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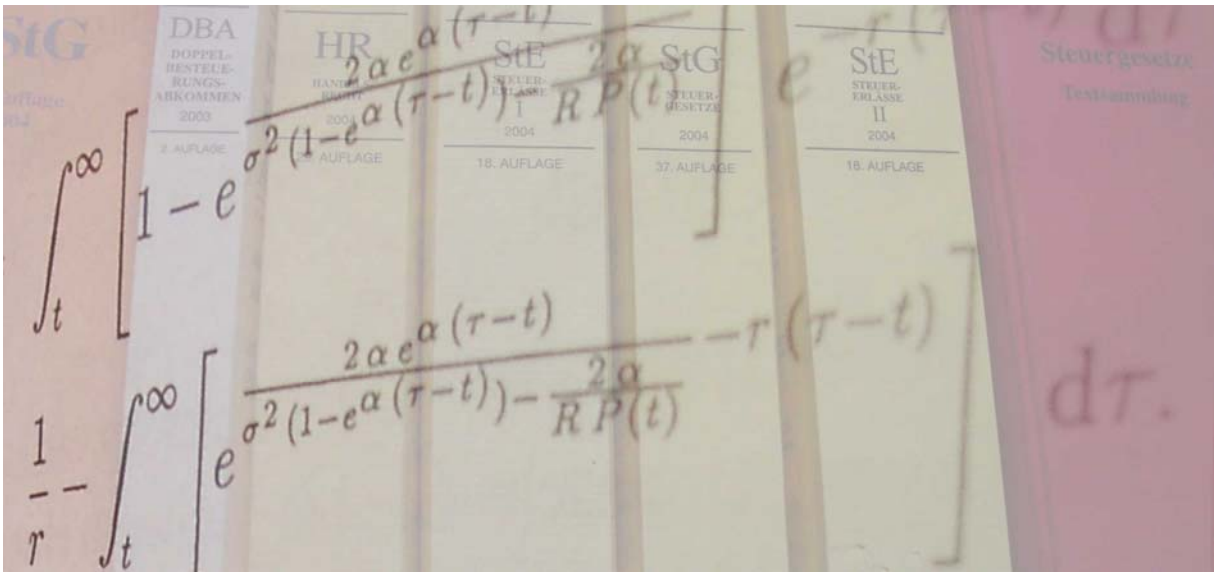

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The influence of tax regimes on distribution policy of corporations – evidence from German tax reforms

Deborah Schanz[*] *Holger Theßeling*[*]

Abstract

For more than 50 years, researchers around the world have been searching for a solution to Blacks famous "dividend-puzzle". However, despite tremendous efforts in different fields of economics, the influence of taxation on the distribution policy of firms has remained elusive and is still subject to extensive debate amongst scholars, professionals and politicians alike. In this paper, we try to shed some light on the discussion by presenting new empirical evidence from German tax reforms. Using a sample containing all firms listed at the Frankfurt stock exchange in the years from 1993 to 2009, we find robust evidence, that the switch from a split-rate tax system with full imputation to a shareholder relief system in 2002 and the change to a flat tax system in 2009 led to significant changes in the payout behavior of German firms. In line with the "traditional view" of dividend taxation, German decision-makers cut back their dividend payments in response to the reduced advantageousness of dividends in comparison to capital gains after the reform.

Keywords: Dividends, Taxation, Payout Policy

JEL classifications: G30, G35, H24, H25

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1 Introduction

Tax effects on the distribution policy of corporations have been at the center of an intense debate in the theoretical and empirical literature on corporate finance and business taxation for over half a century. Under the assumption of perfect markets, Miller and Modigliani (1961) show that at each point in time a shareholder can realize retained earnings by selling his share on the capital market and realizing the capital gain stemming from the retention.[1] Dividends and capital gains are literally the same and distribution policy is irrelevant.

Of course, this assumption does not hold in reality. Under many corporate tax systems, a clearly preferential tax treatment of capital gains compared to dividends can be observed (La Porta et al. (2000), p. 14, table 3). In the neoclassical world of the irrelevance theorem, the implications of this market imperfection are clear. Asymmetric taxation of the two alternatives makes distribution policy relevant and in this case, dividend payments can not be an optimal policy in equilibrium (Brennan (1970), p. 424). Consequently, a firm should not pay out any dividend to its shareholders (Black (1976), p. 9). Clearly, this result stands in contradiction to the observable reality on financial markets where billions of Euros are distributed to shareholders each year. This obvious contradiction led to Black's famous statement:

> "The harder we look at the dividend picture, the more it seems like a puzzle, with pieces that just don't fit together." - Fisher Black (1976), p. 8.

Since then, many scientific papers from the full spectrum of different disciplines of financial economics have searched for an explanation to solve the "dividend puzzle".[2] Some of the first insights in the field were developed by surveying managers. Most of the studies find a rather minor role of taxes. Signalling-, agency- or behavioral effects seem to be at the center of managers' attention when deciding about payout policy (Lintner (1956), p. 100; Baker et al. (1985), p. 79; Abrutyn/Turner (1990), p. 495; Frankfurter et al. (2002), p. 208; Frankfurter et al. (2008), p. 38 and p. 41; Brav et al.

[1] In the last decades, this mechanism has become more and more important, institutionalized by corporations launching major share repurchase programs (Pick/Schanz/Niemann (2009), p. 3).

[2] See Allen/Michaely (2003) for an extensive overview over the relevant literature.

(2005), p. 499 and pp. 510-515 and Brav et al. (2008), p. 387). A different approach is to study the impact of major tax reforms on the behavior of market participants. There are numerous studies to different tax reforms, mostly from the U.K. and the U.S.[3] One of the best documented and most studied reforms to date is the Jobs and Growth Tax Relief Reconciliation Act (JGTRRA) of 2003 in the United States. Many studies find evidence for reactions to the reform, which they specifically attribute to tax effects on dividend decisions (Poterba (2004), p. 174; Chetty/Saez (2005), p. 813; Chetty/Saez (2006), p. 125; Auerbach/Hassett (2006), p. 123; Moser (2007), p. 1009 and Brown et al. (2007), p. 1945). However, there also exist papers that perceive behavioral reactions, but fail to attribute them clearly to the tax reform (Blouin et. al. (2004), p. 21; Julio/Ikkenberry (2004), p. 93 and Brav et al. (2008), p. 383 and p. 387). Chetty and Saez summarize the research on the JGTRRA by stating that

> "These studies have obtained divergent, empirical results, despite using the same underlying data." - Ray Chetty and Emmanuel Saez (2006), p. 124.

These results show that even after years of research, the effect of taxation on payout behavior is still elusive and subject of intense discussions amongst academics.

We analyze the impact of two German tax reforms, the switch from a split-rate tax system with full imputation to a shareholder relief system in 2002 and the change to a flat tax system in 2009. We examine the payout policy of the whole set of firms that constitute the German stock index CDAX each year since its introduction in 1993. The CDAX includes all German firms listed at the Frankfurt stock exchange.

Of course, there exist studies addressing the influence of taxation on payout behavior in Germany. In their international study of 33 countries, La Porta et al. (2000, p. 4) also analyze the effect of the German legal system on agency theory explanations of dividend policy. Goergen et al. (2005, p. 388 and p. 392) find evidence for a higher flexibility of German distribution decisions, both confirming and augmenting Lintner's findings. Amongst 14 other countries in the European Union, von Eije and Megginson

[3] See Poterba and Summers (1984) and Ang et al. (1991) for an analysis of British tax policy from 1954 to 1984, Lie and Lie (1999) for the Tax Reform Act of 1986 in the U.S., Ayers et al. (2002) for the Revenue Reconciliation Act of 1993 in the U.S. and Bell and Jenkinson (2002), who analyze the tax reform of 1997 in the U.K.

(2008, p. 369) also cover Germany and find evidence of a tax effect on payout policy in their sample. Jacob and Jacob (2011, p. 13 and p. 19) provide the most comprehensive international survey of tax-induced effects on payout policy to date by analyzing firms from 25 countries including Germany. They find robust evidence for tax effects in line with the traditional view of dividend taxation. However, to some extent or another, all of these studies lack a detailed modeling of the German tax environment concerning dividends and capital gains. Either they focus on different questions and cover tax implications on dividend policy aside their main analysis, or they have to model the tax environment in a rather simple way, because of a broad international setting.

The contribution of our paper is twofold. First, to the best of our knowledge, a long term analysis of the German taxation of dividends and share repurchases and its effect on firms' payout behavior is still lacking in the literature. Second, we model the relevant decision environment of German managers deciding on payout policy as closely as possible. We consider taxation of dividends and capital gains on the corporate and the personal level for three different classes of investors for each tax system and weigh the computed marginal tax burdens with the shareholder structure. The paper will be proceeding as follows: Section 2 will give a brief overview over the literature concerning possible tax effects on distribution policy and develop the hypothesis. Section 3 will provide a description of the legal regulations regarding the taxation of dividends and capital gains in Germany during our observation period and will introduce a tax variable which covers differences in the tax burden of dividends and capital gains. Section 4 presents the empirical analysis. We describe the sample and provide the univariate analysis. The regression analysis of dividend payments and a supporting analysis of share repurchases will constitute the main part of the section. In section 5, we summarize the results and provide an outlook on possible further research.

2 Literature review and hypothesis

In the literature, theoretical approaches for explaining tax influences on corporations' payout policy are often separated into different "views". Three major schools of thought are classified based on different models' assumptions, the "tax irrelevance view", the "new view" and the "traditional view" of dividend taxation (Poterba/Summers (1985),

p. 11, p. 14 and p. 20).

2.1 Irrelevance of payout policy

Under the assumption of perfect capital markets and the possibility to separate investment and financing decisions (Modigliani/Miller (1958), p. 288), Miller and Modigliani (1961, p. 425 and p. 431) show that distribution policy is irrelevant because it only adjusts the weight between two equivalent alternatives. They note, that this might change under market imperfections like taxation. This is not necessarily the case. The clientele theory, formulated and analyzed in detail by Elton and Gruber (1970, p. 71) and later by Black and Scholes (1974, p. 2 and p. 21) extends the conclusions of the irrelevance theorem. Under the assumption of progressive tax rates and unfavorable taxation of dividends with respect to capital gains, the theory states that shareholders in higher tax brackets will rather hold shares of corporations that retain significant amounts of their earnings, so that they benefit from the lower tax rates on capital gains (Litzenberger/Ramaswami (1980), p. 471). Following this reasoning, each firm has its specific tax clientele, composed of investors preferring the particular distribution policy of the company. In their distribution decision, managers do not have to consider tax consequences, because their clientele will simply change in adaption to the new policy and every clientele values their respective firm in the same way. In this setting, distribution policy is irrelevant, even in the presence of taxation.

Under the tax irrelevance view, tax reforms altering the taxation of dividends relative to capital gains have no influence on the payout policy of a firm.

2.2 The new view of dividend taxation

The new view focusses on the distribution of free cash flows through dividends by mature firms (Gordon (1959), p. 101; King (1974 a) p. 30; King (1974 b), p. 32; King (1977); Bradford (1981), p. 18 and Auerbach (1983), p. 925). These firms have profits exceeding their investment possibilities and finance investments with retained earnings (Sinn (1991), p. 29). Equity is literally trapped inside the firm. Accumulated funds can only be distributed by means of dividend payments and the tax burden on

dividends is inevitable (Zodrow (1991), p. 498). The taxation of dividends reduces a shareholders income, but at the same time, it also reduces the opportunity cost of retention (Sørensen (1995), p. 283). Thus, dividend taxation does not influence the cost of capital. Auerbach (1979, p. 440 and p. 441) demonstrates, using a discrete-time infinite-horizon model with differential taxation of dividends and capital gains, that dividend policy is independent from the dividend tax rate and in the end irrelevant for decision-makers and stockholders alike.

Under the new view, tax reforms can only influence the payout decision of firms if they are temporary, creating one-time opportunities for payout. In case of the tax reforms of 2002 and 2009 in Germany, there were no indications of a temporary nature and German firms should not have changed their payout policy.

2.3 The traditional view of dividend taxation

In the traditional view of dividend taxation, newly issued shares are the marginal source of investment funding (Harberger (1962), p. 227; Harberger (1966); Shoven (1976), p. 1274 and p. 1276, table 4 and Poterba/Summers (1985), p. 23). Dividend taxation influences the cost of capital in this setting, because investors compare the cash flow they receive from a stock investment to the cash flow of other possible investments (Sinn (1991), p. 27). Differential taxation of capital gains and dividends creates a preference towards the favored alternative amongst the shareholders (Sørensen (1995), p. 280). A reform altering the relative taxation of dividends compared to capital gains will directly influence the payout policy of firms.

When reviewing empirical literature on the impact of actual tax reforms on payouts, there is ample evidence of tax induced reactions in the distribution policy of firms. In reaction to the JGTRRA tax reform of 2003 in the United States, Chetty and Saez (2005, p. 813) report an immediate increase in total dividends of more than 20% in the first six quarters after the reform. Poterba (2004, p. 174) further predicts a long-run increase of 31% or $111 billion in dividend payouts. Both studies directly attribute these increases to the tax reform. These reactions support the traditional view of dividend taxation.

The German reform of 2002 significantly reduced the advantageousness of dividends compared to capital gains. Considering the empirical evidence, we expect a behavioral response by German firms in form of a reduction of dividend payments in line with the traditional view. The reform of 2009 aligned the tax burden on both distribution alternatives. Capital gains were treated less favorable than before for some investors. This should lead to increased dividend payments.

H_1: *If a reform changes the relative taxation of dividends and capital gains in favor of dividends (capital gains), firms will increase (reduce) their dividend distributions.*

Capital gains are tax advantaged compared to dividends in many tax systems, creating a preference for capital gains amongst investors and making dividend payout less attractive. The traditional view explains the resulting dividend puzzle with a simple economic opportunity cost approach. For various reasons not directly related to taxation, dividends intrinsically generate utility beyond their basic function of transferring invested funds back to the shareholders (Gerardi et al. (1990), p. 310). The literature under asymmetric information as well as the analysis of human behavior has produced various explanations for this mechanism. Decision-makers weigh the benefits provided by dividends against their cost, the often unfavorable taxation. The result of this cost-utility analysis defines the firms payout rate, which is thus dependent on the tax rates.

2.4 Non-tax influences on distribution policy

The literature on corporate payout behavior has suggested various influences on distribution policy apart from taxation. DeAngelo et al. (2008, p. 116) provide an extensive survey of possible motives to pay out dividends. One significant body of literature states for instance, that managers use dividends to signal profitability to their investors. According to the signalling theory, more profitable firms will pay out higher dividends (Lintner (1956), p. 101; Watts (1973), p. 192; Battacharya (1979), p. 260; Battacharya/Hakansson (1982), p. 419; Baker et al. (1985), p. 79; Miller/Rock (1985), p. 1040 and p. 1045 and Bernheim/Wantz (1995), p. 533).

One of the key elements of agency theory is the likely divergence of incentives between principal and agent, inducing the danger of managerial behavior in conflict to the goal of maximized shareholder value. Monitoring this behavior generates agency costs. Dividend distributions can be used to mitigate these agency costs by simply reducing the cash flows which could be sub-optimally invested by managers. However, if decision-makers own a significant part of the shares of their firm, the incentives of shareholders and managers will be better aligned and the necessity for dividends as a method of control declines. Further, the presence of strong shareholders or the financing of investments through the capital market reduce the need to pay dividends because both extensively control managerial behavior (Jensen/Meckling (1976), p. 308, p. 312 and p. 346; Rozeff (1982), p. 250; Easterbrook (1984), p. 652; Jensen (1986), p. 325; Stulz (1990), p. 8 and Allen et al. (2000), p. 2509 and p. 2519).

According to pecking order- and life-cycle theories of dividend policy, firms preferentially finance their investments with retained earnings and in turn, managers adapt their distribution policy to the availability of advantageous investment opportunities. Particularly young, fast growing firms will retain a large proportion of their earnings to finance their investments and consequently pay lower dividends (Myers/Majluf (1984), p. 194 and p. 217; Myers (1984), p. 581 and Grullon et al. (2002), p. 413 and p. 422).

By relaxing assumptions such as unlimited information processing capability or perfect rationality, the relatively new field of behavioral economics provides further possible explanations for a preference towards dividends amongst investors (Shefrin/Statman (1984), p. 257, p. 265 and p. 268; Roll (1986), p. 202 and p. 206; Heaton (2002), p. 41; Ritter (2003), p. 431; Baker/Wurgler (2004), p. 1127 and p. 1147 and Baker et al. (2007), p. 4).

3 Legal framework: Taxation of dividends and capital gains in Germany

This section will provide the legal framework necessary for calculating the total tax burden on dividends relative to capital gains on the shareholder level. This relation

is expressed in form of the tax variable θ (Poterba/Summers (1984), p. 1400).[4] To get an adequate picture of the tax environment in which distribution policy is made, the relative tax burden θ will be modeled with respect to the tax-status of three types of shareholders: individual investors without substantial interest, individual investors with substantial interest and corporate investors.

In Germany, there have been two major reforms of the taxation of capital income since 1993. In the year 2001, the tax reduction act "Steuersenkungsgesetz" established the transfer from a split-rate full imputation system to a classical system with shareholder relief, the half-income system "Halbeinkünfteverfahren", first effective in the assessment period of 2002. The business tax reform act of 2008 "Unternehmensteuerreformgesetz 2008" again reformed the taxation of distributions in Germany with the transfer to a flat tax system "Abgeltungsteuer" in 2009. Additionally, there have been several minor changes mostly regarding variations in the tax rates. Table 1 provides an overview over the evolution of individual and corporate tax rates from 1993 to 2009.

< Insert table 1 about here >

3.1 1977-2001: Split-rate tax system with full imputation

With the corporate tax reform act "Körperschaftsteuerreformgesetz" of 1976, the then effective classical corporate tax system was replaced with a new full imputation system. The aim of the reform was to eliminate the double taxation of corporate profits by crediting the corporate taxes paid on the firm level against the income tax liability of the shareholders. In case of a dividend distribution, the shareholder received the dividend and a tax credit corresponding to the corporate tax payment. In effect, the corporate tax burden was completely neutralized and the total tax burden equaled the marginal income tax rate of the particular shareholder. Capital gains did not qualify for a tax credit. However, capital gains were not taxable in Germany if the shareholder privately held a minor share in the company, i.e. his share of voting stock was smaller than the threshold for substantial interest and if the investor held the asset long enough

[4] In these calculations we assume that retained earnings induce appreciations of the stock at the value of the retention. A shareholder can always realize this capital gain through the sale of his share, rendering dividends and capital gains equal alternatives for distribution.

to exceed the speculative period.[5]

An individual shareholder with substantial interest receiving a dividend faced exactly the same tax liability as a shareholder without substantial interest. Capital gains, however, were reclassified as business income and were subject to full personal income tax. Under these circumstances, the tax burden on capital gains in Germany was comparably high and the German tax code provided different measures of relief. However, all these options were either marginal or entailed strict requirements or limitations, technically resulting in only minor reductions of the tax burden.[6]

Dividend distributions to corporations were generally treated in the same way as dividends distributed to personal investors under the German full imputation system. Capital gains stemming from the sale of shares of resident corporations were taxed as ordinary business income, subject to the full corporate tax rate on both levels. They did not qualify for a tax credit in the imputation system. This led to a relatively high burden for corporations, too.

3.2 2002-2008: Half-income system

In the year 2000, the tax reduction act "Steuersenkungsgesetz" installed the half-income system, a classic system with shareholder relief. It was first effective for shareholders in 2002, the first year in which distributions of earnings generated under the new corporate tax law were possible. The primary goal of the reform was to reduce personal and corporate tax rates in order to strengthen the competitiveness of the German tax system. Under the new system, the problem of double taxation was solved by the combined effect of lower tax rates and a partial exemption of distributions from the

[5] We assume a holding period exceeding the respective speculative period for the calculations in this paper.

[6] Until 1999, it was allowed to apply a reduced rate of 50% of the particular average personal income tax rate on capital gains stemming from the sale of a substantial share of a corporation. However, this relief was only applied to capital gains below 15 million DM. Given a threshold for substantial interest of 25% at the time and an average goodwill of around 380 million Euros in the sample, the effect of this option is negligible for the calculation of the marginal tax burden. Further, the so called fifth-part rule "Fünftelregelung" alleviated the burden of unfavorable progression-peaks by mathematically distributing the taxable capital gain over a period of five years. Here, a relief only occurred, if the investor was not already in the maximum tax bracket. The German tax code also granted an allowable deduction of 20,000 DM. But this deduction was multiplied by the fraction of the share of the corporation that was sold and bounded by an upper limit. Because of these heavy constraints, these measures are not explicitly modeled in this paper.

tax base of the shareholder. In case of an investor without substantial interest receiving dividend income, the total tax burden on the shareholder level consisted of the new uniform corporate tax, and the personal tax rate levied on 50% of the dividend. The combined burden was similar to the burden on income from other sources. As in the preceding full imputation system, the disposal of privately held shares was not taxable, so the tax burden on capital gains consisted of the corporate tax only.

Conceptually, the new tax code was designed to implement an identical tax burden on dividends and capital gains. Therefore, apart from the case presented above, the two alternatives were treated equally. This was achieved by recognizing only 50% of all capital gains as taxable income. For investors with substantial interest, the tax burden on dividends and capital gains was calculated in the same way, as a combination of the corporate tax and the personal tax, levied on 50% of the respective income.

The problem of double or multiple taxation of distributions between corporations was solved by the "dividend privilege". Dividends paid from one corporation to another were exempt from tax. This regulation applied to foreign and domestic dividends alike and was not bound to any form of minimum share or holding period. However, 5% of the dividend received were deemed as non-deductable business expense and had to be taxed by the receiving corporation. Moreover, corporate capital gains from the disposal of shares were also 95% tax-free, resulting in an equal treatment of dividends and capital gains for corporate investors.

3.3 2009-today: Flat tax system

With the business tax reform act of 2008 "Unternehmensteuerreformgesetz 2008", the shareholder relief system was abolished in favor of a new flat tax system effective for shareholders from the first of January 2009. The aim of the reform was to continually increase Germany's attractiveness as a business location, to provide neutrality regarding the legal form and the financing structure of firms and to simplify tax planning for both, firms and the government. The new system is designed as a classical corporate tax system with a flat tax rate. The problem of double taxation of distributed corporate profits is mitigated by a reduced rate on the shareholder level. First, the corporate income tax is levied on the full corporate profit. Second, a flat rate of 25% is applied to

all income from dividends and capital gains received by individuals privately holding shares. For investors with substantial interest, a partial inclusion system is applied. In addition to the corporate tax, 60% of all income from dividends or capital gains is taxed at the personal income tax rate, the remaining 40% of income are exempt from taxation. If another corporation is the shareholder, dividends as well as capital gains are not taxed, as in the former system. Again, 5% of the distribution are deemed as non-deductable business expense and subject to corporate tax at the receiving corporation. Table 2 shows the tax burden for all three types of shareholders under the different German tax regimes from 1993 until 2009.

< Insert table 2 about here >

3.4 The relative tax burden

To analyze the effect of different tax regimes on the distribution policy of corporations, a variable depicting the taxation of the alternatives a manager faces in his decision process is needed. In the literature, the relative tax burden θ is often calculated by relating the marginal tax rates on dividends (t_{div}) and capital gains (t_{cg}) on the shareholder level to each other (King (1974 b), p. 23 and Poterba (1987), p. 475):

$$\theta = \frac{1 - t_{div}}{1 - t_{cg}}$$

In this equation, a value of 1 indicates equal taxation of dividends and capital gains, while values below 1 indicate a preferential treatment of capital gains. The relative tax burdenθ will change with time, depicting the influence of tax reforms through tax rates and regimes described in the previous sections (Li (2007), p. 8). Table 3 shows the evolution of the tax variable θ in Germany from 1993 until 2009.

< Insert table 3 about here >

However, in most tax systems, the tax variable θ will fluctuate not only with time, but also between different groups of shareholders. Different values of θ result in dissimilar preferences amongst the groups concerning the way corporate earnings should be distributed. These differences pose a potential problem for managers deciding upon

the optimal distribution policy of their company. They have only one tool, the decision between either retention or distribution of earnings, to satisfy multiple, possibly conflicting demands. In this setting, reasonable managers will make their decision considerate of the actual structure of their shareholders' tax status (Lie/Lie (1999), p. 536). Therefore, the decision has to be based on θ^{avg} (Poterba (2004), p. 171), an average of the values of θ_j for the s different groups of shareholders of each company, weighted by their respective relative magnitude in the shareholder structure of the company w_j (Bernheim/Wantz (1995), p. 539):

$$\theta^{avg} = \sum_{j=1}^{s} w_j \theta_j$$

As observable in table 3, the values of the relative tax burden θ for corporations and individual investors holding a substantial share of stock in the form of business property are identical. Both of these investor classes have to tax their income from distributions as business income. For the sake of simplicity, we pool them into the new class "commercial investors". This leaves us with two classes of investors, individual investors without substantial interest and commercial investors.

In Germany, complete and reliable data on the shareholder structure of a firm is often times not publicly available. To be able to adequately depict the decision environment around distribution policy despite of this lack of individual data, we use aggregate data from macroeconomic financing statistics provided by the German central Bank "Bundesbank" to approximate a single firm's situation. The statistics show the total holdings of German stocks by different sectors. We subsume the sectors of private households and other domestic financial institutions, which mainly consist of investment funds that in turn are primarily held by private households, under the investor class of individual investors. The marginal individual investor is assumed to hold a non-substantial share in the company ($nsub$) and to be in the highest tax bracket, leaving θ_{nsub}^{max} as the relevant tax variable for this class. The holdings of all other sectors are subsumed under the class of corporate investors ($corp$), namely non-financial domestic corporations, domestic financial- and insurance institutions and public authorities. The relevant tax variable for this class is θ_{corp}.

For both investor classes, individual investors and corporate investors, we determine the fraction of the shares held in the respective sectors on the total shares held in Germany.[7] These fractions serve as our weights w_{nsub}^{max} and w_{corp} when calculating the weighted average of the tax variable θ^{avg}. Based on the aggregate shareholder structure, the development of the average tax variable is presented in table 4.

< Insert table 4 about here >

When looking at the development of the average tax variable θ^{avg} over the years, the impact of the two tax reforms is clearly visible. The reform of 2002 significantly reduced the disadvantageous taxation of capital gains for individual investors with substantial interest and corporate investors by alleviating the former double taxation of capital gains on the corporate- and the shareholder level, resulting in a decline of θ^{avg} of more than 36% between 2001 and 2002. The reform of 2009 abolished the beneficial taxation of capital gains for individual investors without substantial interest. This aligned the tax burden on dividends and capital gains for all investors. Consequently, the tax variable θ^{avg} shows a value of 1 for this year.

4 Empirical analysis

4.1 Sample

We examine the whole set of firms that constitute the German stock index CDAX, which includes all German firms listed at the Frankfurt stock exchange, for the period from 1993 until 2009. We choose this sample for two reasons. First, the year 1993 is the year the CDAX was introduced by the Frankfurt stock exchange as a broader alternative to the established DAX, which includes the 30 largest German firms only. Second, in the empirical literature about the impact of tax reforms there is evidence that the behavioral adjustment to a change in tax regimes takes a considerable amount of time.[8] Our time horizon covers 9 years before and 8 years after the fundamental

[7] The holdings of foreign investors are not modeled in this paper and are therefore excluded from the calculation.

[8] Feldstein (1970, p. 63) shows that in the first year after the British tax reform of 1958, only 43% of the adjustment took place. Miller and Scholes (1982, p. 1138) note, that the analysis of

reform of the taxation of distributions in 2002. This allows us to draw meaningful conclusions about the long term impact of the reform. By considering every firm existing for at least one year in the period from 1993 to 2009, we avoid possible issues of survivorship bias in our sample.[9] In our observation period, a total of 931 firms was included in the CDAX at one time or the other, providing us with 10129 firm-years. We collect capital market and financial statement data from the September 2010 edition of the WorldScope database.[10] We eliminate all firm-years with missing data for at least one variable, which leaves us with 6,371 observations. Finally, to reduce the impact of outliers on our findings, we truncate the 1st and/or 100th percentile, as theoretically plausible, which brings us to our final sample of 5,646 firm-year observations. Table 5 summarizes the composition of our sample and the necessary adjustments.[11]

< Insert table 5 about here >

Our sample includes a broad set of German firms from different sectors. Panel A of table 6 provides a breakdown of firm-years by sectors, divided using the first digit of the Standard Industrial Classification (SIC). With almost 48% of the firm-years observed, the manufacturing sector is the largest by far. Over 82% of all firms are active in the manufacturing, service or financial sector. Panel B of table 6 gives an overview over a selection of basic firm parameters. The average firm in our panel possesses total assets of around 12 billion Euros and has a market capitalization of over 2 billion Euros. Of course, these high numbers are heavily influenced by huge financial firms

short run responses to dividends faces timing problems because the alternative of capital gains is traditionally realized over longer timescales. Poterba (2004, p. 174) predicts, that in a period of three years after the reform of dividend taxation by the JGTRRA 2003 in the U.S., only a quarter of the adjustment process to the new equilibrium will have occurred.

[9] See Elton et al. (1996), p. 1100 and p. 1104 for a literature overview concerning survivorship bias in the empirical analysis of stocks and estimates of the impact of survivorship bias.

[10] We use the following items (the respective WorldScope ID's are given in parentheses): Total Assets (02999), Total Debt (03255), Market Price - Year End (05001), Common Shares Outstanding (05301), Market Capitalization (08001), Closely Held Shares (05475), Common Equity (03501), Pre-tax Income (01401), Cash Dividends Paid (04551) and Common/Preferred Stock Redeemed, Retired, Converted, etc. (04751).

[11] Because of exceptional capital structures and special regulations for banks and insurance companies possibly affecting payout behavior, many studies exclude financial firms from their sample (Fama/French (2001), p. 6; Amihud/Li (2006), p. 639 and Moser (2007), p. 1000). However, about 16% of our observations are from the financial sector and German financial firms traditionally are substantial dividend payers, commonly included in shareholders' portfolios. Because of the significant weight of this subgroup, we opt to include these observations in our sample and run robustness checks to justify this approach.

like the "Allianz SE" or the "Deutsche Bank AG", with total assets of around 1 and 2 trillion Euros in 2008, respectively. The values for the 75th percentile show that three quarters of the sample observations possess total assets lower than 743 million Euros and a market capitalization below 1.2 billion Euros, with median values of 52% and 21% for earnings and dividends per share, respectively.

< Insert table 6 about here >

4.2 Descriptive statistics

We use a set of reliable and well established variables to test our hypotheses and control for other major influences on distribution policy. As dependent variable, we use three different measures of dividend payments in our regressions (Blouin et al. (2004), p. 11; Chetty/Saez (2005), p. 798; Brav et al. (2008), p. 383 and Jacob/Jacob (2011), p. 13). Our first measure is *Divyield*, which simply expresses the dividend yield, calculated by dividing the total dividends paid by a company by its market capitalization. The mean of this measure is 1.8%, with minimum and maximum values at 0% and 9.6%, respectively. These values reflect the traditional high dividend yield of German firms. The second measure we employ is *Divpaid*, a dummy variable that equals 1 if a firm paid a dividend in a given year. The mean shows that over our whole sample, almost 60% of the firms are dividend payers. Our third measure of dividend payout is *Divinit*, a dummy with the value 1 for firms that initiated payments. We define an initiation as a positive payment preceded by no payment or, in line with Chetty and Saez (2005, p. 830), as an intensive increase in dividend payout of at least 20%. In more than one fifth of the firm-years in our sample, firms have initiated or raised dividend payments by at least 20%. The development of our measures of dividend payments over time is illustrated in panel A of figure 1.

< Insert figure 1 about here >

The first figure of panel A shows the development of the mean of the dividend yield over time. Two observations are especially interesting. First, there is a drop of the mean dividend yield from around 2.25% in the years before 2000 to around 1.5% after the

year 2000, exactly at the time the tax reduction act "Steuersenkungsgesetz" passed, which severely reduced the advantageous taxation of dividends compared to capital gains. The correlation between the mean of the dividend yield and time is negative and highly significant. Second, there is a steep increase in dividend yield in the years after 2008, when the business tax reform act "Unternehmensteuerreformgesetz 2008" passed and aligned the tax treatment of the two alternatives. However, this seems to be an effect mainly driven by falling stock prices during the economic crisis rather than an increase in dividend payouts. The second figure plots the mean of *Divpaid*, our dummy variable indicating whether dividends have been paid or not. In Germany, the fraction of firms paying dividends is traditionally very high. Over 80% of the firms in our sample paid a dividend in 1993. However, the plot clearly shows a declining trend, with only 39% of firms paying dividends in 2003. As we have shown in table 4, the values of our tax variable θ^{avg} have been declining until 2008 as well, rendering distributions via dividends less favorable from year to year. Taxation provides one possible explanation for the disappearance of dividend paying firms in Germany.[12] Finally, the third figure shows the evolution of the mean of *Divinit*, our dividend initiation dummy. Especially remarkable in this figure is the steep increase in initiations from about 20% in 1997 to almost 27.5% in 1998, the continual descent to a value of only 8% during the time of the reform and the return to values of the same magnitude as before the reform shortly thereafter. It can be argued, that firms anticipated the upcoming reform and preliminary distributed a significant amount of their reserves to take advantage of the favorable conditions for dividends prior to the reform of 2002.[13] Overall, the figures show characteristics of a negative impact on our dividend measures around the year 2002, when the reform of the taxation of capital income took place.

[12] Fama and French (2001, p. 7, fig. 1, p. 19 and p. 24) present an additional explanation with evidence from their U.S. sample from 1926 to 1999. They attribute the disappearance of dividend paying firms to a change in the status of the marginal firm in their sample and a generally lower propensity to pay dividends for all firms. This effect is probable for Germany as well. The first half of our observation period is characterized by a steady increase in the number of firms through new listings. According to life-cycle approaches to dividend policy, these young firms are not likely to pay out dividends. With the burst of the "dotcom" bubble in 2000, many of these newly listed firms disappeared and the fraction of dividend payers once again rose to a (significantly lower) level of about 50%. We control for this influence by implementing measures of growth in our multivariate analysis.

[13] German authorities tried to avert this effect by implementing a transition period of 15 years in which earnings retained and taxed at the higher rate before the reform still qualified for the old tax credit when distributed after the reform. However, many firms still opted to pay out their reserves as soon as possible.

However, there are possible explanations for reduced dividend payments during this period besides the tax reform. The burst of the U.S. "dotcom" bubble in the year 2000 hit Germany with some delay and it is possible that the following economic slump dampened payouts. To address this possibility, panel B of figure 1 controls for stock market and growth effects by plotting our dividend measure $Divyield$ against θ^{avg}, against $Index$, a national all-share price index taken from OECD.stat and against $GDPgrowth$, the yearly change in gross domestic product, also taken from OECD.stat. The first figure shows a positive relation between θ^{avg} and the dividend yield that is statistically significant at the 1% level. The other two relations are not significant at conventional levels of confidence. These results confirm our univariate findings of tax effects in line with the traditional view of dividend taxation around the reform of 2002. However, the conclusions taken from these figures can only serve as a sign post because of the small sample size of only 16 or 17 observations. The following multivariate analysis will provide much broader evidence.

To control for the most prominent non-tax influences on distribution policy, we subject our regressions to a set of control variables. To control for signalling, we include the variable $Income$, representing the pre-tax income divided by total assets. Concerning agency effects, we include the variable $Closely$, which includes shares held by insiders and substantial shareholders, in order to account for possible influences of executive stock holdings or strong shareholders on dividend payouts. We further include Lev, representing Total Debt divided by Total Assets, to control for the influence of external financing on distributions. Finally, to control for the impact of growth and investment opportunities on payouts, we introduce the variables $Trend$, representing the development of share prices over the last year and Q, which stands for Tobin's Q or market capitalization divided by common equity, into our regressions.

All monetary variables are deflated by the consumer price index, taken from the OECD.stat online database and scaled by total assets, following Fama and French (1998, p. 822 and 2002, p. 7). To allow for easier interpretation, total dividends paid and total shares repurchased are scaled by market capitalization, giving the dividend- and share repurchase yield, respectively. We lag our scale variables by one year to account for the causality of the assets of period t for the dividends and share repurchases of period t+1. Descriptive statistics for all the variables used in our regressions are

presented in table 7.

< Insert table 7 about here >

4.3 Regression analysis

To test our main hypothesis of a positive relation between the relative taxation of dividends compared to capital gains θ^{avg} and our three measures of dividend payments, *Divyield*, *Divpaid* and *Divinit*, we employ standard ordinary least squares panel regressions with firm fixed effects. In order to avoid problems due to heteroscedasticity, we use robust standard errors throughout all our regressions. Specifically, we test the following regression equation:

$$\begin{aligned} Div_{i,t} &= \alpha_0 + \alpha_i + \beta_1 Income_{i,t-1} + \beta_2 \theta_t^{avg} + \beta_3 Trend_{i,t-1} + \beta_4 Closely_{i,t-1} \\ &\quad + \beta_5 Lev_{i,t-1} + \beta_6 Q_{i,t-1} + \varepsilon_{i,t} \end{aligned}$$

where $Div_{i,t}$ stands for one of the dividend measures $Divyield_{i,t}$, $Divpaid_{i,t}$ or $Divinit_{i,t}$ for firm i in year t. The first three columns of table 8 show the results of the regressions on our whole sample of 5,646 firm-years from 1993 to 2009. The results are in line with tax effects according to the traditional view of dividend taxation. In the regression on *Divyield*, presented in column (1), the coefficient for θ^{avg} is positive and statistically significant at the 1% level. A relative increase in the tax burden on dividends, compared to the burden on capital gains as, for example, in the German tax reform of 2002, has a negative influence on the dividend yield of German firms. A decline of θ^{avg} by a value of 0.5, approximately the value of the decline caused by the reform of 2002,[14] will reduce the average dividend yield by about 0.0027 or 14.59% of the mean dividend yield of 0.0185 in our sample. To control for possible signalling effects, we introduced the control variable *Income*. Its coefficient is positive and highly significant, consistent with the notion of profitable firms paying higher dividends to signal their profitability brought forward in the literature. Further, in order to control for agency effects, we included *Closely* and *Lev*. Both coefficients are negative and significant at the 5% or the 1% level, respectively. This is consistent with the notion of executive stockholdings and

[14] Between 2001 and 2002, θ^{avg} declined by a value of 0.525. See table 4 for reference.

outside control through stock markets both reducing the need for dividend payouts as a measure of managerial control, presented in the agency literature. Finally, we included $Trend$ and Q to account for possible effects of growth and investment opportunities, as stated in pecking order and life-cycle theories. In line with the literature, both coefficients are negative and significant at the 1% level. Fast growing firms with good investment opportunities pay out significantly lower dividends.

The results for our second measure of dividend payout, the dummy variable *Divpaid* indicating positive dividend payments, is presented in column (2). Again, the coefficient of the tax variable θ^{avg} is positive and significant at the 1% level. A reduction of θ^{avg} of 0.5, which is equal to 1.65 times the standard deviation of θ^{avg}, reduces the fraction of dividend payers by about 0.077 or 13.00% of the sample mean. As observable in column (3), the coefficient for the measure of dividend initiations *Divinit* is positive and significant at the 5% level with a t-value of 2.534. A reduction of θ^{avg} in the magnitude of the tax reform 2002 lowers the likelihood of a firm to initiate dividend payments by about 0.032 or 15.12% of the sample mean. The columns (4) to (6) present the regressions on a sample excluding firms from the financial sector, reducing our sample size by 16.7% to 4,701 observations. The results do not change considerably. As in the regressions on the full sample, the coefficients of our tax measures are all negative and significant at the 1% level. The coefficients of the control variables also show similar characteristics as in the full sample regressions.[15]

< Insert table 8 about here >

In our regressions on the dividend yield and the payout dummy, we obtain exceptionally high values for the adjusted R^2 of over 51.7% and 62.5%, respectively. This is because we opt to include the firm fixed effects in the calculation of the coefficient of determination. There are good reasons to do this. In our sample, models using only firm dummies as explanatory variables for *Divyield* and *Divpaid* already explain 47.60% and 58.99% of the variability in the data. This is in line with the overall notion in the literature, that dividend policy is very conservative and that dividends are "sticky".

[15] We also run regressions excluding firms from the utility sector and excluding both, financial and utility firms. In both cases, the results do not change significantly.

Present dividend policy is very dependant on the policy in the past (Lintner (1956), p. 100 and p. 107). This high consistency in a firm's dividend policy explains why simple firm dummies serve as a very good explanatory variable for dividend payouts. The inclusion of other explanatory variables such as θ^{avg} or $Income$ mainly helps to better explain the fluctuations around this rather constant level of payouts. Dividend initiations, however, are not constantly recurring events by nature. Consequently, when analyzing regressions on the initiation dummy $Divinit$, firm fixed effects only produce an adjusted R^2 of 7.51%.

4.4 Robustness: share repurchases

Institutionalized share repurchase programs are the most important alternative to dividend distributions (Dittmar (2000), p. 333 and p. 348; Grullon/Ikkenberry (2000), p. 35 and p. 48; Jagannathan et al. (2000), p. 361, table 1, p. 374 and p. 377; Grullon/Michaely (2002), p. 1656, p. 1660, p. 1665 and p. 1672 and Brav et al. (2005), p. 497). Brav et al. (2008, p. 386, figure 3) show that after a surge of activity in the mid 1990's, aggregate share repurchases exceed the sum of dividends paid in the U.S. today. For a deeper understanding of the effects of taxation on payout policy, and to further back up the evidence presented in the previous paragraphs, we will take a brief look at tax implications on share repurchases. If a shareholder receives income from the disposal of his shares in a share repurchase program, the difference between the acquisition costs and the share price the repurchase offers has to be taxed as a capital gain. Looking at our tax variable θ^{avg}, a reduction of dividend taxes will reduce the relative advantageousness of repurchases. Following the traditional view of dividend taxation, firms will buy back less of their own shares after a dividend tax cut and we expect a negative sign for θ^{avg} in the regressions.

In Germany, share repurchases were heavily restricted for the most part of the 20th century and were only deregulated in 1998 with the enactment of the act for control and transparency in the business sector "Gesetz zur Kontrolle und Transparenz im Unternehmensbereich". Because of this, we eliminate all firm-years prior to 1998, leaving us with a sample of 3,337 firm-years for our regressions on share repurchases. We employ the same methodology as in the dividend regressions before, and test three

different measures of share repurchases. *Repyield* is the share repurchase yield and is calculated by scaling the total shares repurchased by a firm by its market capitalization. *Reppaid* is a dummy variable that equals 1 if a firm repurchased shares and *Repinit* is a dummy variable that equals 1 if a firm has initiated share repurchases or raised its repurchases by at least 20%. Share repurchases in Germany are still a fairly rare phenomenon. In our sample, the mean of the share repurchase yield, *Repyield*, is only 0.27% with a maximum at about 4.3%. In the years from 1998 to 2009, we identify 416 firm-years with active share repurchase programs, implying a mean of 12.5% for *Reppaid*. In 289 of our firm-years, share repurchase programs were initiated or extended by at least 20%, the mean value for *Repinit* is about 8.8%.[16]

Table 9 shows the development of the mean of the share repurchase measure *Repyield* and the results of the fixed effects panel regressions of our three share repurchase measures. Panel A presents some univariate analyses. The first figure shows the development of the mean of the share repurchase yield over time. Apparently, share repurchases in Germany only started in the year 1998. From then, the share repurchase yield grew each year, except for a minor slow-down in the years 2001 and 2002, possibly in conjunction with the difficult situation on the financial markets due to the dotcom crisis. The second figure plots the share repurchase yield *Repyield* against θ^{avg}. In line with our prior findings, there is a highly significant negative relation. However, this time, when plotting *Repyield* against $Index$ in the third figure, we find a significant positive relation. This indicates the importance of the stock market environment for share repurchase decisions. Panel B presents the results of the regressions on the three share repurchase measures *Repyield*, *Reppaid* and *Repinit*. The first three columns show the results of the analysis of the full sample of 3,337 firm-years from 1998 to 2009. As expected, the coefficient of θ^{avg} is negative and significant for all three share repurchase measures. The columns (4) to (6) present the regressions excluding firm-years from the financial sector. Again, the coefficients for all three measures are negative and, for our measures *Repyield* and *Reppaid*, highly significant. The inclusion of financial firms in the analysis does not influence our results.

[16] Due to spatial limitations, we do not report full univariate statistics on our share repurchase measures. These data are available upon request.

< Insert table 9 about here >

It is noteworthy that throughout our share repurchase regressions and despite using the exact same data source and regression techniques, the adjusted R^2 is considerably lower than in our dividend regressions. This is because firm fixed effects do not contribute as much to the coefficient of determination as in case of dividends. Share repurchases are used as more flexible means of payout and are not "sticky", a firms past repurchases are not a good indication of future repurchases (Jagannathan et al. (2000), p. 367 and Brav et al. (2005), p. 494, table 5). Consequently, firm fixed effects are not as effective in explaining share repurchases and thus their contribution to the coefficient of determination is smaller. The evidence presented in panel B clearly backs up our earlier findings from the analysis of dividend payouts and again is in line with the traditional view of dividend taxation. A tax reform reducing the relative tax-advantageousness of dividends compared to share repurchases, as in Germany in the year 2002, induces increased share repurchases.

4.5 Ruling out unobserved macroeconomic influences

It is possible, that the effects of θ^{avg} on distribution policy found in our previous regressions are influenced by the development of unobserved macroeconomic variables as for instance the GDP, the key interest rate or the development of national or international stock markets over the observation period.[17] We have already provided preliminary evidence of the robustness of the tax effect to some macroeconomic variables when presenting the univariate analysis. In a multivariate setting, we tackle this problem in the form of a differences in differences approach. We divide our sample into two subgroups with differential tax sensitivity and assume, that both of these groups react uniformly to changes in the macroeconomic influences in question. In the literature, it is stated that a firm's financing structure depends on the stage of its development (Sinn (1991), p. 39). Young, fast growing firms often have investment opportunities exceeding their funds and thus rely on equity financing. They will react in line with

[17] In our setting, θ^{avg} is the same for all firms in a given year and a given value of the tax variable uniquely identifies a certain year. This means, that θ^{avg} can also be interpreted as a dummy variable for each year, depicting the influence of time. Thus, θ^{avg} may also show the influences of other variables that have the same value for all firms in a given year.

the traditional view, which predicts a change in firms' dividend policy in response to a tax reform. In contrast, slower growing, more mature firms with extensive funds and relatively lower investment opportunities are able to finance their investments with retained earnings. Their reaction will be in line with the new view, which predicts no policy change in response to a reform. When differentiating firms by their ability to self-finance their investments and thus, by separating "traditional view firms" from "new view firms", a divergent reaction of the two groups concerning tax reforms would point to a tax effect not biased by unobserved macroeconomic influences.

To concentrate on the reactions immediately connected with a tax reform, we tighten our time horizon around the reform of the year 2002. In the years from 1999 to 2005, we use two measures to separate the firms in our sample. $Cash$ is a stock figure standing for the cash and cash-equivalent holdings of a company. $Cashflow$ is a flow figure which stands for the sum of net income and all non-cash charges or credits of a company. From these values, we construct two dummy variables, $Cashdummy$ and $Cashflowdummy$, which equal 1 for observations in the top 33 deciles of the sample, indicating high cash- or new view firms.[18] Table 10 provides the results of the regressions including these new controls.

< Insert table 10 about here >

For both, $Cashdummy$ and $Cashflowdummy$, the coefficient is positive and significant at the 5% and the 1% level respectively. This is in line with the notion in the literature, that firms with extensive cash holdings or high cash flows are mature firms, which pay out higher dividends (Grullon et al. (2002), p. 422). Both interaction variables, $Cashdummy \times \theta^{avg}$ and $Cashflowdummy \times \theta^{avg}$, show coefficients with a negative sign which are significant at the 5% and the 1% level respectively. Firms' reaction to a tax reform is considerably lower, when their cash holdings or cash flows lie in the top third of the sample. This is in line with the new view of dividend taxation, predicting that these firms self-finance their investment needs and thus, are not affected by changes in dividend taxation. The results for the original variables $Cash$ and $Cashflow$ point

[18] In the Worldscope database, $Cash$ is equivalent to Cash and Equivalents - Generic (02005); $Cashflow$ is equivalent to Funds From Operations (04201). Univariate statistics for $Cash$, $Cashflow$ and the two dummies are available upon request.

into the same direction. As in the regressions before, our set of control variables was included here as well, with only marginal changes in their coefficients. These results are evidence of a clear tax effect on distribution policy. Groups of firms with different tax sensitivity reacted differently to the reform of 2002, while they were all exposed to the same macroeconomic influences.

5 Conclusion

This paper provides evidence that taxation is an important factor for managers deciding on their firm's payout policy. The German tax reform of 2002 significantly reduced the former disadvantageous taxation of capital gains for many investors. In line with the traditional view of dividend taxation, German decision-makers reacted to the declining tax advantageousness of dividends compared to capital gains by considerably cutting back their dividend payments. From 2008 on, distributions have been plummeting in the wake of the recent economic crisis. The reform of 2009 aligned the taxation of dividends and capital gains for all investors by abolishing the beneficial taxation of capital gains for individual investors. Our results predict, that this will have a positive effect on dividend distributions in the economy.

To study the impact of taxation on payout behavior, we analyze a sample of all 931 firms listed at the Frankfurt stock exchange from 1993 to 2009. We choose this sample, because the German corporate tax system was reformed twice in this period, which provides a valuable setting of a natural experiment. To model the environment around payout policy decisions as closely as possible, we carefully calculate the tax burden on dividends and share repurchases, which are taxed as capital gains, for different investor classes and weigh the burdens according to a typical German firm's shareholder structure. In our regressions, we test three different measures of dividend payments. Our results provide evidence for a solid link between taxation and payout policy. The dividend yield, the likelihood to pay a dividend and the likelihood to initiate dividend payments are significantly and positively correlated to the relative tax advantageousness of dividends compared to capital gains. To test the robustness of our findings, we subject our hypothesis to different compositions of the sample and apply the underlying economic theory to share repurchases, the most important alternative to dividend

payments. We obtain corroborative results. We further strengthen our conclusions with evidence from a differences in differences approach. Again, the results show a clear tax influence on distribution policy along the line of the theory.

There is plenty of opportunity for further research. Particularly, it would be interesting to see if an extension to a more international setting, including detailed models of the tax systems of other countries, confirmed the results. In an international setting, it would be possible to control for country specific, macroeconomic effects. Additionally, a more distinguished modeling of a firms shareholder structure or the use of actual firm specific weights, although difficult to achieve, could prove very helpful. All of these approaches will most likely help to further enhance future research on the link between taxation and payout policy.

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Table 1: Evolution of tax rates in Germany 1993-2009

This table shows the evolution of individual and corporate tax rates from 1993 on. The column *Regime* shows the effective tax system in each year. FI stands for full imputation system, HI for half-income system and FT denotes flat tax system. The columns t_{pers}^{min} and t_{pers}^{max} show the personal income tax rate for individuals in the lowest and the highest income tax bracket, respectively. The columns t_{corp}^{ret} and t_{corp}^{dis} show the corporate income tax rates for retained and distributed profits. *Sol* depicts the rate of the solidarity surcharge imposed, *Subst* denotes the percentage of ownership that qualifies a shareholder as having substantial interest in a corporation.

Year	**Regime**	t_{pers}^{min}	t_{pers}^{max}	t_{corp}^{ret}	t_{corp}^{dis}	**Sol**	**Subst**
1993	FI	19.0%	53.0%	50.0%	36.0%	0.0%	25.0%
1994	FI	19.0%	53.0%	45.0%	30.0%	0.0%	25.0%
1995	FI	19.0%	53.0%	45.0%	30.0%	7.5%	25.0%
1996	FI	25.9%	53.0%	45.0%	30.0%	7.5%	25.0%
1997	FI	25.9%	53.0%	45.0%	30.0%	7.5%	25.0%
1998	FI	25.9%	53.0%	45.0%	30.0%	5.5%	25.0%
1999	FI	23.9%	53.0%	40.0%	30.0%	5.5%	10.0%
2000	FI	22.9%	51.0%	40.0%	30.0%	5.5%	10.0%
2001	FI	19.9%	48.5%	25.0%	25.0%	5.5%	10.0%
2002	HI	19.9%	48.5%	25.0%	25.0%	5.5%	1.0%
2003	HI	19.9%	48.5%	26.5%	26.5%	5.5%	1.0%
2004	HI	16.0%	45.0%	25.0%	25.0%	5.5%	1.0%
2005	HI	15.0%	42.0%	25.0%	25.0%	5.5%	1.0%
2006	HI	15.0%	42.0%	25.0%	25.0%	5.5%	1.0%
2007	HI	15.0%	45.0%	25.0%	25.0%	5.5%	1.0%
2008	HI	15.0%	45.0%	15.0%	15.0%	5.5%	1.0%
2009	FT	15.0%	45.0%	15.0%	15.0%	5.5%	1.0%

Source: Based on Bundesministerium der Finanzen (2007): Datensammlung zur Steuerpolitik, pp. 57, 58.

Table 2: Tax burden in Germany 1993-2009

This table shows the tax burden for individual investors without substantial interest, for individual investors with substantial interest and for corporate investors since 1993. The column $Year$ shows the year in which the shareholder acquires the distribution. Earnings generated and taxed on the corporate level in year t are distributed and taxed on the shareholder level in year $t+1$. The column *Regime* shows the tax system effective on the shareholder level in each year. FI stands for full imputation system, HI for half-income system and FT denotes flat tax system. t_{div}^{min} stands for the total tax burden on a dividend on the shareholder level, received by a shareholder in the minimum tax bracket. t_{div}^{max} denotes the same for a shareholder in the maximum tax bracket. t_{cg}^{min} and t_{cg}^{max} stand for the total tax burden on a capital gain received by a shareholder in the minimum or maximum tax bracket, respectively. The columns t_{div} and t_{cg} show the burden on dividends and capital gains for the corporation retaining the payment.

Year	**Regime**	**Individual investor without substantial interest**				**Individual investor with substantial interest**				**Corporate investor**	
		t_{div}^{min}	t_{div}^{max}	t_{cg}^{min}	t_{cg}^{max}	t_{div}^{min}	t_{div}^{max}	t_{cg}^{min}	t_{cg}^{max}	t_{div}	t_{cg}
1993	FI	19.0%	53.0%	51.9%	51.9%	19.0%	53.0%	61.0%	77.4%	50.0%	75.9%
1994	FI	19.0%	53.0%	50.0%	50.0%	19.0%	53.0%	59.5%	76.5%	45.0%	72.5%
1995	FI	20.4%	57.0%	45.0%	45.0%	20.4%	57.0%	56.2%	76.3%	48.4%	71.6%
1996	FI	27.8%	57.0%	48.4%	48.4%	27.8%	57.0%	62.7%	77.8%	48.4%	73.3%
1997	FI	27.8%	57.0%	48.4%	48.4%	27.8%	57.0%	62.7%	77.8%	48.4%	73.3%
1998	FI	27.3%	55.9%	48.4%	48.4%	27.3%	55.9%	62.5%	77.2%	47.5%	72.9%
1999	FI	25.2%	55.9%	47.5%	47.5%	25.2%	55.9%	60.7%	76.8%	42.2%	69.6%
2000	FI	24.2%	53.8%	42.2%	42.2%	24.2%	53.8%	56.2%	73.3%	42.2%	66.6%
2001	FI	21.0%	51.2%	42.2%	42.2%	21.0%	51.2%	54.3%	71.8%	42.2%	66.6%
2002	HI	34.1%	45.2%	26.4%	26.4%	34.1%	45.2%	34.1%	45.2%	27.3%	27.3%
2003	HI	34.1%	45.2%	26.4%	26.4%	34.1%	45.2%	34.1%	45.2%	27.4%	27.4%
2004	HI	34.0%	45.1%	28.0%	28.0%	34.0%	45.1%	34.0%	45.1%	28.9%	28.9%
2005	HI	32.2%	42.7%	26.4%	26.4%	32.2%	42.7%	32.2%	42.7%	27.3%	27.3%
2006	HI	32.2%	42.7%	26.4%	26.4%	32.2%	42.7%	32.2%	42.7%	27.3%	27.3%
2007	HI	32.2%	43.9%	26.4%	26.4%	32.2%	43.9%	32.2%	43.9%	27.3%	27.3%
2008	HI	32.2%	43.9%	26.4%	26.4%	32.2%	43.9%	32.2%	43.9%	27.0%	27.0%
2009	FT	38.0%	38.0%	38.0%	38.0%	23.8%	39.8%	23.8%	39.8%	16.5%	16.5%

Table 3: Evolution of the tax variable θ in Germany 1993-2009

This table shows the evolution of the tax variable θ in Germany for individual investors without substantial interest, for individual investors with substantial interest and for corporate investors from 1993 on. The column $Year$ shows the year in which the shareholder acquires the distribution. Earnings generated and taxed on the corporate level in year t are distributed and taxed on the shareholder level in year $t+1$. The column *Regime* shows the effective tax system in each year. FI stands for full imputation system, HI for half-income system and FT denotes flat tax system. θ shows the relative taxation of dividends to capital gains for different groups of shareholders. *min* and *max* denote shareholders in the minimum and maximum tax bracket, while *nsub* stands for individual investors without substantial interest, *sub* for individual investors with substantial interest and *corp* for corporate investors.

Year	**Regime**	**Individual investor without substantial interest**		**Individual investor with substantial interest**		**Corporate investor**
		θ_{nsub}^{min}	θ_{nsub}^{max}	θ_{sub}^{min}	θ_{sub}^{max}	θ_{corp}
1993	FI	1.683	0.977	2.078	2.078	2.078
1994	FI	1.620	0.940	2.000	2.000	2.000
1995	FI	1.447	0.782	1.818	1.818	1.818
1996	FI	1.398	0.833	1.937	1.937	1.937
1997	FI	1.398	0.833	1.937	1.937	1.937
1998	FI	1.408	0.854	1.937	1.937	1.937
1999	FI	1.424	0.839	1.904	1.904	1.904
2000	FI	1.312	0.799	1.730	1.730	1.730
2001	FI	1.367	0.845	1.730	1.730	1.730
2002	HI	0.895	0.744	1.000	1.000	1.000
2003	HI	0.895	0.744	1.000	1.000	1.000
2004	HI	0.916	0.763	1.000	1.000	1.000
2005	HI	0.921	0.778	1.000	1.000	1.000
2006	HI	0.921	0.778	1.000	1.000	1.000
2007	HI	0.921	0.763	1.000	1.000	1.000
2008	HI	0.921	0.763	1.000	1.000	1.000
2009	FT	1.000	1.000	1.000	1.000	1.000

Table 4: Average tax variable θ^{avg} in Germany 1993-2009

This table shows the development of the tax variable for a German firm with an average shareholder structure from 1993 on. The column $Year$ shows the year in which the shareholder acquires the distribution. Earnings generated and taxed on the corporate level in year t are distributed and taxed on the shareholder level in year $t+1$. The column *Regime* shows the effective tax system in each year. FI stands for full imputation system, HI for half-income system and FT denotes flat tax system. θ_{nsub}^{max} and θ_{corp} depict the relevant tax variables for the investor classes of individual investors and corporate investors, respectively. w_{nsub}^{max} and w_{corp} depict the weights for the investor classes of individual investors and corporate investors. θ^{avg} shows the tax variable for a firm with an average shareholder structure in Germany.

Year	**Regime**	θ_{nsub}^{max}	θ_{corp}	w_{nsub}^{max}	w_{corp}	θ^{avg}
1993	FI	0.977	2.078	0.280	0.720	1.770
1994	FI	0.940	2.000	0.274	0.726	1.709
1995	FI	0.782	1.818	0.266	0.734	1.542
1996	FI	0.833	1.937	0.274	0.726	1.634
1997	FI	0.833	1.937	0.293	0.707	1.613
1998	FI	0.854	1.937	0.306	0.694	1.605
1999	FI	0.839	1.904	0.343	0.657	1.539
2000	FI	0.799	1.730	0.355	0.645	1.399
2001	FI	0.845	1.730	0.327	0.673	1.440
2002	HI	0.744	1.000	0.331	0.669	0.915
2003	HI	0.744	1.000	0.342	0.658	0.912
2004	HI	0.763	1.000	0.337	0.663	0.920
2005	HI	0.778	1.000	0.336	0.664	0.925
2006	HI	0.778	1.000	0.345	0.655	0.923
2007	HI	0.763	1.000	0.326	0.674	0.922
2008	HI	0.763	1.000	0.268	0.732	0.936
2009	FT	1.000	1.000	0.269	0.731	1.000

Source: Deutsche Bundesbank (2010): Ergebnisse der gesamtwirtschaftlichen Finanzierungsrechnung für Deutschland 1991 bis 2009, Statistische Sonderveröffentlichung 4, pp. 82-115.

Table 5: Composition of the sample and adjustments

This table shows the composition of our sample of all firms listed at the Frankfurt stock exchange (CDAX) from 1993 until 2009 and the adjustments due to missing data and outliers. In each step, the number of remaining observations is given.

CDAX, 1993-2009: 931 firms	**Observations**
Total	10,129
Elimination due to missing data	
Cash Dividends Paid	-2,491
Pre-tax Income	-377
Market Price - Year End	-432
Closely Held Shares	-450
Total Debt/Total Assets	-6
Market Capitalization/Common Equity	-2
Total	6,371
Handling of outliers	
Truncation of the 1. and/or 100. percentile (Cash Dividends Paid, Pre-tax Income, Market Price - Year End, Closely Held Shares, Total Debt/Total Assets, Market Capitalization/Common Equity)	-725
Total	5,646

Source: WorldScope, September 2010.

Table 6: Selected firm characteristics

This table shows selected characteristics of the firms in our sample. Panel A describes the breakdown of observed firm-years to different sectors. The division was carried out by using the Standard Industrial Classification (SIC), the relevant divisions are given in parentheses. *Agr./Min.* stands for Agriculture, Forestry, And Fishing and Mining (Division A and B), *Constr.* stands for Construction (Division C), $Manuf.$ stands for Manufacturing (Division D), *Utility* stands for Transportation, Communications, Electric, Gas, And Sanitary Services (Division E), $Trade$ stands for Wholesale Trade and Retail Trade (Division F and G), *Finance* stands for Finance, Insurance, And Real Estate (Division H), *Service* stands for Services (Division I), *Admin.* stands for Public Administration (Division J). Panel B provides some basic parameters of firms in our sample. All monetary variables are deflated by the consumer price index. n indicates the number of observations for each variable. $MarketCap.$ denotes the Market Capitalization, TA stands for Total Assets, $TDebt$ denotes Total Debt, $Op.Inc.$ stands for Operating Income, EPS denotes Earnings per Share and DPS denotes Dividends per Share.

Panel A: Observations by sectors

Sector	**Agr./Min.**	**Constr.**	**Manuf.**	**Utility**	**Trade**	**Finance**	**Service**	**Admin.**
	54	94	2,703	353	507	945	990	0

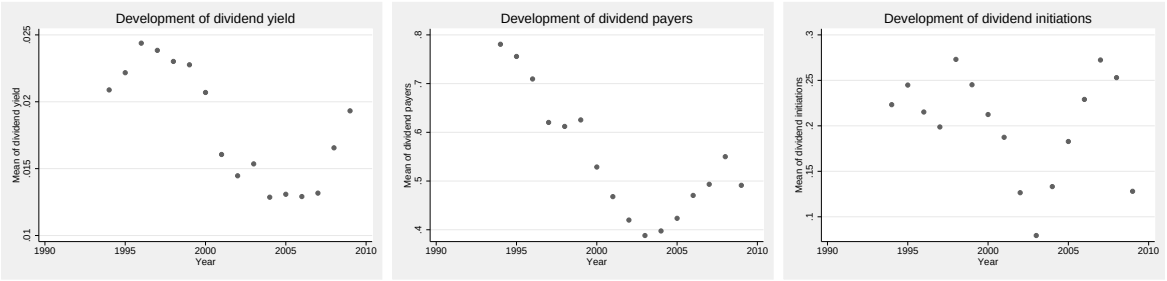
Panel B: Basic firm parameters (in thousands of Euros)

Variable	**n**	**Mean**	**S.D.**	**Min**	**.25**	**Mdn**	**.75**	**Max**
Market Cap.	5,642	2,183,020	8,167,360	190	35,834	139,579	743,349	213,793,900
TA	5,646	12,731,075	76,716,360	742	69,668	236,596	1,287,620	2,193,953,000
TDebt	5,642	4,413,065	28,148,502	0	3,834	32,859	212,100	605,997,100
Op.Inc.	5,579	134,183	714,929	-5,605,000	-3,194	3,748	35,902	15,383,000
EPS	5,640	1.3731	53.9175	-1,570.0	-0.0700	0.5275	1.7665	3,184.5
DPS	5,616	1.1782	5.2558	0.0000	0.0000	0.2140	0.7500	250.00

Figure 1: Development of dividend measures

Panel A provides an overview over the development of the means of our three dividend measures, the dividend yield *Divyield*, the number of dividend payers *Divpaid* and the number of dividend initiations *Divinit*, over time. Panel B plots the dividend yield *Divyield* against the tax variable θ (theta), against *Index*, a national all-share price index taken from OECD.stat and against *GDPgrowth*, the yearly change in gross domestic product, also taken from OECD.stat.

Panel A:



Panel B:

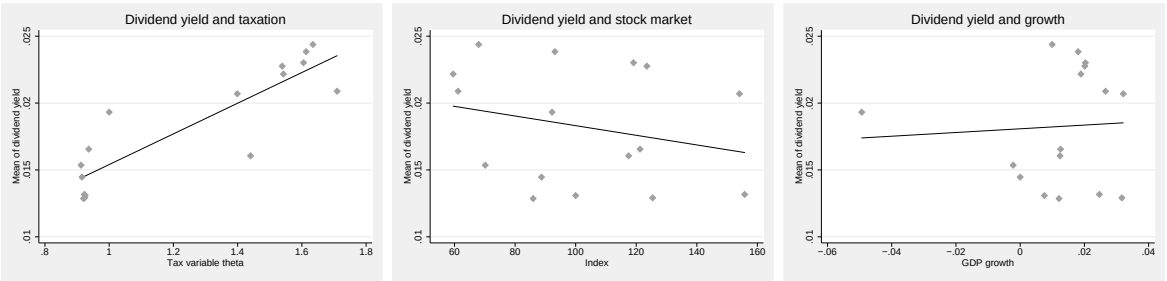


Table 7: Descriptive statistics of regression variables

This table provides descriptive statistics for the variables used in the multivariate analysis. Panel A summarizes our sample of regression variables. The Column *Expsign* presents the sign expected for the coefficients of the multivariate analysis. *Divyield* stands for Cash Dividends Paid scaled by Market Capitalization, *Income* denotes Pre-tax Income and is scaled by Total Assets, θ^{avg} is the weighted average of the tax variable, *Trend* is the relative change between Market Price - Year End in t and $t-1$, *Closely* denotes Closely Held Shares, *Lev* stands for Total Debt divided by Total Assets, *Q* stands for Tobin's Q, *Divpaid* is a dummy variable that equals 1 if a firm paid out a dividend and *Divinit* is a dummy variable that equals 1 if a firm has initiated dividend payments or raised its dividend for at least 20%. The index $t-1$ indicates a variable that is lagged by one year. Panel B presents the correlation matrix for our sample, significance levels are given in parentheses.

Panel A: Variables used in the regressions

Variable	n	Mean	S.D.	Min	.25	Mdn	.75	Max	Expsign
Divyield	5,646	0.0185	0.0211	0.0000	0.0000	0.0128	0.0322	0.0963	
Income_{t-1}	5,646	0.0329	0.1474	-1.1488	0.0016	0.0392	0.0949	0.7462	+
θ^{avg}	5,646	1.1788	0.3026	0.9124	0.9201	0.9363	1.5387	1.6344	+
Trend_{t-1}	5,646	0.0342	0.4933	-0.9309	-0.2609	-0.0097	0.2388	2.4737	-
Closely_{t-1}	5,646	0.4663	0.3287	0.0000	0.1443	0.5037	0.7499	0.9955	-
Lev_{t-1}	5,646	0.2065	0.1920	0.0000	0.0315	0.1671	0.3279	0.8508	-
Q_{t-1}	5,646	2.2546	2.0786	-3.9200	1.0800	1.6800	2.7000	17.4100	-
Divpaid	5,646	0.5925	0.4914	0.0000	0.0000	1.0000	1.0000	1.0000	
Divinit	5,613	0.2117	0.4085	0.0000	0.0000	0.0000	0.0000	1.0000	

Panel B: Correlation Matrix

Variable	Divyield	Income_{t-1}	θ^{avg}	Trend_{t-1}	Closely_{t-1}	Lev_{t-1}	Q_{t-1}	Divpaid	Divinit
Divyield	1.0000								
Income_{t-1}	0.3020	1.0000							
	(0.0000)								
θ^{avg}	0.1672	0.1030	1.0000						
	(0.0000)	(0.0000)							
Trend_{t-1}	-0.0017	0.3109	0.0142	1.0000					
	(0.8935)	(0.0000)	(0.2278)						
Closely_{t-1}	0.1019	0.0992	0.1057	0.0247	1.0000				
	(0.0000)	(0.0000)	(0.0000)	(0.0532)					
Lev_{t-1}	0.0461	-0.0721	0.0046	-0.0526	-0.0192	1.0000			
	(0.0001)	(0.0000)	(0.6737)	(0.0000)	(0.1044)				
Q_{t-1}	-0.1048	0.1657	0.1876	0.2496	0.0470	-0.1200	1.0000		
	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0001)	(0.0000)			
Divpaid	0.7341	0.3634	0.2057	0.1298	0.1546	0.0147	0.0629	1.0000	
	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.2031)	(0.0000)		
Divinit	0.3296	0.2316	0.0566	0.1815	0.0199	-0.0119	0.0794	0.4800	1.0000
	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.1075)	(0.3065)	(0.0000)	(0.0000)	

Table 8: Taxation and dividend distribution 1993-2009

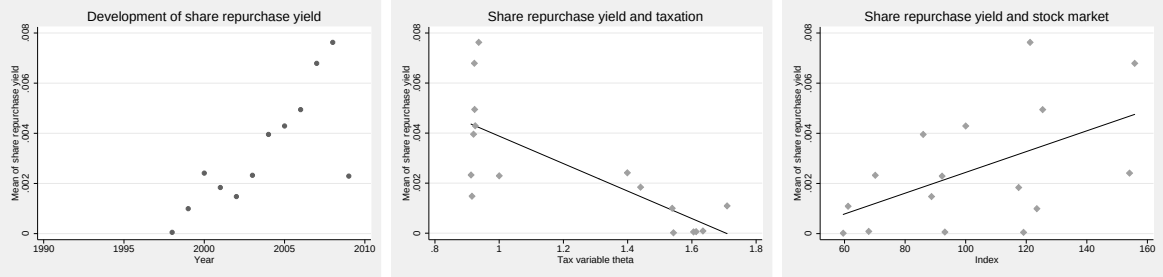
This table shows the results of the fixed effects panel regressions of our three measures of dividend distribution behavior. The first three columns present the results from regressions over the whole sample, the last three columns present the results from regressions excluding firm-years from the financial sector. Column (1) presents the results for *Divyield*, which stands for Cash Dividends Paid scaled by Market Capitalization. Column (2) presents the results for *Divpaid*, a dummy variable that equals 1 if a firm paid out a dividend. Column (3) presents the results for *Divinit*, a dummy variable that equals 1 if a firm has initiated dividend payments or raised its dividend by at least 20%. *Income* denotes Pre-tax Income and is scaled by Total Assets, θ^{avg} is the weighted average of the tax variable, *Trend* is the relative change between Market Price - Year End in t and $t-1$, *Closely* denotes Closely Held Shares, *Lev* stands for Total Debt divided by Total Assets, Q stands for Tobin's Q. The index $t-1$ indicates a variable that is lagged by one year. One star, two stars and three stars denote significance at the 10%, 5% and the 1% level, respectively. Robust standard errors are given in parentheses.

	Full sample			**Excluding financials**		
	(1)	(2)	(3)	(4)	(5)	(6)
Variable	**Divyield**	**Divpaid**	**Divinit**	**Divyield**	**Divpaid**	**Divinit**
Income_{t-1}	0.0307***	0.6020***	0.3979***	0.0280***	0.5630***	0.3615***
	(0.0029)	(0.0608)	(0.0520)	(0.0031)	(0.0646)	(0.0540)
θ^{avg}	0.0053***	0.1540***	0.0641**	0.0059***	0.1508***	0.0773***
	(0.0016)	(0.0328)	(0.0253)	(0.0017)	(0.0364)	(0.0287)
Trend_{t-1}	-0.0035***	0.0004	0.0911***	-0.0035***	0.0033	0.0928***
	(0.0004)	(0.0102)	(0.0137)	(0.0005)	(0.0104)	(0.0148)
Closely_{t-1}	-0.0040**	-0.0896**	-0.0359	-0.0037**	-0.0765**	-0.0487
	(0.0015)	(0.0353)	(0.0315)	(0.0018)	(0.0378)	(0.0348)
Lev_{t-1}	-0.0084***	-0.2486***	-0.1884***	-0.0107***	-0.2487***	-0.2527***
	(0.0031)	(0.0806)	(0.0636)	(0.0038)	(0.0856)	(0.0756)
Q_{t-1}	-0.0011***	0.0029	0.0023	-0.0012***	0.0009	0.0063
	(0.0002)	(0.0045)	(0.0039)	(0.0002)	(0.0051)	(0.0045)
Constant	0.0174***	0.4778***	0.1706***	0.0172***	0.4673***	0.1552***
	(0.0022)	(0.0430)	(0.0365)	(0.0025)	(0.0470)	(0.0407)
Firm fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Observations	5,646	5,646	5,613	4,701	4,701	4,679
Adjusted R^2	0.517	0.625	0.115	0.525	0.634	0.113
F-statistic	30.15	28.52	30.35	25.27	20.84	25.82
Prob > F	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

Table 9: Taxation and share repurchases 1998-2009

This table provides an overview over our univariate and multivariate analysis of share repurchases from 1998 to 2009. The first graph in Panel A shows the development of the mean of the share repurchase measure *Repyield*, which stands for the share repurchase yield or Common/Preferred Stock Redeemed, Retired, Converted, Etc. scaled by Market Capitalization. The two following graphs provide plots of *Repyield* against the tax variable θ^{avg} and against $Index$, a national all-share price index taken from OECD.stat. Panel B shows the results of the fixed effects panel regressions of our three measures of share repurchases. The first three columns present the results from regressions over the whole sample, the last three columns present the results from regressions excluding firm-years from the financial sector. Column (1) presents the results for *Repyield*. Column (2) presents the results for *Reppaid*, a dummy variable that equals 1 if a firm repurchased shares. Column (3) presents the results for *Repinit*, a dummy variable that equals 1 if a firm has initiated share repurchases or raised its repurchases by at least 20%. *Income* denotes Pre-tax Income and is scaled by Total Assets, θ^{avg} is the weighted average of the tax variable, $Trend$ is the relative change between Market Price - Year End in t and $t-1$, *Closely* denotes Closely Held Shares, *Lev* stands for Total Debt divided by Total Assets, *Q* stands for Tobin's Q. The index $t-1$ indicates a variable that is lagged by one year. One star, two stars and three stars denote significance at the 10%, 5% and the 1% level, respectively. Robust standard errors are given in parentheses.

Panel A:



Panel B:

	Full sample			Excluding financials		
	(1)	(2)	(3)	(4)	(5)	(6)
Variable	**Repyield**	**Reppaid**	**Repinit**	**Repyield**	**Reppaid**	**Repinit**
Income_{t-1}	0.0130***	0.2466***	0.2277***	0.0145***	0.2799***	0.2445***
	(0.0047)	(0.0775)	(0.0590)	(0.0054)	(0.0868)	(0.0641)
θ^{avg}	-0.0052***	-0.1315***	-0.0419*	-0.0053***	-0.1211***	-0.0339
	(0.0014)	(0.0351)	(0.0239)	(0.0015)	(0.0381)	(0.0265)
Trend_{t-1}	0.0006	-0.0145	-0.0028	0.0005	-0.0205	-0.0122
	(0.0006)	(0.0155)	(0.0129)	(0.0007)	(0.0161)	(0.0133)
Closely_{t-1}	-0.0013	-0.0781*	-0.0380	-0.0014	-0.0831*	-0.0249
	(0.0014)	(0.0412)	(0.0299)	(0.0016)	(0.0457)	(0.0321)
Lev_{t-1}	-0.0125***	-0.1122	-0.0628	-0.0122***	-0.0630	-0.0128
	(0.0038)	(0.1000)	(0.0716)	(0.0038)	(0.1175)	(0.0790)
Q_{t-1}	-0.0000	0.0046	-0.0009	0.0001	0.0044	0.0007
	(0.0002)	(0.0055)	(0.0040)	(0.0003)	(0.0062)	(0.0045)
Constant	0.0115***	0.3354***	0.1622***	0.0111***	0.3161***	0.1327***
	(0.0021)	(0.0534)	(0.0382)	(0.0021)	(0.0575)	(0.0404)
Firm fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Observations	3,337	3,327	3,290	2,849	2,841	2,807
Adjusted R^2	0.112	0.293	0.100	0.110	0.280	0.0984
F-statistic	3.616	3.897	3.469	3.150	3.469	2.906
Prob > F	0.0016	0.0008	0.0022	0.0049	0.0023	0.0086

Table 10: Taxation and unobserved macroeconomic influences 1999-2005

This table shows the influence of taxation on the distributions of different types of firms in the period from 1999 to 2005 by employing fixed effects panel regressions. In all regressions, the dependent variable is given by *Divyield*, standing for Cash Dividends Paid scaled by Market Capitalization. θ^{avg} is the weighted average of the tax variable. Column (1) presents the results using $Cash$ as a control variable and $Cash \times \theta^{avg}$ as an interaction term, with $Cash$ standing for the Cash and Cash-equivalent Holdings of a company. Column (2) shows the results including $Cashdummy$, a dummy variable that equals 1 for observations in the top 33 deciles. Column (3) presents the results using $Cashflow$, which stands for Net Income and Non-cash Charges or Credits. Column (4) shows the results including $Cashflowdummy$, a dummy variable that equals 1 for observations in the top 33 deciles. The index $t-1$ indicates a variable that is lagged by one year. One star, two stars and three stars denote significance at the 10%, 5% and the 1% level, respectively. Robust standard errors are given in parentheses.

	Cash		**Cashflow**	
	(1)	(2)	(3)	(4)
Variable	**Divyield**	**Divyield**	**Divyield**	**Divyield**
θ^{avg}	0.0082***	0.0087***	0.0083***	0.0090***
	(0.0021)	(0.0021)	(0.0020)	(0.0021)
Cash_{t-1}	0.0135			
	(0.0096)			
$\text{Cash}_{t-1} \times \theta^{avg}$	-0.0137*			
	(0.0077)			
Cashdummy_{t-1}		0.0084**		
		(0.0038)		
$\text{Cashdummy}_{t-1} \times \theta^{avg}$		-0.0080**		
		(0.0033)		
Cashflow_{t-1}			0.0318**	
			(0.0131)	
$\text{Cashflow}_{t-1} \times \theta^{avg}$			-0.0219**	
			(0.0091)	
$\text{Cashflowdummy}_{t-1}$				0.0139***
				(0.0035)
$\text{Cashflowdummy}_{t-1} \times \theta^{avg}$				-0.0087***
				(0.0030)
Constant	0.0116***	0.0111***	0.0113***	0.0097***
	(0.0028)	(0.0027)	(0.0026)	(0.0026)
Control Variables	Yes	Yes	Yes	Yes
Firm fixed effects	Yes	Yes	Yes	Yes
Observations	3,009	3,009	2,969	2,969
Adjusted R^2	0.600	0.601	0.603	0.608
F-statistic	9.417	9.912	9.559	10.97
Prob > F	0.0000	0.0000	0.0000	0.0000

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