Does Dividend Tax Impede Competition for Corporate Charters?

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July 27, 2017

Abstract

We develop a model of jurisdictional competition for corporate charters among the states in which a firm's agency cost depends on the federal dividend income tax rate and the takeover regulations of its domicile state. When firms are mobile across states, the federal dividend income tax rate affects both the intensity of competition among the states and the equilibrium level of state takeover regulations. Our model shows that increasing dividend tax rate weakens the competition for corporate charters under a condition: dividend-paying and the market for corporate control are complementary corporate governance mechanisms. This condition holds empirically, suggesting that dividend tax not only discourages firms from paying dividends but also weakens their corporate governance by disincentivizing states to improve their corporate laws.

Keywords: Jurisdictional competition, Corporate charters, Takeover regulations, Corporate law, Corporate federalism, Tax law, Corporate governance, Agency costs, Dividend taxation, Dividend payment, Investment.

JEL Classifications: G31, G34, G35, H32, K34, K22, K33.

1. Introduction

Since World War II, the U.S. weighted-average household marginal tax rate on dividend never went below 31.9% before 1987 (Poterba, 2004); it stayed at roughly 31% since 1987 until the Jobs and Growth Tax Relief Reconciliation Act (JGTRRA) of 2003 capped it at 15%.[1] The year 1987 had the landmark case *CTS Corp. v. Dynamics Corp. of America* that started waves of state takeover regulations. Why would state takeover regulations proliferate and compromise the market for corporate control while states were competing for corporate charters? Did the high federal dividend income tax rate have something to do with it? We ask these questions because the competition among states shapes U.S. firms' corporate governance, which ultimately affects firm value.

In this paper, we develop a model of jurisdictional competition for corporate charters among the states to examine how and when federal dividend income tax incentivizes the states to enact takeover regulations by changing the competition among them. In the model, there are many states and three types of players: entrepreneurs/managers, investors/shareholders, and state legislators. Each state has a legislator and a mass of heterogeneous entrepreneurs characterized by their exogenously endowed business ideas. There are unlimited amount of homogeneous investors not belonging to any state.

At the beginning of the game, all state legislators simultaneously pick the amount of takeover regulations to enact in their own states. Their trade-off is that while fewer takeover regulations help their states attract corporate charters, the state legislators would privately benefit from enacting more takeover regulations (Romano, 1985). [2] Given the amounts of takeover regulations across the states, the entrepreneurs decide whether or not to incorporate a firm to implement their business idea, and if so, which state should be the domicile. Incorporating a firm must at least give the entrepreneurs a payoff higher than their outside option; those who do so become the

[1] The JGTRRA was signed by President George W. Bush on May 28, 2003. Prior to 2003, dividends were taxed at the marginal tax rate of the individual investors, which could reach as high as 35%. The Act caps the dividend tax rates at 15%, the same rate as the long-term capital gains tax. Specifically, the Economic Growth and Tax Relief Reconciliation Act of 2001 gradually decreased the top individual tax rate from 39.6% to 35%. However, prior to the 2003 tax cut, the top rate was higher than 35%. The 15% cap was initially set to expire on December 31, 2008, but the Tax Increase Prevention and Reconciliation Act of 2005 extended it to 2010. Poterba (2004) reports that from 1993 to 2002, the weighted average household marginal tax rate on dividends leveled at around 32%, but decreased sharply to 18.5% in 2003. The dividend cut is likely significant to U.S. households as Poterba (2004) reports that the share of equity owned by them hovers at approximately 60%.

[2] Throughout this paper, "more takeover regulations" means more pro-manager (or pro-incumbent) laws. From a strictly legal perspective, however, the quantity of regulations do not necessarily mean the set of laws is more pro-manager. For instance, a state can enact new regulations to foster the takeover market on the margin. As we will explain more in Section 3 where the math is formally introduced, a more precise way to describe "more takeover regulations" is that the state enacts more pro-manager laws.

firm managers. Observing the choices of the state legislators and the entrepreneurs, the investors decide whether to invest in a firm or an outside risk-free asset. Those who choose to invest in firms become the shareholders.

Once an entrepreneur-turned manager has incorporated his firm in a state and successfully attracted investors (who become shareholders), they interact strategically as in Chetty and Saez (2010): the shareholders make an effort to monitor the manager who chooses dividend payment and investment (part of it could bring private benefits to himself at the expense of the shareholders). Firm value and the corresponding agency costs, and ultimately the payoffs of the manager and the shareholders would be determined by the following four factors: (a) the interaction of the (investors-turned) shareholders and the (entrepreneur-turned) manager, (b) the profitability of his idea, (c) the takeover regulations of the domicile state, and (d) the federal dividend income tax.

Specifically, once a firm has been formed, the manager may misuse the cash for things that benefit him only but not the shareholders (Fama and Jensen, 1983; Jensen, 1986). We model two corporate governance mechanisms to curb these agency costs. The first is the dividend-paying mechanism that reduces cash under the manager's control (Easterbrook, 1984; Jensen, 1986).[3] The second is the market of corporate control mechanism that reduces the shareholders' monitoring costs (Manne, 1965).[4] While managers ultimately decide how to use their firms' cash, their hands are partially tied by these governance mechanisms. Federal dividend income tax discourages dividend-paying and compromises the first mechanism (Chetty and Saez, 2005, 2010), while state takeover regulations inhibits the market of corporate control and compromises the second one (Romano, 1987).

We solve for the subgame-perfect equilibrium to examine the incentives of the state legislators to enact takeover regulations. Specifically, we derive the "price" each state legislator has to pay for increasing the amount of takeover regulations. Such a "price" is the reduction of corporate charters and consists of two kinds of losses. First, some firms incorporate in other states instead. Second, some firms who would have incorporated in the state if there were fewer takeover regulations do not incorporate at all. Forming a firm requires both the entrepreneur's idea and the investors' willingness to provide capital. They make their own decisions taking into account the future agency problems after a firm has formed. Therefore, regulations that are in favor of managers at the expense of the shareholders ex post discourage investors to provide

[3] Easterbrook (1984) argues that committing firms to disgorge cash mitigates the free cash flow problem and forces firms to borrow from the external capital market from time to time. The capital market's pricing helps solves the free-riding problems among shareholders. Jensen (1986) argues that the free cash-flow problem is a major agency cost for firms with separation of ownership and control that may be curbed with committing to a dividend policy or debt repayment.

[4] Manne (1965) first argues that the ease of ousting lazy managers through hostile takeovers helps reduce agency costs.

capital ex ante. More takeover regulations that are pro-manager, therefore, would lead to fewer charters. The reduction of corporate charters depends on the interactions between entrepreneurs/managers and investors/shareholders, which are functions of the takeover regulations and the federal dividend income tax.

One outcome we focus on is the equilibrium amount of takeover regulations. We find that federal dividend income tax may change the trade-off of state legislators by decreasing the "price" of increasing the amount of takeover regulations. We refer to this change as impeding (or weakening) the competition for corporate charters among the states. Decreasing the "price," (i.e., a state loses fewer corporate charters from increasing the amount of takeover regulations) results in more takeover regulations. This is analogous to any industry in which weaker competition likely results in lower quality outputs. The model shows that federal dividend income tax impedes competition for corporate charters precisely when the two governance mechanisms (dividend-paying and the market for corporate control) are complementary.[5]

Whether dividend-paying and the market for corporate control are complementary, however, is an empirical question. Section 4 offers a test using the JGTRRA of 2003 that sharply reduced the dividend income tax rate. Dividends paid by all U.S. firms were qualified for the tax cut, irrespective of the anti-takeover provisions faced by them. If dividend-paying and the market for corporate control are complementary mechanisms, we explain in Section 4.1 why those firms with fewer anti-takeover provisions should have responded more strongly to the dividend tax cut. Examining the dividend and investment policies of U.S. listed firms with different anti-takeover provisions before and after the 2003 tax cut, we indeed have found such a pattern.[6]

Our model and empirical results lead us to conclude that dividend tax likely impedes the competition among states for corporate charters. This conclusion reconciles the fact that state takeover regulations proliferated in the late 1980s and early 1990s while the states were competing; given the high dividend tax back then, the competition among the states might not have been intense enough.[7]

[5] Misangyi and Acharya (2014) state that "are the different governance mechanisms complements or substitutes?" is a mainstream governance question. In our case, our question is whether dividend-paying (an internal governance mechanism hindered by federal dividend income tax) and the market for corporate control (an external governance mechanism hindered by state takeover regulations) are complementary.

[6] Several robustness checks (in Appendix C) rule out alternative explanations. These explanations include explicitly accounting for the fact that firms can disgorge cash through both paying dividends and engaging in share repurchase, taking into account ownership structure differences among firms, performing a placebo test using a year in which no sudden dividend tax cut was implemented, and explicitly accounting for the possibilities that both the Sarbanes-Oxley Act of 2002 and the Job Creation and Worker Assistance Act of 2002 may drive our results.

[7] Starting from Cary (1974) and Winter (1977), there has long been a debate about whether the competition for corporate charters among states are a "race to the bottom" (RTB) or a "race to the top" (RTT). Essentially, what attracts firms to where they are: Is it the law favoring the managers that attract firms (RTB) or is it the law favoring the shareholders that attract firms (RTT)? Cary (1974) advocates

2. Related Literature

Our paper belongs to the corporate federalism literature. We examine how national tax policies affect the interactions between states and firms in the context of corporate law. A long-term research theme of a leading scholar, Easterbrook (1994, 2003, 2013) studies the plan prescribed in James Madison's Federalist No. 10 in the corporate law context. To mitigate the harm of interest groups, Madison's plan diffuses power through federalism. The U.S. founders envisioned that competition can help foster diversity and constrain states from abusing their powers.

Federalism differentiates U.S. corporate law from the corporate laws in other countries. Romano (1993, 2005, forthcoming) argues that the system strengthens U.S. firms' corporate governance by experimenting with different types of corporate law and diffusing those useful types across states. Carney (1997a,b) argues that corporate federalism harnesses competitive forces in shaping the law, thereby resulting in the faster (slower) diffusion of good (bad) types of corporate laws across U.S. states relative to those among European nations. Easterbrook (1994) also notes such a distinction contributes to the differences in corporate governance between U.S. and European firms.

The key to such a political system is the mobility of people and resources, which underscores the competition among states for people and resources. Cooter (2000) argues that such mobility not only measures but also defines the competition among states. Holmes and Schmitz (2010) review the literature on the measurement of competition at the industry level and conclude that it is a main challenge in understanding how competition improves productivity. We contribute to the literature by not directly measuring the competition intensity of the states for corporate charters but by using theory to identify how we can use firms' responses to national tax policy changes to infer the changes in competition intensity.

Even if federalism has been set up as a political structure, Leeson (2011) questions why the central government would choose not to take the powers away from the states. If the Congress imposes a mandatory set of corporate governance practices on all U.S. corporations, then these practices take the power away from the states and directly reduce corporate federalism.[8] Easterbrook (2009) cautions

the RTB story because firms are run by managers and the shareholders have delegated the authority to the managers to make incorporation and other decisions. Winter (1977) advocates the RTT story because investors only invest in those firms that offer high enough returns; if the managers choose to incorporate in a state which offer lower returns; the investors can just walk away. We support neither the RTB nor the RTT story. Instead, we show that this is a matter of degree. States do compete for corporate charters all the time. However, if the intensity of competition is low, as when dividend tax rate is high, then the result of the competition looks more like a RTB. This is the point we are trying to make and theoretically derive.

[8] Cooter (2000) posits that the federal law that binds state government is a form of obligatory

that a race to the bottom may come from the national government instead of the states by imposing mandatory corporate governance practices, effectively knocking out jurisdictional competition.[9]

The federal dividend income tax paid by shareholders has never been viewed as a means for the national government to compromise the structure of federalism. This tax came from the 16th Amendment of 1913. Our paper is the first to take a closer look at how, through federal dividend income tax, the 16th Amendment impedes the competition among states for corporate charters.

Our paper also contributes to the literature on the regulatory competition of corporate charters. Most papers in this field are empirical in nature; among the few that offer theoretical models, Eldar and Magnolfi (2016) is the closest to ours. Their model guides a structural empirical estimation, which is the main gist of their paper. However, the study of Eldar and Magnolfi (2016) is dynamic, while ours is static. Specifically, Eldar and Magnolfi (2016) emphasize firms' inertia (choosing to remain in their current domicile state unless the benefits of reincorporating elsewhere outweigh the costs). We implicitly model this inertia by modeling entrepreneurs as having a out-of-state incorporation cost. By contrast, we focus on how changing the exogenous federal dividend income tax rate changes the way states compete, which is absent in the model of Eldar and Magnolfi (2016).

3. A Model of Competition for Corporate Charters

We develop a model of jurisdictional competition for corporate charters among the states. The model enables us to explicitly derive the intensity of competition for corporate charters. We can therefore derive the effects of increasing the federal dividend income tax rate on both the competition intensity and the equilibrium levels of state takeover regulations.

3.1. Set-up

There are $N \geq 2$ states indexed by $j = \{1, \ldots, N\}$. Each state has a legislator and a continuum of entrepreneurs of mass 1.[10] There is also an unlimited number of

harmonization. Cooter (2000, p.137) states, "obligatory harmonization diminishes jurisdictional competition and reduces the scope of bargaining over jurisdiction between the parties to a contract."

[9] If the mandatory practices fail to offer corporations good governance, corporations will face more difficulties in moving out of the U.S. than moving to another state. However, other kinds of competition exist, such as incorporating aboard or using other types of legal entities (e.g., unincorporated).

[10] An alternative interpretation of the location of a specific entrepreneur is that he does not reside in any given state; however, he either subjectively prefers to incorporate the firm in a particular state, or a particular state suits his firm objectively. For instance, a corporate law and other laws in a particular state can be more conducive to the type of businesses his idea is endowed with. It is also possible that he knows the laws in a particular state more than that of other states. These alternative interpretations

potential investors who do not belong to any state but can invest anywhere. The federal dividend income tax rate, τ, is exogeneously given.[11] The state legislators simultaneously pick an amount of takeover regulations, denoted as $\theta_j > 0$, in their states.[12]

Each entrepreneur is endowed with an exogenous business idea requiring \$1 to implement. However, the entrepreneur only has a capital of $\$\alpha \in (0,1)$; he needs to raise $\$(1-\alpha)$ from the investors to implement his idea. Every investor's outside option is a risk-free asset (e.g., T-bill) with a return rate of $r > 0$. The entrepreneur either picks one of the N states to incorporate his firm, or does not incorporate his firm at all, in which case he gets a payoff of 0. In addition, he incurs a fixed relocation cost of $R > 0$ if he incorporates outside of his own state.[13]

If the entrepreneur can successfully raise capital, he and his investors set up a firm to implement the business idea; α and $1-\alpha$ shares of the firm will be owned by the entrepreneur and the shareholders, respectively. Those entrepreneurs not able to raise capital drop out of the market. [14] A business idea, if financed by investors, can transform the \$1 capital to $\$X \geq 1$, where X is different across entrepreneurs and follows a distribution $H(X)$.[15] We interpret X as the entrepreneurs' "talent." We assume no information asymmetry in the sense that investors know the distribution of X and the incorporation decisions of the entrepreneurs.

The entrepreneur (now called the manager) will then interact with the investors (now called shareholders) à la Chetty and Saez (2010). Specifically, the shareholders exert an effort to monitor the manager, whose responsibility is to choose the invest-

do not change our results.

[11] In our model, we take changes in federal dividend income tax rate as exogenously given. We agree that endogenizing the decision to change the federal dividend tax rate as a function of corporate contribution can provide a fuller picture of the interactions among federal legislators, state legislators, managers, and shareholders. Nevertheless, to do so requires us to model the optimization problem of the federal government.

[12] Note that throughout the paper, we use the descriptor "more takeover regulations" to refer to the set of laws being more pro-manager (or pro-incubment). Specifically, θ_j reflects the extent of pro-incumbency in terms of constraints on alienability. One can envision two extremes: $\theta_j \to 0$ reflects a world of complete unregulated takeover markets. On the other hand, $\theta_j \to \infty$ refers to the situation in which it is utterly impossible for anyone to takeover a firm.

[13] The relocation cost may include the cost related to the paperwork involved, the time spent on learning the other state's corporate law and finding the right lawyer, etc., when the entrepreneurs register the firm out of their own state.

[14] In our model, the incorporation decisions are one-shot in the sense that once an entrepreneur has incorporated in a certain state, he cannot reincorporate in another state. Of course that still means he does carefully choose his domicile state. We do not model another stage of reincorporation decisions because the state legislators only pick their regulations once. As such, this model is silent as to how we compare the situations of initial incorporation versus subsequent reincorporation. In reality, state legislations occur at different points in time. Some new firms may form while existing firms may either drop out or reincorporate in other states. These dynamics are much richer but the modeling would be substantially more demanding, likely requiring dynamic models that would, however, potentially generate other modeling problems (such as multiple equilibria).

[15] The distribution of X will be specified later.

ment and dividend policies for the firm. However, the manager does have an option of investing in private "pet" projects that only benefit himself at the expense of the shareholders.[16]

The timing of the model is summarized as follows:

- **Stage 1**: State legislators choose the amount of takeover regulations to maximize utility.
- **Stage 2**: Entrepreneurs either choose a state to incorporate or do not incorporate. Investors then decide either to finance the entrepreneurs or to invest in a risk-free asset.
- **Stage 3**: As in Chetty and Saez (2010), this stage is divided into the following periods:
  - **Period 0**: The (investors-turned) shareholders pick an effort level to monitor the (entrepreneur-turned) manager.
  - **Period 1**: Upon observing the monitoring level, the manager chooses the levels of dividend payment and investment.
  - **Period 2**: All the proceeds are distributed back to the manager and the shareholders automatically.

We analyze the game by backward induction.

3.2. Stage 3

If the manager with entrepreneurial talent X can successfully raise capital, he can transform the \$1 capital into $\$X \geq 1$. With X in hand, the manager divides it among dividend payments (D), investments in production projects (I), and investments in pet projects (J). The productive investments I can generate an output $F(I) = f(I) + I$ where $f(I)$ is the net profit for the firm; the pet projects can generate $g(J)/(1+\gamma)$ net private benefit for the manager where γ is the shareholders' monitoring intensity. Let $(1+\theta)c(\gamma)$ denote the effective cost of monitoring, where $\theta > 0$ is the amount of takeover regulations in the firm's domicile state. This function captures the fact that an unfettered market for corporate control lowers the costs of shareholders to monitor firm managers (Manne, 1965). We assume diminishing return for investment (i.e., $f' > 0$, $f'' < 0$, $g' > 0$, $g'' < 0$) and increasing cost of monitoring (i.e., $c' > 0$ and $c'' > 0$).

[16] Chetty and Saez (2010) do not use the term "asymmetric information" but technically, the manager's actions are not directly observable by the shareholders. Hence, there is the need of exerting monitoring costs as well as the existence of the agency problems.

We solve the game within stage 3 by backward induction. Since period 2 has no strategic interaction, we start from period 1. In this period, the manager chooses I, D, and J to maximize his payoff, which is the sum of his share of firm profit (in the form of dividends) and his own private benefit:

$$\max_{I,J,D} \pi^M = \alpha(1-\tau)\left[D + \frac{F(I)+J}{1+r}\right] + \frac{g(J)}{(1+r)(1+\gamma)}$$
$$\text{subject to } X = I + J + D, \tag{1}$$

where τ, again, is the federal dividend income tax rate.[17] Defining $\omega = \alpha(1-\tau)(1+\gamma)$ and substituting the constraint $X = I + J + D$ into the objective function, the above problem becomes:

$$\max_{I,D} \omega\left[D + \frac{f(I)+X-D}{1+r}\right] + \frac{g(X-I-D)}{1+r}. \tag{2}$$

Thus, ω can be interpreted as the weight the manager puts in firm profit. Assuming an interior solution for I, the first order conditions are:

$$\omega f'(I) = g'(X-I-D), \tag{3}$$
$$\omega r \leq g'(X-I-D), \text{ with strict equality if and only if } D > 0. \tag{4}$$

These two equations give the optimal I, D, and $J(= X-I-D)$ as functions of ω.

The following lemma from Chetty and Saez (2010) characterizes the optimal investment and dividend functions. All proofs are in the Appendix.

Lemma 1 *Let $\overline{\omega} = g'(X-I^*)/r$, where I^* is the optimal investment level from the shareholders' perspective, i.e., $f'(I^*) = r$. Then:*

(a) If $\omega \leq \overline{\omega}$, then $D(\omega) = 0$, and $I(\omega)$ satisfies $\omega f'(I) = g'(X-I)$.

(b) If $\omega > \overline{\omega}$, then $I(\omega) = I^*$, and $D(\omega) > 0$ satisfies $\omega r = g'(X-I^*-D)$.

In period 0, anticipating the manager's choices of I, D, and $J(= X-I-D)$ in period 1, the shareholders choose a monitoring intensity (γ) to maximize firm value, net of monitoring cost:

$$\max_{\gamma} \pi^S = (1-\alpha)(1-\tau)\left[D(\omega) + \frac{f(I(\omega))+X-D(\omega)}{1+r}\right] - (1+\theta)c(\gamma). \tag{5}$$

Let:

$$P(\omega) = D(\omega) + \frac{f(I(\omega))+X-D(\omega)}{1+r}. \tag{6}$$

[17] For simplicity, we assume that the corporate income tax rate is 0.

Using $\omega = \alpha(1-\tau)(1+\gamma)$ so that $\partial\omega/\partial\gamma = \alpha(1-\tau)$, the first order condition is:

$$\alpha(1-\alpha)(1-\tau)^2 P'(\omega) = (1+\theta)c'(\gamma). \tag{7}$$

(7) gives the optimal γ as a function of θ and τ.

The subgame-perfect Nash equilibrium (of the game in stage 3) is characterized by γ^*, $I(\omega^*)$, $D(\omega^*)$ and $J(\omega^*)(= X - I(\omega^*) - D(\omega^*))$ in which γ^* satisfies (7), $I(\omega^*)$ and $D(\omega^*)$ satisfy (3) and (4), and $\omega^* = \alpha(1-\tau)(1+\gamma^*)$. The following lemma states some comparative static results which we will use later.

Lemma 2 *In the subgame-perfect Nash equilibrium:*

(a) $\partial\omega/\partial\tau < 0$.

(b) $\partial\omega/\partial\theta < 0$ *and* $\partial\gamma/\partial\theta < 0$.

(c) $\pi^M/\partial\theta > 0$ *and* $\pi^S/\partial\theta < 0$.

Lemma 2(a) and (b) say that increasing the dividend tax rate and more takeover regulations both reduce the weight the manager puts on firm profit; besides, since more takeover regulations also make it more costly to effectively monitor the manager, shareholders choose to monitor the manager less intensively. Consistent with Romano (1987), Lemma 2(c) says that increasing the amount of takeover regulations increases the payoff of the manager while decreases the payoff of shareholders. Later, we will see that given an X, shareholders obviously prefer the firm to incorporate in a state with fewer takeover regulations. A manager has the exact opposite incentive. However, an entrepreneur may not want to incorporate in a state with more takeover regulations because doing so may make his potential investors walk away.

3.3. Stage 2

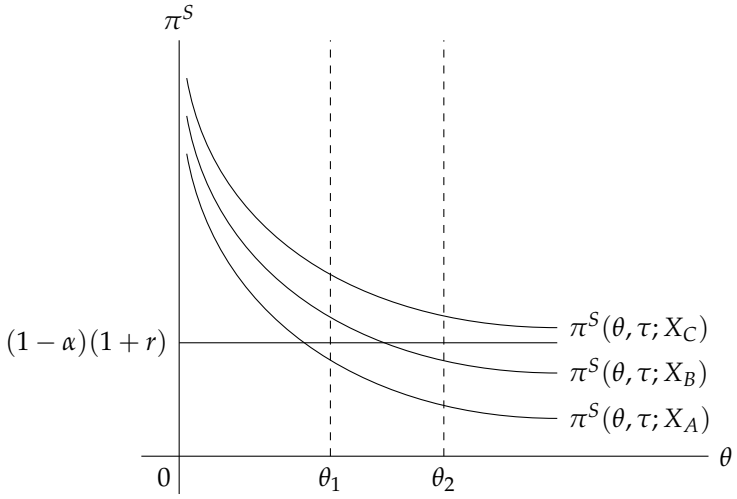
3.3.1. The investment decision

In stage 2, the investors decide whether to provide $(1-\alpha)$ capital to the entrepreneurs. Given the risk-free rate r, the investors are willing to provide capital to an entrepreneur from state j with talent X_j who wants to incorporate in state j' (including state j itself) if the payoff from providing capital is higher than the risk-free payoff, i.e.,:

$$\underbrace{\pi^S(\theta_{j'}, \tau; X_j)}_{\text{Payoff from providing capital}} \geq \underbrace{(1-\alpha)(1+r)}_{\text{"Risk-free" payoff}}. \tag{8}$$

Figure 1 shows an example with three entrepreneurs (A, B, and C) and two states (1 and 2). The entrepreneurs have different talent $X_A < X_B < X_C$ and the two

Figure 1: An example with three entrepreneurs and two states



states have different amount of takeover regulations $\theta_1 < \theta_2$. In this example, both $\pi^S(\theta_1, \tau; X_C)$ and $\pi^S(\theta_2, \tau; X_C)$ are larger than $(1-\alpha)(1+r)$. Entrepreneur C can raise capital by incorporating in either state. If both states are not his home state, he would prefer state 2 for a higher payoff under more takeover regulations (i.e., Lemma 2 (c)). If state 1 is his home state, he would incorporate in state 2 instead as long as his payoff in state 2 relative to state 1 is larger than the relocation cost R. On the other hand, entrepreneur B can only raise capital to incorporate in state 1 because $\pi^S(\theta_1, \tau; X_B)$ is larger than $(1-\alpha)(1+r)$ in state 1 but $\pi^S(\theta_2, \tau; X_B)$ is smaller than $(1-\alpha)(1+r)$ in state 2. Finally, no investors will provide capital to entrepreneur A because both $\pi^S(\theta_1, \tau; X_A)$ and $\pi^S(\theta_2, \tau; X_A)$ are lower than $(1-\alpha)(1+r)$. This example highlights the situation that everything else being equal, all entrepreneurs prefer to incorporate in a state with more takeover regulations; but whether they would actually do so depends on whether they can still attract investors, the home state location, as well as the relocation cost.

From Lemma 2(c), we know that $\partial \pi^S / \partial \theta < 0$. Therefore, given τ, we can find a pair $(\theta, \widetilde{X})$ such that an investor's payoff equals the risk-free rate, i.e., $\pi^S(\theta, \tau; \widetilde{X}) = (1-\alpha)(1+r)$, or

$$(1-\alpha)(1-\tau)\left[D + \frac{f(I) + \widetilde{X} - D}{1+r}\right] - (1+\theta)c(\gamma) = (1-\alpha)(1+r). \tag{9}$$

Given (θ, τ), $\widetilde{X}$ is the minimum entrepreneurial talent such that an entrepreneur can raise capital from investors to set up a firm. As we will explain further in Section 3.6, we interpret $\widetilde{X}$ as "agency cost" because when $\widetilde{X}$ is high, only entrepreneurs with high enough talents can raise capital from investors to set up a firm. Lemma 3 below shows that this is the case when there are more takeover regulations or when the dividend

tax rate is higher:[18]

Lemma 3 *Let $\widetilde{X}(\theta, \tau)$ satisfy (9). Then:*

(a) $\widetilde{X}_\theta = \partial \widetilde{X} / \partial \theta > 0$.

(b) $\widetilde{X}_\tau = \partial \widetilde{X} / \partial \tau > 0$.

3.3.2. *The incorporation decision*

Knowing that the investors' willingness to provide capital depends on $\widetilde{X}$, the entrepreneurs decide where to incorporate their firms to implement their business ideas. In the presence of relocation cost, the entrepreneur from state j with talent X_j is willing to move to another state $j' \neq j$ if he can get a higher payoff net of relocation cost, i.e.:

$$\underbrace{\pi^M(\theta_{j'}, \tau; X_j) - R}_{\text{Payoff from moving to } j'} \geq \underbrace{\pi^M(\theta_j, \tau; X_j)}_{\text{Payoff from staying in } j} . \tag{10}$$

To summarize, an entrepreneur from state j with talent X_j can raise capital in the any given state j' (including state j itself) as long as condition (8) is satisfied. He can move to another state $j' \neq j$ under two conditions: First, he can raise capital in state j'. Second, he can get a higher payoff in state j' net of relocation cost. In other words, both conditions (8) and (10) have to be satisfied.[19]

3.3.3. *Mass of firms in different states*

Let $\theta_1 \leq \theta_2 \leq \ldots \leq \theta_{N-1} \leq \theta_N$ be the amount of takeover regulations in the N states, sorted in ascending order. The mass of firms in different states, m_j, can be computed as follows. Let X_j denote the talent of a given entrepreneur in state j. There are two types of firms which incorporate in state j:

- First, firms set up by entrepreneurs from state j who choose to stay in state j. These include (a) those who can raise capital to incorporate in state j but not in state $j+1$, and (b) those who can raise capital to incorporate in state $k \geq j+1$ but do not move there because of the relocation cost. The former case has the following probability (using (8)):

$$\mathbb{P}\Big\{ \pi^S(\theta_j, \tau; X_j) \geq (1-\alpha)(1+r) > \pi^S(\theta_{j+1}, \tau; X_j) \Big\}. \tag{11}$$

[18] The former is similar to Manne (1965) and the latter is similar to Easterbrook (1984).

[19] Note that in Stage 2 of the game, we assume that entrepreneurs first choose which state to incorporate and the investors then choose whether to finance the entrepreneurs or to invest in a risk-free asset. If the entrepreneurs and the investors choose their decisions *simultaneously*, their decisions are still governed by equations (8) and (10). Therefore, the mass of firms (in equations (11) to (13) , the Nash equilibrium, and more importantly the main propositions are still the same.

The latter case has the following probability (using (8) and (10)):

$$\sum_{k\geq j+1} \mathbb{P}\Big\{\pi^S(\theta_k,\tau;X_j)\geq(1-\alpha)(1+r)>\pi^S(\theta_{k+1},\tau;X_j) \text{ and } \pi^M(\theta_k,\tau;X_j)-R<\pi^M(\theta_j,\tau;X_j)\Big\}. \tag{12}$$

- Second, firms set up by entrepreneurs from another state $j'\neq j$ who move to state j. These include those entrepreneurs who can raise capital to incorporate in state j but not in $j+1$ and can move to j. This has the following probability (using (8) and (10)):

$$\sum_{j'\neq j} \mathbb{P}\Big\{\pi^S(\theta_j,\tau;X_{j'})\geq(1-\alpha)(1+r)>\pi^S(\theta_{j+1},\tau;X_{j'}) \text{ and } \pi^M(\theta_j,\tau;X_{j'})-R\geq\pi^M(\theta_{j'},\tau;X_{j'})\Big\}. \tag{13}$$

Given the distribution of entrepreneurial talent, the mass of firms in state j, denoted as m_j, is the sum of (11), (12), and (13), which is a function of θ_j and all $\theta_{j'}$ where $j'\neq j$.[20]

3.4. Stage 1

Following Romano (1985, 1987), we model the payoff of the legislator in State j, denoted by U_j, as follows:

$$U_j=v(\theta_j)+w(m_j). \tag{14}$$

The first part, $v(\theta_j)$, is the private benefits provided by interest groups as a function of θ_j, which denotes the amount of enacted takeover regulations.[21] We assume that the legislator gets more private benefits by enacting more takeover regulations, but at a diminishing rate (i.e., $v'>0$ and $v''<0$). The second part, $w(m_j)$, is a function of m_j, the mass of firms incorporated in state j. We assume that the legislator obtains a higher utility when more corporations are incorporated in the state at a diminishing rate (i.e., $w'>0$ and $w''<0$).

A legislator's strategic decision is to pick an amount of takeover regulations for

[20] Note that for state N (the state that has the largest amount of takeover regulations), the probability in (11) becomes $\mathbb{P}\{\pi^S(\theta_j,\tau;X_j)\geq(1-\alpha)(1+r)\}$; the probability in (12) is 0; the probability in (13) becomes $\sum_{j'\neq j}\mathbb{P}\{\pi^S(\theta_j,\tau;X_{j'})\geq(1-\alpha)(1+r) \text{ and } \pi^M(\theta_j,\tau;X_{j'})-R\geq\pi^M(\theta_{j'},\tau;X_{j'})\}$. Besides, suppose more than one state chooses the same θ, then we assume that they share equally the mass of entrepreneurs who satisfy the above conditions.

[21] Ribstein (2010, p.7) summarizes these private benefits as follows: "But legislators have a lot to gain from guarding access to the governance levers of large, publicly held firms. For example, managers want laws that help them retain power while workers want to protect their jobs and pay. Federal and state legislators can earn campaign support and other benefits by favoring particular groups."

her state to maximize her own payoff. This way of modeling the state legislators' strategic decision is similar to Hadfield and Talley (2006).[22] In particular, the legislators in different states simultaneously choose the amounts of takeover regulations to maximize their payoffs. The first order condition for state j's legislator is:

$$\frac{\partial U_j}{\partial \theta_j} = v'(\theta_j) + w'(m_j)\frac{\partial m_j}{\partial \theta_j} = 0. \tag{15}$$

The corresponding second order condition is:

$$\frac{\partial^2 U_j}{\partial \theta_j^2} = v''(\theta_j) + w''(m_j)\left(\frac{\partial m_j}{\partial \theta_j}\right)^2 + w'(m_j)\frac{\partial^2 m_j}{\partial \theta_j^2} < 0. \tag{16}$$

The first order conditions for state $j = \{1, \ldots, N\}$ jointly determine the Nash equilibrium amount of takeover regulations. We consider the symmetric equilibrium in which $\theta_j^* = \theta^*$ for all $j = \{1, \ldots, N\}$.

Before we proceed, we consider two parameterizations of the above Nash equilibrium.

- First, we assume that the utility of legislator j takes the form:

$$U_j = \beta \log(\theta_j) + \log(m_j), \tag{17}$$

  where $\beta > 0$ indicates the relative weight the legislator puts on the the first term (i.e., the private benefits provided by interest groups). The first order condition and second order condition become:

$$\frac{\partial U_j}{\partial \theta_j} = \frac{\beta}{\theta_j} + \frac{1}{m_j}\frac{\partial m_j}{\partial \theta_j} = 0, \tag{18}$$

$$\frac{\partial^2 U_j}{\partial \theta_j^2} = -\frac{\beta}{\theta_j^2} - \frac{1}{m_j^2}\left(\frac{\partial m_j}{\partial \theta_j}\right)^2 + \frac{1}{m_j}\frac{\partial^2 m_j}{\partial \theta_j^2} < 0. \tag{19}$$

- Second, we assume that entrepreneurial talent, X, follows an exponential

[22] Hadfield and Talley (2006) extensively discuss whether this is a right way to model the state legislators' behaviors. We believe that their argument is the best available in the literature on the theoretical modeling of regulatory competition for corporate charters. Note that strictly speaking, the dividend tax rate, τ, is embedded in the legislators' utility functions. In our model, τ is exogenously given. But if we allow it to be picked by the federal legislator, the analysis could be very different. In particular, the market for corporate control is much more closely connected to the state legislators' choices of θ_j's than τ is to the corporate free cash problem, because from the federal legislator's perspective, there could be many other (likely dominant) determinants of federal dividend tax policy. We thank an anonymous referee for raising this point.

distribution with parameter $\lambda > 0$:

$$H(X) = 1 - e^{-\lambda X}. \tag{20}$$

Observe that $H''(X) < 0$, i.e., the density function is decreasing in X. Intuitively, it suggests that there are fewer and fewer entrepreneurs at the right tail of the entrepreneurial talent distribution; put it another way, it means that more profitable idea/entrepreneurial talent is rarer. Then, in the symmetric Nash equilibrium, the mass of entrepreneurs in any state j is:

$$\begin{aligned} m_j &= \mathbb{P}\Big\{\pi^S(\theta^*, \tau; X_j) \geq (1-\alpha)(1+r)\Big\} \\ &= \mathbb{P}\Big\{X_j > \widetilde{X}(\theta^*, \tau)\Big\} = 1 - H\Big[\widetilde{X}(\theta^*, \tau)\Big] = e^{-\lambda \widetilde{X}(\theta^*, \tau)}, \end{aligned} \tag{21}$$

where X_j indexes the talent of entrepreneurs in state j and $\widetilde{X}(\theta^*, \tau)$ is defined in (9).

3.5. *Federal dividend income tax rate and competition for corporate charters*

The above model allows us to derive the intensity of the competition for corporate charters among states. Consistent with Cooter (2000), the intensity is measured as the reduction in the number of firms (i.e., the loss of customers of the state) if the number of enacted takeover regulations slightly exceeds that enacted in equilibrium. It should be noted that this intensity measure is an *off-the-equilibrium* notion.

In math, let $n_j(\theta_j^*, \theta_{-j}^*)$ be the *loss* of firms with respect to an increase in θ_j from the equilibrium level θ_j^*, keeping the amount of takeover regulations in other states, denoted as θ_{-j}^*, fixed. Therefore, the competition intensity that state j faces is computed as follows:

$$\textit{Competition intensity} = \frac{\partial n_j(\theta_j^*, \theta_{-j}^*)}{\partial \theta_j}. \tag{22}$$

By construction, $\partial n_j(\theta_j^*, \theta_{-j}^*)/\partial \theta_j = -\partial m_j(\theta_j^*, \theta_{-j}^*)/\partial \theta_j$. Thus:

$$\frac{\partial n_j(\theta_j^*, \theta_{-j}^*)}{\partial \theta_j} = \lambda e^{-\lambda \widetilde{X}(\theta^*, \tau)} \widetilde{X}_\theta. \tag{23}$$

By Lemma 3, $\widetilde{X}_\theta > 0$. Therefore, the above derivative is also positive.

Note that (22) is not the mass of incorporated firms given a particular level of takeover regulations, but is the *decrease* in the mass of firms if the number of enacted takeover regulations slightly exceeds that enacted in equilibrium. As such, it is a counter-factual that does not happen in reality, making it a difficult notion to measure

empirically.

How does an increase in the federal dividend income tax rate (τ) change this competition intensity? How does an increase in the federal dividend income tax rate change the equilibrium level of takeover regulations? Propositions 1 and 2 give our answers to these questions; both depend on the following mainstream governance question: whether the dividend-paying mechanism and the market for corporate control mechanism are complements or substitutes in mitigating agency costs. In particular, if the two governance mechanisms are complementary, $\widetilde{X}_{\theta\tau} = \frac{\partial^2 \widetilde{X}}{\partial\theta\partial\tau} < 0$.

Proposition 1 *The competition intensity decreases with dividend tax rate if* $\widetilde{X}_{\theta\tau} < 0$.

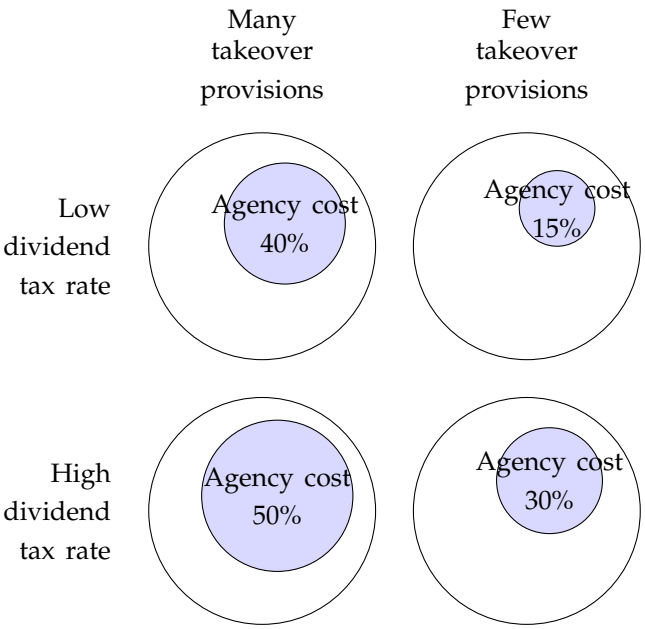
Proposition 2 *The equilibrium level of takeover regulations increases with dividend tax rate if* $\widetilde{X}_{\theta\tau} < 0$.

3.6. The relationship between agency cost and the two governance mechanisms: Further discussion

Recall from (9) that $\widetilde{X}$ is the minimum entrepreneurial talent such that an entrepreneur can raise capital from investors to set up a firm. We interpret this threshold as a measure of the "agency cost:" A high $\widetilde{X}$ indicates high agency costs because only extremely talented entrepreneurs are endowed with business ideas good enough to raise capital from investors. In the presence of takeover regulations and federal dividend income tax, in equilibrium only those entrepreneurs with sufficiently high talent are able to raise capital from the investors to set up the firms. In other words, both takeover regulations and dividend tax rate reduce the population of firms in equilibrium, which also result in a smaller amount of firm value through the matching of entrepreneurs and investors.

Takeover regulations increase agency cost in two ways. First, ex post (i.e., in Stage 3 of the game when a firm has been set up), takeover regulations make shareholders' monitoring more costly, indirectly encouraging managers to invest more in unproductive "pet" projects. Second, ex ante (i.e., in Stage 2 of the game before a firm is set up), fewer entrepreneurs can convince investors that the latter can obtain high-enough returns. Similarly, dividend tax also increases agency cost in two ways. First, ex post, dividend tax discourages the managers from paying dividend, leaving more cash in the hands of the managers. If shareholders' monitoring effort is fixed, they would invest more in unproductive "pet" projects. This forces shareholders to exert more monitoring effort to ensure the managers act properly. Second, ex ante, the investors would anticipate that these ex post agency costs would reduce their investment return. Therefore, fixing the distribution of the entrepreneurial talent, fewer firms would be formed as fewer entrepreneurs will be "talented enough" to raise capital from the investors.

Figure 2: An example of $\widetilde{X}_{\theta\tau} < 0$



Note: The shaded areas indicate the fractions of entrepreneurs who cannot raise capital to set up a firm.

What does complementarity in the two governance mechanisms (i.e., $\widetilde{X}_{\theta\tau} < 0$) mean? Literally, it means that state takeover regulations increase firms' agency costs by a smaller amount under a higher dividend tax rate. Intuitively, it is when the two governance mechanisms are complementary. Figure 2 shows an example of $\widetilde{X}_{\theta\tau} < 0$. Imagine that a firm reincorporates from a state with more takeover regulations to another state with fewer takeover regulations. This reincorporation can be pictured as a move *from the left to the right column*. Such a move reduces the firm's agency costs. A firm can realize such a reduction of agency costs irrespective of whether it is under the low (top row) or high (bottom row) dividend tax regime. If $\widetilde{X}_{\theta\tau} < 0$, then the reduction in the top row (in this example, the reduction is 25%) must be larger than that in the bottom row (in this example, the reduction is 20%), that is, such a reincorporation results in a larger reduction of agency costs for a firm under lower dividend tax rate.

If any state legislator deviates from the equilibrium by slightly increasing the state's takeover regulations, then the state loses some firms. Proposition 1 says that $\widetilde{X}_{\theta\tau} < 0$ is a sufficient condition for an increase in the federal dividend income tax rate to reduce such a loss of firms. State takeover regulations proliferated in the U.S. in the 1980s and 1990s under high dividend income tax rate. Proposition 2 states that a higher dividend income tax rate results in more takeover regulations in equilibrium if $\widetilde{X}_{\theta\tau} < 0$. Therefore, if $\widetilde{X}_{\theta\tau} < 0$ is indeed empirically true, the proliferation of state takeover regulations when states are competing for corporate charters can be

explained by the hypothesis that the high dividend income tax rate weakens the competition intensity that the states face.

4. Empirical Analysis

4.1. Empirical strategy

Whether the two governance mechanisms are complementary is an empirical question. This section presents our empirical test.

The example in Figure 2 illustrates a particular empirical pattern of $\widetilde{X}_{\theta\tau} < 0$. It shows the differential reactions among firms that are governed by a different number of anti-takeover provisions to a dividend tax cut. Specifically, those firms with fewer anti-takeover provisions are expected to react more dramatically in reducing their agency costs (moving from the bottom to the top row in the right column), while those firms with more anti-takeover provisions are expected to react less dramatically (moving from the bottom to the top row in the left column).

Empirically, the 2003 tax cut resembles a movement of all firms *from the bottom to the top row* because the dividends paid by all firms are qualified for the tax cut irrespective of the number of anti-takeover provisions governing them. This empirical strategy is also superior than focusing on a move of firms *from the left to the right column* because of two empirical problems. The first problem is the endogeneity of firm-level estimation. Changing the number of anti-takeover provisions that govern a firm by either reincorporating in another state or amending its corporate charter is an endogenous choice of the firm.[23] This endogeneity requires the use of credible instruments that affect the outcome variables only through the number of anti-takeover provisions. We do not know if any instrument exists. Second, even if an instrument exists, we still cannot identify any differential effects across high- and low-dividend tax regimes because the shareholders of all firms are subject to the same federal dividend tax structure at any point in time. The dividend tax rates do not vary across firms.

How to measure the *changes* in the agency costs of firms?[24] The kind of agency

[23] Hansmann (2006) explains why, in contrast to private firms, publicly held corporations rarely amend their charters. His theory implies that the differences in takeover regulations across the domicile states of firms account for the substantial variation in the anti-takeover provisions of firms, a view shared by Bertrand and Mullainathan (2003).

[24] When we say agency costs, we have in mind the *changes* in the extent of managers misappropriating a firm's surplus. One may think that the changes in agency costs may be measured by the *changes* in the perks that are consumed by corporate managers. However, Rajan and Wulf (2006) show that perks can measure things other than management misappropriation. In addition, they state that the perks across U.S. corporations do not significantly vary over time in their extensive dataset, which explains why they use cross-sectional rather than panel-data estimation. Therefore, the *changes* in these perks over time cannot be easily measured.

costs Easterbrook (1984) and Jensen (1986) focus on is the free cash flow problem. Those firms that are plagued by high agency costs tend to have their managers wasting the firms' cash on matters that are orthogonal to value maximization. Jensen (1993) points out that these firms' symptoms are low-dividend payout ratios and large investment ratios that cannot be explained by reasonable firm covariates. To measure the *changes* in the firms' agency costs, we follow Jensen (1993) by measuring the changes of dividend payout and investment ratios that are *unexplained* by the firm covariates. Increasing dividend payout ratios and reducing investment ratios after controlling for firm covariates are our proxies for the reduction of agency costs.[25]

Figure 2 implies that if $\widetilde{X}_{\theta\tau} < 0$, then reducing the dividend tax rate can induce those firms that are governed by fewer anti-takeover provisions to increase their dividend payout and reduce their investment ratios more drastically than those firms that are governed by more anti-takeover provisions.

4.2. Data and variable definitions

We use a sample of publicly listed firms in the U.S. Standard & Poor's Compustat and the Center for Research in Security Prices (CRSP) provide financial data for these firms. Firm-level anti-takeover provision counts come from two indexes, namely, the Corporate Governance Index (G Index) by Gompers, Ishii, and Metrick (2003) and the Entrenchment Index (E Index) by Bebchuk, Cohen, and Ferrel (2009). The G Index counts 24 anti-takeover provisions, while the E Index counts 6 of these anti-takeover provisions that have the greatest effect on firm value as shown in the literature.[26] These anti-takeover provisions come either from the default charter code of the firms' domicile states or from charter amendments. Similar to Chetty and Saez (2005), we exclude all foreign firms and those in the utilities (SIC codes between 4900 and 4949) and financial (SIC codes between 6000 and 6999) sectors.[27] We also exclude certain observations around 2003 to ensure that the outcomes are measured after the implementation of the tax cut.[28] Our sample period is between 1995 and 2008.

[25]Consistently, Chetty and Saez (2005) show that the dividend tax reduction in 2003 changed firms' payout policies.

[26]The 24 provisions are listed in Appendix A of Gompers, Ishii, and Metrick (2003). State laws allow firms to opt in and out of a particular takeover regulation. These options have been taken care of in the G Index, and thus reflect the actual number of effective provisions that govern the firms.

[27]Chetty and Saez (2006) argue that the "dot-com" bust in 2000 sharply reduced the number of CRSP firms; these dropouts mechanically introduce changes in the dividend payment or initiation rates in the following years. In the empirical analysis, we focus on those firms with available governance indexes in 2002 (i.e., before the tax cut). We also consider those firms with available governance indexes in 1998, 2000, and 2002, and obtain very similar empirical results. Either way, the sample sizes are rather stable at approximately 1,900 across these years. Therefore, this sample selection concern is unlikely to drive our empirical results.

[28]Specifically, the tax cut was signed into law on May 28, 2003. We exclude the observations for those firms whose financial years ended between June 2002 and April 2003 and between June 2003 and April 2004. The observed outcome variables in the data for the former and latter groups may have been

We define the following variables for the dividend and investment regressions:

- *Dividend regressions:* Following Chetty and Saez (2005), we define a Dividend Payer Dummy which takes a value of 100 if the firm pays a positive amount of common dividends in year t.[29] We define another dummy variable, the Dividend Increase Dummy, which takes a value of 100 if the dividend per share of the firm in year t is higher than that in year $t-1$. We also consider dividend yield, defined as common dividend scaled by market capitalization. We follow the literature (e.g., Fama and French 2001; DeAngelo, DeAngelo, and Stulz 2006; Hoberg and Prabhala 2009) and include the following control variables in the dividend equation: profitability, NYSE percentile, asset growth rate, market-to-book ratio, retained earnings, and stock volatility. [30]

- *Investment regressions:* We measure investment by Capital Expenditure scaled by Lagged Net Fixed Assets (i.e., Total Property, Plant, and Equipment). Following Kaplan and Zingales (1997) and Aivazian, Ge, and Qiu (2005), we include the following control variables in the investment equation: cash flow, market-to-book ratio, sales, and leverage.

Tables A and B in Appendix B present the definitions of these variables and reports the summary statistics, respectively. We lag the controls of the dividend regressions by one year to avoid any possible contemporaneous feedback between these controls and the outcome variable. In the investment regressions, we use the lagged values of market-to-book ratio and leverage. To limit the influence of outliers, we also winsorize all of the financial ratios at the 1% and 99% tails.

4.3. Regression model

To test whether a lower dividend tax and fewer anti-takeover provisions exhibit complementarity in reducing agency cost, we estimate the following difference-in-differences model:

$$y_{it} = \beta\Big(\textit{Anti-takeoverProvisions}_i \times \textit{Post2003}_t\Big) + X_{it}'\delta + \mu_i + \lambda_t + \varepsilon_{it}, \tag{24}$$

where i indexes firm and t indexes year; y_{it} is the outcome variable of interest; $\textit{Anti-takeoverProvisions}_i$ is the count of anti-takeover provisions in 2002 to measure the firm's *pre*-tax cut number of anti-takeover provisions; $\textit{Post2003}_t$ is a dummy

counted as responses and non-responses to the tax cut, respectively.

[29] All dummy dependent variables in this paper take values of either 0 or 100.

[30] Our empirical results remain qualitatively the same when the other controls used by Brown, Liang, and Weisbenner (2007) or Brav, Graham, Harvey, and Michaely (2005) are included in the regression analysis. These results are not reported for brevity.

variable that takes a value of 1 if the observation is after 2003;[31] X_{it} contains other relevant covariates; μ_i and λ_t are firm and year fixed effects, respectively; and ε_{it} is the error term. Note that controlling for firm and year fixed effects eliminates the need to include $Anti\text{-}takeoverProvisions_i$ and $Post2003_t$ in the regression. We cluster the standard errors at the firm-level to control for heteroskedasticity and serial correlation.[32]

Our regressor of interest is the interaction term between the *pre*-tax cut number of anti-takeover provisions and the post-2003 dummy (β). Our identification strategy depends on the fact that the 2003 dividend tax cut applies uniformly to all firms, regardless of their anti-takeover provisions. Our estimates of β become biased only if those corporations that are governed by the same number of anti-takeover provisions all amend their charters in anticipation of the tax cut.

A negative β suggests that after the 2003 dividend tax cut, those firms that are governed by fewer anti-takeover provisions *increase* the outcome variable of interest more than those firms that are governed by more anti-takeover provisions. Such complementarity implies that $\beta < 0$ when dividend payment, dividend initiation, or dividend payout is the outcome variable, and $\beta > 0$ when investment is the outcome variable.

4.4. Empirical results

Table 1 shows that $\beta < 0$ when dividend payment, dividend initiation, or dividend payout is the outcome variable, and $\beta > 0$ when investment is the outcome variable.

Panel A uses the Dividend Payment Dummy as the dependent variable; we regress it on the interaction between the governance indexes and the post-2003 dummy and other covariates. Using the G Index as the measure of the anti-takeover provisions in place, we progressively saturate the estimation model. Column (1) includes firm and year fixed effects only. Column (2) includes the controls. Column (3) follows Chetty and Saez (2005) and Brown, Liang, and Weisbenner (2007), in which the controls are interacted with the post-2003 dummy to control for the possibility that these control variables may affect the outcome variable differently after the 2003 tax cut. The coefficients of the interaction term between the G Index and the post-

[31] We exclude those observations in which the firms' financial years end between June 2002 and April 2003 and between June 2003 and April 2004. These observations may be problematic because we do not know whether the outcomes are measured before or after May 2003.

[32] Is our difference-in-differences model valid? We check whether those firms that are governed by more and few anti-takeover provisions follow the same time-trend before 2003. Figure A in Appendix B shows some unconditional time trends for firms with below and above median governance indexes. Those firms with higher governance indexes (i.e., those governed by more anti-takeover provisions) tend to pay or increase their dividends and have higher dividend yields, but have lower capital expenditure ratios, compared with those firms with lower governance indexes (i.e., those governed by fewer anti-takeover provisions). The pre-2003 time trends of both groups for different outcome variables generally look similar, thereby supporting our difference-in-differences model.

2003 dummy are all negative with similar magnitudes and are statistically significant. Using the E Index in columns (4) to (6) generates similar results. Therefore, those firms that are governed by fewer anti-takeover provisions tend to pay dividends following the dividend tax cut, compared with those firms that are governed by more anti-takeover provisions.

Panel B shows the analogous set of estimation results using the Dividend Increase Dummy as the dependent variable. Across these regressions, the coefficients of the interaction term are all negative with similar magnitudes and are statistically significant.

Panel C shows the differential responses of the firms in dividend yield. The coefficients of the interaction terms in these regressions are all negative and statistically significant. The three tables suggest that after the dividend tax cut, those firms that are governed by fewer anti-takeover provisions tend to pay, increase dividends and dividend yield compared with those firms that are governed by more anti-takeover provisions.

Panel D uses Capital Expenditure as the dependent variable. Similar to the previous regressions, column (1) includes firm and year fixed effects only; column (2) includes other covariates; and in column (3), the controls are interacted with the post-2003 dummy to account for the possibility that the controls affect investment decisions differently after the 2003 tax cut. Across the different specifications, the coefficients of the interaction term are all positive and statistically significant, which suggests that those firms that are governed by fewer anti-takeover provisions are less likely to increase their investment after the dividend tax cut compared with those firms that are governed by more anti-takeover provisions.

[Table 1 is about here.]

Appendix C shows several robustness checks, which suggests that our results are unlikely to be attributed to alternative explanations. These explanations include explicitly accounting for the fact that firms can disgorge cash paying dividends and engaging in share repurchase, taking into account ownership structure differences among firms, performing a placebo test using a year in which no sudden dividend tax cut, and explicitly accounting for the possibilities that both the Sarbanes-Oxley Act of 2002 and the Job Creation and Worker Assistance Act of 2002 may influence our results.

5. Conclusion

We develop a model of competition for corporate charters that reconciles the fact that state takeover regulations proliferated in the U.S. under high federal dividend income

tax rate even if the states were competing for corporate charters. Increasing the federal dividend income tax rate weakens the intensity of competition that the states face, i.e., they will lose few charters if they enact more takeover regulations. We derive the condition under which the dividend income tax to impede the competition for corporate charters. The condition is that dividend-paying mechanism and the market for corporate control mechanism are complementary governance mechanisms.

Does the condition hold empirically? We exploit the fact that the 2003 tax cut was uniformly applied to all U.S. corporations, regardless of their anti-takeover provisions. Such uniformity makes our difference-in-differences estimation credible. The differential reactions among those firms governed by more versus fewer anti-takeover provisions to the tax cut suggest that the condition holds. We therefore conclude that the federal dividend income tax impedes the competition for corporate charters. The by-product, that enacting more state takeover regulations will weaken hostile takeover as a disciplinary device for managers, weakens the governance of all U.S. corporations.

Is our theory only applicable to the U.S.? The jurisdictional competition in the provision of corporate laws may seem unique to the U.S. But after *Centros*, *Überseering*, and *Inspire Art*, Europe has been more permissive to firms shopping for corporate laws.[33] International jurisdictional competition can also take place outside of Europe. What determines the intensity of jurisdictional competition in the provision of corporate/company laws is also a relevant question to the regions outside of the U.S.

[33]The references include: Case C-212/97 *Centros Ltd v Erhvervs- og Selskabsstyrelsen* [1999] ECR I-1459. Case C-208/00 *Überseering BV v Nordic Construction Company Baumanagement GmbH* [2002] ECR I-9919. Case C-167/01 *Kamer van Koophandel en Fabrieken voor Amsterdam v Inspire Art Ltd* [2003] ECLI:EU:C:2003:512.

References

Aivazian, Varouj A., Ying Ge, and Jiaping Qiu. 2005. "The Impact of Leverage on Firm Investment: Canadian Evidence." *Journal of Corporate Finance* 11:277–291.

Bebchuk, Lucian, Alma Cohen, and Allen Ferrel. 2009. "What Matters in Corporate Governance?" *Review of Financial Studies* 22:783–827.

Bertrand, Marianne and Sendhil Mullainathan. 2003. "Enjoying the Quiet Life? Corporate Governance and Managerial Preferences." *Journal of Political Economy* 111:1043–1075.

Brav, Alon, John R. Graham, Campbell R. Harvey, and Roni Michaely. 2005. "Payout Policy in the 21st Century." *Journal of Financial Economics* 77:483–527.

Brown, Jeffrey R., Nellie Liang, and Scott Weisbenner. 2007. "Executive Financial Incentives and Payout Policy: Firm Responses to the 2003 Dividend Tax Cut." *Journal of Finance* 62:1935–1965.

Carney, William J. 1997a. "Explaining the Shape of Corporate Law: The Role of Competition." *Managerial and Decision Economics* 18:611–626.

———. 1997b. "The Political Economy of Competition for Corporate Charters." *Journal of Legal Studies* 26:303–329.

Cary, William L. 1974. "Federalism and Corporate Law: Reflections upon Delaware." *Yale Law Journal* 83:663–705.

Chetty, Raj and Emmanuel Saez. 2005. "Dividend Taxes and Corporate Behavior: Evidence from the 2003 Dividend Tax Cut." *Quarterly Journal of Economics* 120:791–833.

———. 2006. "The Effects of the 2003 Dividend Tax Cut on Corporate Behavior: Interpreting the Evidence." *American Economic Review Paper and Proceedings* 96:124–129.

———. 2010. "Dividend and Corporate Taxation in an Agency Model of the Firm." *American Economic Journal: Economic Policy* 2:1–31.

Cooter, Robert D. 2000. *The Strategic Constitution*. Princeton, New Jersey: The Princeton University Press.

DeAngelo, Harry, Linda DeAngelo, and René M. Stulz. 2006. "Dividend Policy and the Earned/ Contributed Capital Mix: A Test of the Life-cycle Theory." *Journal of Financial Economics* 81:227–254.

Demsetz, Harold. 1983. "The Structure of Ownership and the Theory of the Firm." *Journal of Law and Economics* 26:375–390.

Dharmapala, Dhammika and Vikramaditya S. Khanna. 2016. "The Costs and Benefits of Mandatory Securities Regulation: Evidence from Market Reactions to the JOBS Act of 2012." *Journal of Law, Finance, and Accounting* 1:139–186.

Easterbrook, Frank H. 1984. "Two Agency-Cost Explanations of Dividends." *American Economic Review* 74:650–659.

———. 1994. "The State of Madison's Vision of the State: A Public Choice Perspective." *Harvard Law Review* 107:1328–1347.

———. 2003. "When Does Competition Improve Regulation?" *Emory Law Journal* 52:1297–1308.

———. 2009. "The Race for the Bottom in Corporate Governance." *Virginia Law Review* 95:685–706.

———. 2013. "Federalism and Commerce." *Harvard Journal of Law & Public Policy* 36:935–940.

Eldar, Ofer and Lorenzo Magnolfi. 2016. "Regulatory Competition and the Market for Corporate Law." *Yale Law and Economics Research Paper No. 528* .

Fama, Eugene F. and Kenneth R. French. 2001. "Disappearing Dividends: Changing Firm Characteristics or Lower Propensity to Pay?" *Journal of Financial Economics* 60:3–43.

Fama, Eugene F. and Michael C. Jensen. 1983. "Separation of Ownership and Control." *Journal of Law and Economics* 26:301–325.

Gao, Feng, Joanna Shuang Wu, and Jerold Zimmerman. 2009. "Unintended Consequences of Granting Small Firms Exemptions from Securities Regulation: Evidence from the Sarbanes-Oxley Act." *Journal of Accounting Research* 47:459–506.

Gompers, Paul A., Joy L. Ishii, and Andrew Metrick. 2003. "Corporate Governance and Equity Prices." *Quarterly Journal of Economics* 118:107–155.

Hadfield, Gillian and Eric Talley. 2006. "On Public Versus Private Provision of Corporate Law." *Journal of Law, Economics and Organization* 22:414–441.

Hansmann, Henry. 2006. "Corporation and Contract." *American Law and Economics Review* 8:1–19.

Hoberg, Gerard and Nagpurnanand R. Prabhala. 2009. "Disappearing Dividends, Catering, and Risk." *Review of Financial Studies* 22:79–116.

Holmes, Thomas J. and James A. Schmitz. 2010. "Competition and Productivity: A Review of Evidence." *Annual Review of Economics* 2:619–642.

Jensen, Michael C. 1986. "Agency Costs of Free Cash Flow, Corporate Finance and Takeovers." *American Economic Review Papers and Proceedings* 76:323–339.

———. 1993. "The Modern Industrial Revolution, Exit, and the Failure of Internal Control Systems." *Journal of Finance* :831–880.

Kaplan, Steven N. and Luigi Zingales. 1997. "Do Investment-Cash Flow Sensitivities Provide Useful Measures of Financing Constraints?" *Quarterly Journal of Economics* 112:169–215.

Leeson, Peter T. 2011. "Government, Clubs, and Constitutions." *Journal of Economic Behavior & Organization* 80:301–308.

Manne, Henry G. 1965. "Mergers and the Market for Corporate Control." *Journal of Political Economy* 73:110–120.

Misangyi, Vilmos F. and Abhijith G. Acharya. 2014. "Substitutes or Complements? A Configurational Examination of Corporate Governance Mechanisms." *Academy of Management Journal* 57:1681–1705.

Poterba, James. 2004. "Taxation and Corporate Payout Policy." *American Economic Review Paper and Proceedings* 94:171–175.

Rajan, Raghuram G. and Julie Wulf. 2006. "Are perks purely managerial excess?" *Journal of Financial Economics* 79:1–33.

Ribstein, Larry E. 2010. *The Rise of the Uncorporation*. Oxford: Oxford University Press.

Romano, Roberta. 1985. "Law as a Product: Some Pieces of the Incorporation Puzzle." *Journal of Law, Economics, and Organization* 1:225–283.

———. 1987. "The Political Economy of Takeover Statutes." *Virginia Law Review* 73:111–199.

———. 1993. *The Genius of American Corporate Law*. Washington, D.C.: The AEI Press.

———. 2005. "The Sarbanes-Oxley Act and the Making of Quack Corporate Governance." *Yale Law Journal* 114:1521–1611.

———. forthcoming. *Oxford Handbook of Law and Economics*, chap. The Market for Corporate Law Redux. Oxford University Press.

Skinner, Douglas J. 2008. "The Evolving Relation between Earnings, Dividends, and Stock Repurchases." *Journal of Financial Economics* 87:582–609.

Stulz, Rene M. 1988. "Managerial Control of Voting Rights, Financing Policies, and the Market for Corporate Control." *Journal of Financial Economics* 20:25–54.

Winter, Ralph K. 1977. "State Law, Shareholder Protection, and the Theory of the Corporation." *Journal of Legal Studies* 6:251–292.

Table 1: Dividend Tax Cut, Anti-takeover Provisions, and Dividend and Investment Policies

	(1)	(2)	(3)	(4)	(5)	(6)
Panel A: Dependent Variable: Dividend Payer Dummy						
G Index × Post-2003	−1.011**	−0.810**	−1.051**			
	(0.401)	(0.402)	(0.415)			
E Index × Post-2003				−2.053**	−1.670*	−1.826**
				(0.905)	(0.901)	(0.914)
Controls	No	Yes	Yes	No	Yes	Yes
Controls × Post-2003	No	No	Yes	No	No	Yes
Observations	10309	10309	10309	9159	9159	9159
Adjusted R^2	0.819	0.826	0.828	0.822	0.828	0.830
Panel B: Dependent Variable: Dividend Increase Dummy						
G Index × Post-2003	−0.797*	−0.682	−1.030**			
	(0.433)	(0.427)	(0.435)			
E Index × Post-2003				−3.045***	−2.660***	−2.820***
				(0.985)	(0.975)	(0.967)
Controls	No	Yes	Yes	No	Yes	Yes
Controls × Post-2003	No	No	Yes	No	No	Yes
Observations	10324	10324	10324	9172	9172	9172
Adjusted R^2	0.456	0.467	0.471	0.463	0.472	0.477
Panel C: Dependent Variable: Dividend Yield						
G Index × Post-2003	−0.043***	−0.036**	−0.045***			
	(0.014)	(0.014)	(0.014)			
E Index × Post-2003				−0.106***	−0.092***	−0.092***
				(0.032)	(0.033)	(0.033)
Controls	No	Yes	Yes	No	Yes	Yes
Controls × Post-2003	No	No	Yes	No	No	Yes
Observations	10303	10303	10303	9153	9153	9153
Adjusted R^2	0.632	0.636	0.639	0.653	0.657	0.660
Panel D: Dependent Variable: Capital Expenditure						
G Index × Post-2003	0.797***	0.473***	0.402**			
	(0.190)	(0.176)	(0.180)			
E Index × Post-2003				1.522***	0.761*	0.704*
				(0.455)	(0.418)	(0.421)
Controls	No	Yes	Yes	No	Yes	Yes
Controls × Post-2003	No	No	Yes	No	No	Yes
Observations	10579	10579	10579	9366	9366	9366
Adjusted R^2	0.405	0.476	0.480	0.402	0.476	0.481

Note: In all specifications, firm and year fixed-effects are included. Note that controlling for firm and year fixed effects in these difference-in-differences estimations eliminates the need to include $Anti\text{-}takeoverProvisions_i$ (i.e., either G Index or E Index) and $Post2003_t$. Standard errors are clustered at firm-level and are in parentheses. *: significance at 10% level; **: significance at 5% level; ***: significance at 1% level.

Appendices

A. Proofs

A.1. Proof of Lemma 1

Following Chetty and Saez (2010, p.12), we prove by contradiction.

(a) Consider $\omega \leq \overline{\omega}$ and suppose $D > 0$. The first order conditions in (3) and (4) imply that $f'(I) = r$. This suggests that the investment level is first best: $I = I^*$. Then we have $\omega r = g'(X - I^* - D) > g'(X - I^*)$, which is a contradiction. Thus when $\omega \leq \overline{\omega}$, we must have $D(\omega) = 0$.

(b) Consider $\omega > \overline{\omega}$ and suppose $D = 0$. The first order conditions in (3) and (4) imply that $f'(I) \geq r$. This suggests that the investment level can at most be first best: $I \leq I^*$. Then we have $\omega r \leq g'(X - I) \leq g'(X - I^*) = \overline{\omega} r$, which is a contradiction. Thus when $\omega > \overline{\omega}$, we must have $D(\omega) > 0$. □

A.2. Proof of Lemma 2

(a) Differentiate (7) with respect to τ:

$$-2\alpha(1-\alpha)(1-\tau)P'(\omega) + \alpha(1-\alpha)(1-\tau)^2 P''(\omega)\frac{\partial \omega}{\partial \tau} = (1+\theta)c''(\gamma)\frac{\partial \gamma}{\partial \tau}. \quad \text{(A.1)}$$

Since $\omega = \alpha(1-\tau)(1+\gamma)$, we have $\partial\omega/\partial\tau = -\alpha(1+\gamma) + \alpha(1-\tau)\partial\gamma/\partial\tau$. Therefore, (A.1) becomes:

$$\begin{aligned} &-2\alpha(1-\alpha)(1-\tau)P'(\omega) + \alpha(1-\alpha)(1-\tau)^2 P''(\omega)\frac{\partial \omega}{\partial \tau} \\ &= \frac{(1+\theta)c''(\gamma)}{\alpha(1-\tau)}\left[\alpha(1+\gamma) + \frac{\partial \omega}{\partial \tau}\right]. \end{aligned} \quad \text{(A.2)}$$

Rearranging:

$$\frac{\partial \omega}{\partial \tau} = \frac{(1+\theta)c''(\gamma)\alpha(1+\gamma) + 2\alpha^2(1-\alpha)(1-\tau)^2 P'(\omega)}{\alpha^2(1-\alpha)(1-\tau)^3 P''(\omega) - \theta c''(\gamma)}. \quad \text{(A.3)}$$

Note that the second order condition of the shareholders' problem in (5) is:

$$\alpha(1-\alpha)(1-\tau)^2 P''(\omega)\frac{\partial \omega}{\partial \gamma} - (1+\theta)c''(\gamma) < 0. \quad \text{(A.4)}$$

Using $\partial\omega/\partial\gamma = \alpha(1-\tau)$, we have:

$$\alpha^2(1-\alpha)(1-\tau)^3 P''(\omega) - (1+\theta)c''(\gamma) < 0. \quad \text{(A.5)}$$

Since $P'(\omega) > 0$ by (7) and the denominator is negative by (A.5), we have $\partial\omega/\partial\tau < 0$.

(b) Differentiate (7) with respect to θ and using $\partial\omega/\partial\theta = \alpha(1-\tau)\partial\gamma/\partial\theta$, we have:

$$\alpha(1-\alpha)(1-\tau)^2 P''(\omega)\frac{\partial \omega}{\partial \theta} = c'(\gamma) + \frac{(1+\theta)c''(\gamma)}{\alpha(1-\tau)}\frac{\partial \omega}{\partial \theta}. \quad \text{(A.6)}$$

Rearranging:

$$\frac{\partial \omega}{\partial \theta} = \frac{\alpha(1-\tau)c'(\gamma)}{\alpha^2(1-\alpha)(1-\tau)^3 P''(\omega) - (1+\theta)c''(\gamma)} < 0, \tag{A.7}$$

since the denominator is negative by (A.5). Besides, $\omega = \alpha(1-\tau)(1+\gamma)$ implies that:

$$\frac{\partial \gamma}{\partial \theta} = \frac{1}{\alpha(1-\tau)} \frac{\partial \omega}{\partial \theta} < 0. \tag{A.8}$$

(c) Differentiating π^M with respect to θ, we obtain:

$$\frac{\partial \pi^M}{\partial \theta} = -\frac{g(X - I(\omega^*) - D(\omega^*))}{(1+r)(1+\gamma^*)^2} \frac{\partial \gamma^*}{\partial \theta} > 0. \tag{A.9}$$

Differentiating π^S with respect to θ, we obtain $\partial \pi^S / \partial \theta = -c(\gamma^*) < 0$. □

A.3. Proof of Lemma 3

From (9), we can see that suppose θ increases by a small amount, to maintain equality, $\widetilde{X}$ has to increase. Similarly, suppose τ increases by a small amount, to maintain equality, $\widetilde{X}$ also has to increase. Therefore, $\widetilde{X}_\theta = \partial \widetilde{X} / \partial \theta > 0$ and $\widetilde{X}_\tau = \partial \widetilde{X} / \partial \tau > 0$. □

A.4. Proof of Proposition 1

Differentiate $\partial n_j(\theta_j^*, \theta_{-j}^*) / \partial \theta_j$ in (23) with respect to τ:

$$\frac{\partial^2 n_j(\theta_j^*, \theta_{-j}^*)}{\partial \theta_j \partial \tau} = \left[-\lambda^2 e^{-\lambda \widetilde{X}(\theta^*, \tau)} \widetilde{X}_\tau \right] \widetilde{X}_\theta + \lambda e^{-\lambda \widetilde{X}(\theta^*, \tau)} \widetilde{X}_{\theta\tau}. \tag{A.10}$$

By Lemma 3, $\widetilde{X}_\theta > 0$ and $\widetilde{X}_\tau > 0$. Therefore, a sufficient condition for the above expression being negative is $\widetilde{X}_{\theta\tau} < 0$. □

A.5. Proof of Proposition 2

Differentiating the first order condition in (18) with respect to τ, we obtain:

$$\underbrace{\left[-\frac{\beta}{\theta_j^2} - \frac{1}{m_j^2} \left(\frac{\partial m_j}{\partial \theta_j} \right)^2 + \frac{1}{m_j} \frac{\partial^2 m_j}{\partial \theta_j^2} \right]}_{\partial U^2 / \partial \theta_j^2} \frac{\partial \theta_j^*}{\partial \tau} - \left(\frac{1}{m_j^2} \frac{\partial m_j}{\partial \tau} \right) \frac{\partial m_j}{\partial \theta_j} + \frac{1}{m_j} \frac{\partial^2 m_j}{\partial \theta_j \partial \tau} = 0. \tag{A.11}$$

Rearranging:

$$\frac{\partial \theta_j^*}{\partial \tau} = \frac{1}{\partial^2 U_j / \partial \theta_j^2} \left(\frac{1}{m_j^2} \frac{\partial m_j}{\partial \tau} \frac{\partial m_j}{\partial \theta_j} - \frac{1}{m_j} \frac{\partial^2 m_j}{\partial \theta_j \partial \tau} \right). \tag{A.12}$$

From the definition of m_j in (21), we have:

$$\frac{\partial m_j}{\partial \tau} = -\lambda e^{-\lambda \widetilde{X}(\theta^*,\tau)} \widetilde{X}_\tau, \tag{A.13}$$

$$\frac{\partial m_j}{\partial \theta_j} = e^{-\lambda \widetilde{X}(\theta^*,\tau)} \widetilde{X}_\theta, \tag{A.14}$$

$$\frac{\partial^2 m_j}{\partial \theta_j \partial \tau} = \lambda^2 e^{-\lambda \widetilde{X}(\theta^*,\tau)} \widetilde{X}_\tau \widetilde{X}_\theta - \lambda e^{-\lambda \widetilde{X}(\theta^*,\tau)} \widetilde{X}_{\theta\tau}. \tag{A.15}$$

Thus, the terms inside the bracket in (A.12) can be rewritten as:

$$\frac{\lambda^2 e^{-2\lambda \widetilde{X}(\theta^*,\tau)} \widetilde{X}_\theta \widetilde{X}_\tau - e^{-\lambda \widetilde{X}(\theta^*,\tau)} \left[\lambda^2 e^{-\lambda \widetilde{X}(\theta^*,\tau)} \widetilde{X}_\tau \widetilde{X}_\theta - \lambda e^{-\lambda \widetilde{X}(\theta^*,\tau)} \widetilde{X}_{\theta\tau}\right]}{e^{-2\lambda \widetilde{X}(\theta^*,\tau)}} = \lambda \widetilde{X}_{\theta\tau}. \tag{A.16}$$

Therefore, we have:

$$\frac{\partial \theta_j^*}{\partial \tau} = \frac{\lambda \widetilde{X}_{\theta\tau}}{\partial^2 U_j / \partial \theta_j^2}. \tag{A.17}$$

Since $\partial^2 U_j / \partial \theta_j^2 < 0$, the above derivative is positive if $\widetilde{X}_{\theta\tau} < 0$. □

B. Data Appendix

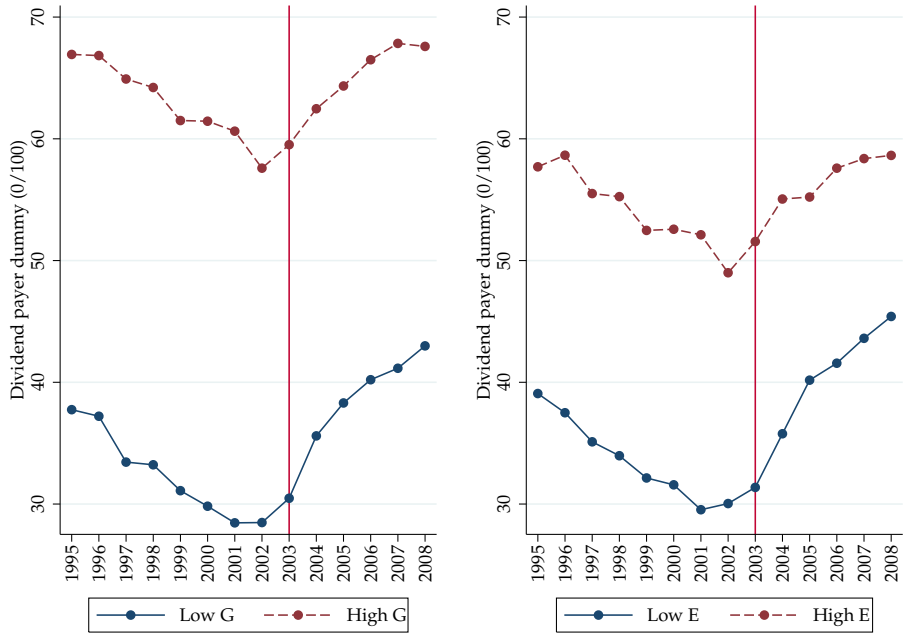
Table A: Variable Definition

Variable	Description
Panel A: Outcome Variables	
Dividend Payer Dummy	A dummy which takes a value of 100 if the firm pays a positive amount of common dividends in year t
Dividend Increase Dummy	A dummy which takes a value of 100 if the firm's dividend per share in year t is higher than that in year $t-1$
Dividend Yield	Common Dividend scaled by Market Capitalization
Capital Expenditure	Capital Expenditure scaled by Lagged Net Fixed Assets (which is Total Property, Plant, and Equipment) $\times$ 100
Panel B: Counts of anti-takeover provisions	
G Index	Corporate Governance Index constructed by Gompers, Ishii, and Metrick (2003), counting 24 anti-takeover provisions
E Index	Entrenchment Index constructed by Bebchuk, Cohen, and Ferrel (2009), counting 6 anti-takeover provisions
Panel C: Other Control Variables	
Profitability	Operating Income Before Depreciation, scaled by Total Assets
NYSE Percentile	NYSE market capitalization, defined as the fraction of NYSE firms having the same or smaller level of market capitalization than firm i in year t
Asset Growth Rate	Percentage change of Total Assets
Market-to-book Ratio	The ratio of the firm's market value to the book value of its assets, defined as (Price $\times$ Common Shares Outstanding + Total Liabilities)/ Total Assets
Retained Earnings	Retained Earnings, scaled by Total Assets
Stock Volatility	The standard deviation of monthly stock returns for the past 24 months
Cash Flow	(Income Before Extraordinary Items + Depreciation)/ Lagged Net Fixed Assets
Sales	Total Sales scaled by Lagged Net Fixed Assets
Leverage	Total Liabilities/ Total Assets

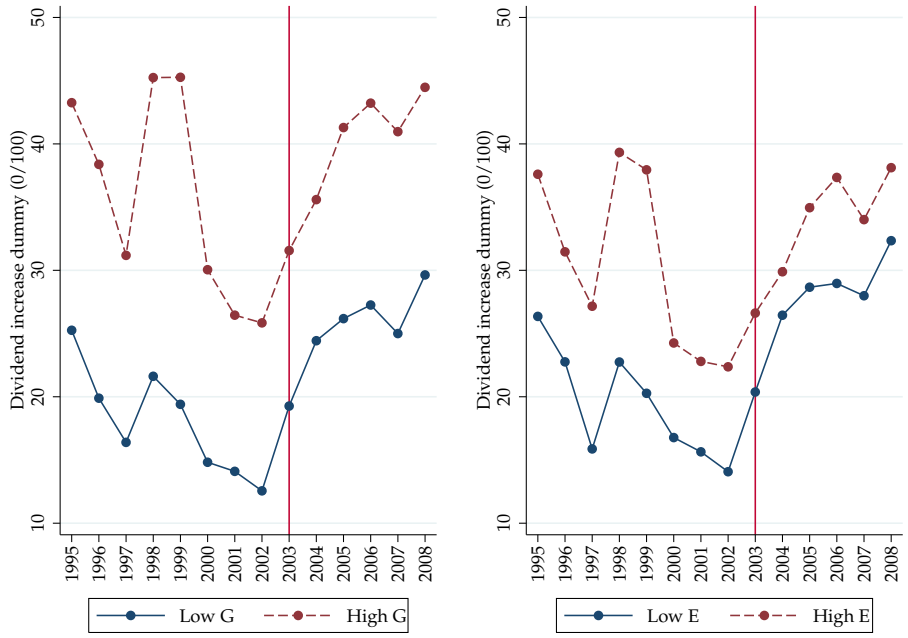
Table B: Summary Statistics

Variable	Observations	Mean	Median
Panel A: Variables for Dividend Regressions			
Dividend Payer Dummy	10309	51.314	49.985
Dividend Increase Dummy	10324	30.618	46.093
Dividend Yield	10303	0.959	1.406
Profitability	10324	0.144	0.111
NYSE Percentile	10324	75.910	17.757
Asset Growth Rate	10324	0.185	0.414
Market-to-book Ratio	10324	2.304	1.644
Retained Earnings	10324	0.154	0.705
Stock Volatility	10324	0.115	0.070
G Index	10324	9.091	2.662
E Index	9172	2.451	1.247
Panel B: Variables for Investment Regressions			
Capital Expenditure	10579	27.935	19.024
Cash Flow	10579	0.811	42.393
Tobin's Q	10579	2.262	1.573
Sales	10579	8.813	17.106
Leverage	10579	0.492	0.220
G Index	10579	9.086	2.657
E Index	9366	2.461	1.254

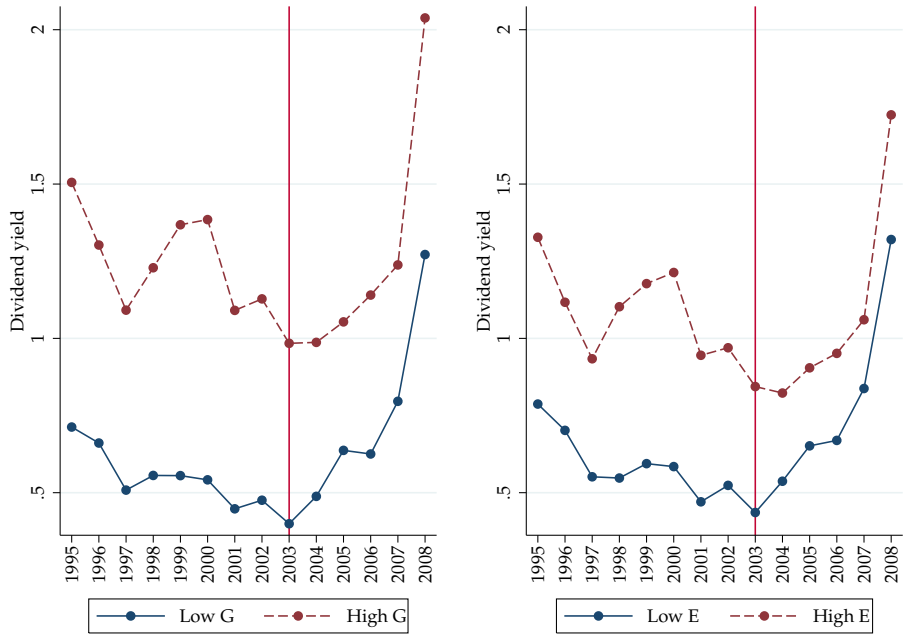
Figure A: Time Trends by High and Low G Index and E Index



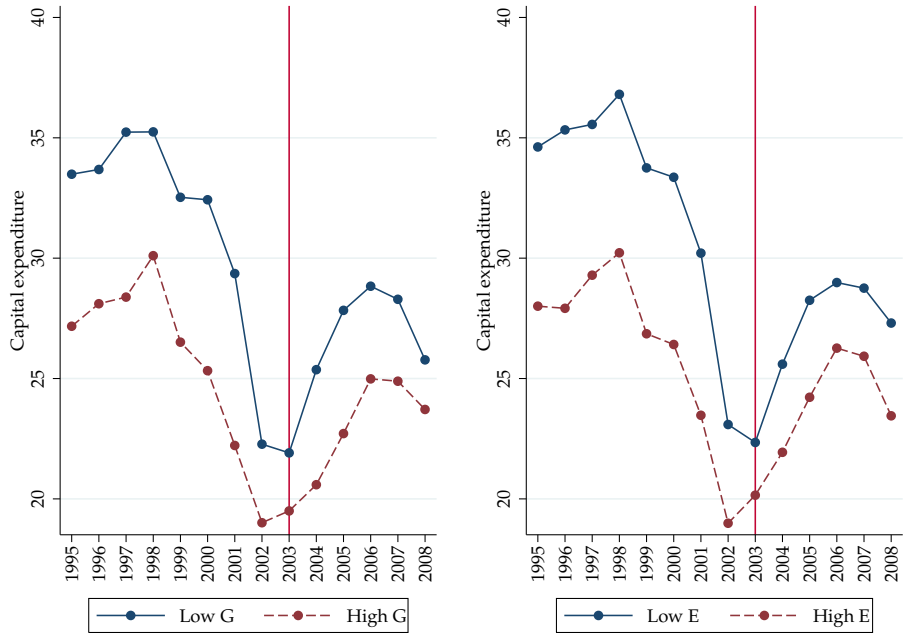
(a) Dividend Payer Dummy



(b) Dividend Increase Dummy



(c) Dividend Yield



(d) Capital Expenditure

C. Robustness Checks: Ruling Out Alternative Explanations

The results in Section 4 are consistent with dividend payment and the market for corporate control being complements. We, however, try the best we can to rule out other alternative explanations. The robustness checks below lead us to conclude that other alternative explanations are unlikely the driving force behind our results.

C.1. Dividend payment versus share repurchase

Do firms with fewer anti-takeover provisions increase their net payout to shareholders relative to those with more anti-takeover provisions? Or do they merely reduce their share repurchases to support their dividend increases after the tax cut? To address this issue, we follow Skinner (2008) and consider net repurchases as the increase in common treasury stock (if the firm uses the treasury stock method for repurchases), or the difference between stock purchases and issuances (if the firm uses the "retirement" method for repurchases instead).[34] We define a dummy variable ("Share Repurchase Dummy") which equals to 100 if the firm has positive share repurchases and 0 dividend payment in year t.

Table C uses this Share Repurchase Dummy as the dependent variable and estimate Equation (24). Using either the G Index or the E Index, the coefficients of the interaction term between the governance index and the post-2003 dummy are never statistically significant. These results suggest that our results are unlikely to be driven by substitution between dividends and share repurchases. Firms governed by fewer anti-takeover provisions indeed disgorge cash more.

Table C: Robustness Check: Dividend Tax Cut, Anti-takeover Provisions, and Share Repurchase

	(1)	(2)
G Index × Post-2003	−0.295	
	(0.413)	
E Index × Post-2003		−0.258
		(0.996)
Observations	10324	9172
Adjusted R^2	0.416	0.415

Note: The dependent variable is a dummy variable which takes a value of 100 if the firm has positive share repurchases but zero dividend payment in year t. Control variables, firm and year fixed-effects are included. Standard errors are clustered at firm-level and are in parentheses. *: significance at 10% level; **: significance at 5% level; ***: significance at 1% level.

C.2. Controlling for ownership measures

Chetty and Saez (2005) report that after the 2003 dividend tax cut, firms pay more dividends and that this effect is stronger for firms whose top executives own a larger

[34] When either of these two amounts is negative, net repurchases are set to 0.

fraction of shares and when large shareholders are on the board of directors. Brown, Liang, and Weisbenner (2007) also find that firms with a larger executive ownership have a higher likelihood of increasing dividends after the tax cut. Large ownership concentration in the hands of managers does not always imply stronger corporate governance. Fama and Jensen (1983) show how managers with large ownership stakes can dominate the board and expropriate corporate wealth, a view also shared in Stulz (1988). Demsetz (1983) argues that diffuse ownership does not necessarily induce detrimental effects. Our previous results do not control for the ownership structure of the firms, thus raising the following concern: Does the omission of ownership concentration drive the previous results?

To address this concern, we follow Chetty and Saez (2005) and Brown, Liang, and Weisbenner (2007) by constructing four ownership measures, namely, the fraction of shares owned by the top five executives, the largest unexercisable option holding among top executives, the largest exercisable option holding among top executives, and the fraction of shares held by institutional investors.[35]

We include these ownership measures and their interaction terms with the post-2003 dummy as extra controls in the previous estimations. Each cell in Table D reports the estimated coefficient of the interaction term between the governance index and the post-2003 dummy in a regression. Panel A uses the Dividend Payer Dummy as the dependent variable. Columns (1) to (8) experiment with the different combinations of each ownership measure and the governance index. Columns (9) and (10) include all four ownership measures in the regression. The coefficients of the interaction terms are consistently negative and statistically significant except those in columns (8) and (10). Using the Dividend Increase Dummy and Dividend Yield as the dependent variables respectively, Panels B and C show that the coefficients of the interaction terms are all negative and statistically significant. The results are similar for the investment regressions, reported in Panel D. These regression results suggest that anti-takeover provisions remain important to the reaction of firms to the tax cut after controlling their ownership structure.

C.3. Placebo tests

One may argue that firms with fewer anti-takeover provisions simply differ from those with more anti-takeover provisions regardless of the dividend tax cut. Therefore, even if there were no dividend tax cut in 2003, the former group of firms would have had increased their dividend and reduced their investment by more than the latter group of firms. To address this issue, we conduct placebo tests by assuming that the dividend tax cut occurred in 1998 (when the actual weighted average household marginal tax rate leveled at 0.34 before and after) instead of 2003. The regression results are presented in Table E. Each cell reports the coefficient of the interaction term between the governance index and the post-event (1998) dummy. These results imply that whether the firms are governed by more or fewer anti-takeover provisions does no change in different dividend and investment policies before and after 1998.

[35]The managerial share and option ownership data come from Execucomp, whereas institutional ownership data are obtained from Thomson Reuters Institutional (13f) Holdings (s34 Master File). We are able to find the ownership measures for approximately 75% to 85% of the observations in the baseline regression sample.

Table D: Robustness Check: Controlling for Ownership Measures

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Ownership measure:	% of shares by top 5 executives		Largest option holdings (unexercisable)		Largest option holdings (exercisable)		% of shares by institutional investors		All	
Panel A: Dependent Variable: Dividend Payer Dummy										
G Index × Post-2003	−1.066**		−1.092**		−1.050**		−1.067**		−1.245***	
	(0.446)		(0.448)		(0.449)		(0.470)		(0.461)	
E Index × Post-2003		−1.986**		−1.931*		−1.944**		−1.678		−2.449**
		(0.978)		(0.984)		(0.980)		(1.068)		(1.067)
Observations	9400	8457	9400	8457	9400	8457	8253	7468	8253	7468
Adjusted R^2	0.824	0.826	0.823	0.825	0.824	0.826	0.829	0.832	0.819	0.822
Panel B: Dependent Variable: Dividend Increase Dummy										
G Index × Post-2003	−1.246***		−1.261***		−1.282***		−1.234**		−1.199**	
	(0.465)		(0.466)		(0.468)		(0.484)		(0.486)	
E Index × Post-2003		−3.308***		−3.236***		−3.244***		−2.974***		−3.502***
		(1.008)		(1.012)		(1.011)		(1.046)		(1.085)
Observations	9412	8467	9412	8467	9412	8467	8264	7477	8264	7477
Adjusted R^2	0.464	0.469	0.464	0.468	0.464	0.468	0.469	0.473	0.452	0.458
Panel C: Dependent Variable: Dividend Yield										
G Index × Post-2003	−0.039**		−0.040***		−0.039**		−0.039**		−0.045***	
	(0.015)		(0.015)		(0.015)		(0.016)		(0.016)	
E Index × Post-2003		−0.087**		−0.086**		−0.087**		−0.097***		−0.127***
		(0.035)		(0.035)		(0.035)		(0.034)		(0.035)
Observations	9397	8454	9397	8454	9397	8454	8250	7465	8250	7465
Adjusted R^2	0.640	0.660	0.640	0.659	0.641	0.660	0.645	0.669	0.637	0.661
Panel D: Dependent Variable: Capital Expenditure										
G Index × Post-2003	0.544***		0.536***		0.537***		0.653***		0.616***	
	(0.165)		(0.165)		(0.166)		(0.180)		(0.179)	
E Index × Post-2003		0.989**		0.944**		0.938**		1.214***		1.110***
		(0.402)		(0.401)		(0.404)		(0.428)		(0.424)
Observations	9524	8554	9523	8554	9523	8554	8329	7526	8328	7526
Adjusted R^2	0.494	0.497	0.495	0.499	0.494	0.498	0.507	0.513	0.512	0.518

Note: Standard errors are clustered at firm-level and are in parentheses. Control variables, firm and year fixed-effects are included. *: significance at 10% level; **: significance at 5% level; ***: significance at 1% level.

C.4. The Sarbanes-Oxley Act

The Sarbanes-Oxley Act (SOX), enacted within a close window of time on July 30, 2002, may have driven the differential effects. This federal-level Act in response to the major U.S. corporate and accounting scandals aims at imposing a one-size-fit-all governance protocol strengthen corporate governance across all firms. The SOX has two possible effects: it either improves corporate governance or weakens corporate governance. The latter case matters to our results.[36]

[36]Suppose the Act has improved corporate governance. As Easterbrook (2009) states, "The Sarbanes-Oxley Act has specified many governance devices that all traded firms must employ." If the Act were effective, we would have likely witnessed the following scenario: all firms, regardless of their initial corporate governance, would all have been brought up to the corporate governance standard aspired by the SOX. Consider that the group of firms with initially weaker governance must have improved

Table E: Robustness Check: Placebo Tests

	(1)	(2)
Panel A: Dependent Variable: Dividend Payer Dummy		
G Index × Post-1998	−0.289	
	(0.283)	
E Index × Post-1998		−0.954
		(0.666)
Observations	10309	9159
Adjusted R^2	0.826	0.828
Panel B: Dependent Variable: Dividend Increase Dummy		
G Index × Post-1998	−0.420	
	(0.400)	
E Index × Post-1998		−1.704*
		(0.932)
Observations	10324	9172
Adjusted R^2	0.467	0.472
Panel C: Dependent Variable: Dividend Yield		
G Index × Post-1998	−0.008	
	(0.010)	
E Index × Post-1998		−0.014
		(0.024)
Observations	10303	9153
Adjusted R^2	0.635	0.656
Panel D: Dependent Variable: Capital Expenditure		
G Index × Post-1998	0.166	
	(0.163)	
E Index × Post-1998		0.483
		(0.422)
Observations	10579	9366
Adjusted R^2	0.480	0.481

Note: Standard errors are clustered at firm-level and are in parentheses. Control variables, firm and year fixed-effects are included. *: significance at 10% level; **: significance at 5% level; ***: significance at 1% level.

If the act has weakened corporate governance (Romano, 2005), one should expect that firms would have benefited from avoiding the Act.[37] Dharmapala and Khanna (2016) show that firms that the Jumpstart Our Business Startups (JOBS) Act of 2012 exempted them from the SOX requirements registered positive abnormal returns compared to their control groups. If this case likewise held true in 2003, then our concern is whether the incentives to be exempted from the SOX would have driven our results. Specifically, if the firms with fewer anti-takeover provisions happen to be those firms that would be more likely to be exempted from the SOX by

more, we should expect a more dramatic reaction in this groups of firms rather than in those firms with fewer anti-takeover provisions. This prediction means that if SOX was effective in improving corporate governance, it would have made it harder for us to find our differential effects. Therefore, the enactment of the SOX, if effective, strengthens our results, not weakening them.

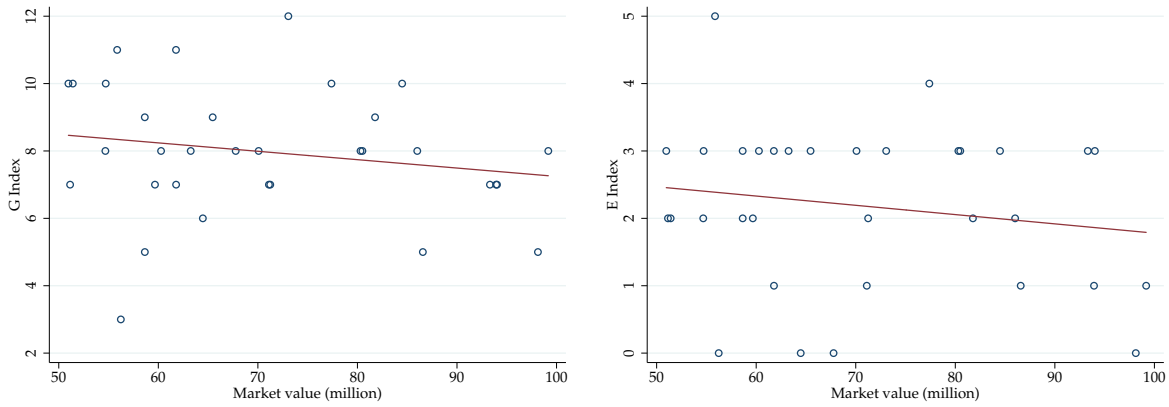
[37]The obvious benefits have been documented in the literature, including the reduction in compliance costs. Some studies documented that given the reporting/disclosure requirement in the Act, firms that would have contemplated to cross-list in the U.S. actually opted to disregard the idea.

reducing investment and increasing dividend payout, relative to the firms with more anti-takeover provisions, then our results can be driven by the SOX rather than the dividend tax cut.

Our tests are as follows. Gao, Wu, and Zimmerman (2009) state that "The initial Securities Act of 1933 and the Securities Exchange Act of 1934 exempt small firms from certain filing requirements. The Securities and Exchange Commission (SEC) expanded these exemptions in implementing the Sarbanes-Oxley Act of 2002 (SOX)." The actual definition of being "small" is that the public float of a firm is below $75 million, which would subsequently prompt the SEC to define the firm as a "nonaccelerated" filer.[38] Paying more dividends and investing less indeed would help keep the public float below this threshold. But if a firm is way larger than $75 million, there is no hope for it to gain the "nonaccelerated" filer status. Therefore, the motive for these firms to avoid SOX cannot drive our results.

We therefore only examine firms whose market value was roughly $75 million in 2002 and determine whether their market value correlates with their number of anti-takeover provisions. Figures B(a) and (b) show such relationships for G Index and E Index, respectively. Both graphs illustrate that out of roughly 1,000 firms in 2002, only 33 firms have a market value of between $50 million and $100 million. Among these 33 firms, the correlations between their market values and the governance indexes are both negative but statistically insignificant. This small number of firms and the weak correlation are unlikely for the SOX to drive our differential effects.

Figure B: Anti-takeover Provisions and Market Value



(a) G Index: Slope $= -24.895$, $(p = 0.288)$

(b) E Index: Slope $= -13.766$, $(p = 0.346)$

C.5. The Job Creation and Worker Assistance Act

The Job Creation and Worker Assistance Act (JCWAA) was enacted on March 9, 2002, roughly a year before the JGTRRA. the JCWAA increases depreciation allowances for certain types of business investments.[39] The JGTRRA not only cuts dividend tax but

[38]Specifically, to determine whether a firm is a "nonaccelerated" filer, the public float of the firm is below $75 million only on the last trading day of its second fiscal quarter. This date is the date out of all trading days of a fiscal year that the firm has to go below this threshold.

[39]Specifically, this Act allows firms to deduct 30% of the costs of investment from their taxable income in the first year, instead of following the depreciation rates set forth in the Modified Acceleration

also further increases this depreciation allowances to 50%.

One may argue that our results are driven by the possibility that firms with fewer anti-takeover provisions face increased difficulty in purchasing wasteful assets qualified for the bonus relative to those firms with more anti-takeover provisions. Consequently, firms with fewer anti-takeover provisions do not increase (and possibly reduce) their capital expenditure as quickly as firms with more anti-takeover provisions. If the differences in the changes in capital expenditure across both groups of firms were enormous, then firms with fewer anti-takeover provisions would more readily increase their dividend payout relative to firms with more anti-takeover provisions before and after the 2003 tax cut.

We examine the differential responses of the firms in R&D expenses following the tax cut. Unlike capital expenditure, R&D expenses are not qualified investment for the increases in depreciation allowances. Therefore, if the JCWAA did drive our results, we would not observe differential responses in R&D expenses. In Table F, we report the regression results using R&D expenses as the dependent variable.[40] In these regressions, we also observe differential responses similar to those reported in Table 1. In other words, even if the depreciation allowances do affect the investment behaviors of firms, these changes in allowances are unlikely to drive all our results.

Table F: Robustness Check: Dividend Tax Cut, Anti-takeover Provisions, and R&D Expenses

	(1)	(2)
G Index × Post-2003	0.131***	
	(0.045)	
E Index × Post-2003		0.239**
		(0.107)
Observations	11116	9869
Adjusted R^2	0.785	0.777

Note: The dependent variable is R&D Expenses/ Lagged Total Assets × 100. Missing R&D Expenses are treated as 0. Control variables, firm and year fixed-effects are included. Standard errors are clustered at firm-level and are in parentheses. *: significance at 10% level; **: significance at 5% level; ***: significance at 1% level.

Cost Recovery System of the IRS.

[40] It is defined as R&D expenses scaled by lagged total assets times 100, with missing R&D expenses treated as 0.