DIVIDEND TAXES AND CORPORATE BEHAVIOR: EVIDENCE FROM THE 2003 DIVIDEND TAX CUT*

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This paper analyzes the effects of dividend taxation on corporate behavior using the large tax cut on individual dividend income enacted in 2003. We document a 20 percent increase in dividend payments by nonfinancial, nonutility publicly traded corporations following the tax cut. An unusually large number of firms initiated or increased regular dividend payments in the year after the reform. As a result, the number of firms paying dividends began to increase in 2003 after a continuous decline for more than two decades. Firms with high levels of nontaxable institutional ownership did not change payout policies, supporting the causality of the tax cut in increasing aggregate dividend payments. The response to the tax cut was strongest in firms with strong principals whose tax incentives changed (those with large taxable institutional owners or independent directors with large share holdings), and in firms where agents had stronger incentives to respond (high share ownership and low options ownership among top executives). Hence, principal-agent issues appear to play an important role in corporate responses to taxation.

I. Introduction

The taxation of dividend income has generated much interest and controversy both in the public economics literature and among tax policy makers, largely because it creates a particularly stark version of the equity-efficiency trade-off. Dividend income,

and especially taxable dividend income, accrues very disproportionately to wealthy individuals. Hence, taxing dividends could be desirable for redistributive reasons. However, taxing dividend income could also generate large efficiency costs. Dividend taxes reduce the net return to investors, potentially reducing savings and the capital stock in the economy. In addition, taxing dividend income at the individual level could induce firms to reduce their tax burdens by retaining earnings rather than distributing dividends. If agency problems lead to inefficient investment of retained earnings (as originally suggested by Jensen [1986]), dividend taxation could reduce the efficiency of capital allocation in addition to distorting the amount of investment. In view of this trade-off, it is important to know firms' behavioral responses to taxation to understand optimal dividend taxation. However, despite extensive research, the effects of dividend taxation on dividend policies and corporate behavior more generally remain disputed, largely because of the lack of compelling tax variations, and therefore of a fully convincing research design (see Auerbach [2003] and Allen and Michaely [2003] for recent surveys).

The Jobs and Growth Tax Relief Reconciliation Act of 2003 in the United States (hereafter, the "2003 tax reform") provides a new opportunity to understand the effects of dividend taxation on corporate behavior. One of the main provisions of the reform was to introduce favorable treatment for individual dividend income whereby dividends are taxed at a rate of 15 percent instead of facing the regular progressive individual income tax schedule with a top rate of 35 percent.[1] The reform was officially signed into law on May 28, 2003, but was first proposed by the Bush administration on January 7, 2003.[2] The tax cut on dividend income was made retroactive to the beginning of 2003. Therefore, during the first two quarters of 2003, corporations knew that

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1. More precisely, taxpayers in the bottom two income tax brackets (facing a regular marginal tax rate of 10 or 15 percent) face a new dividend tax rate of 5 percent, while taxpayers in the top four brackets (facing marginal tax rates of 25, 28, 33, or 35 percent) face a new dividend tax rate of 15 percent. Taxpayers on the Alternative Minimum Tax schedule (flat rate of 28 percent) benefit from the reduced 15 percent tax rate on their dividend income as well. Individual dividend income earned through tax-favored accounts such as 401(k)s and dividend income earned by government agencies, nonprofit organizations, and corporations are not affected by the tax change.

2. Auerbach and Hassett [2005] discuss the timing of the tax reform legislative process in detail. They find that the reduction of dividend taxation was not discussed seriously before the end of December 2002. It was not mentioned in the Bush 2000 campaign platform either, suggesting that there was no anticipation that such a tax change would take place before the very end of 2002.

dividends would face lower taxes with some probability. President Bush initially proposed a full exemption of dividend taxation at the individual level, potentially biasing preenactment expectations toward a larger tax reduction than what actually occurred. The tax cut is scheduled to expire by 2009, but could be made permanent by the second Bush administration.

This paper uses the 2003 dividend tax cut to estimate the effect of dividend taxes on dividend payments by publicly traded corporations (excluding financial and utility companies). We investigate this issue using data on dividend payments up to the second quarter of 2004 from the Center for Research in Security Prices (CRSP). Our empirical strategy is a straightforward before-and-after comparison, coupled with a test for confounding trends using firms owned primarily by nontaxable institutions as a "control group." Our main findings are as follows.

First, dividend initiations surged in the quarters immediately following enactment of the reform. As a result, the fraction of traded companies paying dividends, which had declined continuously over the last two decades (see Fama and French [2001]), increased significantly from a low of 20 percent in 2002-Q4 to almost 25 percent in 2004-Q2. Second, dividend-paying firms were significantly more likely to increase their regular dividend payments after the reform. Third, the number of special (i.e., one time, nonrecurring) dividend payments also increased following the 2003 tax reform. Aggregating the changes in amounts along the extensive and intensive margins, we estimate that the tax cut raised total regular dividend payments by about $5 billion per quarter (20 percent), a change that is statistically significant at the 1 percent level. This implies an elasticity of regular dividend payments with respect to the marginal tax rate on dividend income of -0.5.

All of these results are robust to controlling for a variety of potential confounding factors such as levels and lags of profits, assets, cash holdings, industry, and firm age. We observe no preform decline in dividends, suggesting that the reform was indeed unanticipated and that our estimates are not biased by intertemporal substitution (retiming) of dividend payments. In addition, there is no change in dividends for corporations whose largest shareholder is a nontaxable institution such as a pension fund, further supporting the causal role of the tax cut. While these results suggest that the dividend response was caused by the tax cut, it is also important to note that major accounting

fraud scandals in 2000–2002 might have created distrust among shareholders and increased the demand for dividends. These scandals may have increased the sensitivity of dividend payments to taxation.

We explore the mechanism of the tax response by analyzing the heterogeneity of the effect across firms. The dividend response was concentrated among firms with strong incentives for agents to increase dividend payments or with powerful principals whose incentives to demand dividend income changed significantly with the reform. Firms where top executives held more shares and fewer unexercised stock-options were much more likely to initiate dividend payments, revealing the importance of top executives' self-interests in determining corporate responses to taxation. In addition, firms with high taxable institutional ownership or large independent shareholders on the board of directors were also more likely to raise dividends, especially when top executives have weak incentives to do so. These findings indicate that agency issues should be a central element in the analysis of optimal corporate tax policy, and call for a tighter connection between traditional tax efficiency analysis in public economics and the agency theory of the firm in corporate finance.

Finally, we examine whether the dividend increases crowded out share repurchases, the alternative channel through which companies can distribute profits to shareholders. This question is important because increases in dividends are likely to have efficiency benefits only if total payout (dividends plus share repurchases) changes. Share repurchases have risen since the tax cut was enacted, consistent with limited substitution, but the volatility of aggregate share repurchases makes it difficult to draw statistically precise conclusions about the degree of substitution in the full sample of firms. However, we are able to establish that total payout rose significantly among the subset of companies that initiated dividends after the reform, suggesting that the tax cut did not simply induce "relabeling" of repurchases as dividends.

In parallel and independently of our analysis, a number of recent studies have also examined the effects of the 2003 dividend tax cut. Blouin, Raedy, and Shackelford [2004] analyze a short panel of firms that announced dividends either in the last six months of 2003 (after enactment) or the last six months of 2002 (before the reform was proposed). Consistent with our results, they find a significant increase in dividends both in special and

regular payments. In contrast to our study, they analyze dividends per share at the firm level without decomposing the effects into extensive and intensive margins. Julio and Ikenberry [2005] adopt a longer time series perspective and examine the fraction of firms paying dividends. They also find that the fraction of dividend payers has increased in recent years, but argue that the increase started before 2003, questioning the causality of the tax cut. We describe below how large changes in sample composition due to the dot-com boom and bust explain the discrepancy between our findings and theirs. Finally, Nam, Wang, and Zhang [2004] and Brown, Liang, and Weisbenner [2004] examine the relation between executive stock and option holdings and the dividend response to the 2003 tax cut. Although their econometric methodology and data differ somewhat from our study, their findings are broadly consistent with ours.[3] Brown, Liang, and Weisbenner conclude that most of the dividend increases were due to substitution with share repurchases, while we argue that this inference is at best fragile. We describe the similarities and discrepancies between our study and the concurrent papers in greater detail in the course of the analysis that follows.

The remainder of the paper is organized as follows. Section II provides some background on payout policies and previous work on the effects of dividend taxation. It also describes the data we use and defines the variables of interest. Section III describes our methodology and presents the main results on the change in dividend payments induced by the tax reform. Section IV examines the heterogeneity of the response and substitution with share repurchases. Section V offers concluding remarks.

II. PAYOUT POLICIES AND DATA

II.A. *Payout Policies*

Corporations distribute profits to shareholders in two main forms: dividends and share repurchases. In a world without taxes and with perfect information, share repurchases and dividends are equivalent. Under U. S. tax law, share repurchases were a more tax efficient way of distributing profits because realized

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3. More precisely, they use primarily linear regressions rather than semiparametric graphical evidence. In addition, they limit their analysis to the Execucomp data, and do not analyze the interaction between agent and principal incentives.

capital gains have been taxed more lightly than dividend income. Share repurchases started becoming more common in the early 1980s following a Securities and Exchange Commission (SEC) ruling in 1982 which clarified the circumstances under which corporations could legally make share repurchases without being subject to dividend taxation [Grullon and Michaely 2002]. However, despite the rise in share repurchases, dividends have remained an important conduit for distributing profits.[4] The question of why dividends have not been entirely replaced by share repurchases has been termed the "dividend puzzle," and a number of theories and explanations have been proposed to explain this phenomenon [Allen and Michaely 2003]. The 2003 tax cut almost eliminated the tax disadvantage of dividends relative to repurchases.[5]

Within dividends, there is a further division of types of payout: regular dividends and special dividends. Regular dividends are periodic and recurrent (in general quarterly but sometimes annual, semiannual, or more rarely monthly). Reductions in regular dividends are very rare, consistent with DeAngelo and DeAngelo's [1990] finding that only severely distressed firms lower or terminate dividend payments. Regular dividends are thus very persistent over time, and an initiation of a regular payment is a strong signal that the firm intends to maintain a dividend payment of equal or greater value permanently. In contrast to regular dividends, special dividends are one-time, nonrecurring events. Special payments are made by very few firms, and are also usually of minor importance in terms of amounts relative to regular dividends, accounting for less than 2.5 percent of total dividends on average (see summary statistics in Table I). Dividend payments are announced (declaration) by corporate boards about a month in advance of payment in general. The payment date is the relevant one for tax purposes and hence is the one we primarily focus on in this study. However, the declaration dates matter for understanding the precise timing of the response, and we also analyze them when looking at a

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4. Over the last decade, total dividend payments are about the same size as total share repurchases for publicly traded U. S. corporations; see Allen and Michaely [2003] and subsection IV.C. below. Grullon and Michaely [2002] argue that share repurchases have, to some extent, crowded out dividend payments.

5. Individual tax rates on dividends and realized capital gains are legally the same after the reform, but share repurchases retain a real fiscal advantage relative to dividends because realized gains resulting from share repurchases are taxed net of basis (deferral tax advantage) and can also be timed.

TABLE I
SUMMARY STATISTICS

Variables	Core Sample (all firms in CRSP)		Constant number of firms sample (top 3807 firms)	
	Mean	St. dev.	Mean	St. dev.
Regular dividend amount	4.52	40.34	5.80	45.67
Special dividend amount	0.11	10.73	0.14	12.16
Share repurchases amount	5.33	64.98	6.89	73.82
Fraction paying regular dividends	22.68%	41.88%	28.34%	45.07%
Fraction paying special dividends	0.58%	7.62%	0.67%	8.16%
Fraction initiations	0.24%	4.93%	0.29%	5.39%
Fraction terminations	0.46%	6.77%	0.46%	6.79%
Fraction dividend increases (20%+)	1.06%	10.25%	1.33%	11.44%
Fraction dividend decreases (20%+)	0.28%	5.29%	0.33%	5.75%
Fraction repurchasing (0.1%+)	15.08%	35.79%	16.71%	37.31%
Market capitalization	1125.82	8285.92	1444.76	9373.65
Assets	1137.36	8151.95	1442.00	9186.48
Cash and liquid assets	79.49	568.03	100.50	640.01
After-tax profits	9.88	160.26	12.90	180.15
	CRSP	CRSP-COMP	CRSP	CRSP-COMP
# firm-quarter observations	440,772	395,662	342,630	309,964

Core sample includes all firm-quarters in CRSP that are nonutility, nonfinancial, and nonforeign in their last quarter from 1982-Q1 to 2004-Q2. Constant number of firms' sample keeps only the top 3807 firms ranked by market capitalization in each quarter. All dollar amounts are in real 2004-Q1 millions of dollars. All variables are from CRSP except assets, cash, share repurchases, and profits, which are from COMPUSTAT.

monthly frequency around the reform. Given the modest lag between declaration and payment, all our quarterly analyses are not be affected by using declaration dates instead of payment dates.

Most of the empirical work on the effects of taxation on dividend payments has used time series analysis rather than focusing on a single tax reform. The evidence from this literature is controversial, and is typically divided into the "old view" and the "new view" (see Auerbach [2003] for a recent survey). The old view says that dividend taxes reduce the net return on investment and hence reduce the supply of savings. Therefore, when taxes on dividends are cut, individuals save more, spurring business investment, profits, and dividend distributions in the long run. The time series analysis of Poterba and Summers [1985] for

the United Kingdom and more recently Poterba [2004] for the United States support the old view.

In contrast, the new view on dividend taxation assumes that marginal investments are entirely financed by retained earnings rather than new share issues. Under this assumption, the tax on dividends should not affect the investment decisions of firms, and profits and dividend payments therefore should not change either. In this case, the dividend tax cut is irrelevant for corporate decisions and simply benefits individual investors by reducing their tax burden. However, if the tax reform is only temporary—as might be the case with the 2003 tax reform—even the new view would predict a rise in dividend payments following the tax cut. Auerbach and Hassett [2003] show that consistent with the new view, dividend payments are sensitive to changes in investment at the firm level, suggesting that retained earnings are indeed the marginal source of investment funds.

II.B. Data

We use quarterly data from the CRSP, which reports dividend, stock price, and share information for all companies listed on the NYSE, AMEX, and NASDAQ stock exchanges. The data we use span 1980-Q1 to 2004-Q2. We exclude all foreign firms. We also exclude firms whose most recent industry classification is in utilities (SIC codes between 4900 and 4949) or the financial sector (SIC code between 6000 and 6999) for two reasons. First, this exclusion facilitates comparison of our results with prior work. Most studies on dividends (for example, Allen and Michaely [2003], Fama and French [2001], and Auerbach and Hassett [2003]) exclude companies in these industries on the grounds that they face additional regulations and hence might have different payout behavior. Second, the historical dividend patterns of utilities and financials are in fact quite different from other companies.[6] The fraction of dividend payers in these groups has not declined, and remains around 70 percent today (versus 25 percent for all other firms). Dividend payments by financial and utility companies also rose after the tax cut, but the break relative to historical trends was not as sharp as in other industries. Understanding the reasons for these industry-level differences in dividend payout behavior is a question left for future research.

6. In contrast, there is much less heterogeneity in historical dividend payout trends across all other first digit SIC codes in our sample.

The sample of firms that satisfy the preceding criteria constitutes our "core sample." The number of firms in the core sample in each quarter varies from 4000 in the early 1980s to 6000 in the late 1990s. There are large variations in the number of listed firms because of waves of new lists during some periods, in general booms, and waves of delisting in others, in general recessions and stock market crashes. The large variation over time in the number of firms in the core sample raises important sample composition issues in the empirical analysis. As we show below, it is often useful for comparability to 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 3807 firms ranked by market capitalization in each quarter, which we term the "constant number of firms" sample. The total number of firms which meet our selection criteria in 2004-Q2, the last quarter available, is 3807. For all previous quarters, the CRSP data always contain at least 3807 firms.

For our regression and heterogeneity analysis, we merge our CRSP sample with the Compustat database, losing some firms because not all firms listed in CRSP are covered by Compustat. The left half of Table I gives summary statistics for the core and the constant number of firms samples between 1981-Q3 and 2004-Q2.[7] All dollar amounts in this and subsequent tables and graphs are in real 2004 dollars (deflated using the CPI). We also merge our data with various other databases that contain other covariates of interest. Execucomp provides stock and stock-option ownership data for approximately one-third of the firms in our sample for every year since 1992. The Thomson Financial database provides detailed institutional ownership information for most of the firms in our sample. Dlugosz, Fahlenbrach, Gompers, and Metrick [2004] give information on large shareholders (individuals or entities who hold more than 5 percent of shares), collected from proxy statements, for about 1500 firms for the period 1996–2001. Because Execucomp and the Dlugosz et al. databases cover only about a third of the CRSP-Compustat firms, we augment these data sources for our principal-agent heterogeneity analysis by collecting some share and options ownership variables directly from SEC proxy statements for an additional 347 firms, as described in Section IV.

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7. Lagged data requirements for our subsequent analysis force us to begin with 1981-Q3.

We define regular dividends as monthly, quarterly, semiannual, and annual taxable dividends in the CRSP data. We also reclassify "other frequency" taxable dividends as regular dividend payments when other-frequency payments are followed by regular payments of similar magnitude.[8] Some forms of liquidation can generate nontaxable dividend events that we ignore in this study. We define all taxable dividends besides regular distributions as "special" dividends. More precisely, we define special dividends as the sum of special, one-time, unspecified, and other-frequency dividends (those that were not followed by regular payments of similar magnitude) in the CRSP data. Virtually all payments in our broader definition of special dividends are accounted for by CRSP's "special dividend" category. Unless noted otherwise, we focus on dividend payment dates in our empirical analysis.

Our definitions of dividend initiation and termination follow existing conventions (see, e.g., Fama and French [2001]). In general, we define a firm as initiating regular dividend payments in quarter t if it begins paying in that quarter without paying in the prior year. Analogously, we define a firm as terminating regular dividend payments in quarter t if it stops paying from quarter t on for at least one year. Our exact definitions (presented in the Appendix) are slightly more complex to accommodate changes in quarterly payment dates of annual and semiannual payers and to account for sample censoring.

III. Effect of the Tax Cut on Dividend Payments

Figure I plots aggregate regular dividends for the core sample between 1981-Q3 and 2004-Q2 in real 2004 dollars. Total regular dividends rose from \$25 billion in 2002 to a peak of almost \$30 billion at the end of 2003. Note that most of the increase takes place in the last two quarters of 2003 after the tax cut was signed into law in late May 2003. These are the largest increases during the sample period. If the post-2003 increases in aggregate dividends are due exclusively to the tax cut, the reform appears to have raised aggregate regular dividends by about 20 percent relative to the level in 2002-Q4. Figure I also plots the total

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8. Other-frequency dividends are extremely rare, so our results are not sensitive to the way we treat them.
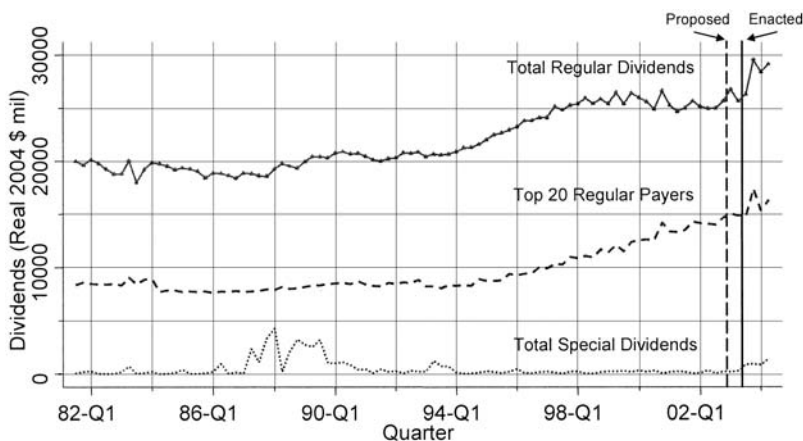
FIGURE I

Regular and Special Dividend Amounts by Quarter

This figure depicts aggregate quarterly regular and special dividend payments, along with total regular dividend payments by the largest twenty regular dividend payers in real 2004 dollars. The sample consists of all firm-quarters in the CRSP database that are nonfinancial, nonutility, and nonforeign in their last quarter. The solid vertical line (separating quarters 2003-Q2 and 2003-Q3) denotes the time at which the 2003 tax reform was enacted. The dashed vertical line (separating quarters 2002-Q4 and 2003-Q1) denotes the time at which the lower tax rate on dividend income was initially proposed and later retroactively applied.

amounts of special dividends paid out. Special dividend amounts also increased after enactment of the 2003 reform, but there are other periods such as the late 1980s when special dividends were substantially higher.

Unfortunately, it is difficult to determine whether the surge in aggregate dividends is tax-driven simply by examining changes in raw dividend amounts paid by publicly traded firms. Estimates from a standard time series regression of dividend payments on a postreform dummy are not robust to the inclusion of controls such as assets and earnings at either the firm or aggregate level, and are hence inconclusive. We show below that the fragility of the simple time series analysis arises primarily from entry and exit effects in the sample. This problem is magnified by the fact that dividend payments are very concentrated.[9] We therefore first examine other, more stable moments of the

9. Figure I, which also plots regular dividend amounts paid by the top twenty payers in each quarter, shows that the dividends from the top twenty payers account for half of all dividends paid by all firms in our core sample.

dividend distribution such as the number of dividend initiations and increases that show clear evidence of a response to the tax change. We then build on this analysis to show how entry and exit effects can be controlled for, yielding more precise and robust estimates of changes in total dividend amounts.
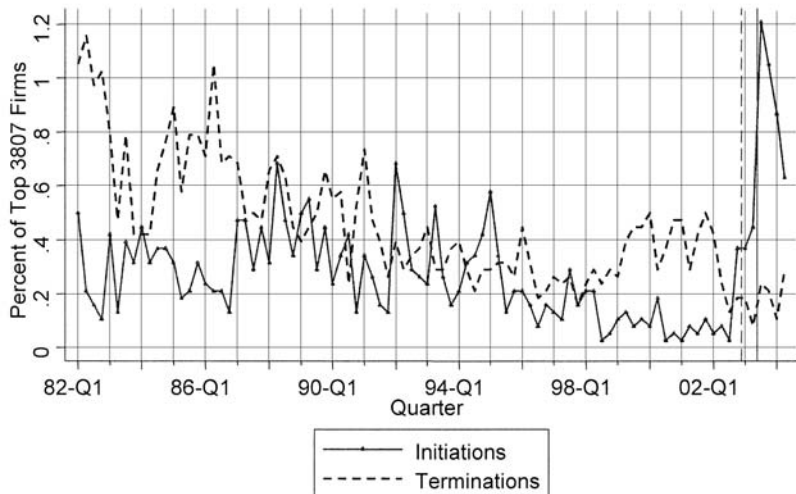
III.A. Extensive Margin

Figure II, Panel A plots the fraction of initiations and terminations of dividend payments in the constant number of firms sample. This fraction is computed relative to all firms in the sample, and hence is proportional to the total number of initiations and terminations. The frequency of initiations surged after the law was enacted. The number of initiations in the three quarters immediately following enactment (2003-Q3, 2003-Q4, and 2004-Q1) is the three highest among the 80 quarters we consider. There is no sign of a decline in initiations prior to the reform, suggesting that the surge in initiations reflects real behavioral responses to an unanticipated change rather than a timing effect due to firms that were delaying initiations in anticipation of the tax reform. Meanwhile, the number of terminations remained very low and, if anything, fell slightly after the reform. Decompositions by size of firms and industrial sectors shows that the surge was not confined to specific sectors or firm sizes.

Table II summarizes the magnitude of the effect by comparing dividend initiations during a short window around the reform period. The prereform period is taken as the six quarters before the reform 2001-Q3 to 2002-Q4, and the postreform period includes the six postreform quarters, 2003-Q1 to 2004-Q2.[10] The first row of Table II shows that the average number of initiations surged from 4.3 per quarter in the prereform period to 29 after the reform. The difference is highly statistically significant (t-statistic over 10). Of course, the conclusion that this change was entirely due to the tax reform is predicated on the assumption that no other unobservable determinant of dividend payments changed contemporaneously. To examine the validity of this assumption, we evaluate the robustness of our results to the inclusion of a rich set of control variables identified as determinants of dividend policy by Lintner [1956] and summarized more

10. Excluding the 2 first quarters of 2003, when the law was not yet enacted, would generate even larger estimates as the response accelerates after enactment.

A. Dividend Initiations and Terminations

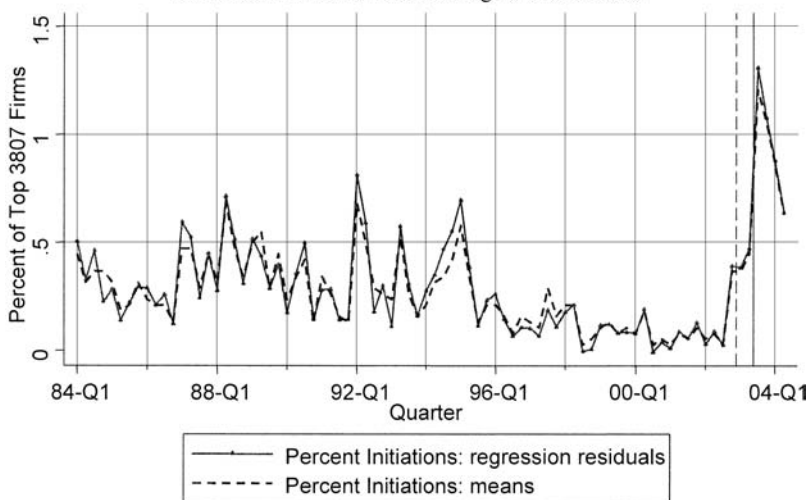B. Dividend Initiations Controlling for Observables

FIGURE II

Extensive Margin: Initiations and Terminations

Panel A depicts the fraction of firms initiating and terminating regular dividend payments for each quarter from 1984-Q1 to 2004-Q2. The sample consists of the top 3807 firms by market capitalization in each quarter in the CRSP database which are nonfinancial, nonutility, and nonforeign in their last quarter (the constant number of firms sample). Initiations and terminations are defined in the text.

Panel B depicts the fraction of firms initiating dividend payments with and without control variables for each quarter from 1984-Q1 to 2004-Q2. The curve with no controls is the same as in Panel A. For the regression residuals curve, the sample is the same as in Panel A with the additional requirement that data on assets, after-tax profits, and cash holdings are available from Compustat. This curve reports the quarter dummy coefficients of an OLS regression of the initiation dummy on a full set of quarter dummies, dummies for first digit industry code, assets, and levels and eight quarterly lags of after-tax profits/assets, marketcap/assets, and cash/assets (see specification (1) in text).

TABLE II

CHANGES IN DIVIDEND POLICIES BEFORE AND AFTER THE TAX REFORM

	Preform (2001-Q3–2002-Q4) (1)	Postreform (2003-Q1–2004-Q2) (2)	Difference (post-minus pre-) (3)	Difference with controls (4)
# Regular dividend initiations per quarter	4.33 (0.85)	29.00 (2.19)	24.67 (2.32)	26.60 (2.86)
# Regular dividend increases (>20%)	19.00 (1.78)	49.83 (2.86)	30.83 (3.22)	29.60 (3.84)
# Special dividend payers	6.83 (1.07)	17.83 (1.72)	11.00 (2.03)	9.47 (2.30)
Increase in regular dividends per quarter due to initiations (real $ millions)	13.22 (4.83)	205.39 (48.35)	192.17 (48.51)	231.82 (66.21)
Increase in regular dividends per quarter due to intensive margin (real $ millions)	125.18 (99.25)	684.56 (108.84)	559.38 (153.95)	480.33 (195.49)
Increase in total regular dividends per quarter including all margins (real $ millions)	63.29 (102.30)	857.65 (119.56)	794.36 (170.54)	740.60 (218.27)
Special dividend amounts per quarter (real $ millions)	112.50 (45.98)	729.94 (151.40)	617.44 (203.48)	369.76 (233.31)

This table reports the average value preform and postreform, as well as estimates of the change between the two periods with and without controls for several statistics of interest.

The sample is the constant number of firms sample, as defined in Table I.

The difference with controls in column (4) is obtained from an OLS regression including assets, levels, and eight lags of profits/assets, cash/assets, mktcap/assets, and SIC dummies, as in specification (1) in the text. The numbers reported in column (4) are the coefficients from the regression multiplied by 3807 to be comparable to column (3). Standard errors, also multiplied by 3807 in column (4), are reported in parentheses.

The increase in regular dividends including all margins sums changes from initiations, intensive changes, and terminations.

Note that increases relative to previous quarter are reported for regular dividends, while quarterly levels are reported for special dividends.

recently in Brav, Graham, Harvey, and Michaely [2005]. We run the following semiparametric regression specification for initiations:

$$(1) \quad Init_{i,t} = \sum_{s=1}^{T} \beta_s \cdot 1 \ (t = s) + \mu^a a_{i,t}$$

$$+ \sum_{s=0}^{8} \mu_s X_{i,t-s} + \sum_{r=0}^{R} v_r SIC_{i,t}^r + \varepsilon_{i,t},$$

where $Init_{i,t}$ is an initiation dummy that takes value 1 if firm i initiates dividend payments in quarter t and 0 otherwise and $\{1\ (t = s)\}_{s=1}^{T}$ are a full set of quarter dummies. The additional firm-level covariates are (1) total current assets, $a_{i,t}$; (2) the level and eight lags of quarterly profits/assets, market capitalization/assets, and cash holdings/assets, denoted by the vector $X_{i,t}$; and (3) first-digit SIC industry dummies, $SIC_{i,t}^{r}$ that indicate whether the first digit of firm i's *SIC code* is r in 2004.

Figure II, Panel B shows that the surge in initiations is robust to adding these controls by plotting the $\{\beta_s\}$ coefficients from the regression along with the mean estimates of initiation rates. Similarly, the fourth column of Table II shows that adding controls does not affect the estimate of the change in dividend initiations between the six-quarter pre- and postreform periods. The estimates reported in this column are from a regression specification equivalent to (1) except that the quarter dummies are replaced with a single postreform dummy, and are scaled up by the sample size (3807) to obtain aggregate changes comparable to the mean change estimates. These results are also robust to trends in mergers and acquisitions that could lead to changes in dividend payments (for example, if a nonpaying firm acquires a dividend-paying company). Among all initiators in the postreform period, only one firm acquired another company just before initiating dividends. In addition, controlling for forecasted growth prospects using I/B/E/S data on analysts' forecasts has no effect on the results. Baker and Wurgler's [2004] recent "catering theory" of dividend initiations also does not explain the surge in initiations.

As noted in the Introduction, the timing of the tax reform—with an initial proposal in early January 2003 and retroactive enactment in late May 2003—is particularly important for our before-and-after comparisons. To establish the pattern of the dividend responses around these dates more precisely, Figure III, Panel A examines initiations at a monthly frequency for the period 2001–2004. Dividend initiations were somewhat higher during the first two quarters of 2003 (relative to the first two quarters of 2000 or 2001), when the reform had been proposed but not yet enacted. But the initiation rate really surges in August, about two to three months after enactment. This delay of a few months in payment dates appears consistent with the actual process through which corporations determine dividend policy with an announcement followed by payment with a lag. In our core sample, the median lag is 5.5 weeks, and over 90 percent of
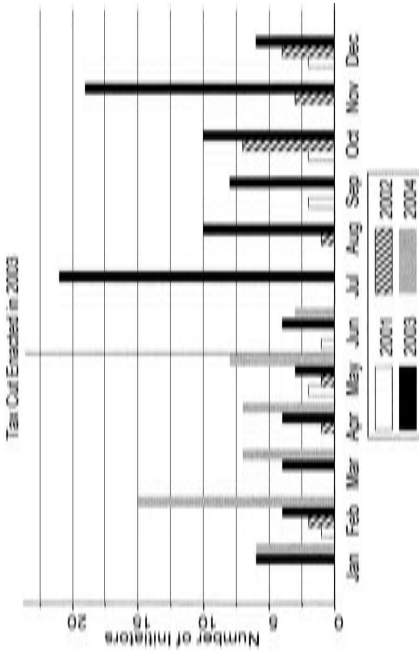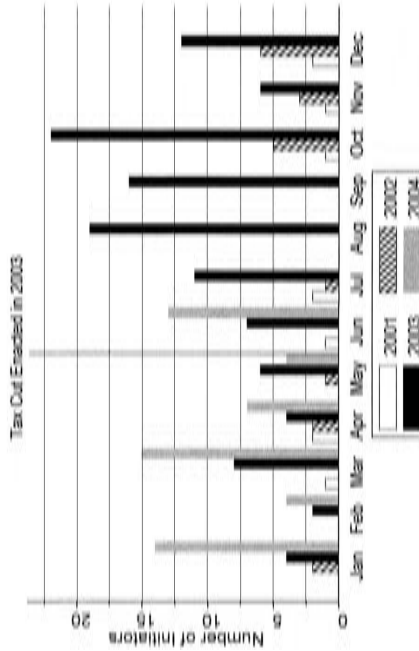
FIGURE III

Number of Initiations per Month by Payment and Announcement Dates, 2001–2004

This figure depicts the number of firms initiating dividend payments for each month from January 2001 to June 2004. Panel A classifies each initiation by the payment date, while Panel B classifies each initiation by the announcement date. The sample is the constant number of firms sample, as in Figure II.
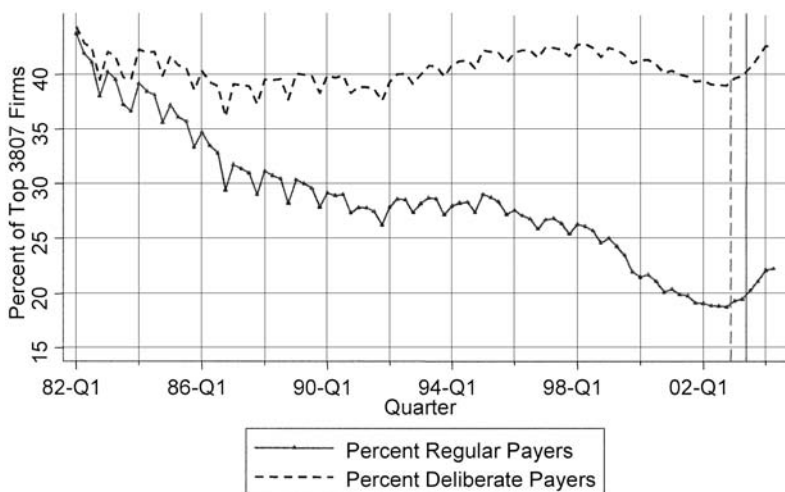
FIGURE IV

Regular and Deliberate Dividend Payers

This figure depicts the fraction of firms paying regular dividends for each quarter from 1982-Q1 to 2004-Q2. The sample is the constant number of firms' sample, as in Figure II. The fraction of deliberate payers curve is constructed by induction as follows. In the first quarter, the number of deliberate payers equals the actual number of regular payers. The number of deliberate payers in quarter $t + 1$ is the number of deliberate payers in quarter t plus the net number of dividend initiations (subtracting out terminations) by firms present in the sample at both t and $t + 1$.

payments occur between 3 and 12 weeks after announcement. Since the announcement date is closer to the date at which dividend policies are actually determined, we examine the pattern of announcement dates directly in Figure III, Panel B. The surge in announcement of initiations begins in July 2003, one month after enactment. This suggests that many corporations acted very quickly following the tax change, supporting the claim that these responses were tax driven.[11]

Not surprisingly, the surge in initiations in the postreform period accompanied by no increase in terminations leads to an increase in the fraction of firms paying dividends. This is shown in Figure IV, which plots the fraction of dividend payers in the

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11. Since the pattern of dividend initiation announcements follows the pattern of payment dates quite closely, using declaration dates rather than actual payment dates would not affect our main empirical results. We therefore use the tax-relevant payment date definition below.

constant number of firms sample between 1981-Q3 and 2004-Q2. As observed by Fama and French [2001], the fraction of dividend payers has declined steadily over the past two decades, from more than 40 percent in the early 1980s to less than 20 percent in 2000. This trend of "disappearing dividends" stops precisely in the last quarter of 2002, at which point the fraction of payers begins to rise.

As noted above, it is important to control for changes in sample composition that arise from listing and delisting to obtain unbiased estimates of the effect of the tax cut.[12] Our simple methodology of focusing on the top 3807 firms by market capitalization in each quarter could also be subject to compositional bias, since this set of firms could change from quarter to quarter. To address this concern, we test whether our results are robust to entry and exit effects by considering only "deliberate" changes in dividend payment status. More precisely, in the initial quarter (1982-Q1 on Figure IV), define the number of deliberate payers to be equal to the actual number of payers. Then, we define by induction the number of deliberate payers in quarter $t + 1$ as the number of deliberate payers in quarter t plus the net number of dividend initiations (subtracting out terminations) by firms present in the sample at both t and $t + 1$. This deliberate payers series effectively purges entry and exit effects, because only behavioral changes by firms that remain in the sample in each quarter affect the series. The dashed line in Figure IV plots the deliberate payers series for our constant number of firms sample.[13] The increase in the fraction of deliberate payers also begins exactly in 2003, and is very close in magnitude to the raw increase in the fraction of payers (solid line). Similar results are obtained with the deliberate payers series for other sample definitions, such as the core sample or the top 1000 firms. These results show that composition effects cancel out in our constant

12. Julio and Ikenberry's [2005] conclusion that the reversal in the fraction of publicly traded firms paying dividends began in late 2000, and hence cannot be attributed to the tax cut, illustrates the sample composition problem. Their finding arises from the fact that the total number of publicly traded firms fell precipitously since late 2000 and most delisted firms were young, nonpaying firms (the so-called "dot-com bust"). This issue is addressed at length in the longer working paper version of our paper [Chetty and Saez 2004]. We show there that once sample composition issues are controlled for, the reversal begins only in 2003, after the tax cut.

13. The fact that the deliberate series does not show a secular downward trend is evidence that the Fama-French [2001] effect on disappearing dividends is due primarily to exits of dividend payers and entry of nonpayers over time.
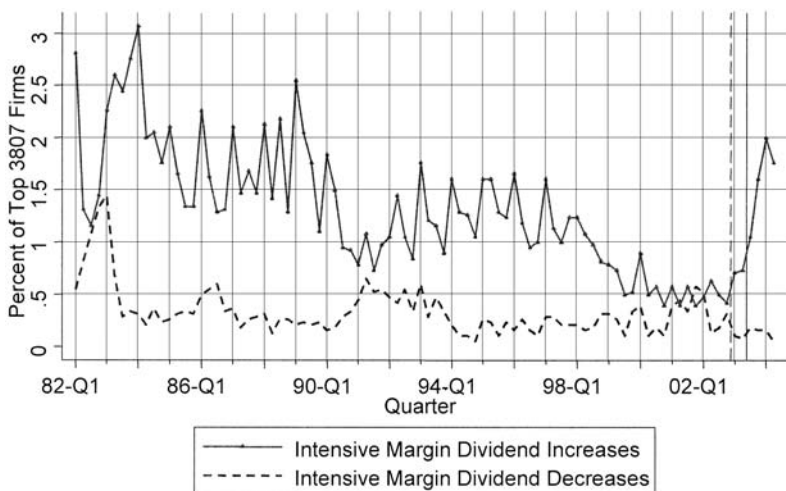
FIGURE V

Intensive Margin: Dividend Increases and Decreases

This figure depicts the fraction of firms increasing or decreasing regular dividend payments by more than 20 percent in a given quarter in the constant number of firms sample. An increase in dividend payments by 20 percent in quarter t occurs when a previously paying firm pays a dividend in quarter t that is 20 percent larger in nominal terms than its largest dividend payout between quarters $t-1$ and $t-4$. Decreases in dividends payments are defined analogously (see Appendix for further details).

number of firms sample, and justify our focus on this group as a simple but valid way to control for entry and exit effects.

III.B. Intensive Margin

We study the intensive margin by examining the effect of the tax cut on the probability that a firm increases or decreases dividend payments by more than 20 percent in nominal terms.[14] In order to avoid double counting, initiations (terminations) are not counted as dividend increases (decreases). The Appendix gives the exact definition of increases and decreases we use.

Figure V plots the fraction of firms in the constant number of firms sample that increased or decreased dividends by 20 percent or more along the intensive margin (relative to all firms as in

14. Other cutoffs, such as 0, 10, or 50 percent also yield similar results. We focus on the 20 percent cutoff because these changes are both relatively frequent and sufficiently large that they are likely to signal a substantial shift in a corporation's distribution policy.

Figure II). There is a surge in the number of firms that increase dividends when the tax cut is enacted in 2003-Q3. The number of these large intensive margin increases jumped from 19 in the prereform period (2001-Q3 to 2002-Q4) to 50 per quarter in the postreform period (2003-Q1 to 2004-Q2), as shown in Table II. Analysis of the data at a monthly frequency (not reported) shows that the pattern of dividend increases coincides very closely with the pattern of dividend initiations. The frequency of dividend decreases remained small and essentially unchanged after the tax cut. These results are also robust to controlling for observable variables from Compustat using a specification analogous to (1), as shown in Table II.

III.C. Changes in Amounts and Elasticity Estimates

We now return to the question of how much the reform raised aggregate dividend amounts by examining how much the extensive and intensive margins contributed in amounts. To obtain statistically precise estimates, we control for entry and exit effects as above by focusing on deliberate changes in dividend amounts along each margin in the constant number of firms sample. We also exclude firms that acquired another company in the previous quarter in order to avoid imputing dividend increases to the acquisition of a dividend-paying company. We calculate the change in total dividends in a quarter by summing the change in regular dividends due to deliberate changes in dividend payouts. Annual dividends are divided by four, and semiannual dividends divided by two in order to normalize changes at the quarterly level.

Figure VI, Panel A depicts the amounts (in real 2004 dollars) of regular dividends initiated in each quarter from 1990-Q1 to 2004-Q2. The amounts raised from dividend initiations surged after the reform, from $13 million per quarter in the prereform period to an average of $205 million per quarter after the reform, as shown in the first two columns of Table II. The six largest initiation amounts since 1990 all take place in the postreform quarters.[15] The difference between the pre- and postreform initiation amounts is significant at the 1 percent level, and robust to introducing the rich set of controls used in (1), as shown in the

15. Some of the initiations which took place in the first quarter of 2003 might have been decided before the reform was even proposed and hence might not be tax driven.

A. Change in Dividend Amounts on Intensive and Extensive Margins

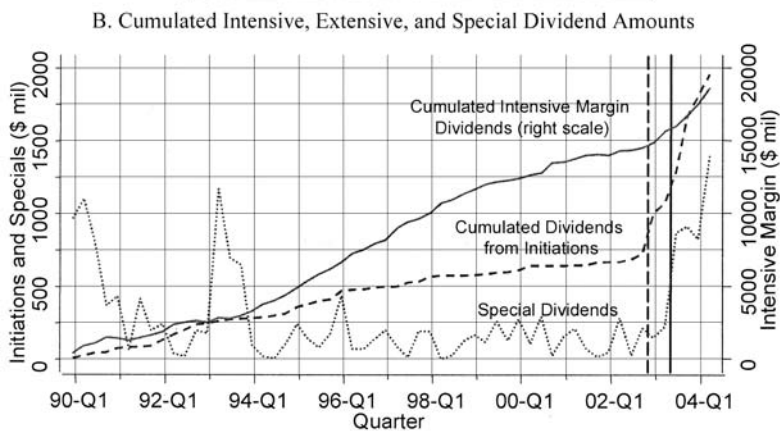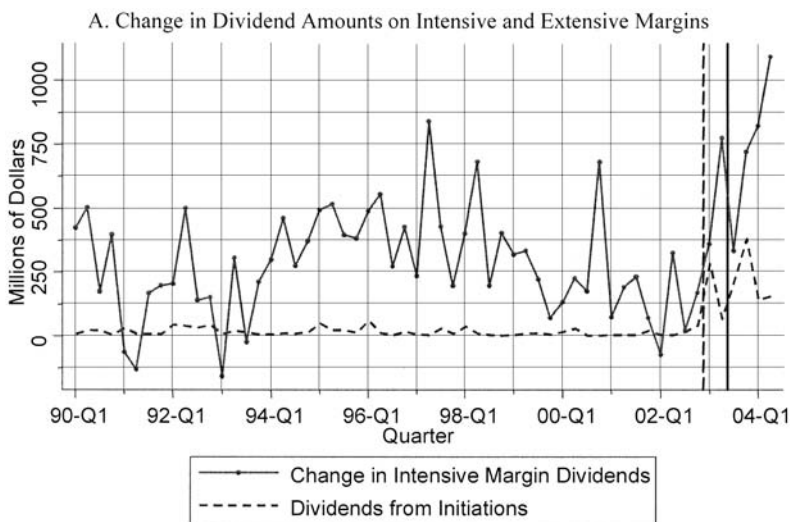B. Cumulated Intensive, Extensive, and Special Dividend Amounts

FIGURE VI

Deliberate Changes in Dividend Amounts

The sample consists of those firms in the constant number of firms sample that did not acquire another company in the previous quarter. Panel A depicts the amounts (in real 2004 dollars) of regular dividends initiated in each quarter and the change in regular dividends along the intensive margin for firms paying regular dividends both in the current and previous quarter. Initiations and terminations are excluded from the latter series.

Panel B depicts the cumulated (from 1990-Q1) amounts of regular dividend initiations (integral of the initiation graph in Panel A) and the amounts of special dividends on the left scale. It also shows the cumulated amounts of regular dividend intensive changes on the right scale (integral of the change in intensive margin dividends in Panel A).

third and fourth columns of Table II. Note again that there is no dip in the amount of dividends from initiations prior to the reform, suggesting that our estimates are unlikely to be biased by retiming effects.

Figure VI, Panel A also depicts the deliberate change in regular dividends on the intensive margin. The change is defined as the current payment minus the more recent regular payment for firms previously paying regular dividends. Entry and exit do not induce changes in the deliberate amounts series: if the firm did not exist in the prior period, or drops out of the sample, the change is defined as 0 (in parallel to the construction of the deliberate payers series discussed above). The series of aggregate changes along the intensive margin also increases in the six quarters following the reform. Table II shows that intensive changes surged from $125 million per quarter on average before the reform to $685 million after. Four of the five largest intensive increases take place in the six postreform quarters. The intensive margin change is also statistically significant and robust to introducing controls.

Figure VI, Panel B depicts the cumulated (from 1990-Q1) amounts of regular dividend initiations (the integral of the initiation graph in Panel A) and the amounts of special dividends on the left scale. Cumulated amounts (from 1990-Q1) of regular dividend intensive changes are shown on the right scale (the integral of the change in intensive margin dividends in Panel A). This figure shows that the extensive margin has contributed about $1.2 billion excess quarterly dividends since the tax cut. Total cumulated dividends from the intensive margin also surged between 2002-Q4 and 2004-Q2. The graph displays a fairly clear break in the slope in the pre- and postreform periods. This figure and the estimates reported in Table II show that by 2004-Q2, $3.4 billion in dividends have been raised from the intensive margin, after subtracting out the trend in the previous years.

Finally, special dividend payments are on average $0.6 billion per quarter higher in the postreform quarters relative to the six prereform quarters (see Table II). This increase is driven by a very small set of firms, as noted by Blouin, Raedy, and Shackelford [2004]. Hence, if regular dividend payments remain as persistent as they have been historically, special dividend payments are likely to be a short-term fluctuation in the time series relative to the change in regular dividend amounts induced by the 2003 tax reform.

The changes along the extensive and intensive margins add up to a total regular dividends increase of $4.8 billion above the prereform trend by 2004-Q2, six quarters after the reform. This increase in aggregate dividend amounts is statistically significant both with and without controls, with a *t*-statistic of approximately 4. Hence, once entry and exit effects are controlled for, we can obtain relatively precise and robust estimates of the deliberate change in aggregate dividend amounts. Starting from a base of approximately $25 billion in 2002-Q4, total regular dividends have therefore risen by roughly 20 percent for our sample of nonfinancial, nonutility publicly traded firms. The short-run increase in total dividends exceeds 20 percent because of the surge in special, one-time distributions.

The average tax rate on dividends (including both taxable and nontaxable dividends distributed directly or indirectly to individuals) fell from 29 to 17 percent [Poterba 2004], a 40 percent reduction. Therefore, the implied elasticity of regular dividend amounts with respect to the dividend tax rate is roughly -0.5 as of 2004-Q2, 1.5 years after the reform. The long-run response could of course be larger, given that the adjustment process may not be complete. This elasticity implies that the tax revenue from dividend taxation that was lost because of the tax cut is 50 percent of the revenue loss assuming no behavioral response.[16]

III.D. Was the Tax Cut Casual?

Our identification strategy relies on the assumption that no event apart from the tax cut generated a surge in dividend payments exactly in 2003. One such potential event is the exposition of several corporate scandals in 2001–2003. These scandals originated primarily from serious accounting fraud among large corporations and may have created distrust among shareholders about management of corporations in general. Shareholders may have therefore pressured management to increase dividends even in the absence of the tax cut.

To try to rule out such alternative hypotheses and establish the causal role of the tax cut more clearly, we exploit the fact that

16. It is possible that the increase in dividends will reduce other sources of tax revenue such as realized capital gains from share repurchases. It should also be noted that we only estimate the dividend response of publicly traded corporations (excluding financial and utility companies). The response of total dividends in the United States could be different.

only dividend income distributed to individuals through nontax-favored accounts was affected by the reform. For instance, dividend income earned through pension funds was not affected by the tax change. Consequently, if the tax cut was responsible for the surge in aggregate dividends, we would not expect to see a response among firms that are controlled by such nonaffected entities. To explore this hypothesis, we isolated a subset of institutional investors that are definitely not affected by the reform—pension funds, insurance companies, nonprofit organizations, nonfinancial corporations, and government agencies—in the Thomson financial institutional ownership database.[17] More precisely, we define as "nonaffected" all entities in the Thomson database classified as insurance companies (type 2) and those classified as "other" (type 5) whose names indicate that they are a pension fund, nonprofit institution, government agency, or nonfinancial corporation.[18] We then implement the following simple test of our identification assumption. We divide the sample of firms alive in our core sample in all quarters between 1998-Q1 and 2004-Q2 into two groups.[19] The "control" group consists of firm-quarter pairs where the largest institutional owner is a nonaffected entity.[20] The "treatment" group includes all other firm-quarter pairs.

Table III reports the annual initiation rates among nonpayers in these two groups of firms in the prereform period (1998-Q1 to 2002-Q4) and the postreform period (2003-Q1 to 2004-Q2). The

17. Most large institutional shareholders (e.g., Fidelity) are partly affected by the reform, because they manage funds on behalf of taxable individuals as well as nontaxable clients such as individual retirement accounts, pension funds, and nonprofit organizations.
18. After 1998, the Thomson financial database misclassifies new institutions which actually belong to type 1–4 categories as type 5 (other). We address this data problem by hand-classifying type 5 institutions throughout. We classify a type 5 institution as nonaffected only if we are highly confident that it is indeed nonaffected based on its name. When in doubt, we do not classify the institution as nonaffected. Our corrected database is available upon request.
19. Details about the definition of this sample and more general breakdowns by size of institutional ownership are given in subsection IV.B. below.
20. Previous papers such as Perez-Gonzalez [2003] and Blouin, Raedy, and Shackelford [2004] have used companies owned by large institutional shareholders as control groups, without distinguishing nontaxable and partly taxable institutions as we do here. We find that only 15 percent of institutional owners (dollar weighted) are fully nontaxable. This point matters because our analysis in Section IV shows that firms with larger institutional ownership are much *more* responsive to the reform, implying that many institutions behave in the interests of their individual taxable clients. Therefore, raw institutional ownership is clearly not a valid proxy for nontaxable status when analyzing the effects of taxes on corporate behavior.

TABLE III
INITIATION RATES BY TAX STATUS OF LARGEST INSTITUTIONAL HOLDER

	Control (not affected) (1)	Treatment (affected) (2)	Difference between groups (3)
Fraction payers	32.33%	27.33%	−5.00%
Prereform init. rate	1.10	0.83	−0.27
(1998-Q1 to 2002-Q4)	(0.60)	(0.16)	(0.64)
# Observations	1,822	27,977	
Postreform init. rate	1.02	5.11	4.09
(2003-Q1 to 2004-Q2)	(1.32)	(0.28)	(2.28)
# Observations	394	8,065	
Difference between	−0.08	4.28	**4.36**
periods	(1.48)	(0.32)	**(1.48)**

The sample consists of all firms in the core sample present in all quarters from 1998-Q1 to 2004-Q2.

The control group is defined as the firms whose largest institutional owner is not affected by the tax change (either a pension fund, an insurance company, a nonprofit organization, a nonfinancial corporation, or a government agency).

The treatment group includes all other firms.

The first row shows the average fraction of regular dividend payers among the two groups prereform.

The table also shows the annual regular dividend initiation rate among nonpayers before and after the reform, as well as the difference between groups and periods, and the difference-in-difference estimate. Standard errors are in parentheses.

initiation rate was very similar for both groups before the reform. However, the initiation rate surged by a factor of 5 after the reform for the treatment group, while remaining virtually constant for the control group. As a result, the postreform initiation rates are significantly different across the two groups, and the difference-in-differences estimate of the causal effect of the tax cut is also highly statistically significant. These estimates are robust to a regression with controls for assets, market capitalization, profits, industry dummies, and interactions of these controls with a tax reform dummy.

The simple treatment/control split based on tax status of the largest institutional shareholder is not the only way to define the control group. We also considered three alternative definitions of the control group: companies with (a) at least one nontaxable institutional shareholder with more than a 5 percent stake, (b) total nontaxable institutional ownership larger than a threshold such as 5 or 10 percent, or (c) more nontaxable institutional ownership than taxable institutional ownership among large (over 5 percent) shareholders. Under all three definitions, there is no change in initiation rates after the reform in the control group,

supporting the causality of the tax cut.[21] Of course, these tests do not rule out the hypothesis that recent corporate scandals increased the sensitivity of dividend payments to taxation. In this case, the large dividend response would be the consequence of both the tax cut and the scandals. Future tax changes might allow identification of tax effects in an environment where such scandals are less relevant.

IV. WHICH FIRMS RESPONDED TO THE TAX CHANGE?

IV.A. *Self-Interested Agents: Executive Share and Stock-Option Ownership*

A large literature in corporate finance has focused on the tension between principals' (shareholders) objectives and agents' (executives) interests. One hypothesis that has received substantial attention is that high degrees of pay-for-performance sensitivity, e.g., from large executive stock and options holdings, can have significant effects on executives' decisions about corporate policy. In this subsection we analyze the impact of executive share and options holdings on the payout response to the tax cut.

We test for such an association without imposing strong functional form assumptions on the data, since the relevant effects could be nonlinear, and outliers could be very influential. We classify firms into quintiles based on executive share and option ownership, and compare the size of the dividend response across the quintiles. To address biases that arise from changing quintile composition, in this and all subsequent heterogeneity analyses, we restrict attention to the set of 2551 firms in the core sample that are alive between 1998-Q1 and 2004-Q2. We choose a relatively long prereform time frame (1998–2003) in order to make the total number of dividend initiations in the prereform period similar to that in the postreform period. We report results on heterogeneity in dividend initiation rates here. Results for dividend increases are generally quite similar.

Our primary data source for the share ownership and options data is Execucomp. The shortcoming of Execucomp data is that it covers only about one-third of the companies listed in CRSP, and

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21. The presence of smaller nontaxable entities (less than 5 percent shareholders) does not appear to have a significant effect on the size of the response to the tax cut. This is consistent with the findings in the corporate finance literature that large shareholders play a particularly important role in policy decisions.

these companies are not a random subsample of the CRSP firms. In particular, Execucomp tends to cover only larger firms, which have a higher propensity to pay dividends and differ from uncovered firms along many other dimensions such as large shareholder ownership as well. To improve the precision of our estimates and obtain results that apply to the full universe of publicly traded firms, we expanded our data on executive holdings by hand-collecting data for an additional 347 firms from SEC proxy filings. The 347 firms include all the firms that initiated dividends, which are of greatest interest for the present study, as well as an additional 147 firms that constitute a 10 percent random sample of the non-Execucomp firms that did not initiate dividends within our 1998Q1–2004Q2 sample frame. Sampling probability weights are used to account for the underrepresentation of non-Execucomp noninitiating firms in this sampling design. The construction of the random sample is described in detail in the Appendix.

We begin by analyzing the relationship between executive share ownership and dividend initiations. An executive who holds a large stake in his company experiences a large change in his personal tax burden from a dividend payment, since a considerable fraction of the total dividend payout would accrue to the executive himself.[22] At the other extreme, the personal tax incentives of an executive who owns no shares are unchanged by the 2003 reform. To analyze whether the personal tax interests of executives have an impact on the tax response of corporations, we classify firms into five quintiles of executive share ownership as follows. We first identify the largest shareholder among the company's executives in a given year. We then define a stable set of quintiles using the average fraction of shares held by the largest executive shareholder during our sample frame if the firm does not initiate dividends during this period, and using share ownership as the time of initiation if the firm does initiate dividends. This procedure ensures that firms do not move across quintiles over time. The advantage of having a stable set of firms in each quintile is that it eliminates the spurious trends that can arise if

22. Many executives are nondiversified with large company stock ownership. Indeed, executives may face explicit contractual restrictions or implicit restrictions (insider sales which have to be publicly disclosed may be viewed as a negative signal by the market or employees) on their ability to sell shares of stock.

the distribution of executive share ownership changes in a manner that is correlated with dividend behavior.[23]

Figure VII, Panel A shows the frequency of initiations among nonpayers across the five quintiles of executive share ownership in the pre- and postreform periods. The prereform period is defined as 1998-Q1 to 2002-Q4, and the postreform period is 2003-Q1 to 2004-Q2. Firms where at least one executive owned a substantial fraction of the company's shares were more likely to initiate dividends in response to the tax cut. The postreform annual initiation rate among firms in the highest quintile of executive share ownership is 9.5 percent, in contrast with 3.5 percent in the lowest quintile. The difference between the change in the initiation rate in the fifth quintile and the first quintile is statistically significant with a *p*-value of 0.03. These results are robust to controlling for a large set of other covariates that could also influence the dividend response to the tax cut (see the longer version of this paper [Chetty and Saez 2004] for this regression analysis). Both the dollar amount of shares held by the largest executive shareholder and the fraction of shares held are positively associated with the size of the tax response. The share holdings of all other executives besides the largest executive shareholder are unrelated to the tax response.[24]

Next, we examine the effect of unexercisable stock-options holdings by top executives on the tax response. Lambert, Lanen, and Larker [1989] note that executives with large options holdings are hurt by dividend payments, because the strike prices of their options are typically not adjusted for dividends. By paying money out of the firm and thereby reducing the price of the shares outstanding, executives make their unexercised options less valuable. Hence, executives with many unexercisable stock options should be especially reluctant to pay dividends, potentially reducing the likelihood that they are on the margin with respect to a change in tax incentives.[25] To examine whether this is the case empirically, we follow the same methodology as above and clas-

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23. Our division into quintiles could be endogenous if the tax change affects executive share ownership. However, results are similar if we classify firms into quintiles based on executive ownership in 1998, suggesting that this is not a serious concern.

24. Rozeff [1982] found no correlation between executive share ownership and dividend payouts in the cross section. Our data also display stability in the fraction of dividend payers across quintiles of executive ownership.

25. Fenn and Liang [2001] indeed find a negative cross-sectional relation between executive option holdings and dividends.

A. Breakdown by Share Ownership
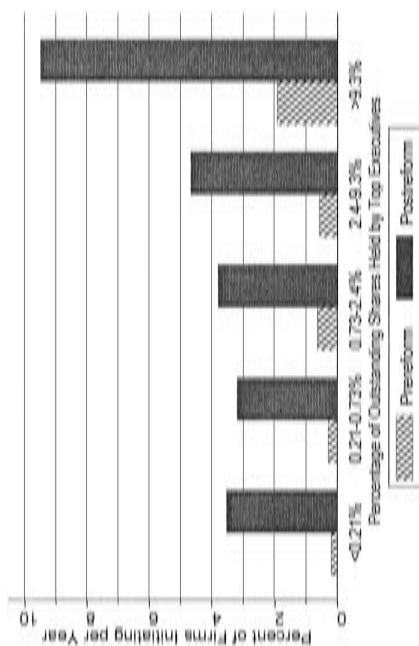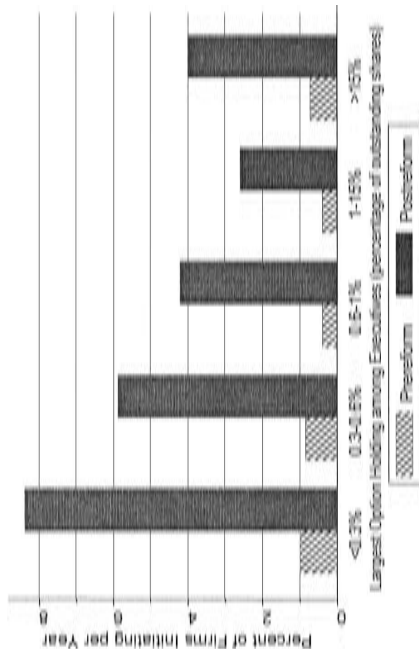
B. Breakdown by Options Holdings

FIGURE VII

Effect of Tax Cut on Initiations: Breakdown by Executive Share and Options Holdings

In both panels the sample consists of all firms present in the core sample in each quarter from 1998-Q1 to 2004-Q2. All firms-quarters (i, t) for which firm i paid regular dividends in any of the previous four quarters $(t - 1, t - 2, t - 3, t - 4)$ are discarded from the sample to focus only on the initiation decisions of nonpayers.

Panel A shows the percentage of firms initiating dividends at an annualized rate preform (from 1998-Q1 to 2002-Q4) and postreform (from 2003-Q1 to 2004-Q2) by quintiles of executive ownership. Executive ownership is defined by the share of the company owned by the executive with the largest share ownership. The horizontal axis shows the percentage range of shares owned by the largest executive owner for each quintile.

Panel B depicts the percentage of firms initiating dividends by quintiles of executive option holding. Executive option holding is defined by the fraction of shares of the company owned in the form of unexercisable stock-options—options which have been granted but are not yet vested and hence cannot be exercised—by the executive who has the largest unexercisable options holdings. Data on executive share and option ownership come from the Execucomp database and also supplemented by data from SEC proxy statements as described in the Appendix.

sify firms into five quintiles based on the unexercisable options holdings (as a fraction of total shares outstanding) of the executive who owns the largest number of such options.

Figure VII, Panel B shows that firms where one or more executives had a large unexercisable option holding were significantly less likely to respond to the tax cut. The annual initiation rate is 8.4 percent among firms with executives in the lowest quintile of options holdings, in contrast with 4 percent in the highest quintile. These differences are statistically significant with a p-value of 0.03. Again, the pattern of the initiation rates is robust to controls. Consistent with the hypothesis that it is mainly unexercised option holdings that make dividend payments unattractive, there is a much weaker relationship between executives' exercisable options holdings and the tax response [Chetty and Saez 2004].

Table IV, Panel A illustrates the interaction between executive incentives through share and option holdings by cross-tabulating the postreform initiation rate by thirds of share ownership and unexercisable options ownership. Only 1.6 percent of the

TABLE IV
DETERMINANTS OF DIVIDEND INITIATION RESPONSES: INTERACTION EFFECTS

A. Interaction of executive incentives

		Largest shareholding among top executives		
		<0.5%	**0.5–3.3%**	**>3.3%**
Largest unexercisable	**<0.5%**	5.00	3.31	11.42
option holding	**0.5–1.2%**	4.95	2.76	7.04
among executives	**>1.2%**	1.58	4.65	6.38

B. Interaction between agents' and principals' incentives

		Shareholding by Institutional Investors		
		<35%	**35–63%**	**>63%**
Largest shareholding	**<0.5%**	1.21	1.24	6.66
among top	**0.5–3.3%**	1.35	0.30	9.34
executives	**>3.3%**	7.12	6.19	10.94

The table reports the annual dividend initiation rate after the reform (from 2003-Q1 to 2004-Q2) for firms present in the data from 1998-Q1 to 2004-Q2 in various groups. Groups are defined by size of option holdings and executive ownership in Panel A and executive ownership and institutional ownership in Panel B (see text and Figures VII and VIII for exact definitions).

firms in the lowest third of share ownership and highest third of option ownership initiated dividends in the six quarters after the reform. In contrast, 11.4 percent of the firms at the other extreme—highest third of share ownership and lowest third of options—have initiated dividend payments since that point. In short, there is systematic evidence that executives behave in a self-interested (although not necessarily inefficient) manner when making decisions about corporate payout policy for their shareholders.

IV.B. Powerful Principals: Institutional Shareholders and Directors

We now turn to the other side of the principal-agent relationship, and examine the effect of having powerful principals on the response to the tax cut. An extensive literature in corporate finance has found an association between the presence of large individual and institutional shareholders and the degree to which firms behave in value-maximizing fashion (see Shleifer and Vishny [1997] for a review). To analyze the impact of these variables on the dividend response, we quantify the power of principals in two ways: the percent of shares controlled by institutions (e.g., mutual funds, trusts, banks, etc.) and whether there is at least one independent (nonofficer) director with large shareholdings.

We obtain data on institutional ownership from Thomson Financial's Institutional Ownership database, which covers nearly 90 percent of the firms in our sample. Our primary data source for the number of large shareholders is a data set compiled by Dlugosz et al. [2004] which corrects a series of mistakes in Compact-Disclosure data on large shareholders compiled from firms' SEC filings. Since this data set covers only the firms tracked by the Investor Responsibility Research Center (roughly the 1500 largest companies in the United States), we augment this data set by hand-collecting information from proxy statements for an additional set of firms. We follow the same methodology as for the executive share ownership data, collecting data for all the firms that initiated dividend payments and a 10 percent random sample of non-IRRC, noninitiating firms. With appropriate sampling probability weights, these additional data allow us to obtain estimates for the full universe of publicly traded firms in CRSP.

We begin by analyzing the impact of institutional ownership

on the tax response. We classify firms into five quintiles based on the average fraction of shares held by institutions over the sample frame. Figure VIII, Panel A shows that among firms previously not paying dividends, those with higher institutional ownership are much more likely to begin paying after the reform. As above, this pattern is robust to adding a large set of control variables (see Chetty and Saez [2004]). Consistent with our results on taxable and nontaxable institutional holdings reported in subsection III.D, there is no association between the fraction of shares held by nontaxable institutions and the magnitude of the tax response (not reported). Only the fraction held by partially or fully taxable institutional owners matters. These findings suggest that partially taxable institutional owners increase their demand for dividends from the corporations in which they invest after the tax reform, and that corporations respond to these demands, perhaps because institutions directly or indirectly influence corporate boards.[26] In addition, the fact that only taxable institutions induce a response is consistent with related studies in the corporate finance literature (reviewed in Shleifer and Vishny [1997]) showing that powerful principals are themselves self-interested, potentially acting at the expense of more diffuse minority shareholders who are less influential.

We now turn to the impact of large-shareholding independent directors (those who own more than 5 percent of shares) on the tax response. We classify firms into two categories: those that never had an independent large-shareholding director during the sample period, and those with at least one such director. We also cut the data into two groups by institutional ownership (below or above the sample median). The left side of Figure VIII, Panel B shows that for firms with low institutional ownership, the presence of a large-shareholding independent director significantly increases the probability of initiating dividends (this difference is statistically significant at the 5 percent level). In contrast with these results, for firms with high institutional ownership, the presence of an independent director has no effect (right side of Figure VIII, Panel B). Hence, powerful principals appear to substitute for each other: the presence of one powerful principal with

26. The mechanism through which institutions affect corporate behavior is not yet well understood in the corporate finance literature. An interesting direction for further research would be to examine whether particular types of institutions were especially influential in inducing a response to the dividend tax cut and whether the influence was mediated through board membership.

A. Breakdown by Institutional Ownership
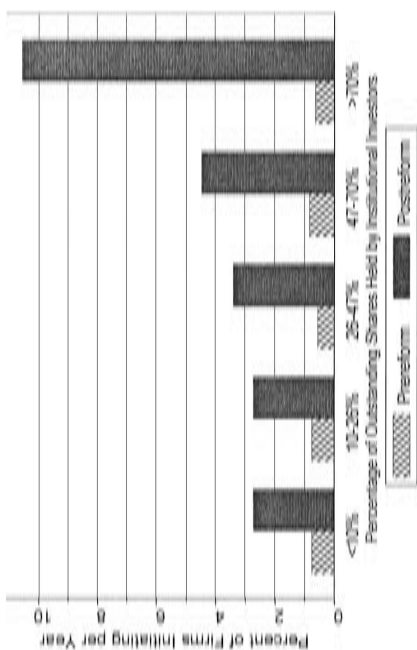
B. Breakdown by Large Shareholders
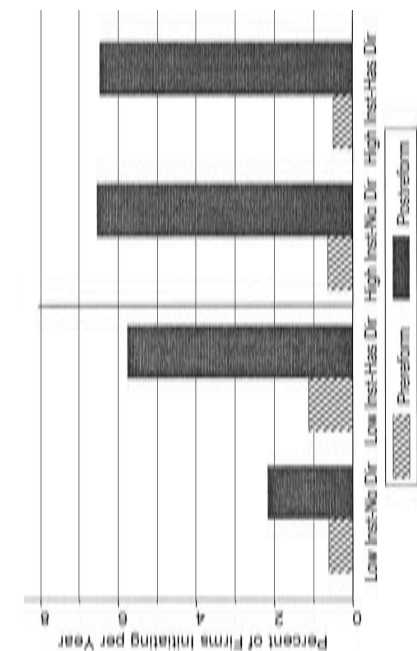
FIGURE VIII

Effect of Tax Cut on Initiations: Breakdown by Institutional and Large Shareholder Ownership

For both panels the sample is the same as in Figure VII. Panel A depicts the percentage of firms initiating dividends at an annualized rate prereform (from 1998-Q1 to 2002-Q4) and postreform (from 2003-Q1 to 2004-Q2) by quintiles of institutional share ownership. Institutional share ownership, obtained from the Thomson Financial database, is defined as the fraction of the firm owned by institutions such as mutual funds, pension funds, other corporations, etc. The horizontal axis shows the percentage range of institutional share ownership for each quintile.

Panel B breaks down the initiation rates by institutional ownership and large-shareholding independent directors. The "low inst" category consists of all firms with below-median institutional shareholding during sample period, and the "high inst" category consists of the rest. The "No Dir" category contains firms that do not have a large-shareholding independent director on their board; the "Has Dir" category contains the rest of the firms. The figure shows pre- and postreform initiation rates for the four categories of firms across these two dimensions. Large-shareholding independent directors are defined as individuals on the board of directors who own at least 5 percent of the company and who are not officers. Data on large shareholders are obtained from the Dlugosz, Fahlenbrach, Gompers, and Metrick [2004] database and also supplemented by data from SEC proxy statements as described in the Appendix.

strong incentives to demand dividends reduces the marginal impact of other powerful principals with similar interests.

Unlike directors and institutions, large "outside" (nondirector) individual shareholders, have no effect on the response to the tax cut, along either the extensive or intensive margins (see Chetty and Saez [2004]). The most likely reason for this is that dividend policy is set directly by the board of directors and is not typically voted upon by shareholders. Hence, large external individual shareholders may have less influence over the short-run payout decisions of corporations.

Table IV, Panel B illustrates the interaction between executive incentives and the power of principals. It cross-tabulates three groups ranked by top executive share ownership by three groups ranked by total institutional ownership. This table shows that executive incentives and powerful principals are also to some extent substitutes. Firms with neither executive incentives nor powerful principals hardly respond to the tax change, while firms with one of the two elements are 6–10 times more likely to initiate dividends in response to the tax cut.

Our results show that principal-agent issues play a first-order role in determining behavioral responses to taxation, and should be included explicitly in models of optimal dividend taxation. Despite the fact that the variation in executive or institutional ownership is purely cross-sectional, it is difficult to formulate a nonagency story that would explain all our results simultaneously. Furthermore, as we have noted above, the quintile breakdowns are all robust to controls for several observable covariates. However, the concern that our results might be driven by unobservables remains. Exogenous variation along the executive and institutional ownership dimensions (unfortunately not generated by the 2003 tax change) is needed for a fully convincing analysis of this issue.

IV.C. Substitution with Share Repurchases

If the tax cut simply induced firms to substitute dividends for share repurchases without raising total payout, it would be unlikely to yield significant efficiency benefits because the total amount of capital recirculation would remain unchanged.[27] It is

27. For example, we show in Chetty and Saez [2004] that the postreform dividend initiations are concentrated among firms with low to moderate forecasted earnings growth. This suggests that the dividend tax cut might have had

therefore important to examine the degree to which such substitution occurred. Unfortunately, answering this question precisely is difficult because of the volatility of share repurchases over time. Figure IX illustrates the problem. Panel A depicts aggregate share repurchases by firms in the core sample which have share repurchase information from Compustat. The figure shows that share repurchases have increased substantially since the tax cut. However, in view of the historical record, it is clearly possible that share repurchases could have increased even more absent the tax change. The problem is that total share repurchases fluctuate much more from quarter to quarter than dividends. This greater time variability makes it impossible to draw any reliable conclusions about the effect of the reform on total payout (total dividends + total repurchases) in the aggregate sample. Controlling for observable variables or removing the largest share repurchasers does not smooth the time series of share repurchases.

Looking at other moments of the repurchase distribution in the full sample, as we did for dividends, does not solve the statistical inference problem either. Panel B displays the total number of firms that repurchase more than 0.1 percent of their shares in the core sample. The number of firms repurchasing shares is also very noisy over time, making it difficult to infer the effect of the tax cut on the total number of firms paying out in some form.

To make some progress on the substitution question, we examine the subset of firms that initiated dividends after the 2003 tax reform. In this group, the noise in repurchases is small relative to the large change in dividend payout. Figure X shows the amounts of dividends and share repurchases in this subset of firms from 2000-Q1 to 2004-Q1.[28] The amount of quarterly dividends is unsurprisingly virtually zero before the reform and increases to almost \$1 billion by 2004-Q1. Meanwhile, share repurchases by this group increased since the reform, suggesting that firms that initiated dividends after the reform did not reduce repurchases to pay dividends. Other statistics also point to a similar result. About 35 percent of these firms never repurchased

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a positive effect on capital allocation efficiency by reshuffling funds from low growth firms toward high growth firms. Such a conclusion, however, clearly requires that the new dividend payments constitute a real increase in payout and not simply substitution with share repurchases.

28. The figure excludes the largest initiating firm, Microsoft, in order to obtain a smoother time series. The results hold if we exclude other large initiations as well.
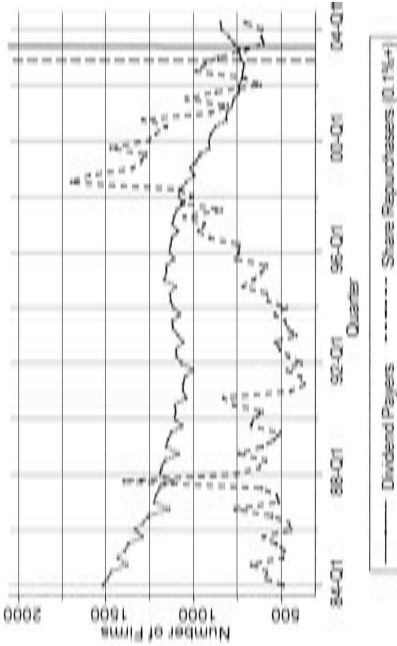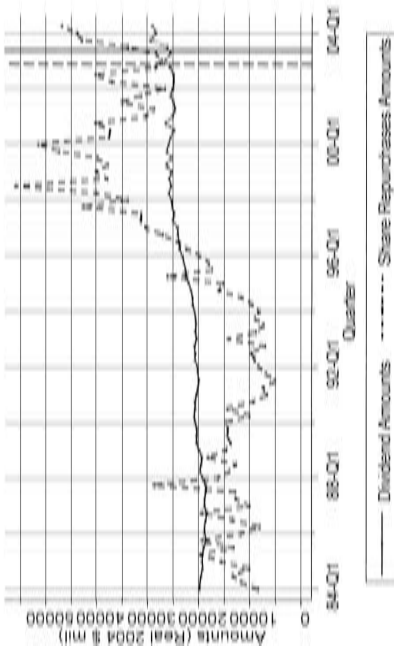
FIGURE IX

Share Repurchase and Dividend Activity

Panel A shows total regular dividend payments and total share repurchases in real 2004 dollars. For regular dividends, the sample is the core sample, as in Figure I. For share repurchases, the sample is the core sample with the additional requirement that Compustat variable data93 in the quarterly file (purchases of common and preferred stock) exists.

Panel B depicts the total number of firms making regular dividend payments and total number of firms repurchasing at least 0.1 percent of their shares from 1984-Q1 to 2004-Q2. The sample is the same as in Panel A.
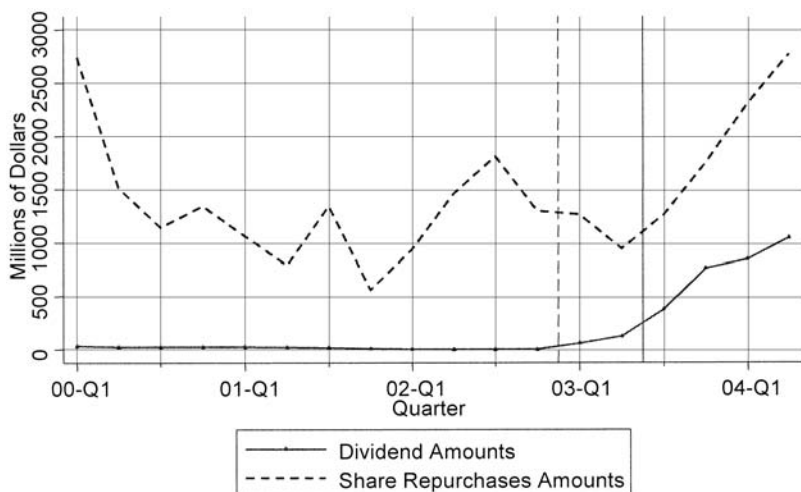
FIGURE X

Dividend and Share Repurchase Amounts for Firms Initiating after the Tax Cut

This figure depicts the amount of regular dividends and share repurchases for the set of firms in the core sample that initiated regular dividend payments between 2003-Q1 to 2004-Q2, and which have Compustat data on share repurchases. Microsoft is excluded from the sample in order to obtain a smoother series not driven by a single outlier.

shares at all in 2002. In addition, the fraction of firms repurchasing at least 0.1 percent of their shares fell by only 4 percent, from 39 percent in 2002 to 35 percent in 2004-Q1 in this sample. These results show that initiators did not simply "relabel" repurchases as dividends after the reform. However, they do not necessarily rule out more general forms of substitution. This is because the selection of this group is endogenous, being based on the choice of initiating dividends. It is possible that absent the reform, the firms that initiated dividends would have repurchased more shares instead.[29]

29. Brown, Liang, and Weisbenner [2004] argue that there is a "strong degree of substitution from repurchases to dividends prompted by the dividend tax cut." They show that firms which increased dividend payments before the tax cut (between 1993–2002) were more likely to increase total payout than firms increasing dividends after the tax cut. However, their results are sensitive to the comparison period chosen because there was a large increase in aggregate repurchase behavior between 1993 and 2003. Moreover, firms that raised dividends prereform are not directly comparable to firms raising dividends postreform as the latter faced better tax incentives and hence possibly had a weaker taste for payout on average than the former.

V. CONCLUSION

The 2003 dividend tax cut induced a large set of firms to initiate regular dividend payments or raise the payments they were already making. The rise in regular dividend payments among publicly traded corporations along both intensive and extensive margins, both in frequencies and amounts, offers perhaps the clearest evidence thus far in the literature that tax policy does matter for dividend payout policies. Overall, we estimate that total dividends paid by nonfinancial, nonutility public corporations increased by 20 percent within six quarters after the reform.

These results would seem to support the old view, which predicts a positive response of dividends to such a tax cut. However, the dividend response appears too fast to be consistent with the old view mechanism, which works through a savings supply-side response leading to more business activity and higher dividend payments in the long run. Indeed, Poterba's [2004] time series estimates supporting the old view imply that the 2003 tax reform should ultimately increase dividend payments 20 percent, but that the adjustment process will be slow, with only a quarter of the long-run effect taking place within three years.[30]

The implications of the empirical evidence for the new view, which predicts no response to permanent changes in dividend taxation, are less clear. The 2003 tax cut was announced as a temporary tax cut scheduled to expire in 2009. Even under the new view, dividend payments should respond to a temporary cut in dividend taxation, so the results do not necessarily contradict this model. It is intriguing, however, that firms chose to respond along the more permanent margin of regular dividends to the 2003 tax change given the option of using the temporary margin of special dividends.[31] Analyzing whether the dividend increase lasts permanently after a few more years have elapsed should offer a more compelling opportunity to test the new view.[32]

There is considerable heterogeneity in the dividend response, which sheds light on the mechanism through which dividend

30. One caveat in comparing our results with Poterba's estimates is that he uses National Accounts data, while we focus only on publicly traded companies.
31. We speculate that the tax change, initially scheduled to last six years, is perhaps perceived as sufficiently likely to be permanent or that firms will not fear cutting regular dividends if the tax cut expires.
32. Our results also seem to contradict the money burning signaling theory of dividends as this theory predicts that a dividend tax cut should *decrease* the fraction of dividend-paying firms [Bernheim and Redding 2001].

taxation affects corporate behavior. Firms with high executive share ownership and low executive stock-options holding were most likely to initiate dividend payments after the tax cut. Firms with large shareholding independent directors and high taxable institutional ownership also responded more strongly to the tax cut, while firms controlled by nontaxable institutions (whose tax incentives were unchanged by the reform) did not respond. Corporations that had neither strong agent incentives nor large principals to induce a dividend policy change were virtually unresponsive to the tax reform. These findings show that the tax incentives of key players—powerful agents and large shareholding principals—are a primary determinant of corporate responses to taxation. In this sense, existing "old view" and "new view" models of corporate taxation in the public finance literature may fail to incorporate explicitly an important element of the behavioral response to taxation by abstracting from agency problems. Developing a theory of dividend taxation that incorporates a principal-agent relationship could allow for a more precise assessment of the efficiency costs of dividend taxation and the optimal design of corporate and individual income tax policy.

Of course, in order to quantify the welfare consequences of the tax reform, it would be most interesting to analyze the effect of the reform on investment behavior. Unfortunately, this does not appear to be feasible because investment levels are extremely volatile and much larger in magnitude than dividend payments. As a result, it is impossible to estimate the effects of the tax cut on any moment of the investment distribution with reasonable confidence intervals using the semiparametric methods employed in this study. A promising avenue for future research is to study closely held corporations and compare subchapter C firms, which face double taxation (corporate and individual), to subchapter S firms which are taxed directly at the individual level and hence were unaffected by the 2003 reform. As the universe of such firms is much larger, and S-corporations offer a natural control group, estimation of other behavioral responses such as investment and debt policy might be possible.[33] Analyzing investment behavior following the dividend tax cut could also cast light on the new view versus old view debate, as the old view

33. In contrast to publicly traded corporations, closely held corporations are not required to publicly report their accounting balance sheets and dividend payments. Therefore, such a project would require using nonpublic corporate tax return data, available through the Treasury or the Internal Revenue Service.

predicts a positive response while the new view predicts no investment response.

<center>APPENDIX</center>

Definition of Initiations and Terminations

We define a firm as initiating dividend payments in quarter t if it pays positive regular dividends in quarter t and did not pay dividends in the previous four quarters ($t - 1$, $t - 2$, $t - 3$, and $t - 4$). If the firm pays annual dividends in quarter t (or paid such an annual dividend in quarter $t - 5$ or $t - 6$), we require in addition that the firm did not pay any dividends in quarters $t - 5$ and $t - 6$ as well. Note that our definition is identical to that in the existing literature on initiations with one exception. Prior studies typically analyze the data at an annual frequency and define an initiation as no payment in the previous year followed by payment in the current year. We require in addition that annual payers not pay in quarters $t - 5$ and $t - 6$ because we are examining the data at a quarterly frequency. This condition accommodates cases where annual dividend payers change the quarter in which they pay dividends, creating five or six consecutive quarters with no payments, but with no real interruption in regular dividend payments. In practice, both definitions of initiation generate very similar results.

We define a firm as terminating regular dividend payments in quarter t if it pays positive regular dividends in quarter $t - 1$ and does not pay dividends in the next four quarters (t, $t + 1$, $t + 2$, and $t + 3$).[34] Because our data are censored after quarter 2004-Q2, we do not observe the full vector of future dividend payments for observations from 2003-Q2 to 2004-Q2. To describe how we handle these cases, let T denote the last quarter available in the data (2004-Q1). In those cases where $t \geq$ 2003-Q2, we define a firm as terminating regular dividends if one of the following three conditions hold: (1) the firm was a quarterly payer in quarter $t - 1$ and paid dividends in all quarters $t - 2$, $t - 3$, $t - 4$, but does not pay in quarters t to T; (2) the firm was a semiannual payer in quarter $t - 1$, but does not pay for at least two consecutive quarters starting in t; or (3) the firm was an annual

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34. In the case of annual payers in quarter $t - 1$ (or quarters $t + 4$ and $t + 5$), we impose in addition that the firm does not pay any dividends in quarters $t + 4$ and $t + 5$ as well, for the same reason as above.

payer in quarter $t - 1$, but does not pay for at least four consecutive quarters starting in t. This definition of termination is the closest prediction we can obtain of actual terminations that would be observed if the data were not censored.

Definition of Intensive Increases and Decreases

We define a firm as increasing its regular dividend payment on the intensive margin by 20 percent 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 dividends in quarter t exceed the maximum value of regular dividends in the past four quarters ($t - 1$ to $t - 4$) by at least 20 percent. The requirement that dividends in quarter t exceed dividends in all of these quarters ensures that annual or semiannual payers are not artificially classified as increasers every time they make a dividend payment.

The definition for decreasing dividends by 20 percent on the intensive margin is analogous. Terminations are not counted as decreases to avoid double counting, given their inclusion in the extensive analysis. Every firm is assigned a value of 0 for both the increase and decrease dummy variables in their first four quarters in the sample, since there is inadequate historical information to apply our definition in these cases. Firms not paying or initiating dividends in period t are always assigned a value of 0 for both dummy variables.

Supplementary Data Collected from SEC Proxy Filings

We collected data on executive stock and option ownership following the definitions in Execucomp and large blockholder ownership (>5 percent) following the definitions in Dlugosz, Fahlenbrach, Gompers, and Metrick [2004] for 347 additional firms not covered in these data sets. These firms included 200 firms that initiated dividends between 1998-Q1 and 2004-Q2, for whom we collected proxy data in the year of initiation. The remaining 147 firms are a random sample of the noninitiating firms not covered by one of Execucomp or Dlugosz et al. We obtained this sample by randomly drawing the names of 10 percent of the firms (163 firms) in this subset, along with a random date between 1998-Q1 and 2004-Q2 for which we collected proxy data. In constructing the random sample of dates, we required that 50 percent of the dates were chosen in the postreform period (after 2003-Q1) given the importance of precision in the postre-

form period. We were unable to obtain proxy statements for 16 of the 163 firms in our random sample, giving us an ultimate random sample, size of 147. The underrepresentation of firms in the non-Execucomp, non-Dlugosz et al. noninitiating group is corrected for in our heterogeneity analysis by probability-weighting these observations by the sampling probability, so that they receive more weight in all computations.

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