Accepted Manuscript

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PII: S0929-1199(16)30296-6
DOI: doi: 10.1016/j.jcorpfin.2016.11.008
Reference: CORFIN 1121

To appear in: *Journal of Corporate Finance*

Received date: 25 March 2016
Revised date: 14 November 2016
Accepted date: 14 November 2016

Please cite this article as: Buchanan, Bonnie, Cao, Cathy Xuying, Liljeblom, Eva, Weihrich, Susan, Uncertainty and firm dividend policy—A natural experiment, *Journal of Corporate Finance* (2016), doi: 10.1016/j.jcorpfin.2016.11.008

Uncertainty and Firm Dividend Policy – A Natural Experiment

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Key Words: Dividend taxes; uncertainty; payout policy; dividend initiation.

JEL Classification: G35; G32; G38; H32

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Uncertainty and Firm Dividend Policy – A Natural Experiment

Abstract

We examine how firms respond to uncertainty around U.S. tax policy changes, namely the individual level tax rate increases set to take effect on January 1, 2011 and January 1, 2013. We provide evidence that firms time the uncertainty in the tax environment and revise their dividend policy to an expected tax increase. We find that firms are likely to initiate their dividends or intensively increase their existing dividend amount one year before the expected tax increase. In addition, in 2012 when there is much less uncertainty on dividend tax changes than in 2010, firms are less likely to initiate a regular dividend but are more likely to initiate special dividends. The results suggest that firms facing less tax uncertainty are less likely to make long-term commitments on regular dividend payments but are more likely to take advantage of the last-minute low tax benefits by issuing special dividends. Furthermore, the response to the possible elimination of a tax cut was strongest in firms with high levels of tax-affected ownership, supporting the argument that when facing policy uncertainty, firms behave to prepare for the worst scenarios from the viewpoint of the shareholders, which in this case is a tax increase.

Uncertainty and Firm Dividend Policy – A Natural Experiment

1. Introduction

Why and how does a firm adjust its corporate policy for uncertainty in tax changes? The importance of tax policy on a firm's dividend decision is a long debated issue. Firms face considerable uncertainty about how future conditions will affect benefits to their shareholders. Uncertainty can arise due to policy shocks such as regulatory and tax reforms. The role of future conditions is particularly important when the reversal of a corporate policy is costly, such as the decision to initiate regular dividends. Brav, Graham, Harvey, and Michaely (2005, 2008) suggest that non-tax conditions, such as the economic setting, high corporate profits, and substantial cash holdings are likely the first-order factors that determine corporate dividend policy. In contrast, Chetty and Saez (2005), Blouin, Ready, and Shackelford (2004), and Brown, Liang and Weisbenner (2007) highlight a strong impact on corporate dividend policy of individual taxation of shareholders.

Regular dividends have been found to be very persistent over time. A classical view has been that reductions in dividends are rare and that the equity markets punish cuts in regular dividends (Healy and Palepu 1988, DeAngelo 1991, Brav et al, 2005). Against this background, an initiation of a regular dividend payment has also been seen as a strong signal that the firm intends to maintain a dividend payment of a certain level or higher in the future. On the other hand, some recent papers have documented a surge in corporate dividends prior to reforms that introduce higher dividend taxation (Korkeamaki, Liljeblom, Pasternack, 2010 for Finland, Hanlon and Hoopes, 2014 for the U.S.). In these two studies, the effect was stronger for firms with higher tax-affected investors/or inside owners. Both studies found that some of the possible increases in dividends were made through special dividends, but they also report evidence of

increases or shifts in regular dividends prior to the reform. A dividend tax increase represents a large decrease in the after-tax value of dividends to individual investors. Firms that initiate regular dividends prior to a reform face the risk of potentially having to reverse the future long-run policy of the firm. Given the stickiness of dividends, one would expect that only firms with strong incentives and good investor relations (i.e. the ability to explain the volatility of the dividend policy well) would act in such a way.

A primary challenge in prior studies has been disentangling the endogenous issues that arise because a firm's dividend policy and the uncertainty that it faces may be jointly determined. For example, does the uncertainty impact dividend policy, or will corporate dividend policy lead to more uncertainty? This study incorporates a natural experiment (or quasi-experiment) that provides a useful setting for addressing endogeneity because it involves making use of an exogenous source of variation in the independent variables of interest (Meyer, 1995). Good natural experiments include policy changes (Roberts and Whited, 2012). We focus on firms' dividend decisions reacting to tax changes of varying uncertainty around the expiration of the Jobs and Growth Tax Relief Reconciliation Act of 2003 (JGTRRA).

We find that firms revise their dividend policy even before the implementation of a new dividend tax policy. Specifically, we document that firms are likely to initiate their dividends or intensively increase their existing dividends the year before an expected tax increase (an increase which would have occurred in 2011 and 2013). Furthermore, the response to the possible increase in dividend tax was stronger in firms with higher levels of tax-affected ownership, supporting the argument that when facing policy uncertainty, firms behave to prepare for the worst scenarios, where the worst case scenario is the termination of the 2003 dividend tax cut.

We also show that firms react differently in 2010 and 2012 in terms of their payout policy for both regular and special dividends. In 2012 when there is much less uncertainty of a dividend tax increase than in 2010, firms are less likely to initiate a regular dividend but are more likely to initiate special dividends. The results suggest that firms are less likely to make long-term commitments on regular dividend payments but are more likely to take advantage of the last-minute lower tax benefits by issuing special dividends. This is in line with our hypothesis that firms in 2012 do not want to send a false signal in the form of a regular dividend initiation, just to turn that policy around later in a higher tax environment. We also find that share repurchases tend to be more common one year prior to an (anticipated) tax increase.

Our study is related to several studies that examine how firms' dividend payout policy responds to tax changes (Chetty and Saez, 2005, Auerbach and Hassett, 2005, and Hanlon and Hoopes, 2014). Our paper is different from Hanlon and Hoopes (2014) in the following ways. First, Hanlon and Hoopes (2014) examine the presence of special dividends. In contrast to Hanlon and Hoopes (2014), we focus on the initiation decision as well as the intensive margin of both regular and special dividends. We identify differential effects of tax uncertainty on firms' regular dividend policy and special dividend policy. Such effects vary across time with different levels of uncertainties. Our evidence is consistent with the view that the change in regular dividends has a longer impact on firms' stock performance and shareholder value than special dividends.

Second, the regular dividend payment shift defined in Hanlon and Hoopes (2014) reflects 1) the policy timing of regular dividend payment and 2) the initiation or intensity increase in regular dividend payment. Different from Hanlon and Hoopes (2014), our study distinguishes

between these two responses of firms. Specifically, we examine dividend initiation and intensity separately after controlling for dividend shifting behavior of the firm.

Third, Hanlon and Hoopes (2014) look at REITS that do not qualify for special treatment. A more interesting and impactful question is to look at tax status of institutional ownership (e. g., pension plans). The recent tax reform has different tax implications for tax-favored accounts vs. nontax-favored accounts. The firms that are more highly owned by these non-taxable entities would have less incentive to engage in dividend restructuring during the 2010 and 2012 period. We provide strong evidence that firms owned by taxable entities do take into account dividend policy changes.

In addition, we contribute to the existing literature by identifying a new determinant of corporate payout policies: tax policy uncertainty. Different from earlier studies, we focus on firms' dividend decisions reacting to tax increases of varying uncertainty. In 2010 and 2012, market expectations on the coming dividend tax increase provide us natural settings to investigate firms' responses to tax uncertainty. Different from 2003 tax reform, the market has a high anticipation that a tax increase would take place in 2011 and 2013, albeit at different levels of uncertainty.[5] In their cross-country payout policy study, Chay and Suh (2005) look at the relation between total dividend payout ratio and cash-flow uncertainty, proxied by stock return volatility. Different from their paper, we focus on tax policy uncertainty. We study firm-level regular and special dividend policy. In addition, we use the tax reform as a quasi-natural experiment setting instead of using the proxies of uncertainty that can have potential endogeneity issues, such as stock volatility.

Moreover, our paper adds new evidence to the dividend policy literature by showing that there are different dividend responses among firms with different composition of large tax-

[5] Auerbach and Hassett [2005] suggest that there was no anticipation on a tax change before the very end of 2002.

affected ownership and nontax-affected ownership across periods with various degrees to tax policy uncertainty.[6] Different from Chetty and Saez (2005), we focus on how tax-affected ownership influences firms' dividend policy when firms face tax policy uncertainty. We find that firms with large tax-affected ownership are more likely to initiate both their regular and special dividends in 2010 but not in 2012. Note that the market in 2010 has much higher uncertainty on a forthcoming tax increase than in 2012.

Finally, our paper provides additional evidence on the importance of tax policy on a firm's dividend decision. Brav, Graham, Harvey, and Michaely (2005, 2008) suggest that nontax conditions, such as economic setting, high corporate profits, and substantial cash holdings are likely the first-order factors that determine corporate dividend policy. Our evidence implies that nontax conditions, such as cash holdings, are not always the first-order factors that determine corporate dividend policy. The impact of these nontax conditions is conditional on the degree of uncertainty of possible tax changes.

The paper is structured as follows. In section two, an overview of U.S. dividend taxation is provided. In section three, we discuss prior studies and derive testable implications. Section four presents the data and methodology, while results are reported in section five. Section six reports the results of robustness tests. Conclusions are presented in section seven.

2. Dividend Taxation in the United States

In the United States, the history of dividend income taxation has been one of fairly stable treatment. Dividends were not taxed at all, except for a brief period, until 1953. Beginning with

[6] The theoretical model in Allen, Bernardo, and Welch (2000) predicts a tax difference between institutions and retail investors that determines dividend payments. Chetty and Saez (2005) document different regular dividend policy between firms whose largest institutional owner is not affected by the tax change and others in 2003 tax reform.

the Internal Revenue Code of 1954 through 1984, dividends were fully taxed at regular ordinary income tax rates, with some minor exemptions of the first $50 - $200 of dividends. Beginning in 1985, there was no provision for exemption of dividends, and they were fully taxed as ordinary income subject to the maximum individual tax rates in place.

In late 2002 President Bush proposed that dividends should be fully exempt from individual taxes as dividends were paid out of corporate profits that had been fully taxed at the corporate level. However, the US Congress compromised on a simpler plan that would tax all qualified dividends at a 15% rate. The Jobs and Growth Tax Relief Reconciliation Act of 2003 (hereafter known as JGTRRA) signed by President Bush on May 23, 2003, provided incentives for investments and reduced individual tax rates on dividends and capital gains. JGTRRA significantly lowered the tax rates from 39.6% to 15% for dividends received by most individuals. At the same time, the tax rate on long-term capital gains was lowered from 20% to 15%. When enacted these preferential dividend rates were designed to expire at the end of 2008. However, the 15% rate was extended in 2006 such that these rates were to remain in place until the end of 2010 at which time they were scheduled to increase to ordinary income tax rates of up to 39.6%.

For most of 2010, there was significant uncertainty as to the extension of these rates. During mid-2010 there were many estimates put forth about budget impact of extending all of the Bush tax cuts, including the tax cut on dividends through 2012. The US Congress debated the extension until the middle of December 2010. On December 6, 2010, President Obama said a compromise had been reached, but it took until December 15, 2010, for the US Senate to pass the Tax Relief, Unemployment Insurance Authorization, and Job Creation Act of 2012. The

House passed the bill on December 16, 2010, and it was signed into law on December 17, 2010, thus extending the lower tax rate on dividends (as well as most of JGTRRA) through 2012[7].

In the run up to the November 2012 election, there were mixed responses as to how to deal with reducing the U.S. federal deficit, estimated to be $1.1 trillion, the fourth largest deficit since World War II[8]. There was considerable media coverage of the impending "*fiscal cliff*", whereby after January 1, 2013 all the Bush era tax cuts would expire and automatic spending cuts to military and domestic programs would follow. If no congressional compromise could be structured, the tax rate of dividends would significantly increase on January 1, 2013. The rate on dividends might have increased to 39.6% plus the 3.8% tax on investment income. However, most tax policymakers thought that the dividend rate would probably be increased to match the capital gains tax rates of 20%. Capital gains tax rates would also increase to 20% plus the tax on investment income of 3.8%.

On January 2, 2013, the U.S. Congress and President Obama reached a compromise and the tax on dividends on January 1, 2013 became a permanent 20 percent plus the 3.8% tax on investment income for unmarried taxpayers with income over $400,000 and married filing jointly taxpayers with income over $450,000.

3. Prior studies and hypothesis development

The effect of significant dividend tax *reductions* on changes in corporate dividend policy has been an area of corporate finance and taxation that has been studied substantially over the last 10 years. What has mostly been looked at is the subsequent post-reform policy, and the

[7] On March 30, 2010, President Obama signed into law the Health Care and Education Reconciliation Act of 2010, P.L.111-152 which imposes a new healthcare tax equal to 3.8% of investment income which includes dividend income. This tax increase became effective 2013.
[8] Source: US Congressional Budget Office.

overwhelming evidence indicates that a dividend tax cut indeed leads to higher post-reform dividends. Auerbach and Hassett (2005) find that firms with higher dividend yields benefit more from the 2003 tax cut. Chetty and Saez (2005) find an initial surge in dividend payments after the 2003 tax cut, as do Blouin, Ready and Shackelford (2004) report that the new legislation boosts both regular and special dividends and dampens share repurchases. Brav, Graham, Harvey and Michaely (2008) find that the 2003 tax reform increases the propensity of firms to initiate dividends (for firms that were considered to be "on the fence" about paying a dividend), while the reform has a smaller impact on increases in payout by long-term dividend payers. Brown, Liang and Weisbenner (2007) find that after the 2003 dividend tax cut firms with higher executive ownership are more likely to increase dividends. In addition, they find firms tend to use dividends as a substitute for share repurchases after the 2003 dividend tax cut. On the other hand, Floyd, Li and Skinner (2015) find that the payouts for industrials after The Jobs and Growth Tax Relief Reconciliation Act of 2003 is not consistent with the tax story that there would be a substitution from repurchases to dividends. Desai and Dharmaphala (2007) observe a substantial increase in firm dividend payments that involve both an initiation of and an increase in dividends.

In the literature, there are relatively fewer studies of the dividend policy changes that address an *increase* in dividend taxation. While a reduction in dividend taxation might induce firms to postpone dividend payments until after the change, an increase in the dividend taxation might induce firms with tax-affected investors to pay unusually large dividends prior to the change (while they still can be taxed at a lower rate) and later have to adjust to a new policy of lower dividends and perhaps more share repurchases if firms want to substitute dividends with share repurchases. This might hold especially if the tax rate on dividends might become greater

than that on capital gains on share repurchases. This means that such firms might then need to cut dividends after the tax increase. This is exactly what was found by Korkeamäki, Liljeblom and Pasternack (2010) for the case of the Finnish tax reform in 2004. However, dividend cuts are risky since they may be misinterpreted as negative signals by the market. What are firms' responses to a potential increase in dividend tax? Do firms still want to continue with an increase in the regular dividend, special dividend, or both? Or do they avoid dividend increases and instead start a gradual adjustment towards the future optimal policy of lower dividend payouts? Hanlon and Hoopes (2014) document a surge in special dividends both in 2010 and 2012, but they also find that firms shift the regular dividends that would normally be issued in January into the preceding December. These effects are above all present in firms where taxed non-institutional owners own a large fraction.[9] In this study, we examine the determinants of potential different responses in more detail, and more important we study the effect of uncertainty on the decisions by looking at whether the responses are different in the case of the uncertain tax changes of 2010 as compared to the tax changes of 2012.

We expect that in the case of *higher certainty* of a dividend tax increase in 2012 firms with tax-affected investors are more prone than otherwise to avoid a false signal and, therefore, are more likely to pay a higher dividend in the form of a special dividend. We also expect fewer firms to initiate regular dividends in 2012 compared to those in 2010. Motivated by prior studies, we have the following hypothesis.

[9] The studies of both Korkeamäki et al (2010), as well as Hanlon and Hoopes (2014) belong to a group of studies that have provided evidence indicating that firms respond differently to changes in dividend taxation, depending on the tax status of the owners of the firm. Other such studies are e.g. Chetty and Saez (2005), and Brav, Graham, Harvey, and Michaely (2008).

Hypothesis 1: Facing a possible dividend tax increase, firms are more likely to initiate and increase both regular and special dividends than in other periods.

Hypothesis 2: Facing a possible dividend tax increase, firms with more tax-affected investors are more likely to initiate and increase regular and special dividends than in other periods.

Hypothesis 3: The more certain the dividend tax increase, the more likely firms are to increase special dividends and the less likely firms are to initiate regular dividends than in other periods.

4. Data and Research Methodology

To analyze the impact of the 2010 and 2012 tax changes on firm value and trading behavior, we use CRSP/COMPUSTAT data as well as Thomson Financial Institutional Ownership data. The methodology we are implementing is similar to Auerbach and Hassett (2005) and Chetty and Saez (2005). We employ regression methodology as well as probit analysis throughout the paper and also apply the difference-in-difference (DID) methodology to test for differences in responses to level of uncertainty. DID estimators usually complement natural or quasi-experiments created by sharp policy changes (Roberts and Whited, 2012). An advantage of DID estimation arises from its potential to circumvent many of the endogeneity problems that typically appear when making comparisons between heterogeneous individual firms (Meyer, 1995).

The screening process is done as follows. We collect dividend data from the CRSP monthly files, and then we separate the data into regular and special dividend data (based on the Chetty and Saez definitions, provided in the appendix). The monthly datasets are then aggregated into quarterly data. The two datasets are then merged with CRSP return data. We delete all foreign firms, ADRs and preferred stocks for companies that are listed on NYSE, NASDAQ and AMEX. Like Chetty and Saez (2005), we delete financial and utility firms. We accordingly adjust data in 2004 real dollars (deflated using CPI).

The variation in the number of sample firms over time can raise concerns about the comparability of subsequent empirical analysis. To mitigate this concern, we construct a sample of "constant number of firms" (following Chetty and Saez (2005)). Specifically, for each quarter we rank the data according to size based on market capitalization from largest to smallest. We then choose the largest possible constant-size sample of firms and focus on a sample of the top 3380 firms ranked by market capitalization in each quarter. This sample of 3380 firms forms the basis of subsequent analysis and tests. For our main tests around the expected 2010 tax changes, we cover the dates 2009Q1 through 2010Q4 and for the tests before the anticipated 2012 reform, we cover 2011Q1 through 2012Q4.

In terms of defining a regular and special dividend, we follow the same definitions presented by Fama and French (2001) and Chetty and Saez (2005). For example, all taxable dividends besides regular distributions are defined as special dividends and are accounted for by most of CRSP's special dividend category. In accordance with Fama and French's definition, an initiating regular dividend occurs if a firm pays a dividend in quarter *t* without having paid a dividend in the previous year. "Dividend intensive margin" is defined as the probability that a firm increases or decreases dividend payments by more than 20 percent in nominal terms (as in

Chetty and Saez, (2005)). A firm is defined as initiating total dividend payments in quarter *t* if it begins paying in that quarter without paying dividends the prior year. Total dividends include both regular dividend and special dividend initiations.

5. Empirical Results

5.1. Descriptive statistics

Table 1 presents the percentage of sample firms that initiate dividends or increase their dividend payments "intensively" from the first quarter of 2008 through to the fourth quarter of 2013. The fourth quarters of 2010 and 2012 are considered to be the periods immediately prior to the expected tax rate increases. We observe that regular dividend initiation increased from 0.28 percent in the fourth quarter of 2009 to 0.87 percent in the fourth quarter of 2010. Special dividend initiations in the fourth quarter of 2010 increase to 1.89 percent compared to 0.8 percent in the prior fourth quarter. The intensive margin dividend increase is approximately double for both regular dividends (4.67 percent in 2010Q4 versus 2.78 percent in 2009Q4) and special dividends (2.43 percent in 2010Q4 compared with 1.18 percent in 2009Q4). Overall, between the two fourth quarter periods total dividend initiations increase from 1.12 percent to 2.88 percent. Additionally, the total dividend intensity margin increases from 3.91 percent to 7.22 percent.

The results are even more pronounced between the fourth quarters of 2011 and 2012, especially for special dividends. Special dividend initiations rise to 3.34 percent in 2012Q4 compared to 1.18 percent the prior fourth quarter. Total dividend initiation increases to 4.15 percent in 2012Q4 versus 1.92 percent in 2011Q4. One of the most striking summary statistics is the regular dividend intensity increase to 11.79 percent in 2012Q4 from 4.78 percent in 2011Q4.

In Table 2 we examine summary statistics for firm characteristics for the 3380 sample firms in both Panel A (for the period 2009Q1 – 2010Q4) and Panel B (2011Q1 – 2012Q4). Our observations appear to be consistent with Hanlon and Hoopes (2014). The sample firms have been publicly listed, on average, for 18.6 years and have an average cash balance of 22 percent (measured relative to book assets). Capital expenditure ratios tend to be lower, with a mean value of 5 percent. The mean and median percentages of the firm's shares held by individual investors are 44 percent and 39 percent, respectively. The mean and median ownership of tax-affected investors is 89 percent and 90 percent, respectively. The mean and median effective tax rate is 21 percent and 15 percent respectively.

If we examine Panel B of Table 2 for the sample during the period 2011Q1 through 2012Q4, we observe that the sample firms have an average cash balance of 21 percent. Capital expenditure ratios still tend to be low (a mean of 5 percent). The mean and median effective tax rates are 19 percent and 16 percent, respectively. The mean and median percentages of the firm's shares held by individual investors are 44 percent and 37 percent, respectively. The average and median ownership of tax-affected investors is 97 percent and 98 percent.

In 2010 there was more uncertainty over the taxation of future dividends than in 2009. Panel A of Table 3 shows descriptive statistics at the firm level for firms that have not previously paid a regular dividend, but start to pay a regular dividend in 2009 and 2010, respectively. We define a firm as initiating a regular dividend payment in year *t* if it begins paying in that year without paying regular dividends in the prior year. Panel A presents several interesting differences in firms' characteristics between the regular dividend initiation sample of 2009 and that of 2010. In 2010 there were almost triple the number of firms initiating regular dividends as compared to 2009. Firms that initiate regular dividends in 2010 tend to be older. Interestingly,

the firms that initiate regular dividends in 2010 have lower cash balances (and the difference is statistically significant). The firms in 2010 also have net equity issuance. Moreover, the evidence indicates that despite slightly higher averages in 2010, there is no significant difference in the composition of the firms' individual ownership, nor tax-affected ownership, between the years of 2009 and 2010.

With respect to regular dividend intensive margin, Panel B of Table 3 shows descriptive statistics at the firm level. A higher number of sample firms increase regular dividend payments by more than 20 percent in 2010 as compared to the previous year. These sample firms in 2010 tend to be older and smaller firms (measured by asset size) and tend to have higher cash balances. Firms which have a higher dividend intensity margin in 2010 also have lower capital expenditures, investment growth, and lower financing deficits[10].

Table 4 presents a comparison of firm characteristics for firms that paid dividends in 2010 and 2012. Panel A shows summary statistics for total dividend initiations. The difference between two categories of firms is means tested by a two-tailed test. Panel A reveals that firms which initiate dividends (regular and special dividends) in 2012 have higher R&D expenditures, lower net equity issuance, and more acquisition intensity compared with firms which initiate dividends in 2010. The ownership of tax-affected investors is much higher (0.97) for sample firms in 2012 compared with sample firms in 2010 (0.89) and this difference is statistically significant.

[10] In untabulated results we have summary statistics for firms that initiated a special dividend in 2009 and 2010. In 2010, more than twice the number of firms initiated a special dividend as compared to 2009. We find that firms that pay special dividends in 2010 have a higher market-to-book ratio and a lower financial deficit compared with those firms in 2009. Firms that pay special dividends in 2010 (before the expected tax change) also have higher investment growth compared with sample firms in 2009. Additionally, we also have descriptive statistics for special dividend intensity increase margins for both 2009 and 2010. The number of firms is 140 for 2010 versus 86 firms in 2009. We find that firms with higher R&D intensity tend to increase their special dividends in 2010. Results are available upon request.

In Panel B of Table 4, the data reveals that total dividend intensity for firms in 2012 tends to be characterized by firms that are older, smaller, have lower cash balances, higher profitability ratios, and higher investment growth compared with firms in 2010. The results suggest that a significantly higher sales growth rate is related to the high number of dividend intensity firms in 2012. The ownership of tax-affected investors is much higher (0.97) for sample firms in 2012 compared with sample firms in 2010 (0.88) and this difference is statistically significant.

5.2. Dividend initiations and time to potential tax increase

In the analyses reported in Sections 5.2-5.3, we study how firms' dividend policies change dramatically from the prior year in response to uncertainty in dividend tax policy in both 2010 and 2012. In this section we compare the dividend policy response in 2010 with that in 2012. We turn to explicitly examine whether there was a difference in regular versus special dividend initiations induced by the expected tax increase. We define a firm initiating regular (special) dividend payments in quarter t if it begins paying in that quarter without paying regular (special) dividends in the prior year. The signaling value of regular dividend initiation is assumed to be different from that of a one-time special dividend (Chetty and Saez, 2005).[11] We include a group of control variables that have been identified in the literature (Brav, et. 2005) as determinants of dividend payout. We run a probit regression for regular and special dividend initiations respectively between 2009Q1 and 2010Q4, and also for 2011Q1 and 2012Q4, in the following form:

$$\text{Init}_{i,t} = \boldsymbol{\alpha} + \boldsymbol{\gamma}\, \mathbf{D}_{\mathbf{2010\ or\ 2012}} + \sum \beta_s \cdot 1\,(t = s) + \sum \mu_s\, X_{i,\,t-s} + \sum \upsilon_r\, \text{SIC}^r_{i,t} + \varepsilon_{i,\,t} \qquad (1)$$

[11] See also Hanlon and Hoopes (2014) for a discussion about the cost of decreasing regular dividends.

where $Init_{i,t}$ is a dummy variable that takes the value 1 if firm *i* initiates dividends in quarter *t* and 0 otherwise. $D_{2010 \text{ or } 2012}$ refers to the dummy variable indicating year 2010 or year 2012. Quarter dummies are denoted by $[1\ (t = s)]^{T}_{s=1}$. The $X_{i,t}$ vector in the probit analysis includes the following lagged firm level covariates: (1) log(assets) (2) cash/assets (3) market capitalization/assets (4) net income/assets, (5) capital expenditures and (6) financial deficit. We also include seven additional lags of: quarterly net income/assets, market capitalization/asset, and cash/assets. The industry dummy, $SIC^{r}_{i,t,}$ represents the first two digits of SIC industry codes.

Our estimation results for the control variables are consistent with the findings in the existing literature. Table 5 reports the results from our model for dividend initiations, showing that both regular and special initiation dividends were significantly higher in 2010 as compared to 2009. For the regular dividend initiations, the explanatory variable net income/assets is positive and significant at the 1 percent level in both sample periods. The evidence suggests that the higher this ratio the more likely the firm is to initiate a regular dividend. This is consistent with the literature concerning the relationship between dividends and profitability. The variable cash/assets is significant for special dividends at all levels, in line with the view that special dividends are a vehicle to distribute excess cash on a more non-permanent basis. Our first hypothesis says that with an expectation of dividend tax increase, firms tend to initiate regular dividends.

The results for 2012 are different than for 2010. The dummy variable for 2012 is positive and significant for special dividend initiations but not for regular dividend initiations. This is in line with our hypothesis that firms in 2012 avoid sending a false signal in the form of a regular dividend initiation and reversing the high-regular-dividend policy later in a higher tax

environment. This evidence on special dividend initiations suggests that in 2012 firms would want to take advantage of the lower dividend tax rate before a more certain tax increase.

Finally we want to look at whether some firms adjust to a potentially higher tax environment by also increasing their share repurchases, perhaps as an alternative to increasing dividends. We report the estimation results on share repurchases in Table 5 column 3 and 6. The results show that the coefficients for the dummies of 2010 and 2012, respectively, are both significant and positive. The evidence indicates that firms tend to increase share repurchases right before a possible incoming dividend tax increase. For share repurchases, the coefficient of assets is positive and significant at the 1 percent level in both sample periods, as is that of market capitalization/assets. The evidence suggests that the larger the firm and the higher the market-to-book ratio, the more likely the firm is to conduct a share repurchase. The variable cash/assets is significant for share repurchases at the 5 percent level. Overall, our results are consistent with hypothesis 1.

5.3 Dividend intensity increase and time to potential tax increase

We also study whether there was a difference in dividend intensity as a result of an expected tax increase. Following Chetty and Saez (2005), we define a firm as intensively increasing its regular (special) dividend payment in quarter t if two conditions are met: (1) the firm is not initiating payments in quarter t by the definition given in the previous section; (2) regular (special) dividends in quarter t exceed the maximum value of regular (special) dividends in the past four quarters (t-1 to t-4) by at least 20 percent. As in Chetty and Saez (2005), we do not count initiations as a dividend increase to avoid double-counting our sample. We run probit regressions for the periods between 2009Q1 and 2010Q4, and also for 2011Q1 and 2012Q4.

Table 6 displays the probit regression results. As Table 6 shows, the coefficient for the dummy variable for 2010 is positive and significant at the one percent level for intensity for both regular dividends and special dividends. The evidence suggests that firms tend to intensively increase both regular and special dividends at the expectation of a tax increase. Moreover, the coefficients for cash/asset ratio and for net income/assets are positive and significant across all models. The results suggest that if firms have a higher cash/assets ratio and are more profitable, then the more likely the firm is to intensively increase both regular and special dividends. Again this is consistent with the literature concerning the relationship between dividends and profitability.

The dummy variable for 2012 (or intercept term) is also positive and significant (at the 1 percent level) for both regular dividend intensity and special dividend intensity. Liquidity (cash/assets) and profitably (net income /assets) are also significant variables in determining whether or not a firm intensively increased both regular and special dividends during this period. Overall, our results are consistent with hypothesis one.

5.4 Dividend initiation, taxable ownership and time to potential tax increase

So far, we have documented that firms adjust their dividend policy in a timely manner when facing uncertainty in tax policy: firms tend to initiate their dividend distributions or intensively increase their dividend payments in response to possible change in tax policy in the near future. If tax concerns of tax-affected shareholders play an important role in defining corporate dividend policy, we will expect a differential effect of the potential tax increase on firm dividend decision between firms with a different composition of tax-affected ownership.

To further analyze the importance of tax concerns in shaping firm dividend policy, we employ a difference-in-difference (DID) test procedure. In the regression models, the first difference reflects firm's dividend policy change between the year before and the year after a shift in the market expectation on tax policy change. The second difference is the differences in dividend policy change among firms with various levels of tax-affected ownership. To capture the two differences, our main variable of interest is the interaction of two variables: Dummy for Y2010 (Y2012) and Tax-affected Ownership or Individual ownership in Panel A (Panel B) of Table 7. Individual ownership is defined as one minus the percentage of the firm's shares that are being owned by institutional owners. Ownership of tax-affected investors is defined as the percentage of the firm's shares owned by both individual investors, as well as tax-affected institutional owners following the definition for those in Chetty and Saez (2005). Previous studies show that the sensitivity of dividend changes to the change in tax rate is larger for firms with a larger composition of individual investors and tax-affected institutional investors. [12] The results are reported in Table 7. The dependent dummy variable takes a value of one if a firm initiates its regular dividend and zero otherwise (as in column 1 and 2); it takes a value of one if a firm initiates its special dividend and zero otherwise (as in column 3 and 4).

Panel A of Table 7 presents the estimation results over the period between the first quarter of 2009 and the fourth quarter of 2010. Results in Panel A of Table 7 suggest that in year of 2010 when there is a possible tax increase, firms with larger individual ownership and tax-affected ownership are more likely to initiate their dividend. Specifically, in the estimation model of regular dividend initiation decision, the coefficient of the interaction term between the

[12] For example, Blouin et al. (2004b) find that firms revise their dividend policy to "reflect the new tax-advantaged status of dividend income for individual investors". Similarly, Chetty and Saez (2005) show that firms with large taxable institutional owners modify their dividend policy to respond more to tax cut. See also the results of Korkeamäki et al (2010).

dummy for year 2010 and the individual ownership as in column 1 (the tax-affected ownership as in column 2) is positive and statistically significant, indicating that in 2010 firms with higher individual ownership (the tax-affected ownership) are more likely to initiate its regular dividend, everything else equal.

In addition, the results on regular dividend initiations in Panel A of Table 7 suggests that in 2010 when firms face a high expectation of an income tax increase, factors such as cash holdings become less important in determining regular dividend initiation. Specifically, in the estimation model of regular dividend initiation decision, the coefficient of the interaction term between the dummy for year 2010 and firm cash holdings (as in column 1 and 2) is negative and statistically significant. The evidence indicates that the effects of cash holdings on regular dividend initiation become smaller for firms with a high percentage of tax-affected investors than for firms with a lower percentage of tax-affected investors. Our results suggest that nontax conditions, such as cash holdings, are not always the first-order factors that determine corporate dividend policy. The impact of these nontax conditions are conditional on expected tax environment.

Interestingly, the special dividend initiation decision tends to be affected by firm's total tax-affected ownership rather than retailer investors only. In the estimation model of special dividend initiation decision, the coefficient of the interaction term between the dummy for year 2010 and the individual ownership as in column 3 of Panel A is not significant. Instead the coefficient of the interaction term between the dummy for year 2010 and the tax-affected ownership (the sum of the individual ownership and tax-affected institutional ownership) as in column 4 is positive and statistically significant at 5% level (with t-value of 2.33).

Panel B of Table 7 reports the estimation results between the first quarter of 2011 and the fourth quarter of 2012. Comparing with the results in Panel A, Panel B presents several differences. First, as seen in column 1 and 2 of Panel B, the regular dividend initiation is not statistically affected by either individual ownership or tax-affected ownership. One of the possible explanations is that fewer firms initiate their regular dividend in 2012 than in 2010 since the cost of initiating dividends overcomes the benefits of doing so in 2012. It is a strong commitment for a firm to make regular dividend payments. Thus only when the benefits of a dividend distribution are large enough, will a firm initiate its regular dividend. Unlike in 2010, there is much more certainty in 2012 that the tax on dividend income would increase at the beginning of 2013. For example, if a firm initiates their regular dividend in June of 2012, the relatively low taxes on the dividends for their shareholders will end soon by the end of 2012. However, once a firm triggers its regular dividend payment, it has to commit to the long-term promise of paying regular dividends since the termination in regular dividends sends negative signals to investors and thus has a negative impact on stock performance.

The results of special dividend initiation are presented in column 3 and 4. As shown in column 3, the coefficient of the interaction between the dummy for 2012 and individual ownership level is negative and significant. In contrast, as shown in column 4, the coefficient of the interaction between the dummy for 2012 and tax-affected ownership level is positive and insignificant. Note that the tax-affected ownership includes not only the individual ownership but also the tax-affected institutional ownership. The results in column 3 and 4 suggest that firms treat individual shareholders and tax-affected institutional investors differently when making the decision concerning special dividend initiation. Moreover, the results on special dividend

initiation show that large and growth firms with more financial deficits are less likely to initiate their special dividend in 2012 than in 2011.

In sum, the evidence in Table 7 suggests that in 2010, when the market had high uncertainty concerning the potential tax increase, firms with large tax-affected owners were more likely to initiate both their regular and special dividends than otherwise anticipated. In contrast, in 2012 when market has less uncertainty about a forthcoming tax increase, there is no significant difference between firms with large tax-affected ownership and firms with low tax-affected ownership in terms of their decision on both regular and special dividend initiations.

5.5. Dividend intensity increase, taxable ownership and time to potential tax increase

To further examine the importance of tax concerns in shaping firm dividend policy, we investigate the differential impact of tax policy on firms with different level of tax-affected ownership by focusing on the intensive increase in firms' dividends. Again, to avoid double counting, we exclude dividend-initiating firms from this test. The test results are presented in Table 8.

The dependent dummy variable in Table 8 takes a value of one if a firm increases its previous regular dividend by more than 20 percent and zero otherwise (as in column 1 and 2); it takes a value of one if a firm increases its previous special dividend by more than 20 percent and zero otherwise (as in column 3 and 4).

The results on the intensive increase in regular dividends, as shown in columns 1 and 2, show that tax-affected investors, including retail investors, positively influence firms' decision on regular dividend increase. Specifically, the coefficients on individual ownership and on tax-affected ownership are statistically significant at the one percent level. However, in 2010 the

impact of tax-affected ownership on a firm's decision on regular dividend increase is not significantly different from the ownership impact in 2009. In contrast, the results in column 3 and 4 of panel A show that in 2010 the impact of tax-affected ownership on firms' decision on special dividend increase is significantly stronger than the ownership impact in 2009. The findings are consistent with the belief that a special dividend, due to its non-recurring nature, is more sensitive to the tax environment than are regular dividends.

Panel B of Table 8 reports the estimation results of firms' decision on dividend intensive increase over the period between the first quarter of 2011 and the fourth quarter of 2012. Similar to the period between 2009 and 2010 (as shown in Panel A), during the period between 2011 and 2012, there is a significant positive relation between tax-affected ownership, including individual ownership, and firms' tendency to intensively increase their regular dividend. As in Panel A of Table 8, the impact of tax-affected ownership in 2012 on firms' decision on regular dividend increase does not show any significant difference from the ownership impact in 2011. Moreover, similar to the results on the intensive increase in regular dividends (as shown in column 1 and 2 of Panel B), the decision on the intensive increase in special dividend is positively associated with tax-affected investors, including retail investors (as shown in column 3 and 4 of Panel B). However, the influence of tax-affected ownership in 2012 on special dividend increase does not show any significant difference from the ownership impact in 2011. In addition, evidence in Panel B suggests that in 2012 when firms face a higher expectation of a dividend tax increase, small and value firms are more likely to intensively increase their special dividends than in 2011.

In sum, the evidence in Table 8 suggests that in 2010 when market has high uncertainty concerning a potential forthcoming tax increase, firms with large tax-affected ownership are more likely to intensively increase the special dividend payments, but not regular dividend

payments, than otherwise. In contrast, in 2012 when the market has less uncertainty about a forthcoming tax increase, there is less heterogeneity in the firms' actions, i.e. no significant difference between firms with large tax-affected ownership and other firms in terms of their decision on the intensive increase of both regular and special dividend payments. Generally, our results are consistent with hypothesis 2.

5.6. Tax increase events compared

In the analyses reported in Table 7 and 8, we do not directly test for significant differences in the responses in 2010 and 2012. Now we turn to a more explicit test of our hypotheses, concerning dividend policy differences under high versus low uncertainty concerning a future tax change. To test for that we again employ a difference-in-difference test procedure. We examine probit models for the initiations of regular and special dividends, now interacting all variables both with a general dummy for "prior to a potential tax increase" (both in 2010 and 2012), and with a specific dummy for observations during the period of 2011 to 2012, when the uncertainty started to become smaller. The results are reported in Table 9. To the best of our knowledge, no prior study has examined the differences in responses between 2010 and 2012. Our results suggest that when an increase in taxes from 15 percent to 20 percent was becoming more certain than in 2010, firms responded differently.

In Table 9, the coefficient for the Dummy for being within 1 year of Tax Reform is positive and significant for both regular and special dividend initiation. However, when interacted with the dummy for 2011-2012, the interaction term is negative and significant for regular dividends but still positive and significant at the 10 percent level for special dividends. This indicates a difference in firm responses under higher versus lower uncertainty. During the

time period of 2011 to 2012, regular dividends were initiated much less frequently compared to the prior period, while special dividends in turn were even more common than in 2010 when uncertainty was higher. These findings are in line with our hypotheses.

Table 9 also presents evidence concerning the difference in reaction to tax uncertainty on the dividend policy related to an intensive margin increase (more than 20 percent) in firms' dividends. Specifically, in the estimation model for regular dividend intensive increase, the coefficient of the interaction term between the dummy for the period 2011-12 and the dummy variable for being within 1 year of tax increase is positive and statistically significant at the 1 percent level, indicating that in 2012 firms were more likely to increase regular dividends than they were in 2010.

Additionally, in 2012 firms were more likely to have an intensive increase in special dividends (over 2011) than in 2010. The coefficient of the interaction term between the dummy for the period 2011-12 and the dummy variable for being within 1 year of tax increase is positive and statistically significant at the 10 percent level, indicating that in 2012 firms were more likely to increase special dividends (as compared to the prior year) than they were in 2010.

These differences in the findings between dividend initiation and dividend intensive increases, as the evidence in Table 9 shows, are revealing in terms of how firms react to tax uncertainty. In 2012, firms were less likely to initiate regular dividends than they would in 2010, which is consistent with our hypothesis. Surprisingly, we find that for firms already paying dividends, they strongly responded by intensively increasing regular dividends in 2012, controlling for the major factors which have been cited as contributing to dividend policy. In 2012 firms were much more certain that the rate was going to go up for future years (by 5 percent), but the dividend tax increase was much less than might have been possible in 2010.

Firms were more certain in 2012 that in the future the rate was going to remain at relative historical lows. Our results suggest that firms do take into account the dividend tax paid by investors. Once the firms knew that rates would remain relatively low, they were less hesitant to intensively increase dividends. Generally, our results are consistent with hypothesis 3.

5.7. Share Repurchases

We have so far discussed the incentives of firms to adjust their dividends in response to an impending tax increase. However, firms may have incentives for a smooth transition to a post-change payout policy. Since share repurchases are an important part of corporate payout policy, such a policy change could be smoothly implemented by revising share repurchases prior to the tax reform.

Share repurchases are often viewed as non-cash dividends and a substitute of cash dividends to take advantage of personal tax benefits. However, beside tax considerations, there are several non-mutually exclusive non-tax factors that affect firms' decision on stock repurchases. First, stock repurchases involve no explicit or implicit firm commitment and thus stock repurchases provide firms with the flexibility in their payout policy (Jagannathan, Stephens, and Weisbach (2000)). Second, several studies (Dann (1981), Vermaelen (1981), Comment and Jarrell (1991), Ikenberry et al. (1995), Dittmar (2000)) also suggest that firms use stock repurchase as a signal to market when the insiders believe that the stock is undervalued. Third, stock repurchases are used to deter a take-over or to finance an acquisition (Bagwell (1991)). Fourth, stock repurchases may be preferred by firms with an employee stock option program (Kahle (2002)).

Between 2003 and 2012, capital gains and dividend income are taxed at the same level. In addition, due to the multiple tax and non-tax considerations, we do not expect strong substitution effect between stock repurchases and dividends in our sample.

Table 9 also reports the results from estimating a difference-in-difference probit model for share repurchases, testing for differences between the latter and the first tax reform event by the use of the Dummy for Period 2011-12 variable. The table indicates that share repurchases are more common within one year prior to a (potential or actual) tax reform (the variable Dummy for being within 1 year of Tax Reform being significant at the 10 percent level). This supports the notion that some firms prefer a smooth transition to a higher tax, lower dividend environment. Instead of temporarily increasing dividends (regular or special) by a large amount, firms use some cash to repurchase shares. Firms more likely to do so are larger firms, and firms with lower capital expenditures and financial deficit. However, we observe that there is no significant difference in firms' repurchases activities between the period of 2009-2010 and the period of 2011-2012. Our evidence indicates that firms' repurchase behaviors do not vary significantly with the tax uncertainty.

6. Robustness results:

To mitigate the concern that our previous findings are driven by regular dividend shifting actions identified in Hanlon and Hoopes (2014), we further test the robustness of our results. We delete firms that shift their January dividends to December as identified in Hanlon and Hoopes (2014). We find the results are consistent with our main results.

In previous tests, we focus on the uncertainty in year 2010 and 2012, the year right before the potential tax reform. Here, we turn our attention to the last quarter of year 2010 and 2012, the quarter right before the potential tax reform.

$$Init_{i,t} = \alpha + \gamma \, \mathbf{D_{Q4\ of\ 2010\ or\ 2012}} + \sum \beta_s \cdot 1\ (t = s) + \sum \mu_s \, X_{i,\,t-s} + \sum \upsilon_r \, SIC^{r}_{i,t} + \varepsilon_{i,\,t} \qquad (2)$$

where $Init_{i,t}$ is a dummy variable that takes the value 1 if firm *i* initiates dividends in quarter *t* and 0 otherwise. $D_{Q4\ of\ 2010\ or\ 2012}$ refers to the dummy variable indicating the **fourth quarter** of year 2010 or year 2012. We are specifically interested in the coefficient estimate of $D_{Q4\ of\ 2010\ or\ 2012}$. Quarter dummies are denoted by $[1\ (t = s)]^{T}_{s=1}$. The $X_{i,t}$ vector in the probit analysis includes the following lagged firm level covariates: (1) log(assets) (2) cash/assets (3) market capitalization/assets (4) net income/assets, (5) capital expenditures and (6) financial deficit. We also include seven additional lags of: quarterly net income/assets, market capitalization/asset, and cash/assets. The industry dummy, $SIC^{r}_{i,t,}$ represents the first two digits of SIC industry codes.

Table 10 Panel A reports the results from our model for dividend initiations, showing that both regular and special dividends initiation were significantly higher in the last quarter of 2010 as compared to other quarters between 2009 and 2010 (as seen in Column 1 and 2, respectively). The results are consistent with our hypothesis that with an expectation of dividend tax increase, firms tend to initiate regular dividends.

The dummy variable for 2012 Q4 is positive and significant for special dividend initiations but not for regular dividend initiations (as seen in Column 4 and 5, respectively). This evidence suggests that in the fourth quarter of 2012 firms would want to take advantage of the lower dividend tax rate before a more certain tax increase by initiating special dividends payment but not regular dividends.

The results on stock repurchases suggest that firm's repurchase activities do not significantly respond to uncertainty in tax reform. As seen in Table 10 Panel A Column 3 and 6, the coefficient estimates on $D_{Q4 \text{ of } 2010 \text{ or } 2012}$ are insignificant.

For Table 10, Panel B we estimate the following model:

$$Incrs_{i,t} = \alpha + \gamma \mathbf{D_{Q4 \text{ of } 2010 \text{ or } 2012}} + \sum \beta_s \cdot 1\,(t = s) + \sum \mu_s X_{i,\,t-s} + \sum \upsilon_r SIC^{r}_{i,t} + \varepsilon_{i,\,t} \qquad (3)$$

where $Incrs_{i,t}$ is a dummy variable that takes the value 1 if firm *i* intensively increases dividends in quarter *t* and 0 otherwise. $D_{Q4 \text{ of } 2010 \text{ or } 2012}$ refers to the dummy variable indicating the **fourth quarter** of year 2010 or year 2012. We are interested in the coefficient estimate of $D_{Q4 \text{ of } 2010 \text{ or } 2012}$. Quarter dummies are denoted by $[1\,(t = s)]^{T}_{s=1}$. The $X_{i,t}$ vector in the probit analysis includes the following lagged firm level covariates: (1) log(assets) (2) cash/assets (3) market capitalization/assets (4) net income/assets, (5) capital expenditures and (6) financial deficit. We also include seven additional lags of: quarterly net income/assets, market capitalization/asset, and cash/assets. The industry dummy, $SIC^{r}_{i,t,}$ represents the first two digits of SIC industry codes.

The results are consistent with our main results. Table 10 Panel B reports the results from our model for dividend increases, showing that firms significantly and intensively increase both regular and special dividends in the last quarter of 2010 as compared to other quarters between 2009 and 2010 (as seen in Column 1 and 2, respectively). The results are similar for the period between 2011 and 2012 (as seen in Column 3 and 4).

Now we turn to a test for significant differences in the responses between the last quarter of 2010 and 2012. To test for that we again employ a difference-in-difference test procedure. We examine probit models for the initiations of regular and special dividends, by interacting all variables both with a general dummy for the last quarter of 2010 and 2012, and with a specific

dummy for observations during the period of 2011 to 2012, when the uncertainty started to become smaller. The results are reported in Table 10 Panel C.

The results show that the coefficient for the Dummy for being within 1 quarter of Tax Reform is positive and significant for both regular and special dividend initiations. However, when interacted with the dummy for 2011-2012, the interaction term is insignificant for regular dividends but still positive and significant at the 1 percent level for special dividends. This indicates a difference in firm responses under higher versus lower tax policy uncertainty. During the time period of 2011 to 2012 when tax policy uncertainty was lower, regular dividends were initiated much less frequently within the last quarter before tax reform compared to the prior period. In contrast, special dividends in turn were even more common within the last quarter of 2012 than in 2010 when uncertainty was higher.

Table 10 Panel C also presents evidence concerning the difference in reaction to tax uncertainty on the dividend policy related to an intensive margin increase (more than 20 percent) in firms' dividends.

Specifically, in the estimation model for regular dividend intensive increase, the coefficient of the interaction term between the dummy for the period 2011-12 and the dummy variable for being within 1 quarter of tax increase is positive and statistically significant at the 1 percent level, indicating that in the Q4 of 2012 firms were more likely to increase regular dividends than they were in 2010 Q4. Similarly, in 2012 Q4 firms were more likely to have an intensive increase in special dividends than in 2010 Q4. Note that it was more certain in 2012 Q4 that dividend rates were going to increase the following year than in 2010.

In the estimation model for equity repurchases, the coefficient of the interaction term between the dummy for the period 2011-12 and the dummy variable for being within 1 quarter of

tax increase is positive and statistically significant at the 5 percent level, indicating that in the Q4 of 2012 firms were more likely to have repurchase activities than in 2010 Q4.

7. Conclusions

We use the individual level tax rate increases set to take effect on January 1, 2011 and January 1, 2013 as a natural experiment to investigate firm dividend policy. We examine firms' different responses to the expected U.S. tax changes between 2010, when there was more uncertainty on dividend tax increase, and 2012, when a dividend tax increase was more anticipated.[13] We do this by applying the difference-in-difference (DID) approach. Secondly, we examine the mechanism and determinants of such dividend changes by looking thoroughly at regular dividends, special dividends, dividend initiations and intensity increases, as well as the links to share repurchasing activity.

We have several key findings. We show that firms are likely to initiate their dividends or intensively increase their existing dividend amount in the year before (in 2010 and in 2012) the expected tax increase. In addition, we show that firms react differently in 2010 and 2012 in terms of their payout policy on regular dividends and on special dividends. In 2012, when there is much less uncertainty regarding the coming tax increase than that in 2010, firms are less likely to initiate a regular dividend but more likely to initiate their special dividends than they were in 2010. The results suggest that firms are less likely to make long-term commitments on regular dividend payments but more likely to take advantage of the last-minute low tax benefits by issuing special dividends. Furthermore, the response to the possible termination of a lower dividend tax was strongest in firms with higher levels of tax-affected ownership, supporting the

[13] In comparison, e.g. the U.S. tax reform of 2003, studied by Chetty and Saez (2005), was largely an unanticipated one; hence companies reacted only after its retroactive enactment.

argument that when facing policy uncertainty, firms behave to prepare for the worst scenarios, which in this case is the termination of the 2003 dividend tax cut.

In addition, we find that share repurchases tend to be more common one year prior to an (anticipated) tax increase. The evidence on share repurchases seems inconsistent with the substitution hypothesis between dividends and repurchases. However, it is possible there are other non-tax factors driving the result. For example, over this period from 2009 to 2012 (after the financial crisis) the economic environment is full of uncertainty, and firms face high uncertainty of future cash flows, and stocks are undervalued. Firms' repurchase behavior remains an open topic for future research.

Acknowledgements:

We would like to thank the editor, Jeff Netter, the anonymous referees, Danial Hemmings, Maurizio Montone, Gulnur Muradoglu, Iftekar Hasan, as well as seminar participants of the 2016 FMA International Meeting in Helsinki, the 2016 Multinational Finance Society Meeting in Stockholm, the 2016 Behavioral Finance Working Group Conference in London and the Bank of Finland Monetary Policy and Research Unit seminar series.

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Table 1: Summary Statistics

This table presents the percentage of sample firms initiating or intensively increasing their dividend payments from the first quarter of 2008 and the fourth quarter of 2013. The sample includes non-financial and non-utility US firm in quarterly CRSP dataset with reported dividend stock price, and share information on the NYSE, AMEX, and NASDAQ stock exchanges. To make our tests/ results comparable, we keep the same number of firms in each quarter in the sample. To obtain the largest possible constant-size sample of firms, we focus on a sample of the top 3380 firms ranked by market capitalization in each quarter. We measure ***total dividend*** as the sum of regular and special dividends. We define a firm as ***initiating regular (special or total) dividend payments*** in quarter t if it begins paying regular (special or total) in that quarter without paying regular (special or total) dividends in the prior year. We define a firm as ***intensively increasing its regular (special or total) dividend payment*** in quarter t if two conditions are met: (1) the firm is not initiating regular (special or total) payments in quarter t by the definition given above; (2) regular (special or total) dividends in quarter t exceed the maximum value of regular (special or total) dividends in the past four quarters (t-1 to t- 4) by at least 20 percent.

Period	Regular Dividend Initiation	Special Dividend Initiation	Regular Dividend Intensive Increase	Special Dividend Intensive Increase	Total Dividend Initiation	Total Dividend Intensive Increase
20081	0.0030	0.0092	0.0338	0.0133	0.0132	0.0429
20082	0.0045	0.0092	0.0447	0.0121	0.0146	0.0550
20083	0.0035	0.0077	0.0304	0.0098	0.0119	0.0414
20084	0.0016	0.0107	0.0327	0.0139	0.0127	0.0426
20091	0.0013	0.0033	0.0179	0.0068	0.0047	0.0228
20092	0.0034	0.0044	0.0349	0.0071	0.0080	0.0417
20093	0.0034	0.0036	0.0186	0.0047	0.0071	0.0254
20094	0.0028	0.0080	0.0278	0.0118	0.0112	0.0391
20101	0.0059	0.0062	0.0208	0.0080	0.0125	0.0328
20102	0.0089	0.0074	0.0441	0.0095	0.0165	0.0574
20103	0.0067	0.0074	0.0254	0.0089	0.0147	0.0393
20104	0.0087	0.0189	0.0467	0.0243	0.0288	0.0722
20111	0.0065	0.0050	0.0264	0.0071	0.0120	0.0358
20112	0.0106	0.0059	0.0573	0.0101	0.0171	0.0689
20113	0.0055	0.0074	0.0324	0.0092	0.0129	0.0444
20114	0.0067	0.0118	0.0478	0.0160	0.0192	0.0577
20121	0.0074	0.0059	0.0315	0.0077	0.0138	0.0441
20122	0.0090	0.0118	0.0523	0.0151	0.0214	0.0686
20123	0.0061	0.0080	0.0293	0.0107	0.0147	0.0444
20124	0.0067	0.0334	0.1179	0.0414	0.0415	0.1479
20131	0.0032	0.0083	0.0229	0.0101	0.0122	0.0366
20132	0.0068	0.0104	0.0952	0.0157	0.0181	0.1098
20133	0.0085	0.0068	0.0295	0.0092	0.0159	0.0438
20134	0.0053	0.0071	0.0506	0.0142	0.0131	0.0527

Table 2: Summary Statistics

This table presents summary statistics for our sample during the period from the first quarter of 2009 and the fourth quarter of 2010 (as in Panel A) and during the period from the first quarter of 2011 and the fourth quarter of 2012 (as in Panel B). The sample includes non-financial and non-utility US firm in quarterly CRSP dataset with reported dividend stock price, and share information on the NYSE, AMEX, and NASDAQ stock exchanges. To make our tests/ results comparable, we keep the same number of firms in each quarter in the sample. To obtain the largest possible constant-size sample of firms, we focus on a sample of the top 3380 firms ranked by market capitalization in each quarter. The final sample size depends on the availability of accounting variables in quarterly and annual COMPUSTAT datasets. The variable definitions are provided in Appendix.

Panel A: From the first quarter of 2009 and the fourth quarter of 2010

	Mean	Median	Standard Deviation	N
Firm Age Since Being Public	18.58	15.00	13.90	24862
Book Asset (in Y2004 Dollar)	3499.78	434.46	10117.41	24862
Effective Tax Rate	0.21	0.15	0.23	24862
Market-to-book Ratio	1.71	1.30	1.31	24724
Cash / Book Asset (Quarterly)	0.22	0.14	0.21	25819
Market Capitalization/Asset (Quarterly)	1.31	0.92	1.24	25820
Net Income/ Book Asset (Quarterly)	-0.01	0.01	0.06	25776
Capital Expenditure/ Book Asset	0.05	0.03	0.06	24833
Profitability	0.03	0.08	0.21	24858
R&D/ Book Asset	0.05	0.00	0.10	24862
Net equity issuance	0.03	0.00	0.15	24831
Acquisition Activity	0.02	0.00	0.05	24015
Financing deficit	0.03	0.00	0.19	24843
Investment growth rate	0.20	-0.11	1.59	24078
Individual Ownership	0.44	0.39	0.29	25393
Ownership of Tax-affected Investors	0.89	0.90	0.09	26431

Panel B: From the first quarter of 2011 and the fourth quarter of 2012

	Mean	Median	Standard Deviation	N
Firm Age Since Being Public	19.41	16.00	14.47	24771
Book Asset (in Y2004 Dollar)	3787.11	452.71	10652.19	24771
Effective Tax Rate	0.19	0.16	0.21	24771
Market-to-book Ratio	1.90	1.42	1.53	24563
Cash / Book Asset (Quarterly)	0.21	0.14	0.21	25611
Market Capitalization/Asset (Quarterly)	1.41	0.97	1.34	25604
Net Income/ Book Asset (Quarterly)	-0.01	0.01	0.06	25569
Capital Expenditure/ Book Asset	0.05	0.03	0.06	24730
Profitability	0.04	0.08	0.20	24755
R&D/ Book Asset	0.05	0.00	0.10	24771
Net equity issuance	0.05	0.00	0.19	24718
Acquisition Activity	0.02	0.00	0.06	23892
Financing deficit	0.03	-0.01	0.22	24740
Investment growth rate	0.66	0.21	1.94	23461
Individual Ownership	0.44	0.37	0.30	24842
Ownership of Tax-affected Investors	0.97	0.98	0.03	24918

Table 3: Comparison of Firm Characteristics between Y2009 And Y2010

This table describes firm characteristics of regular dividend initiation group for year 2009 and year 2010 (as in Panel A), firm characteristics of regular dividend intensively increase group for year 2009 and year 2010 (as in Panel B), firm characteristics of special dividend initiation group for year 2009 and year 2010 (as in Panel C), and firm characteristics of special dividend intensively increase group for year 2009 and year 2010 (as in Panel D). The sample includes non-financial and non-utility US firm in quarterly CRSP dataset with reported dividend stock price, and share information on the NYSE, AMEX, and NASDAQ stock exchanges. To make our tests/ results comparable, we keep the same number of firms in each quarter in the sample. To obtain the largest possible constant-size sample of firms, we focus on a sample of the top 3380 firms ranked by market capitalization in each quarter. The final sample size depends on the availability of accounting variables in quarterly and annual COMPUSTAT datasets. We measure ***total dividend*** as the sum of regular and special dividends. We define a firm as ***initiating regular (special or total) dividend payments*** in quarter t if it begins paying regular (special or total) in that quarter without paying regular (special or total) dividends in the prior year. We define a firm as ***intensively increasing its regular (special or total) dividend payment*** in quarter t if two conditions are met: (1) the firm is not initiating regular (special or total) payments in quarter t by the definition given above; (2) regular (special or total) dividends in quarter t exceed the maximum value of regular (special or total) dividends in the past four quarters (t-1 to t- 4) by at least 20 percent. The variable definitions are provided in Appendix. The difference between two categories of firms in means is tested by a two-tailed test.

Panel A: Firm characteristics of regular dividend initiation Group for year 2009 and year 2010

	2009		2010		P value of difference
	Mean	N	Mean	N	$Mean_{2010}$ - $Mean_{2009}$
Firm Age Since Being Public	13.28	32	19.38	91	0.003
Book Asset (in Y2004 Dollar)	4370.89	32	8168.96	91	0.203
Effective Tax Rate	0.23	32	0.23	91	0.980
Market-to-book Ratio	1.82	32	1.53	91	0.400
Cash / Book Asset (Quarterly)	0.30	32	0.16	87	0.002
Market-to-book Ratio (Quarterly)	1.57	32	1.17	87	0.128
Net Income/ Book Asset (Quarterly)	0.02	32	0.02	87	0.445
Capital Expenditure/ Book Asset	0.05	32	0.05	91	0.924
Profitability	0.10	32	0.11	91	0.629
R&D/ Book Asset	0.02	32	0.02	91	0.429
Net equity issuance	-0.02	32	0.01	91	0.006
Acquisition Activity	0.01	30	0.01	85	0.486
Financing deficit	-0.04	32	-0.02	91	0.539
Investment growth rate	0.87	30	0.14	86	0.222
Individual Ownership	0.40	33	0.46	93	0.300
Ownership of Tax-affected Investors	0.88	34	0.89	95	0.555

Panel B: Firm characteristics of regular dividend intensity increase group for year 2009 and year 2010

	2009		2010		P value of difference
	mean	N	mean	N	$Mean_{2010}$ - $Mean_{2009}$
Firm Age Since Being Public	23.08	299	26.14	394	0.003
Book Asset (in Y2004 Dollar)	14109.58	299	11740.72	394	0.141
Book Asset - Cash (in Y2004 Dollar)	12541.98	299	10328.75	394	0.123
Effective Tax Rate	0.28	299	0.28	394	0.979
Market-to-book Ratio	1.63	299	1.91	394	0.001
Cash / Book Asset (Quarterly)	0.14	293	0.17	391	0.015
Market-to-book Ratio (Quarterly)	1.22	293	1.48	391	0.002
Net Income/ Book Asset (Quarterly)	0.02	292	0.02	390	0.001
Capital Expenditure/ Book Asset	0.06	299	0.05	394	0.000
Profitability	0.12	299	0.11	394	0.147
R&D/ Book Asset	0.02	299	0.02	394	0.978
Net equity issuance	-0.01	299	0.00	394	0.001
Acquisition Activity	0.02	276	0.01	364	0.013
Financing deficit	0.00	299	-0.02	394	0.014
Investment growth rate	0.13	297	-0.02	390	0.008
Individual Ownership	0.37	301	0.39	393	0.324
Ownership of Tax-affected Investors	0.89	315	0.88	419	0.236

Table 4: Comparison of Firm Characteristics Between Y2010 And Y2012

This table describes firm characteristics of total dividend initiation group for year 2010 and year 2012 (as in Panel A) and firm characteristics of total dividend intensively increase group for year 2010 and year 2012 (as in Panel B). The sample includes non-financial and non-utility US firm in quarterly CRSP dataset with reported dividend stock price, and share information on the NYSE, AMEX, and NASDAQ stock exchanges. To make our tests/ results comparable, we keep the same number of firms in each quarter in the sample. To obtain the largest possible constant-size sample of firms, we focus on a sample of the top 3380 firms ranked by market capitalization in each quarter. The final sample size depends on the availability of accounting variables in quarterly and annual COMPUSTAT datasets. We measure ***total dividend*** as the sum of regular and special dividends. We define a firm as ***initiating total dividend payments*** in quarter t if it begins paying either regular or special dividends in that quarter without paying either regular or special dividends in the prior year. The variable definitions are provided in Appendix. We define a firm as ***intensively increasing its total dividend payment*** in quarter t if two conditions are met: (1) the firm is not initiating total dividend payments in quarter t by the definition given above; (2) total dividends in quarter t exceed the maximum value of total dividends in the past four quarters (t-1 to t- 4) by at least 20 percent. The variable definitions are provided in Appendix. The difference between two categories of firms in means is tested by a two-tailed test.

Panel A: Firm characteristics of total dividend initiation Group for year 2010 and year 2012

	2010		2012		P value of difference
	mean	N	mean	N	$Mean_{2012}$ - $Mean_{2010}$
Firm Age Since Being Public	19.18	197	19.07	250	0.931
Book Asset (in Y2004 Dollar)	5635.17	197	4097.46	250	0.205
Effective Tax Rate	0.24	197	0.25	250	0.642
Market-to-book Ratio	1.70	196	1.67	249	0.787
Cash / Book Asset (Quarterly)	0.20	196	0.22	254	0.309
Market-to-book Ratio (Quarterly)	1.38	193	1.28	253	0.347
Net Income/ Book Asset (Quarterly)	0.02	194	0.01	251	0.721
Capital Expenditure/ Book Asset	0.05	196	0.05	250	0.892
Profitability	0.10	196	0.11	250	0.250
R&D/ Book Asset	0.02	197	0.03	250	0.012
Net equity issuance	0.02	196	-0.01	250	0.001
Acquisition Activity	0.01	185	0.02	245	0.000
Financing deficit	-0.01	196	-0.03	250	0.142
Investment growth rate	0.14	188	0.35	240	0.112
Individual Ownership	0.49	205	0.43	240	0.050
Ownership of Tax-affected Investors	0.89	216	0.97	246	0.000

Panel B: Firm characteristics of total dividend intensity increase group for year 2010 and year 2012

	2010		2012		P value of difference
	mean	N	mean	N	$Mean_{2012}$ - $Mean_{2010}$
Firm Age Since Being Public	22.54	601	24.00	914	0.055
Book Asset (in Y2004 Dollar)	9459.54	601	7716.52	914	0.055
Effective Tax Rate	0.26	601	0.25	914	0.255
Market-to-book Ratio	1.84	593	1.76	902	0.250
Cash / Book Asset (Quarterly)	0.18	599	0.16	910	0.008
Market-to-book Ratio (Quarterly)	1.44	594	1.33	909	0.078
Net Income/ Book Asset (Quarterly)	0.02	595	0.02	908	0.219
Capital Expenditure/ Book Asset	0.05	600	0.05	912	0.062
Profitability	0.10	600	0.12	912	0.012
R&D/ Book Asset	0.02	601	0.02	914	0.105
Net equity issuance	0.01	600	-0.01	912	0.000
Acquisition Activity	0.01	557	0.02	864	0.000
Financing deficit	-0.01	600	-0.02	913	0.223
Investment growth rate	0.09	580	0.35	890	0.000
Individual Ownership	0.43	620	0.40	918	0.303
Ownership of Tax-affected Investors	0.88	659	0.97	928	0.000

Table 5: Dividend initiation and time to (potential) tax reform

This table reports results from estimating probit model for dividend initiation, using a dummy variable of dividend initiation as the dependent variable. The table presents the marginal effects on the probability of firm initiating regular, special, or total dividends over period from 2009 to 2010 and period from 2011 to 2012, respectively. The marginal effect for a dummy variable is for a discrete change from zero to one. The sample includes non-financial and non-utility US firm in quarterly CRSP dataset with reported dividend stock price, and share information on the NYSE, AMEX, and NASDAQ stock exchanges. To make our tests/ results comparable, we keep the same number of firms in each quarter in the sample. To obtain the largest possible constant-size sample of firms, we focus on a sample of the top 3380 firms ranked by market capitalization in each quarter. The final sample size depends on the availability of accounting variables in quarterly and annual COMPUSTAT datasets. ***Dummy for Year 2010*** equals to one if the sample year is 2010, otherwise zero. ***Dummy for Year 2012*** equals to one if the sample year is 2012, otherwise zero. We define a firm as ***initiating regular (special or total) dividend payments*** in quarter t if it begins paying in that quarter without paying regular (special or total) dividends in the prior year. Stock ***Repurchase*** is a dummy variable that equals to one if in quarter *t* when the firm has a positive value of total shares repurchased reported in quarterly COMPUSTAT dataset, and equals to zero if the total shares repurchased reported in quarterly COMPUSTAT dataset is zero or missing. The variable definitions are provided in Appendix. The t-values in parenthesis are computed using robust standard errors. *, **, and *** indicate significance at 10, 5, and 1% levels.

	2010			2012		
Independent Variables	Regular Dividend Initiation	Special Dividend Initiation	Re-purchase	Regular Dividend Initiation	Special Dividend Initiation	Re-purchase
Dummy for Y2010	0.004***	0.005***	0.040***			
	(3.71)	(4.06)	(4.41)			
Dummy for Y2012				0.001	0.008***	0.012*
				(0.75)	(5.62)	(1.87)
Log (Asset)	-0.000	-0.000	0.061***	0.001	-0.000	0.077***
	(-0.11)	(-0.81)	(33.18)	(1.58)	(-0.39)	(43.55)
Cash/Asset	0.012*	0.031***	0.118**	0.017	0.071***	0.119**
	(1.68)	(2.82)	(2.44)	(1.64)	(4.30)	(2.23)
Market Capitalization/Asset	0.001	-0.001	0.018***	-0.000	0.002	0.020***
	(0.78)	(-1.43)	(3.23)	(-0.23)	(1.29)	(3.24)
Net Incomes/Asset	0.017***	0.005	0.009	0.031***	0.036**	0.132*
	(2.68)	(0.52)	(0.14)	(2.96)	(2.26)	(1.80)
Capital Expenditure	-0.001	-0.004	-0.131***	-0.009	0.001	-0.287***
	(-0.15)	(-0.43)	(-2.61)	(-1.12)	(0.06)	(-5.24)
Financial Deficit	-0.004	0.002	-0.162***	-0.003	-0.007*	-0.292***
	(-1.39)	(0.54)	(-10.08)	(-1.02)	(-1.88)	(-16.86)
Including 8 lags of quarterly Net Incomes/Asset, Market Capitalization/Asset, and Cash/Asset	Yes	Yes	Yes	Yes	Yes	Yes
Industry Dummy	Yes	Yes	Yes	Yes	Yes	Yes
Quarter Dummy	Yes	Yes	Yes	Yes	Yes	Yes
R-square	0.002	0.004	0.095	0.002	0.010	0.139
N	22465	22864	22838	21923	22191	22161

Table 6: Dividend intensity increase and time to (potential) tax reform

This table reports results from estimating probit model for dividend intensive increase, using a dummy variable indicating the dividend intensive increase response of a firm as the dependent variable. The table presents the marginal effects on the probability of firm intensively increasing their regular, special, or total dividends over period from 2009 to 2010 and period from 2011 to 2012, respectively. The marginal effect for a dummy variable is for a discrete change from zero to one. The sample includes non-financial and non-utility US firm in quarterly CRSP dataset with reported dividend stock price, and share information on the NYSE, AMEX, and NASDAQ stock exchanges. To make our tests/ results comparable, we keep the same number of firms in each quarter in the sample. To obtain the largest possible constant-size sample of firms, we focus on a sample of the top 3380 firms ranked by market capitalization in each quarter. The final sample size depends on the availability of accounting variables in quarterly and annual COMPUSTAT datasets. ***Dummy for Year 2010*** equals to one if the sample year is 2010, otherwise zero. ***Dummy for Year 2012*** equals to one if the sample year is 2012, otherwise zero. We define a firm as ***intensively increasing its regular (special or total) dividend payment*** in quarter t if two conditions are met: (1) the firm is not initiating payments in quarter t by the definition given above; (2) regular (special or total) dividends in quarter t exceed the maximum value of regular (special or total) dividends in the past four quarters (t-1 to t- 4) by at least 20 percent. The variable definitions are provided in Appendix. The t-values in parenthesis are computed using robust standard errors. *, **, and *** indicate significance at 10, 5, and 1% levels.

	2009-2010		2011-2012	
Independent Variables	Regular Dividend Increase	Special Dividend Increase	Regular Dividend Increase	Special Dividend Increase
Dummy for Y2010	0.006***	0.005***		
	(2.62)	(3.14)		
Dummy for Y2012			0.020***	0.009***
			(6.79)	(5.43)
Log (Asset)	0.007***	-0.000	0.011***	0.000
	(9.02)	(-0.85)	(11.20)	(0.24)
Cash/Asset	0.064***	0.033***	0.039*	0.077***
	(3.69)	(2.59)	(1.76)	(4.44)
Market Capitalization/Asset	0.005***	-0.001	0.010***	0.002
	(2.84)	(-0.69)	(4.79)	(1.60)
Net Incomes/Asset	0.028**	0.026**	0.108***	0.061***
	(2.04)	(2.40)	(5.06)	(3.03)
Capital Expenditure	-0.024	0.004	-0.011	0.015
	(-1.58)	(0.35)	(-0.45)	(0.89)
Financial Deficit	-0.000	0.006*	-0.001	-0.003
	(-0.08)	(1.88)	(-0.14)	(-0.64)
Including 8 lags of quarterly Net Incomes/Asset, Market Capitalization/Asset, and Cash/Asset	Yes	Yes	Yes	Yes
Industry Dummy	Yes	Yes	Yes	Yes
Quarter Dummy	Yes	Yes	Yes	Yes
R-square	0.019	0.005	0.031	0.011
N	22358	22864	21758	22191

Table 7: Dividend initiation, taxable investor ownership, and time to (potential) tax increase

This table reports results from estimating probit model for dividend initiation, using a dummy variable dividend initiation as the dependent variable. Panel A presents the marginal effects on the probability of firm initiating regular, special, or total dividends over period from 2009 to 2010. Panel B presents the marginal effects on the probability of firm initiating regular, special, or total dividends over period from 2011 to 2012. The marginal effect for a dummy variable is for a discrete change from zero to one. The sample includes non-financial and non-utility US firm in quarterly CRSP dataset with reported dividend stock price, and share information on the NYSE, AMEX, and NASDAQ stock exchanges. To make our tests/ results comparable, we keep the same number of firms in each quarter in the sample. To obtain the largest possible constant-size sample of firms, we focus on a sample of the top 3380 firms ranked by market capitalization in each quarter. The final sample size depends on the availability of accounting variables in quarterly and annual COMPUSTAT datasets. ***Dummy for Year 2010*** equals to one if the sample year is 2010, otherwise zero. ***Dummy for Year 2012*** equals to one if the sample year is 2012, otherwise zero. We define a firm as ***initiating regular (special or total) dividend payments*** in quarter t if it begins paying in that quarter without paying regular (special or total) dividends in the prior year. We measure ***Individual ownership*** as the percentage of a firm's shares held by individual investors, which is estimated as one minus the percentage of a firm's shares held by institutional investors. The data source is Thomson Financial CDA/Spectrum. We measure ***Ownership of Tax-affected Investors*** as the percentage of a firm's shares held by individual investors plus the percentage of a firm's shares held by tax-affected institutional investors. The definition of "tax- affected institutional investors" is following Chetty and Saez (2005). The control variables include the following lagged firm level covariates: (1) log(assets) (2) cash/assets (3) market capitalization/assets (4) net income/assets, (5) capital expenditures and (6) financial deficit. The variable definitions are provided in the Appendix. The t-values in parenthesis are computed using robust standard errors. *, **, and *** indicate significance at 10, 5, and 1% levels.

Panel A: From first quarter of 2009 and the fourth quarter of 2010

Independent Variables	(1) Reg-Div Init	(2) Reg-Div Init	(3) Spec-Div Init	(4) Spec-Div Init
Dummy for Y2010	0.006	-0.026	0.003	-0.039*
	(0.43)	(-1.29)	(0.20)	(-1.80)
Individual Ownership	0.005*		0.010***	
	(1.87)		(3.77)	
Dummy for Y2010 × Individual Ownership	0.015**		0.006	
	(2.08)		(0.80)	
Ownership of Tax-affected Investors		-0.001		0.004
		(-0.10)		(0.41)
Dummy for Y2010 × Ownership of Tax-affected Investors		0.047***		0.045**
		(2.80)		(2.33)
Log (Asset)	0.001**	0.001	0.001***	0.000
	(2.47)	(1.54)	(3.07)	(1.30)
Cash/Asset	0.007**	0.006**	0.009***	0.008**
	(2.30)	(2.05)	(2.66)	(2.44)
Market Capitalization/Asset	0.001	0.000	-0.000	-0.001
	(1.11)	(0.53)	(-0.59)	(-1.26)
Net Incomes/Asset	0.024***	0.023***	0.020**	0.019**
	(4.20)	(4.14)	(2.18)	(2.11)
Capital Expenditure	-0.005	-0.005	-0.009	-0.009
	(-0.54)	(-0.64)	(-1.12)	(-1.02)
Financial Deficit	-0.005*	-0.004	0.001	0.002
	(-1.74)	(-1.37)	(0.56)	(0.85)
Dummy for Y2010 × Log (Asset)	0.000	0.000	-0.001	-0.000
	(0.37)	(0.15)	(-0.72)	(-0.25)
Dummy for Y2010 × Cash/Asset	-0.018**	-0.018**	0.014	0.019*
	(-2.35)	(-2.49)	(1.33)	(1.79)
Dummy for Y2010 × Market Capitalization/Asset	-0.001	-0.001	-0.000	-0.001
	(-0.53)	(-0.66)	(-0.19)	(-0.39)
Dummy for Y2010 × Net Incomes/Asset	0.027	0.022	0.088***	0.089***
	(1.19)	(1.05)	(3.07)	(3.16)
Dummy for Y2010 × Capital Expenditure	-0.010	-0.007	0.012	0.014
	(-0.34)	(-0.27)	(0.36)	(0.45)
Dummy for Y2010 × Financial Deficit	0.003	0.004	-0.005	-0.006
	(0.57)	(0.67)	(-0.73)	(-0.79)
Dummy for Y2010 × Industry Dummy	Yes	Yes	Yes	Yes
Industry Dummy	Yes	Yes	Yes	Yes
Quarter Dummy	Yes	Yes	Yes	Yes
R-square	0.004	0.003	0.005	0.005
N	22101	23080	23138	24126

Panel B: From first quarter of 2011 and the fourth quarter of 2012

Independent Variables	(1) Reg-Div Init	(2) Reg-Div Init	(3) Spec-Div Init	(4) Spec-Div Init
Dummy for Y2012	0.004	-0.059	0.053***	-0.036
	(0.36)	(-1.34)	(3.69)	(-0.59)
Individual Ownership	-0.001		0.014***	
	(-0.19)		(4.65)	
Dummy for Y2012 × Individual Ownership	-0.001		-0.017**	
	(-0.17)		(-2.00)	
Ownership of Tax-affected Investors		-0.029		0.054**
		(-1.01)		(2.00)
Dummy for Y2012 × Ownership of Tax-affected Investors		0.060		0.067
		(1.42)		(1.16)
Log (Asset)	0.001	0.000	0.002***	0.002***
	(1.25)	(0.85)	(4.58)	(3.40)
Cash/Asset	0.008*	0.009*	0.015***	0.012***
	(1.75)	(1.93)	(3.61)	(3.05)
Market Capitalization/Asset	-0.002***	-0.002***	-0.000	-0.000
	(-3.18)	(-3.87)	(-0.52)	(-0.03)
Net Incomes/Asset	0.036***	0.038***	0.022*	0.021
	(3.34)	(3.35)	(1.74)	(1.59)
Capital Expenditure	-0.009	-0.011	0.005	0.002
	(-0.89)	(-1.20)	(0.40)	(0.16)
Financial Deficit	-0.004	-0.004	-0.006***	-0.005**
	(-1.32)	(-1.24)	(-2.79)	(-2.18)
Dummy for Y2012 × Log (Asset)	-0.000	0.000	-0.006***	-0.004***
	(-0.20)	(0.31)	(-4.23)	(-3.23)
Dummy for Y2012 × Cash/Asset	0.004	0.003	0.030**	0.042***
	(0.49)	(0.36)	(1.96)	(2.63)
Dummy for Y2012 × Market Capitalization/Asset	-0.000	0.000	-0.003**	-0.003**
	(-0.50)	(0.28)	(-2.05)	(-2.15)
Dummy for Y2012 × Net Incomes/Asset	0.001	0.003	0.140***	0.156***
	(0.06)	(0.15)	(4.70)	(4.91)
Dummy for Y2012 × Capital Expenditure	0.019	0.019	-0.028	-0.008
	(0.96)	(0.98)	(-0.93)	(-0.24)
Dummy for Y2012 × Financial Deficit	-0.000	-0.004	-0.019**	-0.025***
	(-0.04)	(-0.69)	(-2.47)	(-2.88)
Dummy for Y2012 × Industry Dummy	Yes	Yes	Yes	Yes
Industry Dummy	Yes	Yes	Yes	Yes
Quarter Dummy	Yes	Yes	Yes	Yes
R-square	0.002	0.002	0.014	0.014
N	21327	21854	22712	23032

Table 8: Dividend intensity increase, taxable investor ownership, and time to (potential) tax reform

This table reports results from estimating probit model for dividend intensive increase, using a dummy variable indicating the dividend intensive increase response of a firm as the dependent variable. Panel A presents the marginal effects on the probability of firm intensively increasing their regular, special, or total dividends over period from the first quarter 2009 to the fourth quarter 2010. Panel B presents the marginal effects on the probability of firm intensively increasing their regular, special, or total dividends over period from the first quarter 2011 to the fourth quarter 2012. The marginal effect for a dummy variable is for a discrete change from zero to one. The sample includes non-financial and non-utility US firm in quarterly CRSP dataset with reported dividend stock price, and share information on the NYSE, AMEX, and NASDAQ stock exchanges. To make our tests/ results comparable, we keep the same number of firms in each quarter in the sample. To obtain the largest possible constant-size sample of firms, we focus on a sample of the top 3380 firms ranked by market capitalization in each quarter. The final sample size depends on the availability of accounting variables in quarterly and annual COMPUSTAT datasets. ***Dummy for Year 2010*** equals to one if the sample year is 2010, otherwise zero. ***Dummy for Year 2012*** equals to one if the sample year is 2012, otherwise zero. We define a firm as ***intensively increasing its regular (special or total) dividend payment*** in quarter t if two conditions are met: (1) the firm is not initiating payments in quarter t by the definition given above; (2) regular (special or total) dividends in quarter t exceed the maximum value of regular (special or total) dividends in the past four quarters (t-1 to t- 4) by at least 20 percent. ***Individual ownership*** refers to the percentage of a firm's shares held by individual investors, which is estimated as one minus the percentage of a firm's shares held by institutional investors. ***Ownership of Tax-affected Investors*** equals the percentage of a firm's shares held by individual investors plus the percentage of a firm's shares held by tax- affected institutional investors. The definition of "tax- affected institutional investors" is following Chetty and Saez (2005). We include the same controls as in Table 6, such as Log (Asset), Cash/Asset, Market Capitalization/Asset, Net Incomes/Asset, Capital Expenditure, and Financial Deficit. The variable definitions are provided in Appendix. The t-values in parenthesis are computed using robust standard errors. *, **, and *** indicate significance at 10, 5, and 1% levels.

Panel A: From first quarter of 2009 and the fourth quarter of 2010

Independent Variables	(1) Reg-Div Inc	(2) Reg-Div Inc	(3) Spec-Div Inc	(4) Spec-Div Inc
Dummy for Y2010	-0.008	0.003	-0.005	-0.051*
	(-0.24)	(0.05)	(-0.35)	(-1.90)
Individual Ownership	0.036***		0.016***	
	(6.27)		(4.83)	
Dummy for Y2010 × Individual Ownership	0.012		0.008	
	(0.99)		(0.94)	
Ownership of Tax-affected Investors		0.108***		0.004
		(5.15)		(0.29)
Dummy for Y2010 × Ownership of Tax-affected Investors		-0.001		0.054**
		(-0.03)		(2.19)
Controls	Yes	Yes	Yes	Yes
Dummy for Y2010 × Controls	Yes	Yes	Yes	Yes
Industry Dummy	Yes	Yes	Yes	Yes
Dummy for Y2010 × Industry Dummy	Yes	Yes	Yes	Yes
Quarter Dummy	Yes	Yes	Yes	Yes
R-square	0.021	0.021	0.008	0.007
N	21986	22962	23138	24126

Panel B: From first quarter of 2011 and the fourth quarter of 2012

Independent Variables	(1) Reg-Div Inc	(2) Reg-Div Inc	(3) Spec-Div Inc	(4) Spec-Div Inc
Dummy for Y2012	0.074**	0.263	0.050***	-0.025
	(2.36)	(1.51)	(3.14)	(-0.35)
Individual Ownership	0.050***		0.021***	
	(7.28)		(6.14)	
Dummy for Y2012 × Individual Ownership	-0.024		-0.011	
	(-1.44)		(-1.13)	
Ownership of Tax-affected Investors		0.342***		0.121***
		(4.99)		(3.94)
Dummy for Y2012 × Ownership of Tax-affected Investors		-0.194		0.062
		(-1.17)		(0.91)
Controls	Yes	Yes	Yes	Yes
Dummy for Y2010 × Controls	Yes	Yes	Yes	Yes
Industry Dummy	Yes	Yes	Yes	Yes
Dummy for Y2010 × Industry Dummy	Yes	Yes	Yes	Yes
Quarter Dummy	Yes	Yes	Yes	Yes
R-square	0.035	0.034	0.017	0.016
N	21166	21683	22712	23032

Table 9: Compare dividend responses to (potential) tax reform for period 2009-2010 and for period 2011-2012

This table reports results from estimating probit model for dividend initiation, using a dummy variable indicating dividend initiation and dummy variable indicating the dividend intensive increase response of a firm, respectively, as the dependent variable. The marginal effect for a dummy variable is for a discrete change from zero to one. The sample period includes the period from 2009 and 2010 and the period from 2011 and 2012. The sample includes non-financial and non-utility US firm in quarterly CRSP dataset with reported dividend stock price, and share information on the NYSE, AMEX, and NASDAQ stock exchanges. To make our tests/ results comparable, we keep the same number of firms in each quarter in the sample. To obtain the largest possible constant-size sample of firms, we focus on a sample of the top 3380 firms ranked by market capitalization in each quarter. The final sample size depends on the availability of accounting variables in quarterly and annual COMPUSTAT datasets. We measure ***total dividend*** as the sum of regular and special dividends. We define a firm as ***intensively increasing its total dividend payment*** in quarter t if two conditions are met: (1) the firm is not initiating total dividend payments in quarter t by the definition given above; (2) total dividends in quarter t exceed the maximum value of total dividends in the past four quarters (t-1 to t- 4) by at least 20 percent. Stock ***Repurchase*** is a dummy variable that equals to one if in quarter *t* when the firm has a positive value of total shares repurchased reported in quarterly COMPUSTAT dataset, and equals to zero if the total shares repurchased reported in quarterly COMPUSTAT dataset is zero or missing. ***Dummy for Period 2011-12*** equals to one if the sample year is either 2011 or 2012, otherwise zero. ***Dummy for Being Within 1 year of Tax Reform*** equals to one if the sample year is either 2010 or 2012, otherwise zero. We include controls such as Log (Asset), Cash/Asset, Market Capitalization/Asset, Net Incomes/Asset, Capital Expenditure, and Financial Deficit. The variable definitions are provided in Appendix. The t-values in parenthesis are computed using robust standard errors. *, **, and *** indicate significance at 10, 5, and 1% levels.

	Dividend Initiation		Intensive Increase		Re-purchase
Independent Variables	Regular Dividend	Special Dividend	Regular Dividend	Special Dividend	
Dummy for Period 2011-12	0.003	-0.001	-0.009	-0.002	-0.024
	(0.72)	(-0.22)	(-1.09)	(-0.38)	(-1.30)
Dummy for Being Within 1 year of Tax Reform	0.004***	0.004**	0.002	0.004**	0.015*
	(3.21)	(2.35)	(0.80)	(2.42)	(1.93)
(Dummy for Period 2011-12) ×	-0.004**	0.004*	0.016***	0.004*	-0.003
(Dummy for Being Within 1 year of Tax Reform)	(-2.30)	(1.86)	(3.89)	(1.68)	(-0.29)
Controls	Yes	Yes	Yes	Yes	Yes
Dummy for Period 2011-12 × Controls	Yes	Yes	Yes	Yes	Yes
Industry Dummy	Yes	Yes	Yes	Yes	Yes
Quarter Dummy	Yes	Yes	Yes	Yes	Yes
R-square	0.002	0.007	0.027	0.008	0.123
N	46032	48724	45741	48724	44999

Table 10: Robustness: Excluding Dividend Shifter

This table reports results from estimating probit model for dividend initiation, using a dummy variable of dividend initiation as the dependent variable. Panel A (B) presents the marginal effects on the probability of firm initiating (intensity increasing) regular dividend, special dividend, or repurchase activities over period from 2009 to 2010 and period from 2011 to 2012, respectively. Panel C compares dividend responses to (potential) tax reform for period 2009-2010 and for period 2011-2012. The marginal effect for a dummy variable is for a discrete change from zero to one. The sample includes non-financial and non-utility US firm in quarterly CRSP dataset with reported dividend stock price, and share information on the NYSE, AMEX, and NASDAQ stock exchanges. To make our tests/ results comparable, we keep the same number of firms in each quarter in the sample. To obtain the largest possible constant-size sample of firms, we focus on a sample of the top 3380 firms ranked by market capitalization in each quarter. We also delete firms that shift their January dividends to December as identified in Hanlon and Hoopes (2014). Dummy for Year 2010 Q4 equals to one if the sample year is the fourth quarter of 2010, otherwise zero. Dummy for Year 2012 Q4 equals to one if the sample year is the fourth quarter of 2012, otherwise zero. We define a firm as initiating regular (special) dividend payments in quarter t if it begins paying in that quarter without paying regular (special) dividends in the prior year. Stock Repurchase is a dummy variable that equals to one if in quarter t when the firm has a positive value of total shares repurchased reported in quarterly COMPUSTAT dataset, and equals to zero if the total shares repurchased reported in quarterly COMPUSTAT dataset is zero or missing. We define a firm as intensively increasing its regular (special) dividend payment in quarter t if two conditions are met: (1) the firm is not initiating payments in quarter t by the definition given above; (2) regular (special) dividends in quarter t exceed the maximum value of regular (special) dividends in the past four quarters (t-1 to t- 4) by at least 20 percent. The variable definitions are provided in Appendix. The t-values in parenthesis are computed using robust standard errors. *, **, and *** indicate significance at 10, 5, and 1% levels.

Panel A: Dividend initiation and time to (potential) tax reform

	2010			2012		
Independent Variables	Regular Dividend Initiation	Special Dividend Initiation	Re-purchase	Regular Dividend Initiation	Special Dividend Initiation	Re-purchase
Dummy for Y2010 Q4	0.005**	0.009***	0.016			
	(2.09)	(2.91)	(1.28)			
Dummy for Y2012 Q4				0.001	0.025***	0.008
				(0.43)	(6.04)	(0.64)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Including 8 lags of controls	Yes	Yes	Yes	Yes	Yes	Yes
Industry Dummy	Yes	Yes	Yes	Yes	Yes	Yes
Quarter Dummy	Yes	Yes	Yes	Yes	Yes	Yes
R-square	0.001	0.003	0.090	0.001	0.012	0.134
N	21029	21424	21399	20511	20777	20747

Panel B: Dividend intensity increase and time to (potential) tax reform

	2009-2010		2011-2012	
Independent Variables	Regular Dividend Increase	Special Dividend Increase	Regular Dividend Increase	Special Dividend Increase
Dummy for Y2010 Q4	0.011**	0.012***		
	(2.18)	(3.30)		
Dummy for Y2012 Q4			0.037***	0.029***
			(5.75)	(6.47)
Controls	Yes	Yes	Yes	Yes
Including 8 lags of controls	Yes	Yes	Yes	Yes
Industry Dummy	Yes	Yes	Yes	Yes
Quarter Dummy	Yes	Yes	Yes	Yes
R-square	0.021	0.005	0.027	0.013
N	20934	21424	20355	20777

Panel C: Compare dividend responses to (potential) tax reform for periods 2009-2010 and 2011-2012

	Dividend Initiation		Intensive Increase		Re-purchase
Independent Variables	Regular Dividend	Special Dividend	Regular Dividend	Special Dividend	
Dummy for Period 2011-12	0.005	0.000	-0.007	0.001	-0.018
	(1.30)	(0.12)	(-0.93)	(0.13)	(-1.05)
Dummy for Being Within 1 quarter of Tax Reform	0.005**	0.008***	0.005	0.011***	-0.007
	(2.46)	(3.09)	(1.27)	(3.66)	(-0.71)
(Dummy for Period 2011-12) ×	-0.004	0.018***	0.032***	0.018***	0.029**
(Dummy for Being Within 1 quarter of Tax Reform)	(-1.49)	(4.27)	(5.03)	(4.03)	(2.39)
Controls	Yes	Yes	Yes	Yes	Yes
Dummy for Period 2011-12 × Controls	Yes	Yes	Yes	Yes	Yes
Industry Dummy	Yes	Yes	Yes	Yes	Yes
Quarter Dummy	Yes	Yes	Yes	Yes	Yes
R-square	0.002	0.008	0.026	0.009	0.110
N	43171	45838	42901	45838	45568

Appendix

1) Key Variables:

Dummy for Year 2010: It equals to one if the sample year is 2010, otherwise zero.

Dummy for Year 2012: It equals to one if the sample year is 2012, otherwise zero.

Regular (special or total) Dividend Initiation: We define a firm initiating regular (special or total) dividend payments in quarter t if it begins paying in that quarter without paying regular (special or total) dividends in the prior year.

Regular (special or total) Dividend Intensive Increase: We define a firm as intensively increasing its regular (special or total) dividend payment in quarter t if two conditions are met: (1) the firm is not initiating payments in quarter t by the definition given above; (2) regular (special or total) dividends in quarter t exceed the maximum value of regular (special or total) dividends in the past four quarters (t-1 to t- 4) by at least 20 percent.

Dummy for Stock Repurchase: It equals to one if in quarter t the firm has a positive value of total shares repurchased reported in quarterly COMPUSTAT dataset, and equals to zero if the total shares repurchased reported in quarterly COMPUSTAT dataset is zero or missing.

Individual ownership: The percentage of a firm's shares held by individual investors, which is estimated as one minus the percentage of a firm's shares held by institutional investors. The data source is Thomson Financial CDA/Spectrum.

Ownership of Tax-affected Investors: The percentage of a firm's shares held by individual investors plus the percentage of a firm's shares held by tax- affected institutional investors. The definition of "tax- affected institutional investors" is following Chetty and Saez (2005).

Dummy for Period 2011-12: It equals to one if the sample year is either 2011 or 2012, otherwise zero.

Dummy for Being Within 1 year of Tax Reform: It equals to one if the sample year is either 2010 or 2012, otherwise zero.

2) Other Variables:

Age: Number of years since the firm observations were included in COMPUSTAT.

Financing deficit: Sum of cash dividends, investments, and change in working capital minus internal cash flows, with all components scaled by the book value of total assets. See Frank and Goyal (2003) and John and Litov (2010) for details of the financing deficit calculation.

Capital expenditures: Ratio of capital expenditures to the book value of total assets.

Cash: Ratio of cash plus marketable securities to net assets (i.e., book value of total assets minus cash plus marketable securities).

Cash flow: Operating income before depreciation minus interest expenses, taxes, preferred dividends, and common dividends, scaled by total assets.

Profitability: Ratio of operating income before depreciation to the book value of total assets.

Market-to-book: Ratio of market value of assets to the book value of total assets, where the market value of assets is computed as the sum of the book value of total assets plus the market value of common stock minus the book value of commons stock.

R&D: Ratio of research and development expense to total book asset, with R&D set equal to zero when research and development expense is missing.

Investment growth rate: the ratio of previous year's capital expenditures to current year's capital expenditures minus one.

Acquisition activity: Ratio of expenditures on acquisitions to the book value of total assets.

Effective tax rate: the ratio of income taxes minus deferred taxes to pretax income.

Net equity issuance: The split-adjusted change in shares outstanding times the split-adjusted average stock price (data199t + data199t−1 ∗ (data27t/data27t−1)) dividend by the end of year t−1 total assets.

Highlights

Uncertainty and Firm Dividend Policy – A Natural Experiment

- Firms time the uncertainty in the tax environment and revise their dividend policy to an expected tax increase.
- Firms are likely to initiate their dividends or intensively increase their existing dividend amount one year before the expected tax increase.
- Firms facing less tax uncertainty are less likely to make long-term commitments on regular dividend payments.
- Instead they are more likely to take advantage of the last-minute low tax benefits by issuing special dividends.
- The response to the possible elimination of a tax cut was strongest in firms with high levels of tax-affected ownership.