking first at dividends, we can easily distinguish which age groups are driving the strong growth of dividends over the last ten years. As we shown above, it is of special importance the behavior of firms aged between 10 and 20 years, those between 30 and 40 and finally the oldest firms. Moreover, during the 1990s and the early 2000s the youngest firms (<= 30 years) are responsible for around 40% of all dividend payments. Together with those firms aged between 30 and 40, we find that right before the financial crisis, the group of firms with less than 40 years into the market are paying more than 60% of all dividends. In contrast, we see that dividends payments from firms between 40 and 50 and between 60 and 70 years do not contribute at all to the growth of dividends before the financial crisis (the width of the bands is very small). This concentration shows the importance of relatively younger firms into the growth of dividends during the last years of the sample. On the other hand, the youngest firms (<= 10), firms between 40 and 50 years into the market and firms with more than 70 years show strong resilience during the financial crisis. In strong contrast, firms between 10 and 40 years together with firms between 60 and 70 are seriously affected by the financial crisis. With the exception of firms between 20 and 30, none of them have recovered their pre-crisis levels.

The growth of stock repurchases is also related to the behavior of the youngest firms. In this case, those firms aged <= 20 are making around 40% of all stock repurchases during the 2000s. Instead, the same fractions of dividends were reached by firms aged

<= 30. Thus, the concentration of repurchases into the youngest firms is much bigger in the case of stock repurchases. Moreover, during the first years of the 2000s, firms with less than <= 30 years were making more than 60% of all stock repurchases. In contrast, with the exception of the oldest firms (¿=80) and firms between 30 and 40 after 2002, the rest of the oldest firms (between 40 and 70 years into the market) are not very active in terms of stock repurchases. For that the reason, the width of the bands among them is very small since the 1990s.

Based on the importance of these results, we will now analyze these age patterns without relying on age groups and looking at individual firm ages every year. Thanks to these Figures, we are going to be able to analyze if dividends and/or stock repurchases are also concentrated in firms born in specific years in the sample. We restrict our attention to the last part of the sample, from 2000 to 2012, in order to cover the so called dividend reappearing phenomena. All of these graphs can be found in the Appendix.

Figures A.1 to A.13 report the fraction of dividends paid and repurchases made by firm age every year from 2000 to 2012. Looking at these Figures as a whole, we can conclude that dividends are concentrated in firms listed in specific years of the sample. It is specially significant the fraction of dividends paid by the oldest firms in the CRSP sample. We shown before that these firms have been constantly paying high amounts of dividends during the whole sample period and it is also the case for the last 12 years of our sample. But this is mainly happening with those firms that were originally listed in the CRSP sample in 1926. From 2000 to 2012 they paid between 12% and 18% of all dividends every year. We need to wait for firms listed in 1930 to find again considerable amounts of dividends but far from those paid by the oldest firms (between 2% and 6% during these years). After firms listed in 1930, we can not find significant amounts of dividends paid by firms included in the CRPS index during the 1930s and the beginning of the 1940s. This could be explained by the effect of the 1930s crisis. Those firms listed during these years probably decided not to distribute dividends when they got into the market (Figure 3.1 shows tgat during the 1930s non-payers exceeded 60% of all firms) and have been reluctant to do it since then. The situation changes in the mid 1940s when we find that firms listed in 1945 and 1947 are paying each between 2% and 6% of all dividends during the last 12 years. On the other hand, it is difficult to find firms listed in the 1950s that pay significant amounts of dividends. According to Figure 3.1, during the 1950s 90% of all firms were paying dividends. It could be the case that firms listed during these years never paid high amounts of dividends or that they reduced them as a consequence of the dividend disappearing phenomena. According to our data, during the 1950s these firms were not paying significant amounts of dividends. Later on, we will also check which type of firms (in terms of size, index, group and type) were listed in the 1950s in order to better understand this behavior. During the 1960s, we find that firms listed in 1964 constantly pay between 2% and 4% during the 2000s and until the end of the sample.

It is during the 1970s, and specially in 1973, where we find firms paying similar amounts of dividends to those paid by the oldest firms. During the last 12 years, firms listed in 1973 contributed with between 8% and 15% of all dividend payments. Remember that these firms were part of the $> 20 <= 30$ and $> 30 <= 40$ age groups during the 2000s as we shown before. If we consider both groups of firms, those listed in 1926 and those included in 1973, we find that they were paying between 20% and 35% of all dividends from 2000 to 2012. After these firms, we need to wait for firms listed in the 1980s (specifically in 1985 and 1987) to find again significant fractions of total dividends paid each year since 2000. These firms were paying between 2% and 8% of all dividends from 2000 to 2012 with the exception of 2004. Again, we are able to understand the magnitude of the dividend paid by Microsoft. According to Figure A.5, firms listed in 1987 (Microsoft among them) paid more than 20% of all dividends. This contrasts to the oldest firms that paid 14% and firms listed in 1973 that paid 12% of all dividends in 2004. Finally, although the youngest firms (listed between the 1990s and the 2000s) do not stand out in terms of single year payments (with the exception of 2009 and with firms listed in 2008 that paid 5% of all dividends), they became important after 2000 and all together paid around 20% of all dividends. This is in line with our findings with respect to the youngest groups of age firms and their importance for the growth of dividends before and after the financial crisis.

We now exploit the differential effect of the crisis on these firms by plotting on Figure A.14 the dividend growth for the largest dividend payers by firm age. We have included a secondary axis in order to accommodate the effect of the Microsoft special dividend into the dividend growth. Thus, the scale for the analysis of the 1987 dividend growth is on the right hand side. Before the financial crisis, the youngest firms (included after 1989) together with those born in 1987 are driving the aggregate dividend growth after 2000. When the crisis takes hold, dividends paid by firms included in 1963, 1970, 1973 and 1987 are seriously affected. In 2009, these firms reduced dividends by 29%,53%, 50% and 43% respectively. On the other hand, we find that the oldest (1926 and 1947) and the youngest ($>= 1990$) firms decreased dividends modestly. Moreover, dividends increased in the case of firms included in 1930, 1947 and 1985 during 2008 and 2009. After 2009, the growth in dividends is mainly driven by firms included in 1970, 1963 and again by the youngest firms (included after 1989).

We turn next to stock repurchases. The growth of repurchases during the 2000s, before and after the financial crisis, is mainly due to the same firms that are driving the growth in dividends, together with the youngest firms (those firms included in the CRPS sample after the 1990s). From 2000 to 2012, firms included between 1990 and 2011 made more than 20% of all stock repurchases each year. Moreover, after 2007 they have been constantly making more than 30% of all repurchases, with highs of 37% and 39% in 2009 and 2011 respectively. Finally, the big drop in stock repurchases experienced during the financial crisis seems not to affect the youngest firms at all. In 2008 and 2009 they made 31% and 37% of all stock repurchases. We also find that in 2009 more than 10% of all repurchases were coming from firms included in 2000. It is also interesting to see how these firms are always making more repurchases than dividends from 2000 and 2012. They were born or included when making repurchases was very common among public U.S. firms. In spite of this, it is also true that after 2001 dividends paid by the youngest firms have been increasing significantly and they are in part responsible for the upsurge of dividends after 2001 (and specially after 2009). On the other hand, as it was the case with dividends, stock repurchases are not very important for firms included in the 1930s, in the first years of the 1940s, in the 1950s, and in the late 1970s.

Figure A.15 includes repurchases into the calculation of dividend growth for the largest dividend payers based on age. As in the case of the dividend growth, we have included a secondary axis in order to accommodate those firms included in 1970 - these firms increased repurchases by more than 260% in 2010 - and again firms from 1987. When we include repurchases into the dividend growth, we find that the series become much more volatile. Moreover, with the exception of the high ups and drops in the case of firms from 1926, 1930, 1945 and 1987, the rest of the firms follow similar growth paths from 2001 to 2009. In the case of the youngest firms, dividend growth is increasing by around 40% each year from 2004 to 2007. It is also significant during these years for firms included in 1930 (dividend growth increased by more than 50% each year from 2004 to 2006). All of these age groups of firms reduced dividends and stock repurchases during 2009, compared to 2008 where in some age groups dividend growth was still increasing. Moreover, with the exception of firms from 1945, payouts decreased by more than 35% in 2009 (in 2008 only the 1973 age group reduced payouts by more than 30%), with lows of 80% for 1970 firms and 66% for 1987 firms. After the financial crisis, it took more time for some age groups to recover payouts. It is the case for the 1926, 1945 and 1963 age groups in 2010 where they still reduced payouts by 25%, 31% and 18%. It is in 2011 when these firms increased payouts significantly (by 75%, 54% and 60% respectively). In the case of the rest of the groups, payouts from the youngest firms increased by 40% during 2010 and 2011. The growth in the case of firms from the 1970s is also significant (250% and 12% for firms included in 1970 and 58% and 31% for 1973 firms).

Finally, the reduction in the amount of payouts seen in 2012 (remember that dividends increased during 2012) is in part driven by the behavior of the youngest firms, which reduced repurchases by 32% at the same time that they were increasing dividends significantly (by more than 52%). For that reason, payouts from the youngest firms only decreased by 10%. It is also the case for firms from 1970, which reduced repurchases by 45% while they were increasing dividends by 37%. This drove payouts from these firms to decrease by only 17%. The same happened with firms from 1926 and 1930. Firms from 1926 reduced repurchases by 11% while they were increasing dividends by 9%. As a consequence, their payouts only decreased by 2%. And firms from 1930 reduced stock repurchases by 42% at the same time that they were increasing dividends by 15%, which drove their payouts to decrease by 7%.

Finally, the role of the youngest firms in the growth of aggregate payouts (dividends and repurchases) in the last 12 years should help us to reconsider the role of the different theories about the existence and importance of dividends.

3.6 Conclusions

This paper investigates the anatomy of corporate payouts. We start by replicating and updating recent work that analyzes patterns in the time series and cross-sectional behavior of payouts (dividends and stock repurchases) by U.S. firms. Similar to recent research by Floyd, Li and Skinner (2013), we document that dividends have bounced back strongly, fueling a massive surge in overall payouts and reviving the dividend puzzle. We find that since 2001 not only has there been an increase in the number of dividend payers, but also these dividend paying firms have increased payouts to the massive levels before, and more recently after the financial crisis, although stock repurchases have not reached yet the pre-crisis levels.

Industrials and financials both increase payouts significantly in the years prior to the crisis. For industrials, the growth of stock repurchases is much larger than the growth of dividends. However, unlike industrials, the growth of repurchases is not as important for financial firms and is similar to the increase on dividends. Moreover, the big increase in the fraction of dividends paid by financials since the 1990s is not at the expense of industrials that were constantly paying between 60% and 70% of all dividends, but it affected the fraction of dividends paid by utilities because their dividends did not grow significantly during these years.

As the financial crisis took hold in 2007, industrials and financials reduced payouts in different ways. While industrials reduced dividends modestly, financial firms cut dividends aggressively. They moved from paying 30% of all dividends at the end of 2007 to less than 10% in 2009. On the other hand, the reduction of stock repurchases was similar among all types of firms. This explains why repurchases were so seriously affected by the financial crisis compared to dividends. Finally, the rebound in dividends and stock repurchases after 2009 is shared between both, industrials and financials, but with financial firms a bit more active.

There are noticeable differences between the dividend and repurchase policies of the different types of industrial and financial firms, including how these policies evolve over time and respond to the crisis. Starting from industrials, we find that the Manufacturing Division is the main contributor for dividends and repurchases. This Division was paying more than 60% of all total aggregate dividends until the 1970s when financials started to pay significant amounts of dividends. At the end of 2012 they paid more than 50% of all dividends. The same happened with stock repurchases. Manufacturing firms have been responsible for more than 40% of all stock repurchases made since the late 1970s with highs of 70% in the 1980s and lows of 37% in the early 2000s. The dividend concentration of industrial firms dividends reported by DeAngelo, DeAngelo and Skinner (2004) extends to the Major Groups of the Manufacturing Division. In short, during the 1930s and the 1940s four major groups were paying between 10% and 15% of all aggregate dividends and between 15% and 25% of the total dividends paid in Division D. After the 1990s, we find that only the Chemicals and Allied Products Group have been paying between 10% and 15% of all dividends and between 20% and 35% of the total dividends paid in Division D. Moreover, it is far from the second Major Group (Group 29: Petroleum and Refining Products), which is paying less than 8% of total aggregate dividends and around 15% of the total dividends paid in Division D. The story of repurchases is slightly different and we can find several groups making substantial repurchases before and after the financial crisis. This explains why stock repurchases have been increasing so fast and well in excess of dividends before and after the financial crisis.

Similar to Manufacturing companies, dividends paid by financial firms are concentrated in two Major Groups. Before the late 1990s, Holding and other investment offices firms concentrated the majority of all dividend payments. This helped these firms to pay around 10% of all dividends since the 1980s until the late 1990s. After that, these firms reduced them significantly until the last years of the sample. After the late 1990s, depositary institutions are fueling the dividend payments of financial firms. Thanks to them, financial firms were able to pay more than 30% of all dividends right before the financial crisis. As an example, from 1992 to 2007 dividends paid by depositary institutions increased more than 2462%. If this increase is impressive (none of the industrial Groups show similar growths), the reduction in dividends payments after 2007 is also worth mentioning. From 2007 to 2010 dividends paid by depositary institutions decreased around 90%. In only two years, dividends paid by this group returned to the late 1990s levels. Based on these numbers, it is easy to understand how the financial sector went from paying 30% to less than 10% of all dividends in less than 3 years. In contrast, repurchases made by financial firms are shared among several Major Groups. Moreover, Depositary Institutions used repurchases less extensively than dividends. Financial firms also cut repurchases aggressively during the financial crisis. In contrast, after 2009 only Insurance Carriers firms are driving the rebound of repurchases made by financial firms.

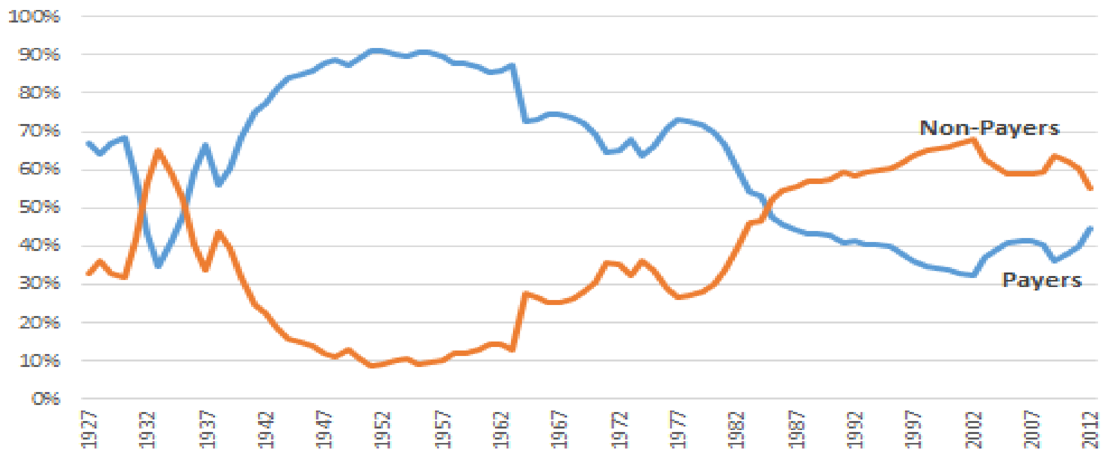
The analysis of firm age is very informative in helping to understand the upsurge of payouts for both industrials and financials beginning around 2001. Thanks to this analysis, we have found that dividends and stock repurchases are also concentrated in firms included in specific years of the CRSP sample and that the growth of payouts over the last 12 years is not shared among all age groups. For example, we have seen that during the last 12 years only those firms included in 1926 and 1973 were paying between 20% and 35% of all dividends. Before the financial crisis, the youngest firms (included after 1989) together with those included in 1987 are driving the growth of dividends. When the crisis took hold, dividends paid by firms included in 1963, 1970, 1973 and 1987 were seriously damaged. On the other hand, we find that the oldest (included in 1926 and 1947) and the youngest (included since 1990) decreased dividends modestly. Moreover, dividends increased in the case of firms included in 1930, 1947 and 1985 during 2008 and 2009. After 2009, the growth in dividends is mainly driven by firms included in 1970, 1963 and again by the youngest firms (included after 1989). The growth of repurchases during the 2000s, before and after the financial crisis, is mainly due to the same firms that are driving the growth in dividends, together with the youngest firms (those firms included in the CRPS sample after the 1990s).

We will include earnings into the analysis of U.S. corporate payouts by looking at the role of earnings and payout ratios for the different groups of firms, market indexes and firm age. This help us to re-visit the related issue of return and dividend growth predictability and the role of dividend smoothing as an explanatory factor in the changes seen in the relative importance of cash flows and discount rate news in driving stock returns. We are also studying the role of the different theories about the existence and importance of dividends based on the behavior of the different type of firms, stock market indexes and age groups. We use the crisis as a shock to help differentiate these theories. We have preliminary results that throw new light on these important issues and we hope to add these in the next version of this Chapter.

The empirical analysis in this Chapter is based on U.S market data and in the environment of the U.S. financial system. These results are based therefore on the largest equity market in the world. If a similar analysis is done on smaller markets, e.g like one the European Union markets, the results are likely to be different mainly due to the smaller size and corporate payout policies of these markets, the domination of these market by few large firms, the importance of the bank system in some countries and other legal and institutional differences in trading and stock market regulations. An avenue for future work could be to do a similar analysis of other national stock markets and compared and contrast the results with those of the U.S market. There are also other limitations to the empirical analysis in this Chapter. First, the data pertains to the period which is available on the WRDS database. There are also other pre-1920s data in other sources and the results we have obtained may be not be possible to generalize to other time periods. Moreover, other definitions of corporate payout variables could affect the patterns found in this Chapter.

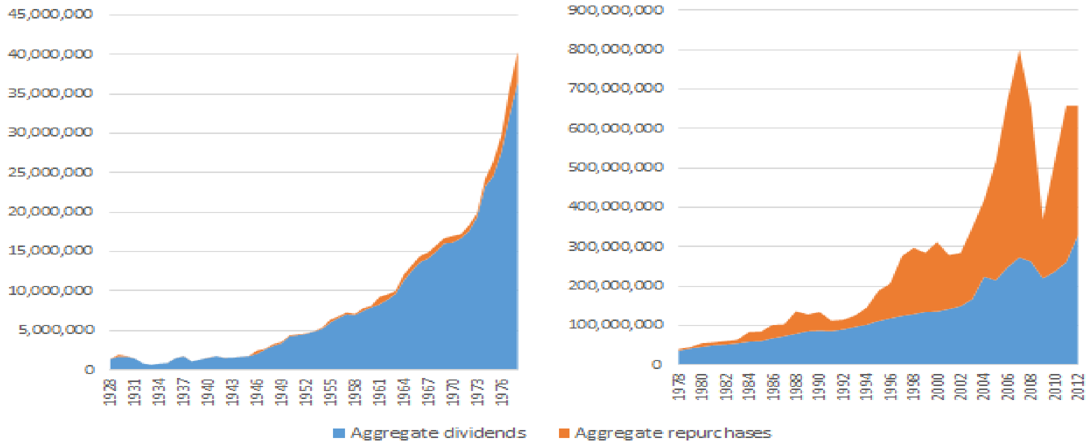
3.7 Figures and Tables

FIGURE 3.1: The fraction of CRSP firms in different dividend groups, 1927-2012



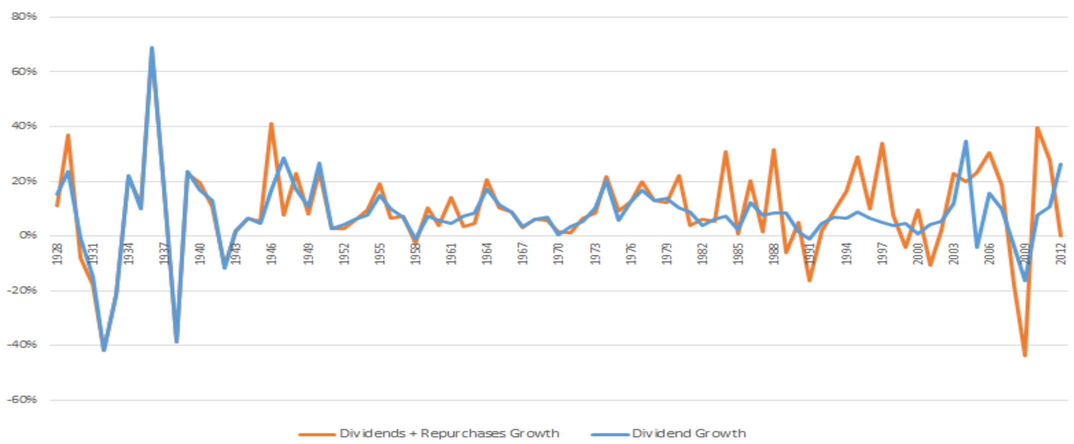
Note: The CRSP sample includes NYSE, AMEX and NASDAQ securities with shares codes of 10 and 11. A firms must have market equity data (price and shares outstanding) for any month of year t and t-1 to be in the sample for that year. We consider all firms incorporated into the U.S. without excluding utilities or financial firms. Payers pay dividends in year t; non-payers do not. A firm in the CRSP sample is defined as a dividend payer for calendar year t if its with-dividend return exceeds its without dividend return in any month of year t.

Figure 3.2: Aggregate dividends and repurchases for all firms incorporated into the U.S., 1927-2012



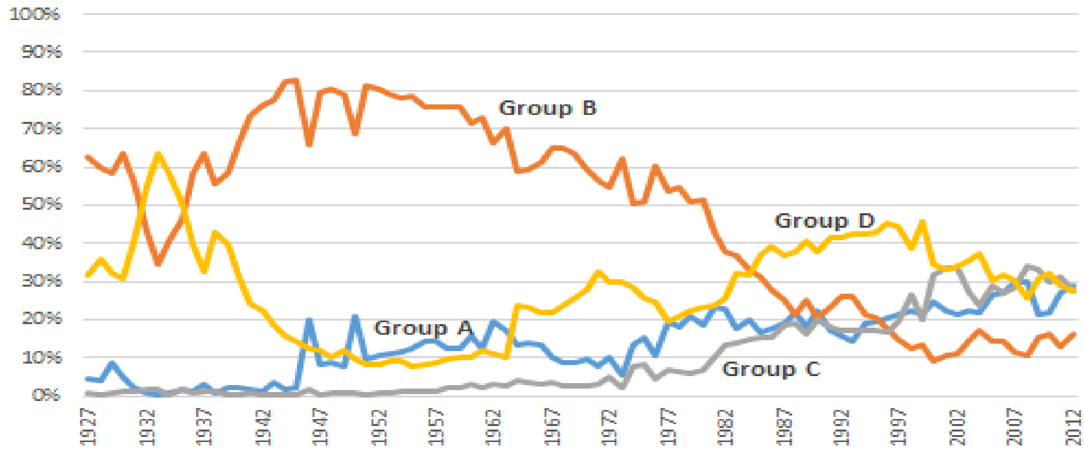
Note: The sample includes NYSE, NASDAQ, and AMEX firms on CRSP that have share codes 10 or 11. We calculate dividends and repurchases in dollars for each firm-month, and we aggregate them over the year. For that reason, we require non-missing monthly lagged ex-dividend price and cum-dividend and ex-dividend returns to compute monthly firm dividends. We estimate monthly shares repurchased by a firm as the decrease in shares outstanding reported by CRSP, adjusted for other activities that affect the number of shares outstanding, such as stock dividends and stock splits.

Figure 3.3: Aggregate dividends and payouts growth for all firms incorporated into the U.S., 1927-2012



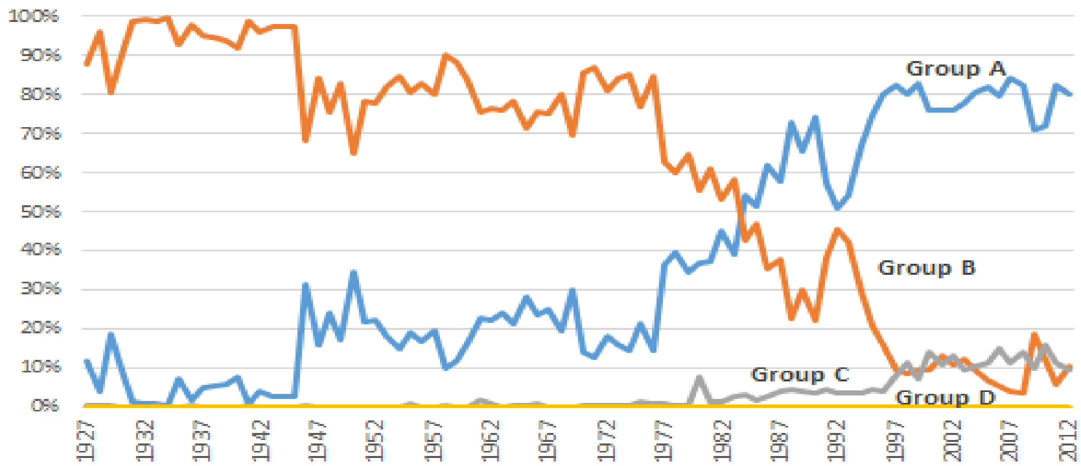
Note: The sample includes NYSE, NASDAQ, and AMEX firms on CRSP that have share codes 10 or 11. We calculate dividends in dollars for each firm-month, and we aggregate them over the year. For that reason, we require non-missing monthly lagged ex-dividend price and cum-dividend and ex-dividend returns to compute monthly firm dividends.

FIGURE 3.4: The fraction of firms in the different payout categories, 1927-2012



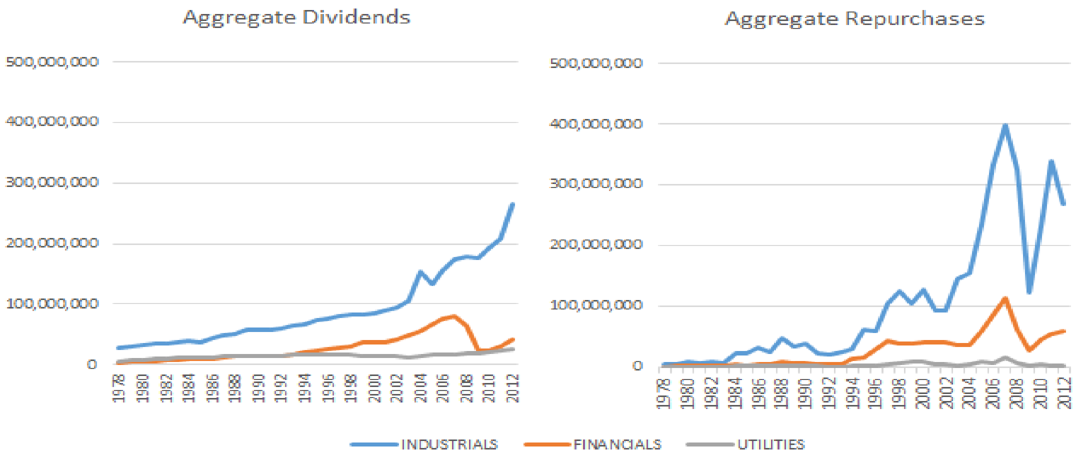
Note: Following Skinner (2008), we divide the entire sample of CRSP firms into four different groups: (Group A) firms that both pay dividends and make stock repurchases, (Group B) firms that pay only dividends, (Group C) firms that make only stock repurchases and (Group C) firms that do not pay out cash to stockholders.

FIGURE 3.5: The fraction of aggregate payouts represented by firms in different payer categories, 1927-2012



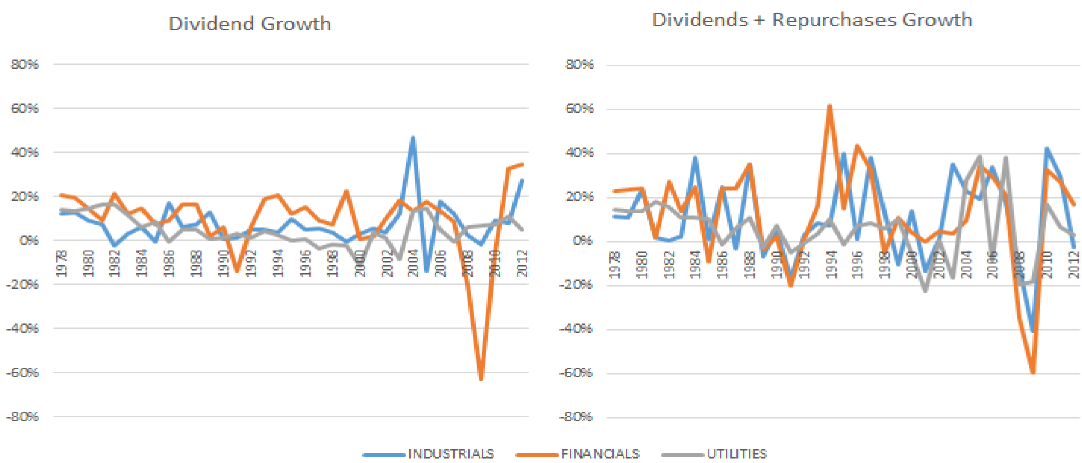
Note: Following Skinner (2008), we divide the entire sample of CRSP firms into four different groups: (Group A) firms that both pay dividends and make stock repurchases, (Group B) firms that pay only dividends, (Group C) firms that make only stock repurchases and (Group C) firms that do not pay out cash to stockholders.

FIGURE 3.6: Aggregate dividends and repurchases for industrials, financial and utilities, 1927-2012



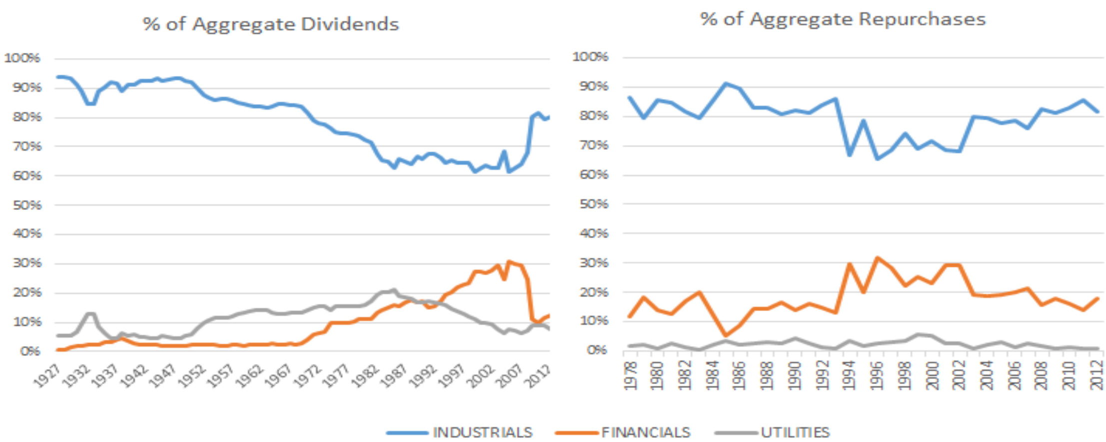
Note: The sample includes NYSE, NASDAQ, and AMEX firms on CRSP that have share codes 10 or 11. The SIC codes for industrial firms are outside the range of 4900 to 4949 and 6000 to 6999. Financial firms are in the range of 6000 to 6999 and utilities between 4900 and 4949. We calculate dividends and repurchases in dollars for each firm-month, and we aggregate them over the year. For that reason, we require non-missing monthly lagged ex-dividend price and cum-dividend and ex-dividend returns to compute monthly firm dividends. We estimate monthly shares repurchased by a firm as the decrease in shares outstanding reported by CRSP, adjusted for other activities that affect the number of shares outstanding, such as stock dividends and stock splits.

FIGURE 3.7: Dividends and payouts growth for industrials, financials and utilities, 1927-2012



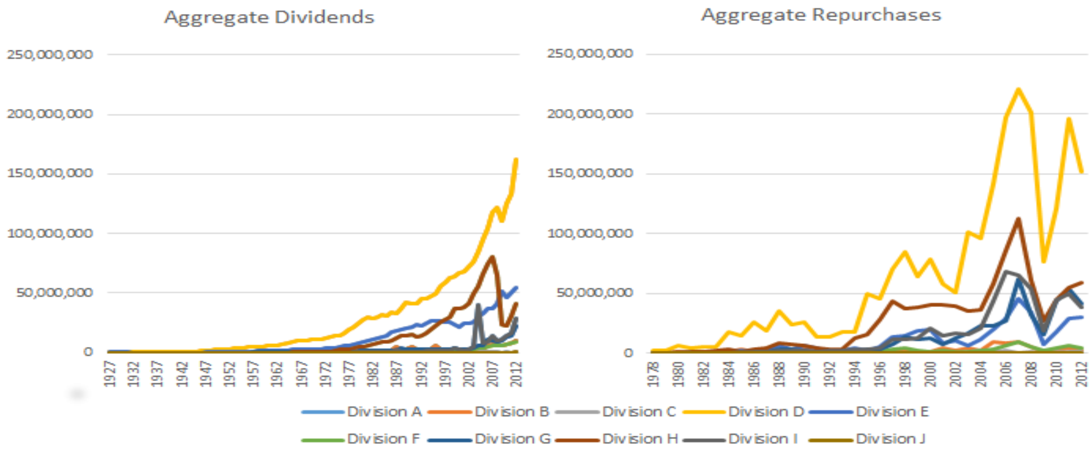
Note: The sample includes NYSE, NASDAQ, and AMEX firms on CRSP that have share codes 10 or 11. The SIC codes for industrial firms are outside the range of 4900 to 4949 and 6000 to 6999. Financial firms are in the range of 6000 to 6999 and utilities between 4900 and 4949. We calculate dividends and repurchases in dollars for each firm-month, and we aggregate them over the year. For that reason, we require non-missing monthly lagged ex-dividend price and cum-dividend and ex-dividend returns to compute monthly firm dividends. We estimate monthly shares repurchased by a firm as the decrease in shares outstanding reported by CRSP, adjusted for other activities that affect the number of shares outstanding, such as stock dividends and stock splits.

FIGURE 3.8: The fraction of aggregate dividends and aggregate stock repurchases for industrials, financials and utilities, 1927-2012



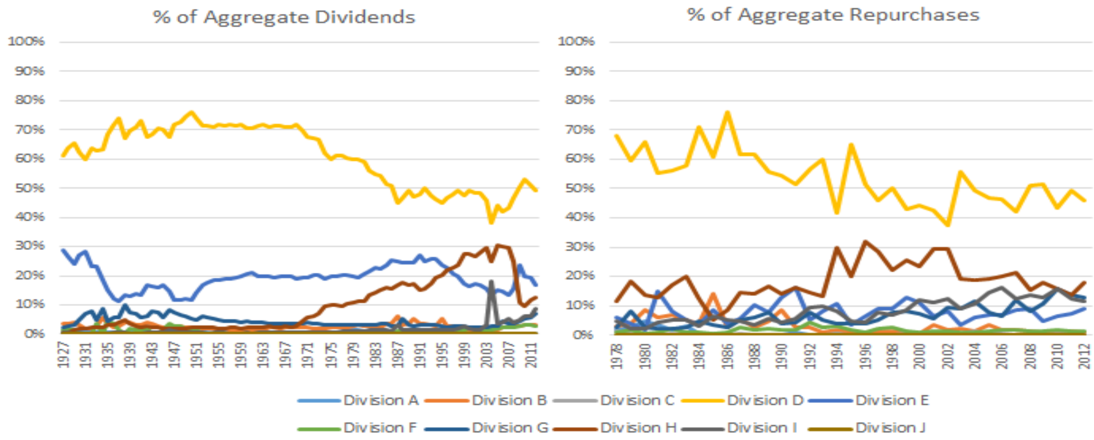
Note: The sample includes NYSE, NASDAQ, and AMEX firms on CRSP that have share codes 10 or 11. The SIC codes for industrial firms are outside the range of 4900 to 4949 and 6000 to 6000. Financial firms are in the range of 6000 to 6999 and utilities between 4900 and 4949. We calculate dividends and repurchases in dollars for each firm-month, and we aggregate them over the year. For that reason, we require non-missing monthly lagged ex-dividend price and cum-dividend and ex-dividend returns to compute monthly firm dividends. We estimate monthly shares repurchased by a firm as the decrease in shares outstanding reported by CRSP, adjusted for other activities that affect the number of shares outstanding, such as stock dividends and stock splits.

FIGURE 3.9: Aggregate dividends and repurchases by SIC Divisions, 1927-2012



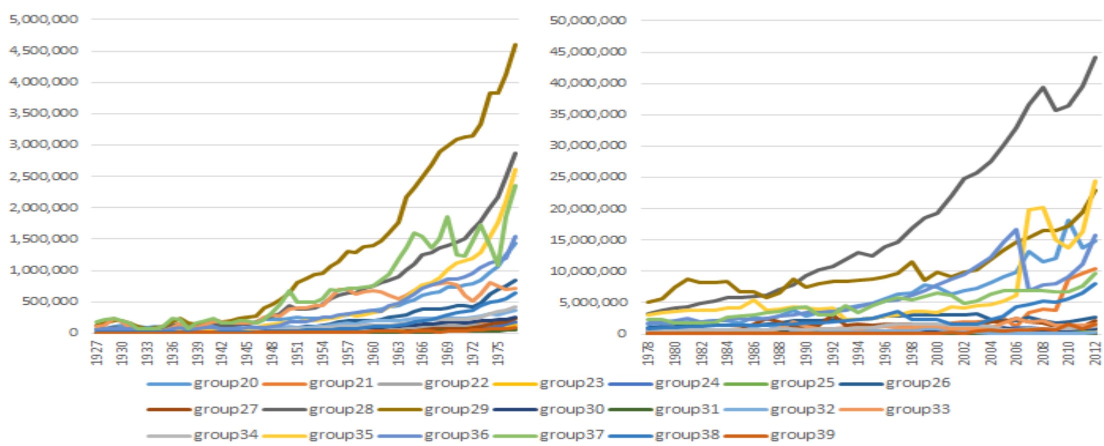
Note: The SIC manual consists of Divisions A-J: Division A corresponds to Agriculture, Forestry, and Fishing; Division B to Mining; Division C to Constructing; Division D to Manufacturing; Division E to Transportation, Communications, Electric, Gas, and Sanitary Services; Division F to Wholesale Trade; Division G to Retail Trade; Division H to Finance, Insurance, and Real Estate; Division I to Services; Division J to Public Administration. We calculate dividends and repurchases in dollars for each firm-month, and we aggregate them over the year. For that reason, we require non-missing monthly lagged ex-dividend price and cum-dividend and ex-dividend returns to compute monthly firm dividends. We estimate monthly shares repurchased by a firm as the decrease in shares outstanding reported by CRSP, adjusted for other activities that affect the number of shares outstanding, such as stock dividends and stock splits.

FIGURE 3.10: The fraction of aggregate dividends and repurchases paid by SIC Divisions, 1927-2012



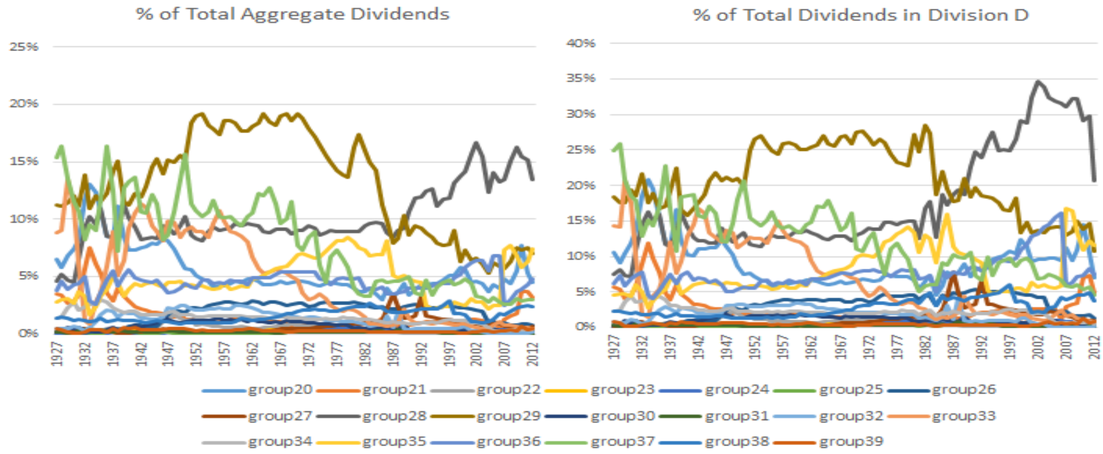
Note: The SIC manual consists of J Divisions: Division A corresponds to Agriculture, Forestry, and Fishing; Division B to Mining; Division C to Constructing; Division D to Manufacturing; Division E to Transportation, Communications, Electric, Gas, and Sanitary Services; Division F to Wholesale Trade; Division G to Retail Trade; Division H to Finance, Insurance, and Real Estate; Division I to Services; Division J to Public Administration. We calculate dividends and repurchases in dollars for each firm-month, and we aggregate them over the year. For that reason, we require non-missing monthly lagged ex-dividend price and cum-dividend and ex-dividend returns to compute monthly firm dividends. We estimate monthly shares repurchased by a firm as the decrease in shares outstanding reported by CRSP, adjusted for other activities that affect the number of shares outstanding, such as stock dividends and stock splits.

FIGURE 3.11: Aggregate dividends paid by the Major Groups of Division D: Manufacturing, 1927-2012



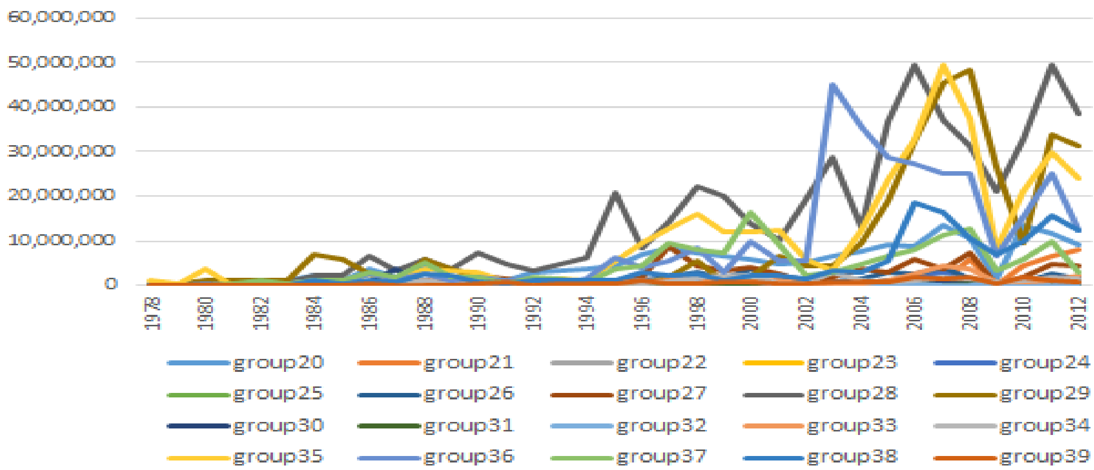
Note: In the SIC Manual, Division D consists of 20 Major Groups: from Group 20 to Group 39. We calculate dividends in dollars for each firm-month, and we aggregate them over the year. For that reason, we require non-missing monthly lagged ex-dividend price and cum-dividend and ex-dividend returns to compute monthly firm dividends.

Figure 3.12: The fraction of dividends paid on each Major Group of Division D, 1927-2012



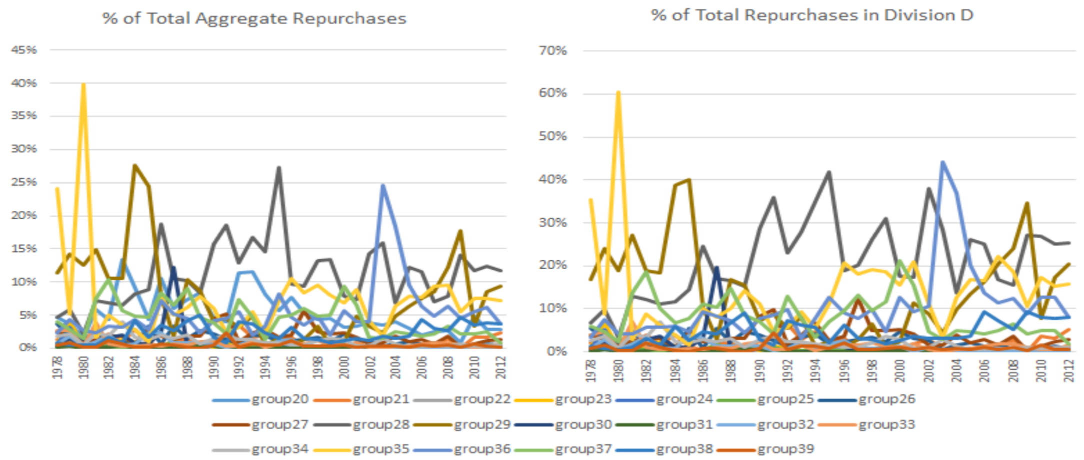
Note: In the SIC Manual, Division D consists of 20 Major Groups: Groups 20 to 39. On the left hand side we can find the fraction of dividends paid on each Major Group of Division D with respect to the total amount of all aggregate dividends paid, and on the right hand side the fraction of dividends paid on each Major Group of Division D with respect to the total sum of all dividends paid in Division D. We calculate dividends in dollars for each firm-month, and we aggregate them over the year. For that reason, we require non-missing monthly lagged ex-dividend price and cum-dividend and ex-dividend returns to compute monthly firm dividends.

Figure 3.13: Aggregate stock repurchases made by the Major Groups of Division D: Manufacturing, 1978-2012



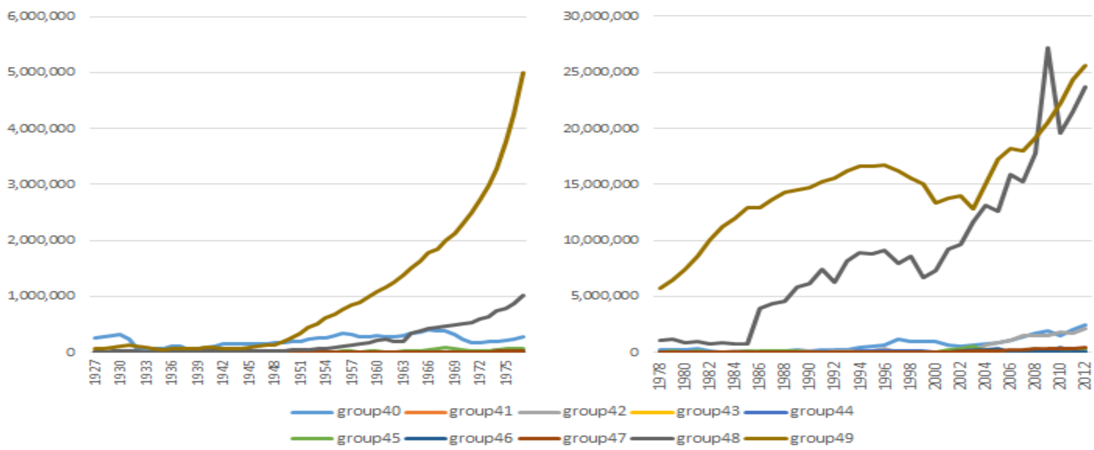
Note: In the SIC Manual, Division D consists of 20 Major Groups: Groups 20 to 39. We calculate repurchases in dollars for each firm-month, and we aggregate them over the year. We estimate monthly shares repurchased by a firm as the decrease in shares outstanding reported by CRSP, adjusted for other activities that affect the number of shares outstanding, such as stock dividends and stock splits.

Figure 3.14: The fraction of stock repurchases made on each Major Group of Division D, 1978-2012



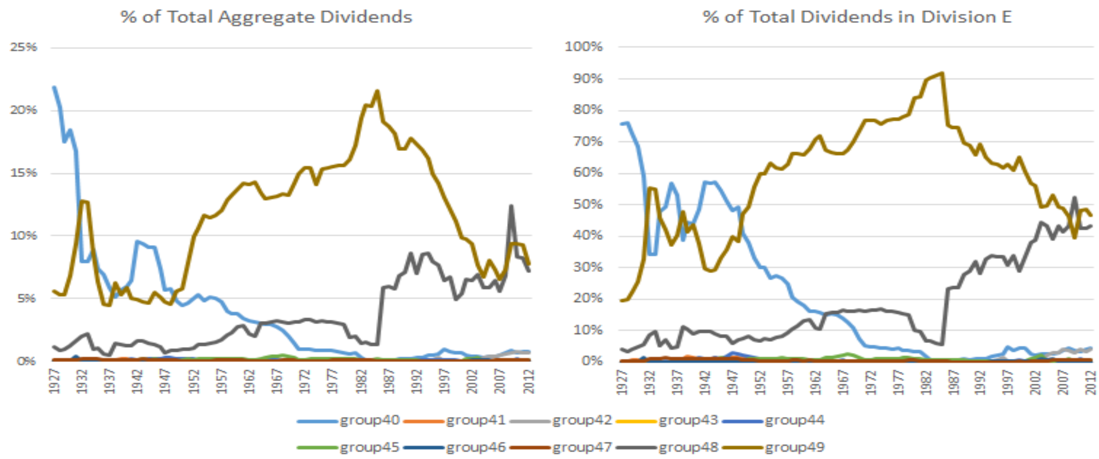
Note: In the SIC Manual, Division D consists of 20 Major Groups: Groups 20 to 39. On the left hand side we can find the fraction of stock repurchases made on each Major Group of Division D with respect to the total amount of all aggregate repurchases made, and on the right hand side the fraction of stock repurchases on each Major Group of Division D with respect to the total sum of all repurchases made in Division D. We calculate repurchases in dollars for each firm-month, and we aggregate them over the year. We estimate monthly shares repurchased by a firm as the decrease in shares outstanding reported by CRSP, adjusted for other activities that affect the number of shares outstanding, such as stock dividends and stock splits.

Figure 3.15: Aggregate dividends paid by the major groups of Division E: Transportation, Communications, Electric, Gas, and Sanitary Services, 1927-2012



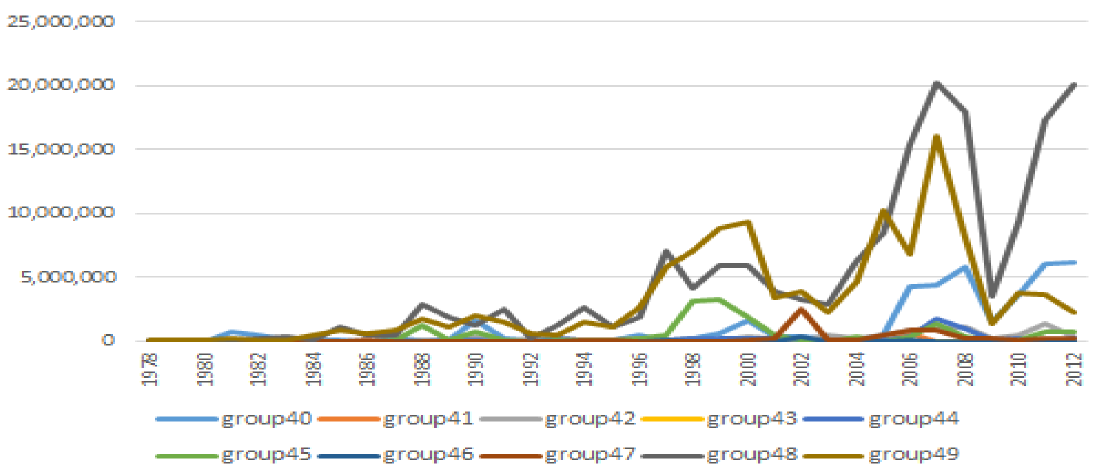
Note: In the SIC Manual, Division E consists of 10 Major Groups: from Group 40 to Group 49. We calculate dividends in dollars for each firm-month, and we aggregate them over the year. For that reason, we require non-missing monthly lagged ex-dividend price and cum-dividend and ex-dividend returns to compute monthly firm dividends.

FIGURE 3.16: The fraction of dividends paid on each Major Group of Division E, 1927-2012



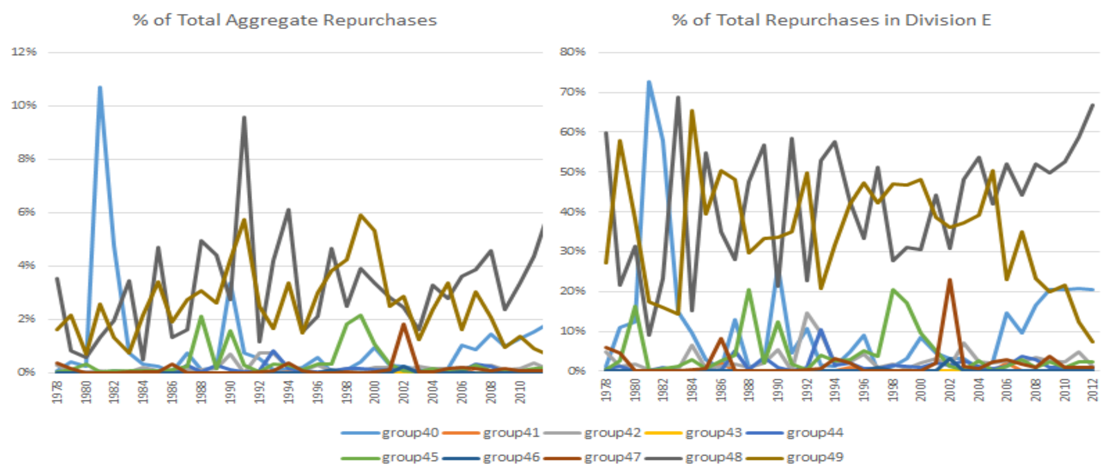
Note: In the SIC Manual, Division E consists of 10 Major Groups: from Group 40 to Group 49. On the left hand side we can find the fraction of dividends paid on each Major Group of Division E with respect to the total amount of all aggregate dividends paid, and on the right hand side the fraction of dividends paid on each Major Group of Division E with respect to the total sum of all dividends paid in Division E. We calculate dividends in dollars for each firm-month, and we aggregate them over the year. For that reason, we require non-missing monthly lagged ex-dividend price and cum-dividend and ex-dividend returns to compute monthly firm dividends.

FIGURE 3.17: Aggregate stock repurchases made by the major groups of Division E: Transportation, Communications, Electric, Gas, and Sanitary Services, 1978-2012



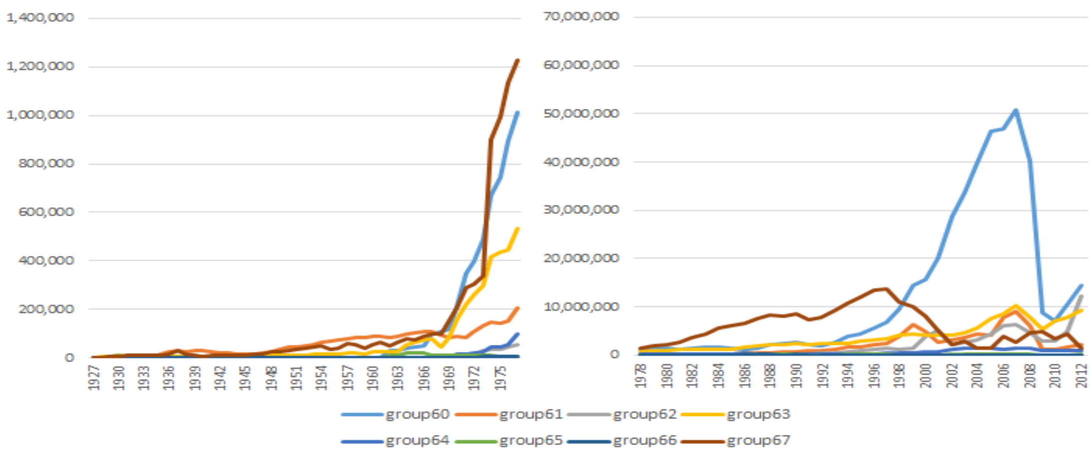
Note: In the SIC Manual, Division E consists of 10 Major Groups: from Group 40 to Group 49. We calculate repurchases in dollars for each firm-month, and we aggregate them over the year. We estimate monthly shares repurchased by a firm as the decrease in shares outstanding reported by CRSP, adjusted for other activities that affect the number of shares outstanding, such as stock dividends and stock splits.

FIGURE 3.18: The fraction of stock repurchases made on each Major Group of Division E, 1978-2012



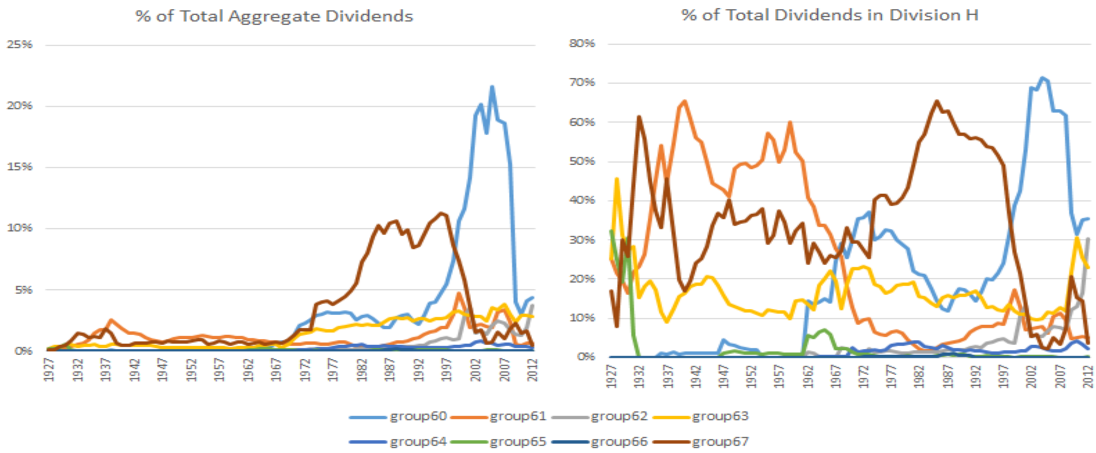
Note: In the SIC Manual, Division E consists of 10 Major Groups: from Group 40 to Group 49. On the left hand side we can find the fraction of stock repurchases made on each Major Group of Division E with respect to the total amount of all aggregate repurchases made, and on the right hand side the fraction of stock repurchases on each Major Group of Division E with respect to the total sum of all repurchases made in Division E. We calculate repurchases in dollars for each firm-month, and we aggregate them over the year. e estimate monthly shares repurchased by a firm as the decrease in shares outstanding reported by CRSP, adjusted for other activities that affect the number of shares outstanding, such as stock dividends and stock splits.

Figure 3.19: Aggregate dividends paid by the major groups of Division H: Finance, Insurance and Real Estate, 1927-2012



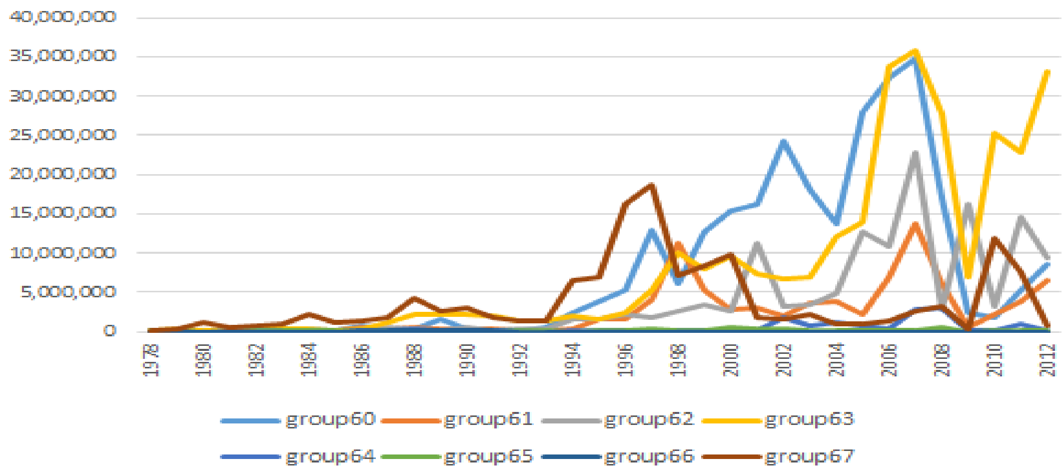
Note: In the SIC Manual, Division H consists of 8 Major Groups: from Group 60 to Group 67. We calculate dividends in dollars for each firm-month, and we aggregate them over the year. For that reason, we require non-missing monthly lagged ex-dividend price and cum-dividend and ex-dividend returns to compute monthly firm dividends.

FIGURE 3.20: The fraction of dividends paid on each Major Group of Division H, 1927-2012



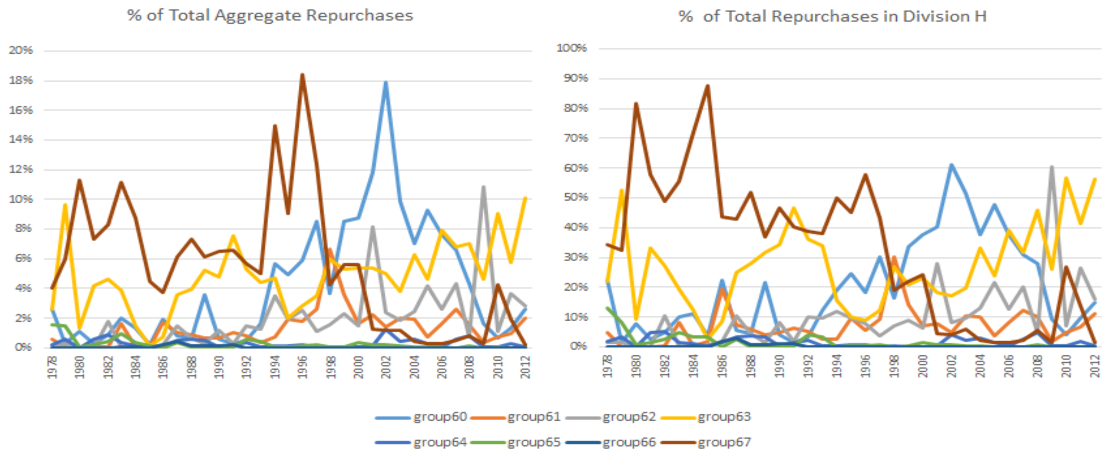
Note: In the SIC Manual, Division H consists of 8 Major Groups: from Group 60 to Group 67. On the left hand side we can find the fraction of dividends paid on each Major Group of Division H with respect to the total amount of all aggregate dividends paid, and on the right hand side the fraction of dividends paid on each Major Group of Division H with respect to the total sum of all dividends paid in Division H. We calculate dividends in dollars for each firm-month, and we aggregate them over the year. For that reason, we require non-missing monthly lagged ex-dividend price and cum-dividend and ex-dividend returns to compute monthly firm dividends.

FIGURE 3.21: Aggregate stock repurchases made by the major groups of Division H: Finance, Insurance and Real Estate, 1978-2012



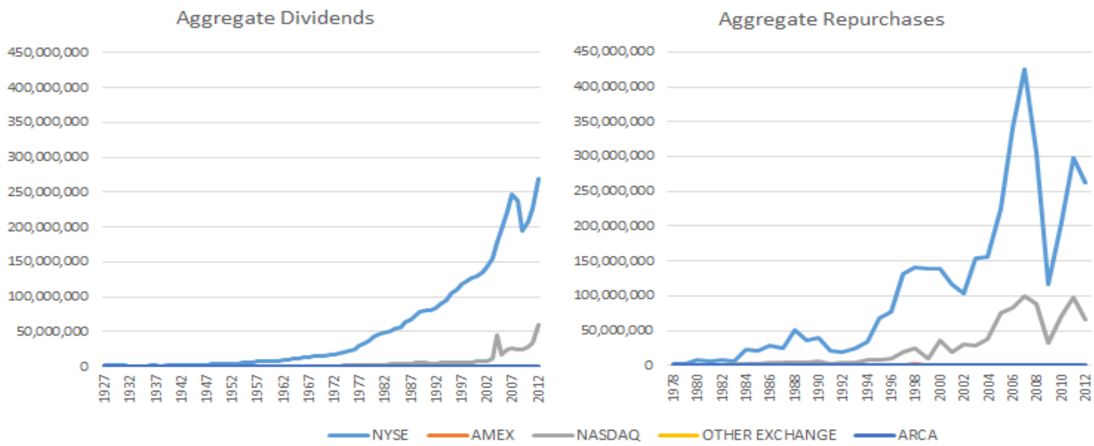
Note: In the SIC Manual, Division H consists of 8 Major Groups: from Group 60 to Group 67. We calculate repurchases in dollars for each firm-month, and we aggregate them over the year. We estimate monthly shares repurchased by a firm as the decrease in shares outstanding reported by CRSP, adjusted for other activities that affect the number of shares outstanding, such as stock dividends and stock splits.

FIGURE 3.22: The fraction of stock repurchases made on each Major Group of Division H, 1978-2012



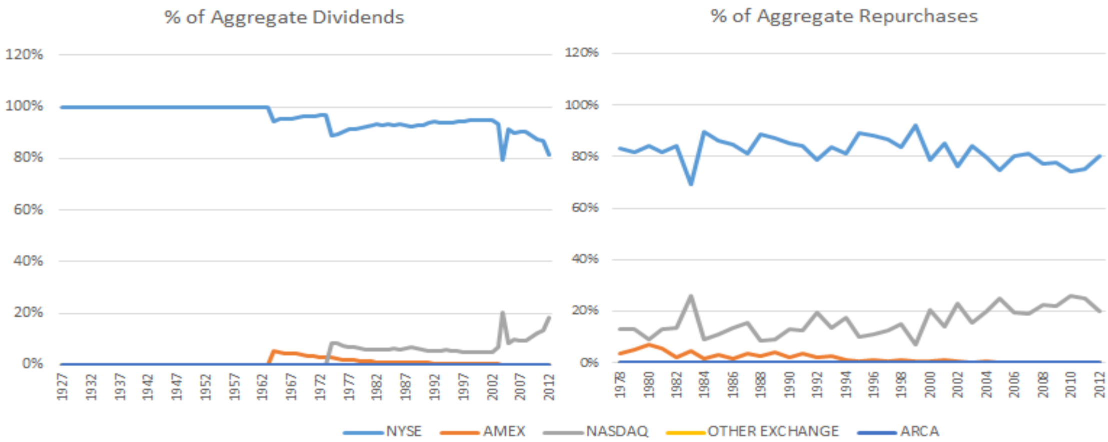
Note: In the SIC Manual, Division H consists of 8 Major Groups: from Group 60 to Group 67. On the left hand side we can find the fraction of stock repurchases made on each Major Group of Division H with respect to the total amount of all aggregate repurchases made, and on the right hand side the fraction of stock repurchases on each Major Group of Division H with respect to the total sum of all repurchases made in Division H. We calculate dividends in dollars for each firm-month, and we aggregate them over the year. We estimate monthly shares repurchased by a firm as the decrease in shares outstanding reported by CRSP, adjusted for other activities that affect the number of shares outstanding, such as stock dividends and stock splits.

FIGURE 3.23: Aggregate dividends and aggregate stock repurchases paid by stock market indexes



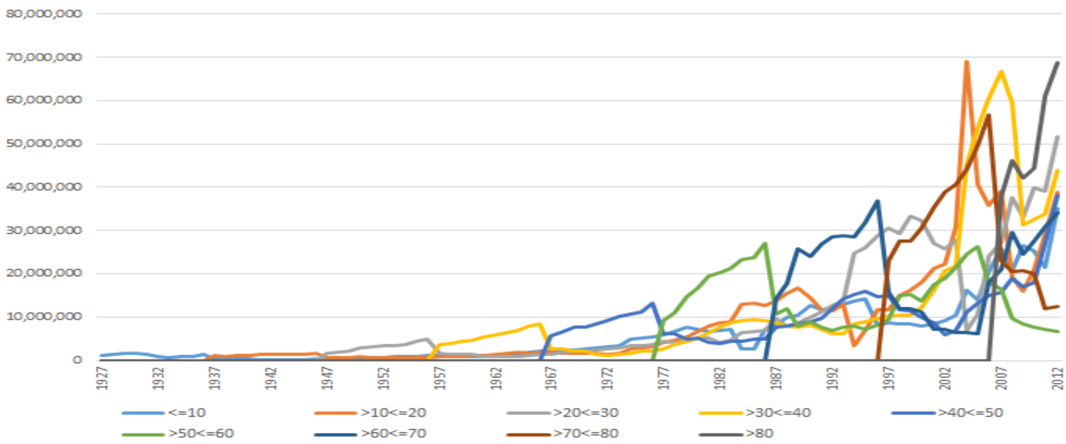
Note: We use the primary exchange variable in the CRSP database to identify the primary exchange on which the security trades. The indexes contained in the CRSP sample are: NYSE, AMEX, NASDAQ, ARCA and other exchanges. We calculate dividends and repurchases in dollars for each firm-month, and we aggregate them over the year. For that reason, we require non-missing monthly lagged ex-dividend price and cum-dividend and ex-dividend returns to compute monthly firm dividends. We estimate monthly shares repurchased by a firm as the decrease in shares outstanding reported by CRSP, adjusted for other activities that affect the number of shares outstanding, such as stock dividends and stock splits.

FIGURE 3.24: The fraction of aggregate dividends and aggregate stock repurchases paid by stock market indexes



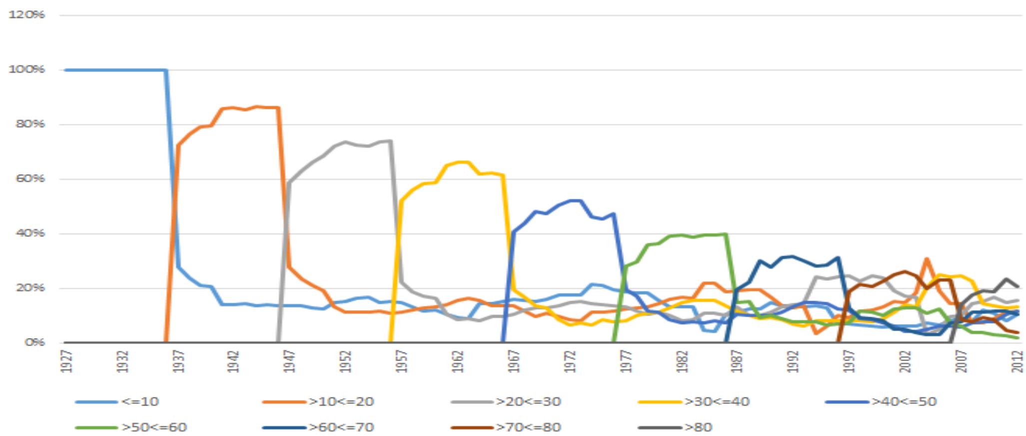
Note: We use the primary exchange variable in the CRSP database to identify the primary exchange on which the security trades. The indexes contained in the CRSP sample are: NYSE, AMEX, NASDAQ, ARCA and other exchanges. We calculate dividends and repurchases in dollars for each firm-month, and we aggregate them over the year. For that reason, we require non-missing monthly lagged ex-dividend price and cum-dividend and ex-dividend returns to compute monthly firm dividends. We estimate monthly shares repurchased by a firm as the decrease in shares outstanding reported by CRSP, adjusted for other activities that affect the number of shares outstanding, such as stock dividends and stock splits.

FIGURE 3.25: Aggregate dividends paid by firms in different age groups, 1927-2012



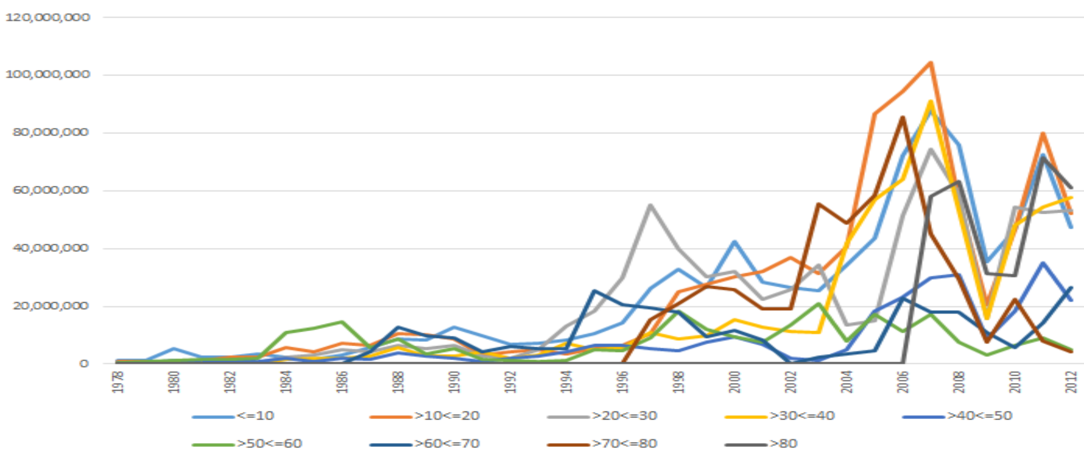
Note: We have divided the CRSP sample into 9 age groups based on the years since a firm has been included in the CRSP sample: $<= 10; > 10 <= 20; > 20 <= 30; > 30 <= 40; > 40 <= 50; > 50 <= 60; > 60 <= 70; > 70 <= 80; > 80$. We calculate dividends in dollars for each firm-month, and we aggregate them over the year. For that reason, we require non-missing monthly lagged ex-dividend price and cum-dividend and ex-dividend returns to compute monthly firm dividends.

FIGURE 3.26: The fraction of aggregate dividends paid by firms in different age groups, 1927-2012



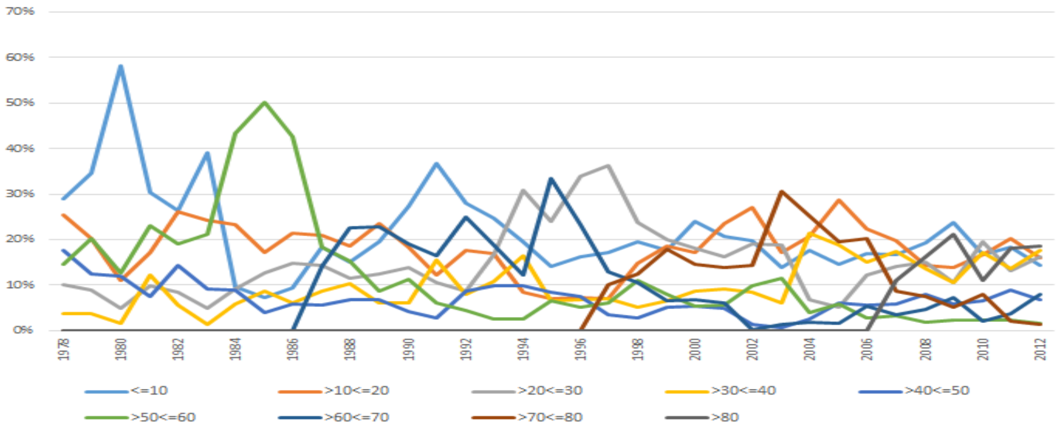
Note: We have divided the CRSP sample into 9 age groups based on the years since a firm has been included in the CRSP sample: $<= 10; > 10 <= 20; > 20 <= 30; > 30 <= 40; > 40 <= 50; > 50 <= 60; > 60 <= 70; > 70 <= 80; > 80$. We calculate dividends in dollars for each firm-month, and we aggregate them over the year. For that reason, we require non-missing monthly lagged ex-dividend price and cum-dividend and ex-dividend returns to compute monthly firm dividends.

Figure 3.27: Aggregate stock repurchases made by firms in different age groups, 1978-2012



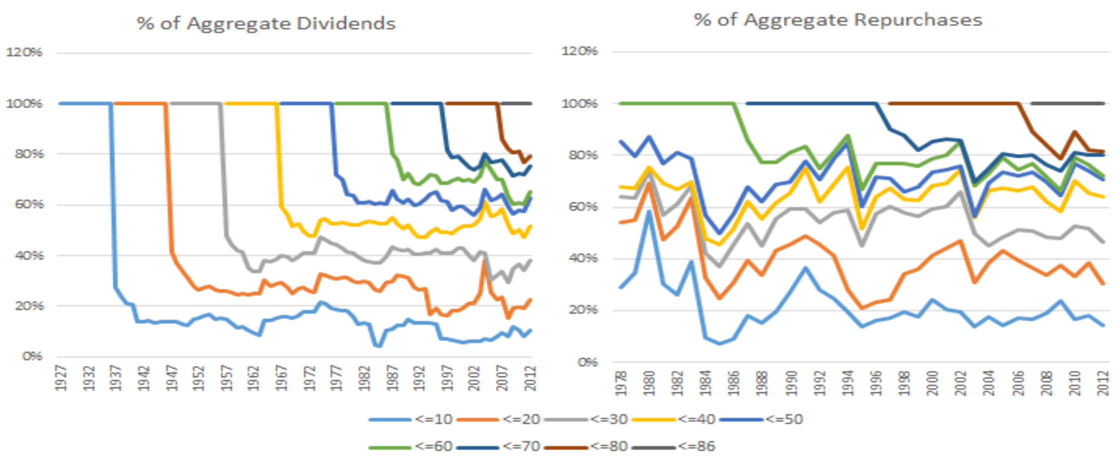
Note: We have divided the CRSP sample into 9 age groups based on the years since a firm has been included in the CRSP sample: $<= 10; > 10 <= 20; > 20 <= 30; > 30 <= 40; > 40 <= 50; > 50 <= 60; > 60 <= 70; > 70 <= 80; > 80$. We calculate repurchases in dollars for each firm-month, and we aggregate them over the year. We estimate monthly shares repurchased by a firm as the decrease in shares outstanding reported by CRSP, adjusted for other activities that affect the number of shares outstanding, such as stock dividends and stock splits.

Figure 3.28: The fraction of aggregate stock repurchases made by firms in different age groups, 1978-2012



Note: We have divided the CRSP sample into 9 age groups based on the years since a firm has been included in the CRSP sample: $<= 10; > 10 <= 20; > 20 <= 30; > 30 <= 40; > 40 <= 50; > 50 <= 60; > 60 <= 70; > 70 <= 80; > 80$. We calculate repurchases in dollars for each firm-month, and we aggregate them over the year. We estimate monthly shares repurchased by a firm as the decrease in shares outstanding reported by CRSP, adjusted for other activities that affect the number of shares outstanding, such as stock dividends and stock splits.

Figure 3.29: The cumulative sum of the fraction of aggregate dividends and aggregate repurchases paid in the different age groups, 1927-2012



Note: We have divided the CRSP sample into 9 age groups based on the years since a firm has been included in the CRSP sample: $<= 10; > 10 <= 20; > 20 <= 30; > 30 <= 40; > 40 <= 50; > 50 <= 60; > 60 <= 70; > 70 <= 80; > 80$. We calculate dividends and repurchases in dollars for each firm-month, and we aggregate them over the year. For that reason, we require non-missing monthly lagged ex-dividend price and cum-dividend and ex-dividend returns to compute monthly firm dividends. We estimate monthly shares repurchased by a firm as the decrease in shares outstanding reported by CRSP, adjusted for other activities that affect the number of shares outstanding, such as stock dividends and stock splits.

Appendix A

Appendix

Figure A.1: The fraction of total dividends paid and repurchases made by firm age in 2000.

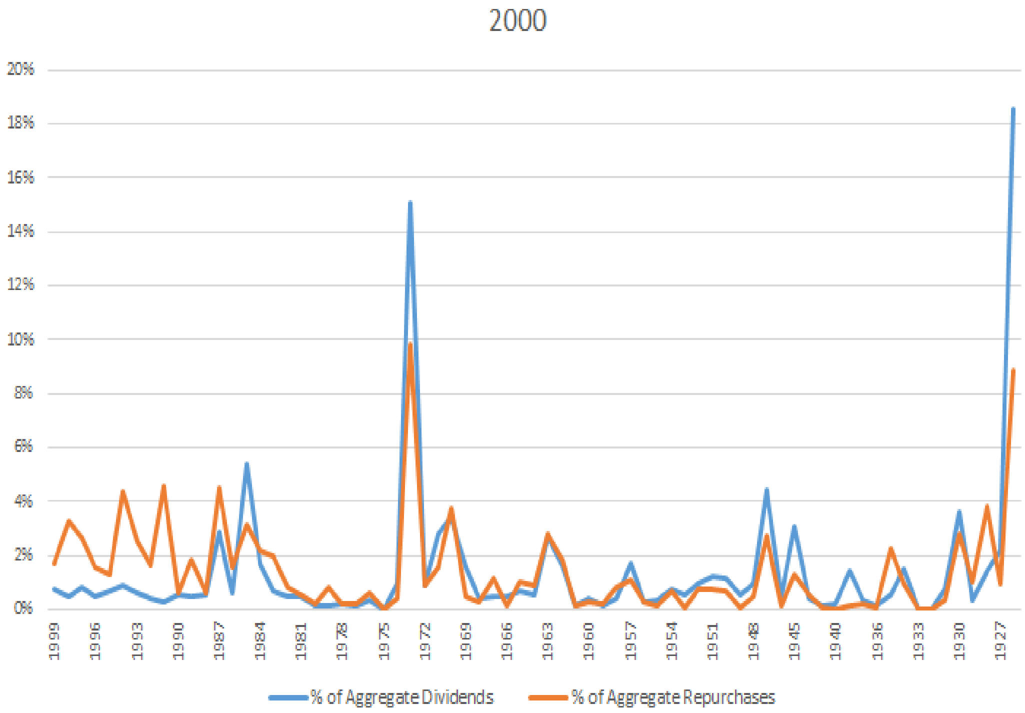


Figure A.2: The fraction of total dividends paid and repurchases made by firm age in 2001.

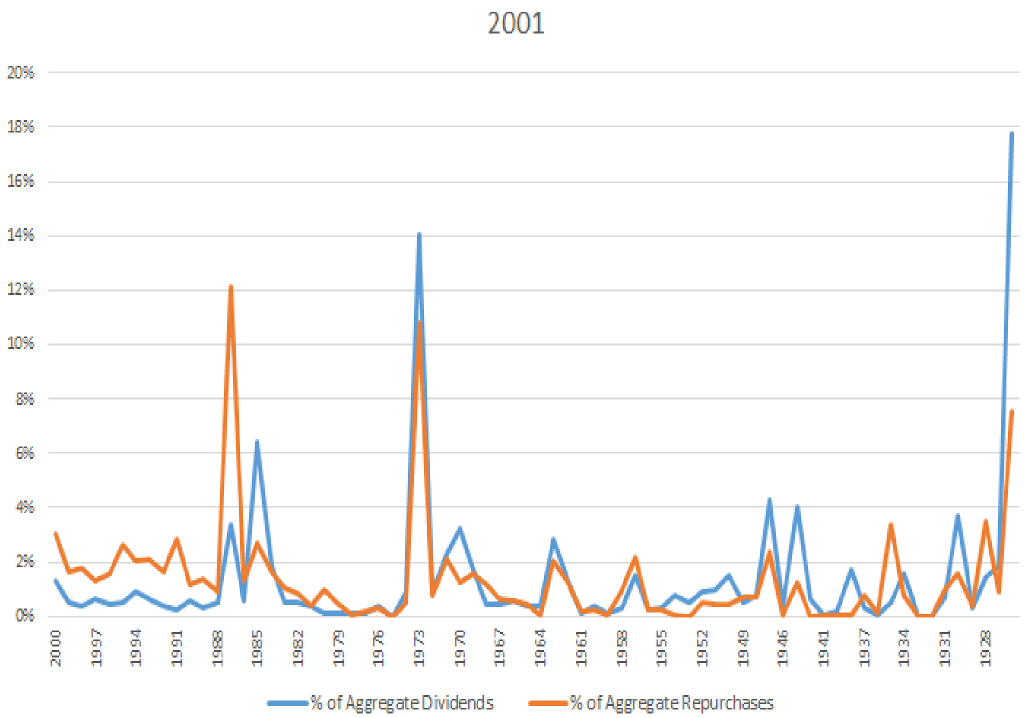


Figure A.3: The fraction of total dividends paid and repurchases made by firm age in 2002.

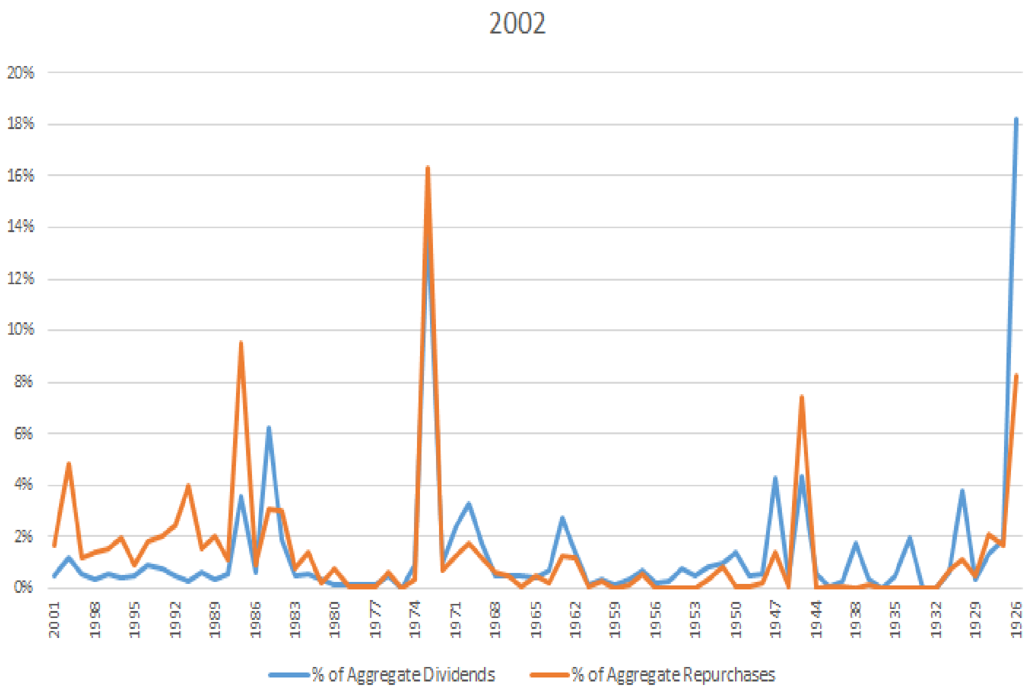


Figure A.4: The fraction of total dividends paid and repurchases made by firm age in 2003.

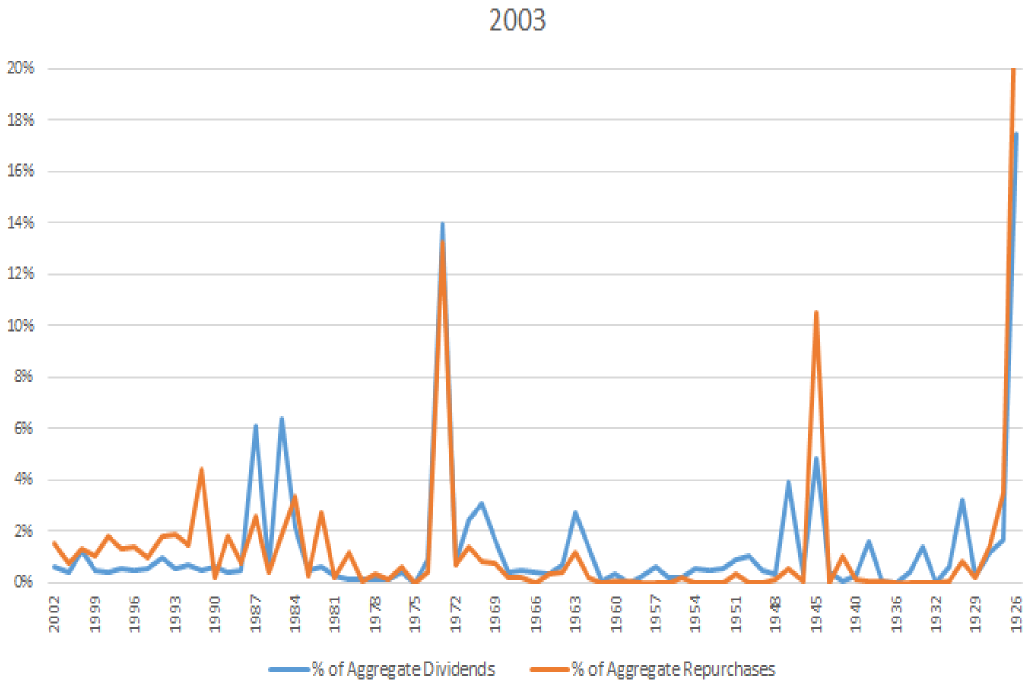


Figure A.5: The fraction of total dividends paid and repurchases made by firm age in 2004.

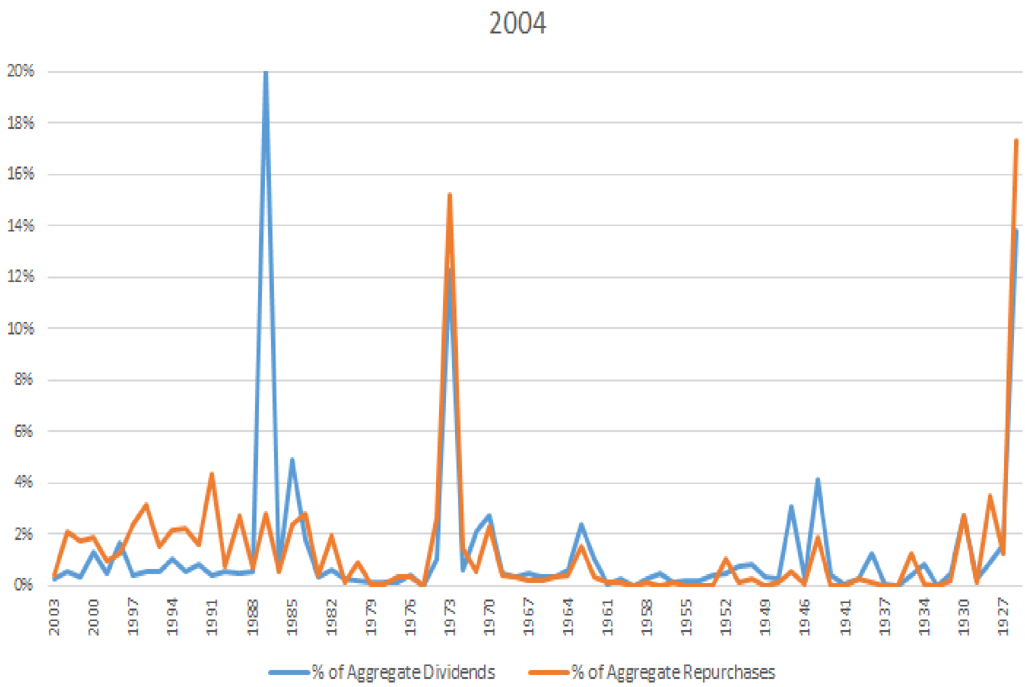


FIGURE A.6: The fraction of total dividends paid and repurchases made by firm age in 2005.

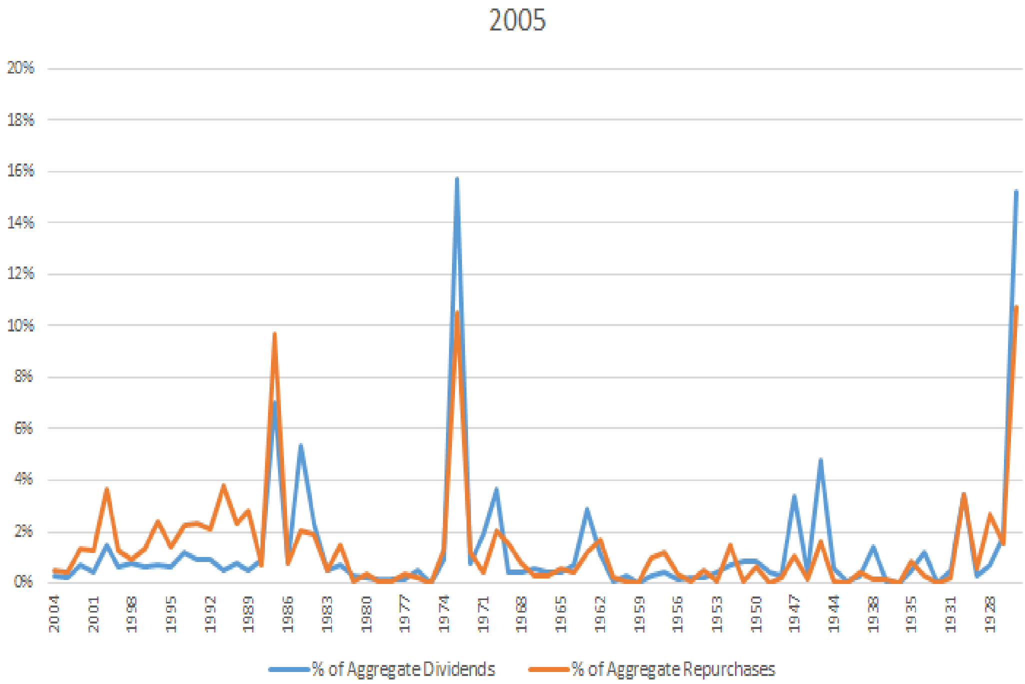


FIGURE A.7: The fraction of total dividends paid and repurchases made by firm age in 2006.

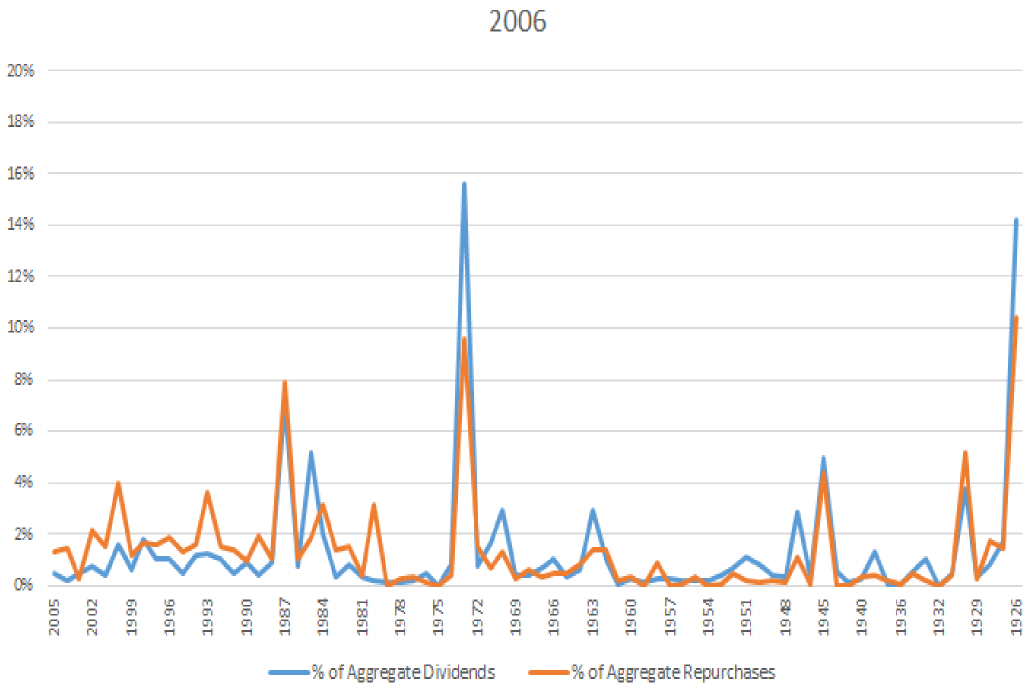


FIGURE A.8: The fraction of total dividends paid and repurchases made by firm age in 2007.

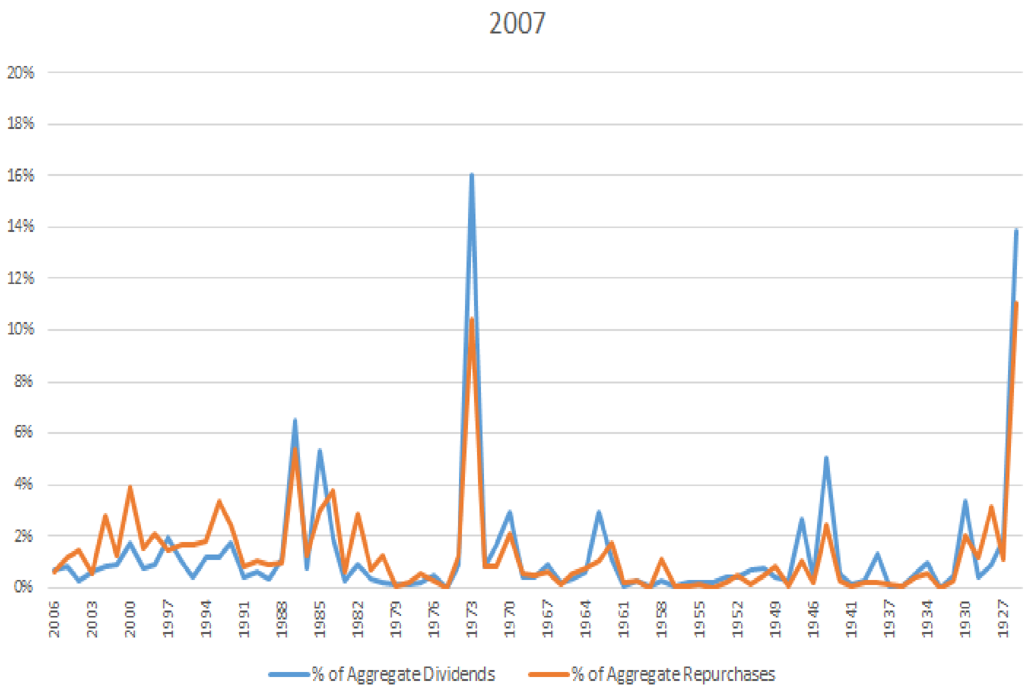


FIGURE A.9: The fraction of total dividends paid and repurchases made by firm age in 2008.

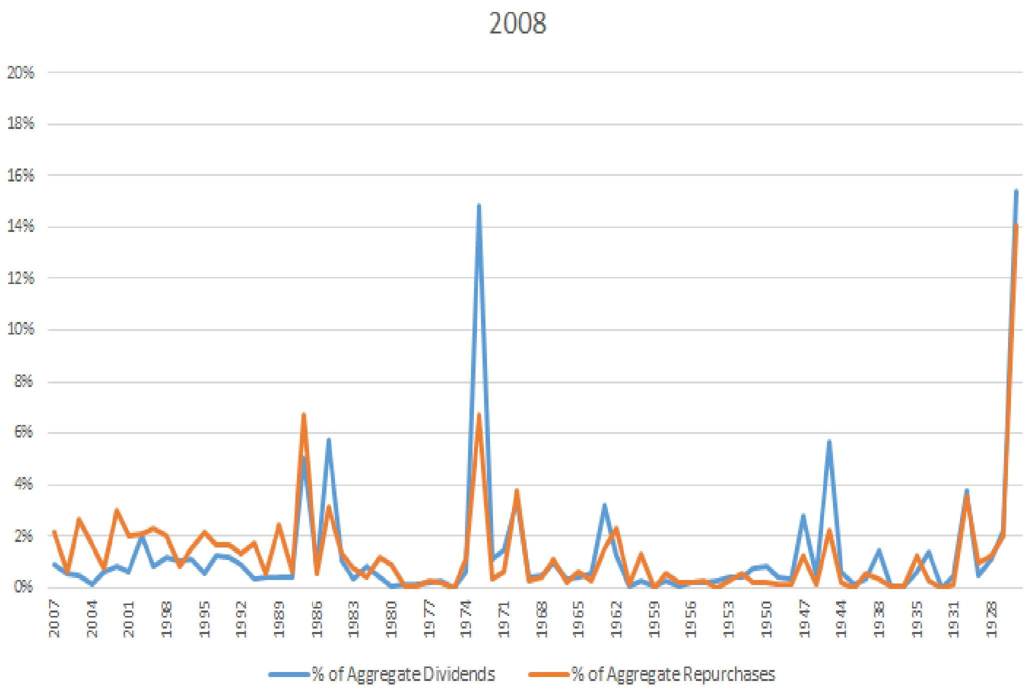


Figure A.10: The fraction of total dividends paid and repurchases made by firm age in 2009.

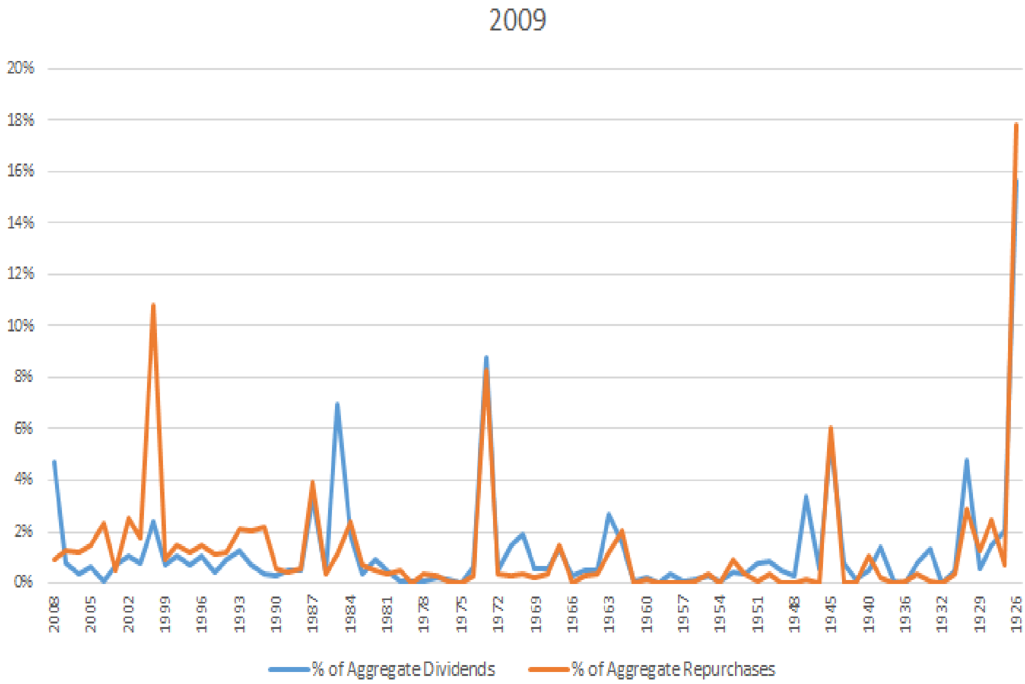


Figure A.11: The fraction of total dividends paid and repurchases made by firm age in 2010.

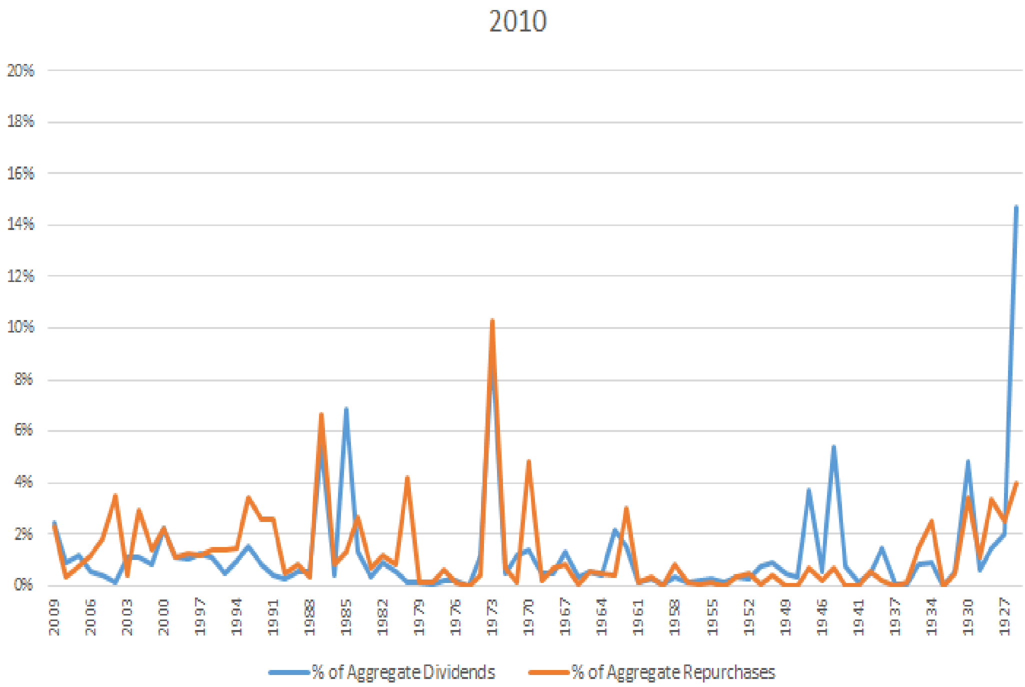


FIGURE A.12: The fraction of total dividends paid and repurchases made by firm age in 2011.

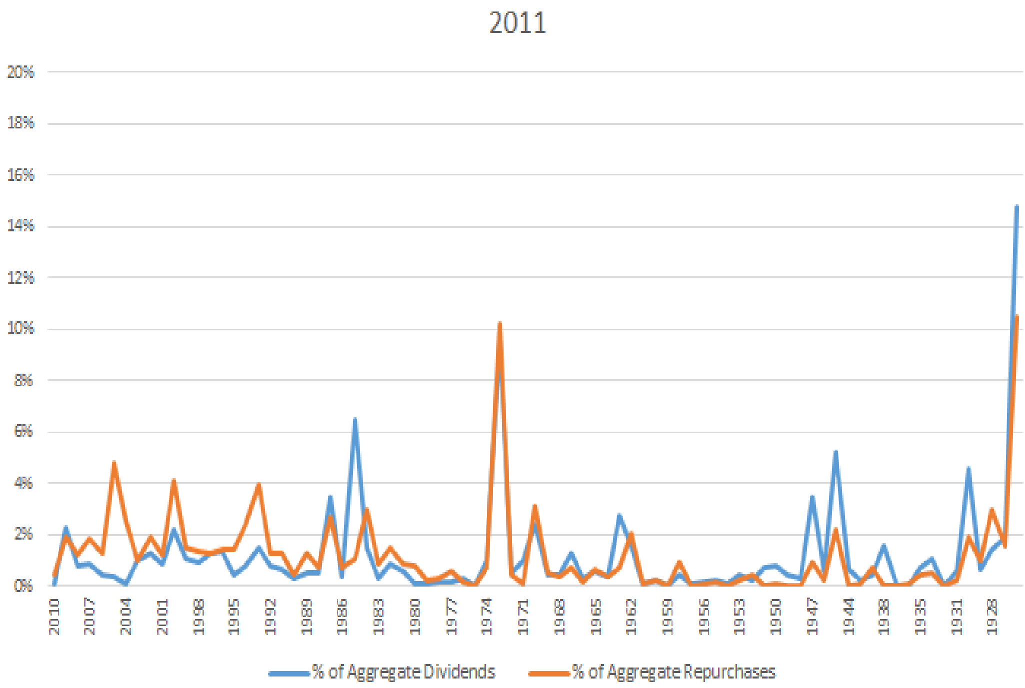


FIGURE A.13: The fraction of total dividends paid and repurchases made by firm age in 2012.

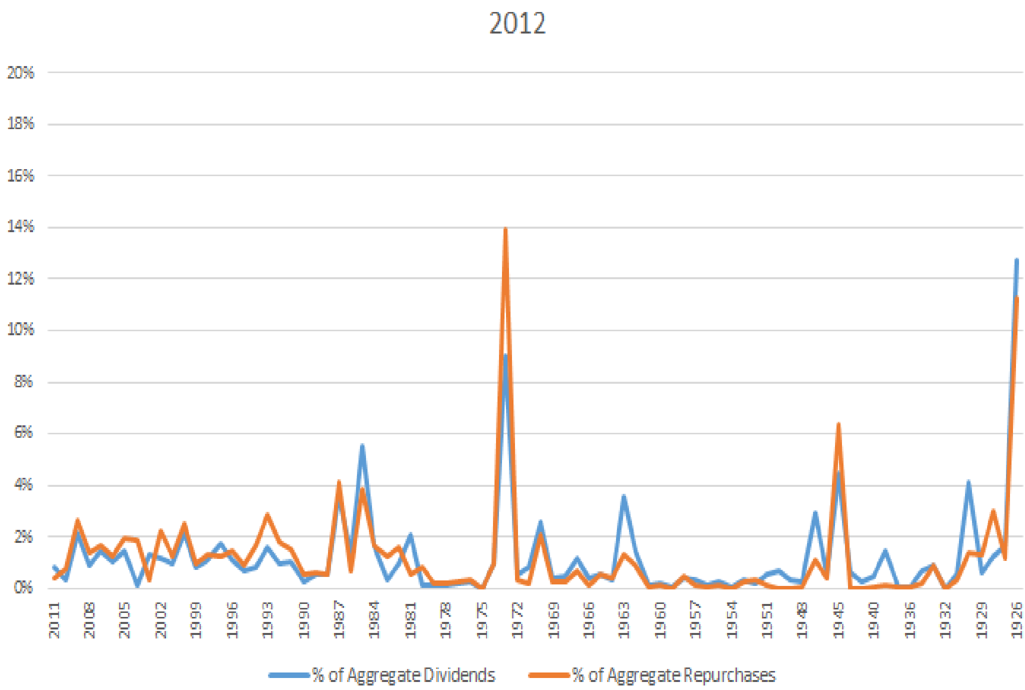


Figure A.14: Dividend growth for the largest dividend payers by age from 2000 to 2012.

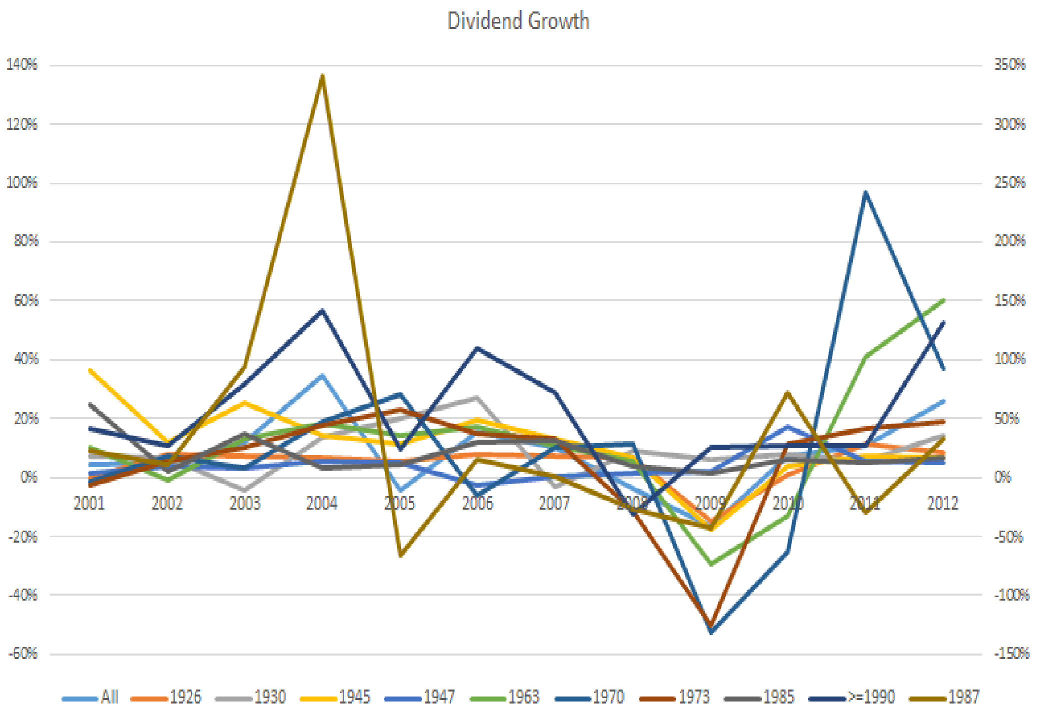
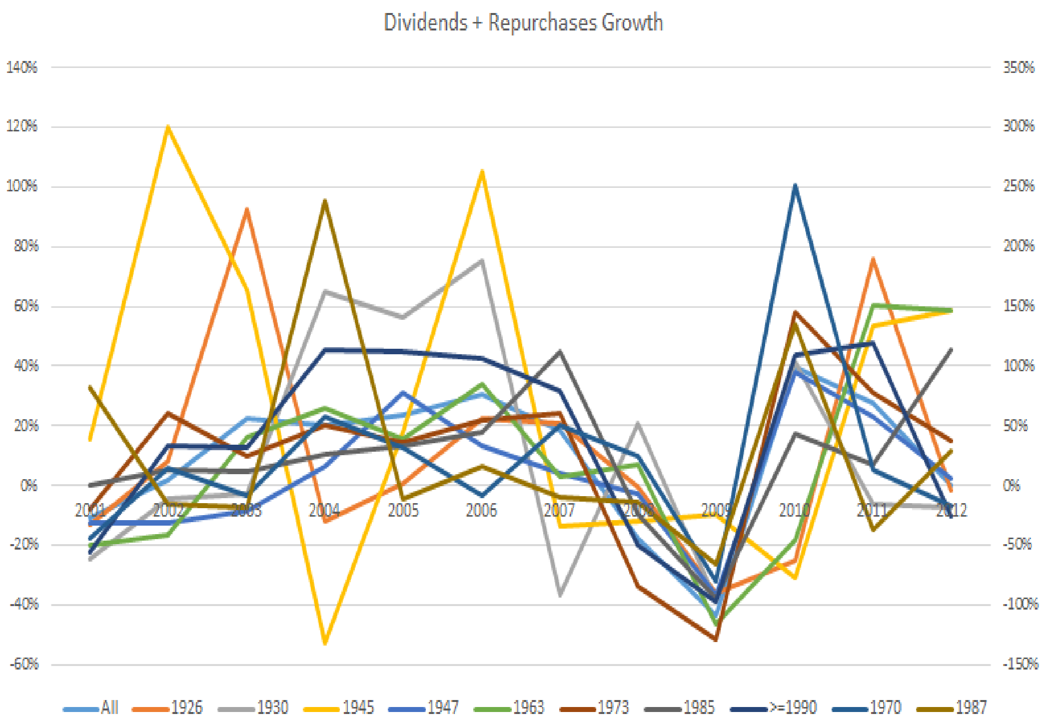


Figure A.15: Payout growth for the largest dividend payers by age from 2000 to 2012.



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