

# How Does Law Affect Finance? An Examination of Financial Tunneling in an Emerging Market

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# How Does Law Affect Finance?

## An Examination of Financial Tunneling in an Emerging Market

### **Abstract**

We present a theoretical model that outlines the mechanisms through which law affects finance. Our model first establishes that certain legal provisions can impact the use of financial tunneling techniques like equity dilution and freeze-out. The model then develops the interaction between financial tunneling and equity valuations, thus providing a direct link between specific legal protections and stock prices. Bulgarian privatization in 1998 and securities law changes in 2002 provide a natural experiment to test the predictions of the model. We document that following the improvements in anti-dilution and freeze-out protections in 2002 minority shareholders begin to share equally in the gains from secondary equity offers, rather than suffer severe dilution. Freeze-out tender offers cease and going-private premiums approach those in developed markets. As financial tunneling abates, market valuations rise, especially for those firms with non-government majority owners. The model and empirical findings suggest that the regulation of financial tunneling is a necessary condition for the development of functional capital markets.

Prior research in finance (e.g., La Porta et al., 1997, 1998, 2002; Demirguc and Maksimovic, 1998; Shleifer and Wolfenzon, 2002) argues that the legal environment is a significant factor in explaining capital market growth and development. In economies where securities laws offer investors better protection, stock markets tend to be more liquid and companies often finance their projects through public issuance of shares. Countries with poor legal protections, in contrast, tend to have illiquid markets and concentrated ownership structure. This research implies that law may affect finance, but offers little insight into the specific mechanisms by which this linkage occurs since legal protection is typically estimated in the aggregate and evaluated across countries.

This goal of this paper is to examine more precisely how law matters to the creation of functional capital markets. We build on research by La Porta, Lopez-De-Silanes, and Shliefer (2006) that examines “what works in securities law” by modeling the legal framework for a fundamental investor property right - the protection from expropriation of the investor’s “stock” of firm value (Gordon and Gilson, 2003). Johnson et al. (2000) use the term “financial tunneling” for expropriation methods used by controlling shareholders to expropriate minority shareholders’ stock value. Financial tunneling involves transactions such as secondary equity offerings to dilute minority ownership and below-market-value “freeze-out” tender offers, which eliminate or reduce minority shareholders' claims of future cash flows. In contrast, Johnson et al. (2000) characterize “operational tunneling” as self-dealing issues such as excessive manager compensation or transfer pricing between affiliates, which principally affect current cash flows. Gilson and Gordon (2003) assert that financial tunneling is the most value-destroying type of wealth expropriation, because it captures the claim to *all* future cash flows, while operational tunneling affects only the *current* flow. Despite their relative levels of destructiveness, however, operational tunneling has received most the attention in the literature (e.g. Bertrand, Mehta, and Mullainathan, 2002; Cheung, Rao, and Stouraitis, 2005; Djankov et al, 2005), although there is

growing stream of recent research on financial tunneling (e.g., Baek, Kang, and Lee, 2006; Bates, Lemmon, and Linck, 2006).

Our model predicts that laws offering minority investors' protection against financial tunneling mechanisms such as dilution and freeze-out will reduce the level of financial tunneling in the economy. More specifically, the model predicts that (1) stronger preemptive rights will reduce equity dilution from equity offerings, and (2) stronger appraisal rights will reduce freeze-out at less than fair value. To test the model's predictions, we use stock market and ownership data from the creation and early years (1998-2002) of the Bulgarian stock market. We document weaknesses and "loopholes" in investors' preemptive and appraisal rights in the initial (post "Big Bang") Bulgarian securities laws, and show that financial tunneling in Bulgaria prior to 2002 is widespread. Detailed stock ownership, trade, and price data on over 800 firms reveals how secondary share offerings are at highly dilutive prices, and minority shareholders rarely participate. Formal freeze-outs occur at an average of less than 35 percent of market value, which had often already been severely depressed by a prior dilutive offering. Informal freeze-outs ("going dark" transactions) are at effective prices approaching zero. During 1999-2001, over 400 companies, more than half of all the firms on the Bulgarian Stock Exchange, de-list.

Legal changes adopted in June 2002 altered provisions related to investors' preemptive and appraisal rights, effectively offering the minority investor enhanced "call" and "put" option protection against dilution and freeze-out, respectively. We rely on this natural experiment, a change of law in an emerging market, to examine how law affects financial tunneling mechanisms. The results are striking and clearly show the link between law and financial tunneling. Post-2002, secondary equity offerings result in significantly less ownership dilution. They tend to be subscribed to by both minority and majority shareholders, as opposed to being bought totally by the controlling shareholders. Buyouts of minority shareholders decline in frequency, and when they occur, are at premiums consistent with those in developed markets (DeAngelo et al., 1984), instead of the large discounts that existed prior to the legal changes.

The paper then turns to examining the second piece of the linkage between law and finance. While changes in law can impact financial tunneling, how does the reduction in financial tunneling impact the capital market? We show that improved minority investor protection in Bulgaria leads to higher corporate valuation (La Porta et al. 2002). As financial tunneling declines, valuations in the Bulgarian market rise. Moreover, the valuation increases are concentrated in the firms which were previously most vulnerable to financial tunneling -- firms with a private owner who holds a majority interest. Our paper thus documents that law matters to capital market development through the control of financial tunneling, which results in higher equity valuation. By showing the linkage between stock market performance and legal changes within a country, we also reinforce the assertion that securities law matters (La Porta, Lopez-De-Silanes, and Shliefer, 2006).

From a policy perspective, our results suggest that stopping widespread financial tunneling is critical for emerging markets to emerge. Through the detailed empirical analysis of stock market and ownership data from over 800 Bulgarian firms, our paper generalizes the findings from firm-specific (case study) evidence of expropriation of investors in emerging markets (e.g., Black et al., 2000). We also contribute to the understanding of the impact of law on finance more generally. While prior research tends to measure legal protection in the aggregate or in a highly-stylized manner, we provide a more granular understanding of specific provisions in the law and their impact on wealth expropriation mechanisms. Our research thus informs the link between law and finance that has been established at the cross-country level (e.g., La Porta et al., 1998, 2002; Demirguc and Maksimovic, 1998; Shleifer and Wolfenzon, 2002; Burkart, Gromb, and Panunzi, 1998). The paper also complements recent research on financial tunneling via a specific mechanism (Baek, Kang, and Lee, 2006) or operational tunneling (Burkart, Gromb, and Panunzi, 1998; Shleifer and Wolfenzon, 2002; and La Porta et al., 2002) by providing a model that establishes a link between law and equilibrium equity valuations.

Section I presents a theoretical analysis of financial tunneling. Section 2 applies the theoretical framework to the legal protections against financial tunneling in Bulgarian law pre-2002 and the improvements in these protections passed in 2002. This section then develops testable predictions. Section 3 describes the data. We test empirically the effect of the 2002 law on financial tunneling mechanisms (equity dilution and freeze-out) in Section 4 and on valuation in Section 5. Section 6 summarizes the findings and offers conclusions.

### **1. A Theoretical Model of Law, Financial Tunneling, and Equity Valuation**

Prior research linking law and finance tends to measure legal protection in the aggregate as an index of various protections and rights (*e.g.*, La Porta et al. 1998). Building on this work, subsequent studies have related the level of investor protection across countries to measures of firm valuation, ownership structure, or required dividend payments.<sup>1</sup> Countries with stronger protection and shareholder rights tend to have higher valuation, more liquid markets, and less ownership concentration.<sup>2</sup> Black (2001) provides a list of specific legal provisions necessary for strong securities markets, but only a few finance papers address the impact of particular legal statutes on capital market development (Baek, Kang, and Lee, 2006; Nenova, 2005).

Gilson and Gordon (2003) argue that protecting minority shareholders against financial tunneling is of particular importance. In emerging markets, financial tunneling commonly occurs via dilution of minority ownership by issuing equity at prices below intrinsic value, or freeze-out of minority shareholders in going private transactions with prices below intrinsic value.<sup>3</sup> Table 1 summarizes the recent research on financial tunneling and describes the methods used in Bulgaria.

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<sup>1</sup> See Denis and McConnell (2003) for a survey of this extensive literature.

<sup>2</sup> See Ciccotello and Muscarella (2001) for similar results for master limited partnerships in the United States.

<sup>3</sup> We define intrinsic value as the value of minority shares in a world with effective sanctions against all forms of tunneling.

In this section we develop a theoretical framework of how law can affect finance by reducing financial tunneling. We first model the outcomes for minority shareholders of the two most common financial tunneling methods – dilution via equity issue and going private transactions (freeze-outs) – and the effect of various legal statutes on these tunneling methods. We then combine the effects of cash-flow and financial tunneling to assess overall equity prices and earnings multiples and thus establish a causal link between legal protections from financial tunneling and equity valuation.

### *1.1. Model Setup*

There are  $N$  firms in the economy, indexed by  $n$ , and three relevant time periods, indexed by  $t$  ( $t = 0, 1, \text{ or } 2$ ). All notation in the model below is included in Table 2. Each firm has  $S_{n,t}$  shares outstanding. Unless specified otherwise, we develop the analysis for a typical firm ( $n = 1$ ) and suppress the  $n$ -subscript. Without loss of generality we assume that the firm initially has one share outstanding ( $S_0 = 1$ ). Define the intrinsic value of a share in the firm, if no operational or financial tunneling is possible, as  $V_{no-tun}$ . The firm has a controlling shareholder  $C$  and minority shareholders  $m$ . Initially, the controlling shareholder  $C$  owns  $\alpha_0$  shares, minority shareholders own the remaining  $(1 - \alpha_0)$  shares.

The model does not seek to explain how the proportion  $\alpha_0$  of minority shares was chosen. In this respect our model is similar to La Porta et al. (2002), but differs from Bebchuk (1999) and Shleifer and Wolfenzon (2002) who model the decision-making process of controlling shareholders to sell a proportion of firm equity to minority shareholders and thus make their ownership stake endogenous to the benefits and costs of tunneling. Our model setup can be appropriate for a situation immediately following mass privatization, as in Bulgaria or Russia,

where the government auctioned shares in a large number of companies. Investors could choose the price they would pay for shares, but not the aggregate number of shares to buy.<sup>4</sup>

The controlling shareholder has the ability to engage in both "cash-flow" tunneling (stealing a fraction  $d_{cf}$  of the firm's pre-tunneling cash flow) and financial tunneling.<sup>5</sup> Prior to time  $t = 0$ , the controlling shareholder determines how much of the firm's earnings to extract through cash-flow tunneling. At time  $t = 0$ , minority shareholders observe the firm's income after cash-flow tunneling and value the firm, taking into account the risk of future financial tunneling. At time  $t = 1$ , the controlling shareholder decides whether the firm will issue  $i$  new shares at a discounted price  $P_{dilut}$ . The newly issued shares are offered to some or all of the firm's existing shareholders. The controlling shareholder will acquire any shares not purchased by other shareholders. At time  $t = 2$ , the controlling shareholder decides whether to freeze-out minority shareholders through a tender offer at  $P_{freeze}$  and thus acquire 100% ownership in the company.

Prior to time  $t = 0$ , the controller determines the level of cash-flow tunneling in which to engage. We assume that cash flow tunneling is costly to the controller, so that it involves only a fraction  $d_{cf}$  of the firm's pre-tunneling income. The fraction  $d_{cf}$  may depend on the controller's ownership stake, legal protections against cash flow tunneling, and other firm characteristics. We do not model these determinants and refer the reader to Durnev and Kim (2005), La Porta et al (2002), and Shlefer and Wolfenzon (2002). The firm has income per share before cash-flow tunneling of  $E_{act}$ . Minority shareholders, however, observe only the firm's per-share income after cash flow tunneling:  $E_{obs} = E_{act}(1 - d_{cf})$ . Observed earnings can also be interpreted as paid dividends.

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<sup>4</sup> In Bulgaria, for example, the government sold most of its stake in many companies and allowed large investors to bid for a large but still minority stake, in other companies a majority investor did not appear and the shares became dispersedly-held.

<sup>5</sup> We do not consider "asset tunneling," separately in the model. Such tunneling could occur by sales of bulk assets at below market value, for example.

Let shareholders value a share in common stock using a simple no-growth cash flow model. This implicitly assumes that the cash flow tunneling is expected to be permanent. For simplicity, we assume that tunneling does not directly affect the discount rate  $r$  that minority shareholders apply to equity cash flows. A richer framework could incorporate earnings growth, observed instead of unobserved cash flow tunneling, and investor anticipation that cash flow tunneling may increase or decrease over time as a fraction of pre-tunneling income.

The firm's share value to minority shareholders  $V_{no-fin}$ , if the probability of financial tunneling were zero, would equal:

$$V_{no-fin} = E_{obs} * \frac{1}{r} = V_{no-tun} (1 - d_{cf}) \quad (1)$$

We next introduce investor anticipation of financial tunneling, through dilution, freeze-out, or both. Investors anticipate:

- (1) Future share dilution, with probability  $\pi_d$ , new shares issued at an expected fractional discount  $d_{dilut}$ , and expected number of newly issued shares  $i$ .
- (2) Financial tunneling through freeze-out, which we assume occurs only after a dilutive offering, with probability  $\pi_f$  and expected discount  $d_{freeze}$ . For simplicity, we do not consider a freeze-out without a prior dilutive offering.

The probabilities of dilution and subsequent freeze-out  $\pi_d$  and  $\pi_f$  can depend on characteristics of the firm and controller, including share ownership  $\alpha_0$ , nature of the controller (private or government), and firm size, which proxy for direct and indirect costs of financial tunneling.<sup>6</sup>

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<sup>6</sup> The probabilities of dilution and freeze-out ( $\pi_d$  and  $\pi_f$ ) may depend on each other, on the extent of dilution and freeze-out discounts that can be achieved ( $d_{dilut}$  and  $d_{freeze}$ ) and may be correlated with the extent of cash-flow tunneling. For example, investors might judge that a firm with high cash-flow tunneling has a controller who attaches little value to reputation, and hence increase their estimates of the risk of financial tunneling. Investors might also infer from a dilutive offering that a future freeze-out has become more likely, and adjust their estimates of the freeze-out parameters  $\pi_f$  and  $d_{freeze}$ . We do not model these interactions here.

We next define and summarize the prices and values that arise in the model. So far we have defined  $V_{no-tun}$  as the intrinsic value of a share in the firm and  $V_{no-fin}$  as the value after cash-flow tunneling if the probability of financial tunneling were zero. We also defined  $P_{dilut}$  as the price at which new shares are issued in time  $t = 1$  and  $P_{freeze}$  as the price at which the controlling shareholder freezes-out minority owners at time  $t = 2$ . Let  $V_{no-freeze}$  equal the hypothetical value of minority shares after a dilutive offering in a world without freeze-outs, and  $V_{freeze}$  equal the minority shares value in a freeze-out transaction. Lastly, define the prices at which minority shareholders are willing to trade shares at time  $t$  as  $P_t$  ( $P_0$  at  $t = 0$ ,  $P_1$  at  $t = 1$  after the dilutive offering is completed, and  $P_2$  after a freeze-out is initiated). Note that since dilution and freeze-out are each possible but not certain, the equilibrium market prices  $P_1$  and  $P_0$  do not equal  $V_{no-freeze}$  and  $V_{no-fin}$ . However, at the last stage, once a freeze-out is completed, these two series converge, so  $P_2 = V_{freeze}$ . In the analysis below we express the wealth effects of dilution and freeze-out relative to the no-financial-tunneling share value  $V_{no-fin}$ . We then incorporate investor anticipation of possible dilution and freeze-out to determine the ex ante market equilibrium price  $P_0$ .

## 1.2. Law and Financial Tunneling.

In this sub-section we develop theoretically the links between legal statutes like preemptive rights, appraisal rights, and minority shareholder vetoes and the outcomes of equity dilution and freeze-out. Following the timeline of the model we first discuss equity dilution and then freeze-outs.

### 1.2.1. Period 1: Dilution

The controlling shareholder decides to issue  $i$  shares to dilute minority shareholders, at a discounted price equal to  $(1 - d_{dilut})$  of the pre-dilution market price. The minority shareholders acquire  $k*(1 - \alpha_0)*i$  of the newly issued shares. Here  $k$  is between 0 and 1, and represents the fractional take-up of shares by minority shareholders, relative to the number they would have the

right to acquire in a system of effective preemptive rights. Minority shareholders may not subscribe for a variety of reasons: they are not offered shares or are not effectively notified of the opportunity to purchase; they lack the wealth to acquire shares themselves and cannot transfer the purchase rights to others; the time period for acquiring shares is too short for them to arrange to acquire shares, the transaction costs would exceed their expected gain; or the issuance causes them to expect future tunneling and they decide not to “throw good money after bad.”

Since the shares are offered at a discount, the controlling shareholder has an incentive to cause the company to offer the shares on terms that discourage or prevent other shareholders from acquiring them, to the extent permitted by law. The participation parameter  $k$  thus depends on the existence and strength of preemptive rights and other legal protections for minority shareholders against dilutive share offerings.

After the offering, the minority shareholders own the following proportion of the company:

$$(1 - \alpha_1) = \frac{(1 - \alpha_0) + k(1 - \alpha_0)i}{(1 + i)} = \frac{(1 - \alpha_0)[1 + k * i]}{(1 + i)} \quad (2)$$

We assume that this dilutive offering does not preclude future dilution, and does not affect the future tunneling probabilities  $\pi_d$  and  $\pi_f$  or the expected discounts  $d_{dilut}$  and  $d_{freeze}$ . With this assumption, the dilutive offering has the same fractional effect on observed share price  $P_1$  (relative to the pre-dilution price  $P_0$ ) and on the firm's no-freeze-out value to minority shareholders  $V_{no-freeze}$  (relative to the no-financial tunneling value  $V_{no-fin}$ ). After the issuance, the firm's no-freeze-out value is  $[1 + i*(1-d_{dilut})]*V_{no-fin}$  and the number of outstanding shares is  $(1 + i)$ . The value of minority shares, without anticipation of a freeze-out or further dilution, drops to:

$$V_{no-freeze} = \frac{(1 + i * (1 - d_{dilut}))}{1 + i} * V_{no-fin} = \left(1 - d_{dilut} \frac{i}{(1 + i)}\right) V_{no-fin} \quad (3)$$

We formulate the following proposition about the effect of dilution on minority shareholder wealth.

*Proposition 1. The wealth transfer  $D_{dilut}$  from minority shareholders to the controlling shareholder in a dilutive offering (as a fraction of the no-financial tunneling value of minority shares  $V_{no-fin}$ ) equals:*

$$D_{dilut} = [1 - \alpha_0] d_{dilut} \frac{i}{1+i} (1 - k) \quad (4)$$

Proof:

The minority shareholders initially hold  $(1 - \alpha_0)$  shares. These shares are each worth  $V_{no-fin}$  without financial tunneling. The dilutive issuance causes minority shareholders to lose a proportion  $d_{dilut} \frac{i}{1+i}$  of this value. They also purchase a fraction  $(1 - \alpha_0) * k$  of the newly issued shares at the discounted offering price and make a profit on these shares (as a proportion of  $V_{no-fin}$ ) equal to:

$$(1 - \alpha_0) k * i \left[ 1 - d_{dilut} \frac{i}{1+i} - (1 - d_{dilut}) \right] = (1 - \alpha_0) k * d_{dilut} \frac{i}{1+i} \quad (5)$$

The combined effect of the loss on original holdings and gain on newly acquired shares is given by Equation (4).

Q.E.D.

The controlling shareholder has a majority of the votes and thus can approve an equity issue that is arbitrarily large, which makes  $\frac{i}{(1+i)}$  arbitrarily close to 1. (We assume that existing law limits neither the size nor the price of an equity issue, nor requires minority shareholder approval.) The wealth loss by minority shareholders due to dilution, expressed as a fraction of no-financial-tunneling value or of market price, then roughly equals:

$$D_{dilut} \approx [1 - \alpha_0] d_{dilut} (1 - k) \quad (6)$$

If there are no legal protections against dilutive share offerings, then  $d_{dilut}$  approaches 1,  $k$  approaches 0; and  $i$  approaches  $\infty$ ; so  $D_{dilut} \approx (1 - \alpha_0)$ . The controlling shareholder can acquire an

arbitrarily large number of shares at an arbitrarily low price, thus expropriating the minority shareholders' entire initial ownership of the firm ( $1-\alpha_0$ ). Most legal systems, however, include some rules that attempt to prevent this outright looting of the entire wealth of small shareholders. Based on Equation (6) these rules can be classified into two main groups: rules that affect  $k$  and attempt to make it close to one, and rules that regulate  $d_{dilute}$  and attempt to make it as close to zero.

The rules that regulate  $k$  and seek to ensure that all shareholders can participate pro rata in acquiring newly issued shares are called preemptive rights. Preemptive rights are common in many markets and come in variety of flavors. If the legal system provides for effective preemptive rights (preferably rights that are transferable and traded on a exchange in the form of warrants) and the legal system effectively restricts other forms of tunneling (so that shareholders who exercise preemptive rights do not risk having their investment appropriated in another way), any significant discount  $d_{dilut}$  will induce essentially complete take-up of shares, thus  $k$  approaches 1. The fractional wealth loss to minority shareholders  $D_{dilut}$  then approaches zero, regardless of the price at which new shares are offered. The controller's incentive to make a dilutive offering disappears.

The second legal strategy, which seeks to prevent issuance of under-priced shares and thus make  $d_{dilut}$  as close to zero as possible, can be implemented in two main ways. One approach is direct regulation of the offer price; another is to require minority shareholder approval of related party transactions, which would include a new share issuance to the controlling shareholder without preemptive rights. These minimum price statutes are relatively rare. Notable examples are the Russian corporate law (see Black & Kraakman, 1996) and the 1940 Investment Company Act regulations for equity offerings of closed-end funds (offerings at or above net asset value). If the legal regime requires new shares to be issued at the current market price, or else gives minority shareholders veto rights over new issuances, which they will exercise if the new

issuance is at a significantly below-market price, then  $d_{dilut} \approx 0$ .<sup>7</sup> Thus the wealth loss to minority shareholders is  $D_{dilut} = 0$ , regardless of issue size or who acquires the shares.

### 1.2.2. Period 2: Freeze-out.

We next analyze the scenario where at  $t = 2$ , the controlling shareholder takes the company private and freezes out the minority shareholders. After the freeze-out, there is no further financial tunneling to be anticipated, so the  $V$  series of "intrinsic" values (which assume no further financial tunneling) converges to the  $P$  series of prices (which anticipate future tunneling): The controller pays a discounted freeze-out price  $P_{freeze}$  for the minority shares, where  $P_{freeze}$  equals:

$$P_{freeze} = V_{no-freeze} (1 - d_{freeze}) = V_{no-fin} \left[ 1 - d_{dilut} \frac{i}{1+i} \right] (1 - d_{freeze}) \quad (7)$$

We formulate the following proposition about the effect of freeze-out on minority shareholder wealth.

*Proposition 2. The wealth transfer  $D_{freeze}$  from the minority shareholders to the controlling shareholder in a freeze-out transaction (as a fraction of no financial tunneling value  $V_{no-fin}$ ) equals:*

$$D_{freeze} = \frac{(1 - \alpha_1) * V_{no-freeze} * d_{freeze}}{V_{no-fin}} = \frac{(1 - \alpha_0)[1 + k * i]}{(1 + i)} \left[ 1 - d_{dilut} \frac{i}{1+i} \right] d_{freeze} \quad (8)$$

Proof:

Prior to the freeze-out, the minority shareholders own  $(1 - \alpha_1)$  shares which are worth  $V_{no-freeze}$  each. In the freeze-out, the minority shareholders will lose a fraction  $d_{freeze}$  of this value.

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<sup>7</sup> If minority shareholders have *both* veto rights and effective preemptive rights, and are sufficiently protected against financial tunneling, they may not veto an offer at a discount to current market value, because they will not be harmed by the offering. In practice, in developed markets which provide effective preemptive rights, notably the U.K., offerings at a small discount to market are the norm.

Proposition 2 follows directly after plugging in the expressions for post dilution ownership  $(1-\alpha_I)$  and post-dilution minority value  $V_{no-freeze}$  given by Equations (2) and (3) respectively.

Q.E.D.

In an extreme case without any legal protections, the controlling shareholder can offer an arbitrarily low freeze-out price, so  $d_{freeze}$  approaches 1, and all of the minority shareholders' remaining wealth is expropriated, regardless of outcome of the equity dilution at time  $t = 1$ . Moving from this extreme case, the law may offer some protection against freeze-out. If the controlling shareholder makes an explicit freeze-out offer, the law customarily addresses the freeze-out problem by either setting limits on  $d_{freeze}$  via appraisal rights, through fiduciary duty statutes, or by requiring minority shareholder approval of the freeze-out price.

One legal approach to limit expropriation in freeze-outs is to stipulate that the freeze-out price cannot be lower than the market price before the freeze-out is announced - a "market price rule." A market price rule can be effective if the company's shares trade in an efficient and liquid market, where share price manipulation is not possible. Even then, the controlling shareholder can suppress the market price by engaging in cash-flow tunneling or by paying no dividends. The controller can then freeze-out minority shareholders at this suppressed price.

However, when the market is inefficient, illiquid, or subject to price manipulation, the "market rule" will provide even weaker protection. Suppose that a market price rule is in effect and that minority shareholders do not expect a freeze-out for less than the no-freeze-out value of their shares, so shares are priced in the market at  $V_{no-freeze}$ .<sup>8</sup> The controlling shareholder can arrange "wash" trades with related parties at a price that is at a fractional discount  $d_{wash}$  below  $V_{no-freeze}$ . Assume also that the minimum freeze-out price  $P_{freeze}$  permitted by the market price rule is calculated as a trade-volume-weighted average price over a specified period, the pre-manipulation

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<sup>8</sup> If there is a positive probability of a freeze-out at a discount or other financial tunneling, the market price  $P_1$ , will already be lower than the no-freeze-out value  $V_{no-freeze}$ , which will make a market price rule even less effective at protecting minority shareholders. See Bebchuk and Kahan (2000).

price is  $V_{no-freeze}$ , wash sales represent a fraction  $v_c$  of the total trading volume in the stock over this period, and true sales take place, at  $V_{no-freeze}$ . Then the minimum freeze-out price under the market price rule will be:

$$P_{freeze} = V_{no-freeze} * (1 - v_c) + V_{no-freeze} (1 - d_{wash}) v_c = V_{no-freeze} (1 - d_{wash} v_c) \quad (9)$$

If the controlling shareholder can initiate a large volume of manipulative trades, so that  $v_c \rightarrow 1$ , a market price rule will allow the controller to freeze-out minority shareholders at a discount approaching  $d_{wash}$ .<sup>9</sup>

Thus, in order for a market price rule to prevent dilution of the value of minority shares, laws must also limit the amount of manipulative trading  $v_c$ , the discount  $d_{wash}$  at which manipulative trading can be executed, or both, as well as prevent dilutive share offerings. Limiting either will reduce the extent to which the minimum freeze-out price  $P_{freeze}$  can fall below the pre-manipulation share value. It may be difficult to enforce bans on manipulative trading, however. Even if one could do so, lack of liquidity can render a market-based rule to protect minority shareholders ineffective.

An alternate way to limit the freeze-out discount  $d_{freeze}$  is to use liquidation value or discounted cash flow (*DCF*) valuation to compute the “fair value” of minority shares, and require a freeze-out to be at a price no lower than “fair value.” The valuation could be conducted either by the securities agency, before a tender offer is made, or by a court through shareholder exercise of appraisal rights. Such a “fair value” rule is potentially robust to market manipulation and to lack of trading in the stock. Still, a controlling shareholder could indirectly manipulate the minimum price by depressing reported earnings or engaging in cash-flow tunneling.

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<sup>9</sup> Note the opposite possibility. Assume that market manipulation by a controlling shareholder is controlled by law, but minority shareholders can anticipate a freeze-out, perhaps because the law requires advance notice. Minority shareholders can manipulate the price upwards, thus increasing the freeze-out price. The controller then has to decide to either abandon the freeze-out or complete it at a higher than expected price. One of the authors was involved in such a situation as a director of a parent company (in Korea); the parent company completed the freeze-out despite reason to believe that the freeze-out price was substantially higher than the no-freeze-out value of its subsidiary's shares.

Combining a market price rule and a fair value rule can provide more protection for minority shareholders. Suppose the freeze-out price must be the greater of market value or fair value. In order for the controlling shareholder to freeze-out the minority at a discount, she must both manipulate the market price and engage in misreporting or operational tunneling. If the practical limits on operational tunneling are stricter than those on manipulative trading (or vice-versa), minority shareholders are better off than with only a market price rule or only a fair value rule.

A self-enforcement approach would require majority-of-minority shareholder approval of the freeze-out. Minority shareholders will generally approve a freeze-out only if the price offered equals or exceeds the no-freeze-out price. By granting them a veto, the law ensures that  $d_{\text{freeze}} \leq 0$ . In most cases minority shareholders will approve the freeze-out only if they receive a premium, so  $d_{\text{freeze}}$  will often be less than zero. At the same time, shareholders may approve a freeze-out price at a positive discount when they have limited liquidity for their shares, or fear that if they reject a freeze-out offer, the controlling will find another means to extract value. An alternate self-enforcement mechanism would give veto power to independent directors. If they are truly independent and satisfy their fiduciary duties, they should reject a freeze-out price that is less than fair value.

### **1.2.3. Interaction of Dilution and Freeze-out**

In the analysis above we assume that the parameters  $k$  and  $d_{\text{freeze}}$  are independent. Still, there is a potential interaction between dilution and freeze-out. Imagine that preemptive rights existed and let minority shareholders purchase pro-rata shares in an equity offering, but freeze-out rules are weak and let minority shareholders be frozen out at a large discount  $d_{\text{freeze}}$ .

If no freeze-out is possible, minority shareholders will rationally participate in the new equity issue, thus preventing dilution of their existing holdings. In contrast, if the probability of a freeze-out is high and the freeze-out discount is large, minority shareholders will not exercise

their preemptive rights, because to do so would “throw good money after bad.” In the general case, for minority shareholders to rationally exercise preemptive rights, the offering price must be less than the expected share value after the dilutive offering, taking into account both the subsequent freeze-out case (with probability  $\pi_f$ ) and the no freeze-out case (with probability  $1 - \pi_f$ ). This condition reduces to the following inequality:

$$(1 - d_{dilut}) \leq \frac{1 + i(1 - d_{dilut})}{1 + i} (\pi_f (1 - d_{freeze}) + (1 - \pi_f)) \quad (10)$$

If  $d_{freeze}$  and  $\pi_f$  are sufficiently high, the above inequality is violated, and preemptive rights will be ineffective at preventing dilution, and hence at limiting the compound effect of dilution followed by freeze-out. Thus, successful protections from equity dilution may work only in conjunction with effective protections against freeze-out. This argument is even better illustrated by the limiting case of a large dilutive offering ( $i \gg 1$ ). In this case (10) simplifies to:

$$1 \leq (\pi_f (1 - d_{freeze}) + (1 - \pi_f)) = (1 - \pi_f d_{freeze}) \quad (11)$$

which is violated at any  $\pi_f, d_{freeze} > 0$ .

Based on this analysis we can conclude that anti-freeze-out statutes are especially important in reducing the effect of financial tunneling. Not only they directly reduce expropriation in freeze-outs, but they also allow minority shareholders to rationally exercise their preemptive rights and reduce equity dilution.

We summarize most results developed in Section 1.2 about the interaction between various legal statutes and the model parameters describing equity dilution and freeze-outs in Table 3.

### 1.3. Financial Tunneling and Equity Valuations

After developing the causal links between legal statutes like preemptive and appraisal rights and the wealth effects of financial tunneling (equity dilution and freeze-out) we now turn to modeling the effect of financial tunneling on overall equity valuations.

To simplify the algebra, we assume that a dilutive offering, if it occurs, will be "large" -- it will involve a large number of shares ( $i \gg 1$ ). Then the post-dilution per share value without additional tunneling will be  $V_{no-fin} * [1 - d_{dilut}]$  and the minority shareholders' fractional loss of wealth from the dilutive offering will be  $D_{dilut} = d_{dilut}(1 - k)$ . If the firm's value to minority shareholders with cash-flow tunneling alone is

$V_{no-fin}$ , then investors will realize the following payoffs:

$V_{no-fin}$  with probability  $(1 - \pi_d)$

$[1 - d_{dilut}(1 - k)]V_{no-fin}$  with probability  $\pi_d(1 - \pi_f)$

$[1 - d_{dilut}(1 - k)](1 - d_{freeze})V_{no-fin}$  with probability  $\pi_d * \pi_f$

The following proposition then provides the equilibrium market price at time  $t = 0$  and  $t = 1$ .

*Proposition 3. If large dilutive offerings occur, then the market price of minority shares at  $t = 0$  will equal:*

$$P_0 = V_{no-fin} \times \left\langle 1 - \pi_d * \left\{ 1 - [1 - d_{dilut}(1 - k)](1 - \pi_f d_{freeze}) \right\} \right\rangle \quad (12)$$

Proof:

Proposition 3 is a direct application of the expected payoffs for minority shareholders over the three possible scenarios: no financial tunneling, dilution only, and dilution followed by freeze-out.

Q.E.D.

The fractional difference between value without financial tunneling and market price with anticipated tunneling can be called the tunneling discount  $d_{fin}$ , which is:

$$d_{fin} = \pi_d * \{1 - [1 - d_{dilut} (1 - k)](1 - \pi_j d_{freeze})\} \quad (13)$$

Then  $P_0 = V_{no-fin} * (1 - d_{fin})$ . Combining operational tunneling and anticipated financial tunneling, the price of minority shares, relative to their no-tunneling "intrinsic value," will be:

$$P_0 = V_{no-tun} * (1 - d_{cf})(1 - d_{fin}) \quad (14)$$

We next derive an important result that allows us to separate the valuation effects of cash-flow and financial tunneling by looking at observed Price/Earnings (P/E) ratios. We assume that, to first order, tunneling does not affect the discount rate  $r$ . Both forms of tunneling affect share prices. But:

*Proposition 4: Cash-flow tunneling does not directly affect observed P/E ratios while financial tunneling does.*

Proof:

Consider the following two cases: Case 1: No Financial Tunneling, and Case 2: No Cash-Flow Tunneling. The P/E ratio with only cash-flow tunneling  $PE_{no-fin}$  will be:

$$PE_{no-fin} = \frac{P_0}{E_{obs}} = \frac{E_{obs} \frac{1}{r}}{E_{obs}} = \frac{1}{r} = \frac{E_{act} \frac{1}{r}}{E_{act}} = PE_{no-tun} \quad (15)$$

In contrast, the P/E ratio with financial tunneling  $PE_{fin}$  will be:

$$PE_{fin} = \frac{P_0}{E_{obs}} = \frac{E_{obs} \frac{1}{r} (1 - d_{fin})}{E_{obs}} = \frac{1}{r} (1 - d_{fin}) = PE_{no-tun} (1 - d_{fin}) \quad (16)$$

Q.E.D.

Proposition 4 allows us to distinguish between the valuation effects of cash-flow and financial tunneling. Both tunneling methods reduce stock prices but affect P/E multiples differently. Legal changes that reduce cash-flow tunneling need not affect P/E ratios while protections from financial tunneling affect P/E ratios directly. By focusing on P/E ratios we are

able to limit the confounding effects of cash-flow tunneling and document the effect of financial tunneling on equity valuations.

#### 1.4. Model Comparative Statics and a Numerical Example

Combining Equation (13) with Equation (16) we get the following expression for observed P/E ratios in an economy with financial tunneling:

$$PE_{fin} = PE_{no-tun} \left\langle 1 - \pi_d * \left\{ 1 - [1 - d_{dilut} (1 - k)] (1 - \pi_f d_{freeze}) \right\} \right\rangle \quad (17)$$

Observed P/E ratios are affected by five parameters:  $k$ ,  $d_{dilut}$ ,  $d_{freeze}$ ,  $\pi_f$ , and  $\pi_d$ . In the comparative statics below we focus on the first three parameters:  $k$ ,  $d_{dilut}$ , and  $d_{freeze}$ . A full model of the drivers of the probabilities of financial tunneling  $\pi_f$  and  $\pi_d$  is beyond the scope of our paper and is left for future work.<sup>10</sup>

We formulate the following Proposition for the effect of  $k$ ,  $d_{dilut}$ , and  $d_{freeze}$  on the observed  $PE_{fin}$  ratios.

*Proposition 5. The partial first derivatives of  $PE_{fin}$  with respect to  $k$ ,  $d_{dilut}$ , and  $d_{freeze}$  equal:*

$$\frac{\partial PE_{fin}}{\partial k} = PE_{no-tun} \pi_d d_{dilut} (1 - \pi_f d_{freeze}) \quad (18)$$

$$\frac{\partial PE_{fin}}{\partial d_{dilut}} = -PE_{no-tun} \pi_d (1 - k) (1 - \pi_f d_{freeze}) \quad (19)$$

$$\frac{\partial PE_{fin}}{\partial d_{freeze}} = -PE_{no-tun} \pi_d \pi_f [1 - (1 - d_{dilut} (1 - k))] \quad (20)$$

Proposition 5 provides several pieces of intuition. An increase in minority investor participation  $k$ , arguably achieved through improving preemptive rights, has a positive effect on  $PE_{fin}$ . This effect is further increased when the intrinsic PE ratios ( $PE_{no-tun}$ ) are high, and when the probability of dilution or the discount of newly issued shares is large. Large freeze-out probability and discount reduce the positive effect on PE of increasing  $k$ . In the extreme, when  $d_{freeze}$  is large enough, the inequality (11) will be violated and the positive effect on PEs of increasing  $k$  will be reduced to zero. In that case, granting preemptive rights will not improve equity valuations.

In contrast, decreasing  $d_{dilut}$  or  $d_{freeze}$  has a positive effect on PE ratios. This effect is further strengthened in companies with higher intrinsic valuations. Also, the positive effect of decreasing  $d_{dilut}$  ( $d_{freeze}$ ) is reduced when the discount on the other financial tunneling transaction  $d_{freeze}(d_{dilute})$  is larger. These results imply that granting minimum price provisions and freeze-out protections in general increase valuations and these legal changes are most effective when they are granted in combination – reducing simultaneously dilution and freeze-out generates disproportionately more wealth for minority shareholders than dealing with each issue separately.

To put these comparative statics results in perspective, assume that a company operating in an economy with poor legal protections has an intrinsic  $PE_{no-tun}$  equal to 20, the  $d_{dilut}$  and  $d_{freeze}$  equal 0.6,  $k$  equals 0 and  $\pi_d$  and  $\pi_f$  equal 0.75. The resulting  $PE_{fin}$  ratio is only 8.30 and the company trades at a discount of 58.5% to its intrinsic value due to the large expected financial tunneling wealth effects. Now, imagine that the preemptive rights in the economy are improved together with a strengthening of appraisal rights and minimum issue price provisions. Assume

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<sup>10</sup> For a formal model of the determinants of operational tunneling see Durnev and Kim (2005). They show that the extent of operational tunneling is a function of controlling shareholder ownership and firm investment opportunities and need for financing. Growth in sales is a proxy for investment opportunities. Need for financing is measured as the gap between growth in assets and  $ROE/(1-ROE)$ . Both measures are biased by operational tunneling effects and do not describe the costs of financial tunneling well. The probability of financial tunneling will reflect the cost and benefits of initiating dilutive equity issues and freeze-outs. The costs of financial tunneling may include damages on firm reputation, political pressure from the government, loss of access to equity financing, and possibly reduced access to debt financing.

that these legal changes keep the probabilities of dilution and freeze-out unchanged, but increase  $k$  to 1, and reduce  $d_{dilut}$  and  $d_{freeze}$  to 0.2. The wealth effects for minority shareholders from the legal changes will be large. Under the new legal regime the company observed  $PE_{fin}$  ratio will increase more than 113% and will equal 17.75, which is only an 11.25% discount to the  $PE_{no-tun}$  of 20.

## **2. Applying the Theoretical Framework to Bulgaria - Empirical Predictions**

In this section we first apply our theoretical framework to analyze the weaknesses of the Bulgarian law governing dilutive offerings and freeze-outs pre 2002 and evaluate the 2002 improvements in these protections. Then, we formulate testable predictions about the impact of these changes on financial tunneling and stock valuation.

### *2.1. An Analysis of Preemptive and Appraisal Rights in Bulgarian Law*

In Bulgaria prior to 2002, there were no minimum price rules for secondary equity issues, and thus no limits on  $d_{dilut}$ . Preemptive rights existed but these rights were not transferable. In practice, the preemptive rights rules were weak enough that the controlling shareholder could effectively count on most small shareholders not participating. Small shareholders would have to bear the proportionately large administrative expense of participating pro rata in a secondary offering. Consistent with the discussion in Section 1.2, minority shareholders might rationally choose not to participate in a dilutive offering, even if they those to bear the administrative costs, due to concerns for “throwing good money after bad.” Thus, we expect  $k$  to be close to 0. There was also no realistic possibility for an equity offering to raise capital from outside investors. We are not aware of any such offerings during the period from the 1998 mass privatization until the

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These costs may depend not only on the firm's behavior, but on the behavior of other firms in the market, and on legal rules.

2002 reforms. So the cost of a dilutive offering, in reduced future access to equity capital, was not an important constraint.

Minimum price rules in a freeze-out were also so weak that many controlling shareholders did not need to use the two-stage process of dilution accompanied by freeze-out described in Equation (8). They could expropriate virtually all minority shareholder wealth via freeze-out alone. The tender offer rules required only that the freeze-out price could not be lower than the three-month weighted average stock price. No minimum price rules based on valuation methods existed. The Bulgarian market was also very illiquid. There were several means by which controlling shareholders could freeze-out minority shareholders at a discount  $d_{\text{freeze}}$  that approached and sometimes effectively equaled 1. One was to execute large block trades with related parties at depressed prices during the period prior to the freeze-out. These block trades would form the vast percentage of trading during the three-month period, and de facto set the appraisal price at close to zero. In our framework, the absence of rules forbidding market manipulation allows  $v_c \rightarrow 1$  and  $d_{\text{wash}} = d_{\text{freeze}} \rightarrow 1$  even though Bulgaria had a market price rule.

In many cases, a company's shares did not trade at all in the three months preceding a freeze-out. This allowed controllers to de-list the company without making any offer to minority shareholders. Companies undergoing bankruptcy procedures could also be de-listed, with no check on whether these companies were actually insolvent. A controlling shareholder could then use the bankruptcy process to squeeze out at minority shareholders at a zero price.

If a Bulgarian company is de-listed (goes dark), minority shareholders formally retain their shares. However, once the company is de-listed, it is not subject to the securities laws, which govern public corporations. Private firms are governed by the Bulgarian Commercial Code, which offers no protections against dilutive offers or freeze-outs, and does not require disclosure of company financials to shareholders. A going dark transaction is likely to be equivalent to a freeze-out at close to a zero price.

In the summer of 2001, a newly elected government headed by the former Bulgarian king came into power. One of the priorities outlined by the new government was to improve the functioning of capital markets. In December 2001 the government proposed to the Bulgarian Parliament several changes to the securities laws. Table 4 summarizes these changes, which became effective in June 2002.

The first main changes involved strengthening of preemptive rights. An increase in firm equity could be implemented only through providing tradable preemptive rights (warrants) to all shareholders. These warrants had to be listed and traded on the Bulgarian Stock Exchange. As a result of this change, majority owners could no longer rely on the lack of participation of minority shareholders in new equity issues. If the majority shareholders wanted to increase their percentage ownership, they would have to purchase warrants from the remaining shareholders and thus compensate them for any dilution.

The second major change was the regulation of tender offers in going-private transactions. The law now recognizes three critical ownership levels: 50%, 67%, and 90%. A tender offer for all minority shares becomes mandatory when a shareholder reaches each of these critical levels, and a controlling shareholder can de-list a company only when reaching 90% ownership or greater. The law also gives veto power to minority shareholders regarding the terms of the mandatory tender offer. More than half of all shareholders, besides the majority owner, must approve the tender offer price. Finally, minority shareholders are now entitled to receive a minimum fair price for their shares in a tender offer. The fair price is calculated using a combination of *DCF* and comparison to peer firms. This value is to be used in combination with the three-month average stock market price (excluding block trades) to set a lower limit on the freeze-out price.

The changes in the law were accompanied by a reorganization and dramatic increase in the powers of the securities regulator. The newly established Bulgarian Financial Supervision Commission (FSC) succeeded the Bulgarian Securities and Stock Exchange Commission (SSEC)

with the goal of protecting the interests of minority investors. Since its creation the FSC has both enforced the 2002 Law and drafted several important regulations that strengthen and clarify the protections built in the law. These changes are consistent with arguments made by Glaeser, Johnson, and Shleifer (2001) advocating a strong centralized regulator in an emerging market.

For example, the FSC reviews all tender offers and has often required majority shareholders to increase the freeze-out price, before the FSC will approve the transaction. Also, in early 2003 the FSC issued rules for computing freeze-out prices. These rules distinguish between companies with liquid and illiquid stocks. For liquid stocks the minimum price is based on a combination of the market price and *DCF* and peer-multiple valuations. For illiquid stocks the minimum price is based only on *DCF* and peer multiple valuations. The freeze-out price must also equal or exceed estimated liquidation value.

## *2.2. Empirical Predictions and Framework to Test Them*

Our theoretical model and the discussion of Bulgarian legal changes imply that 1) the improved legal protections will reduce the impact of financial tunneling via equity dilution and freeze-out and 2) the reduction in financial tunneling will lead to increase equity valuations. We now translate these predictions into a framework to test them.

Our first empirical prediction about the link between law and financial tunneling is that the participation in equity issues  $k$  will increase following the legal changes in Bulgaria. We cannot observe  $k$  directly. However, if we observe the pre-offering ownership ( $\alpha_0$ ), the post-offering ownership by the controlling shareholder ( $\alpha_1$ ), and the number of new shares issued ( $i$ ), we can estimate  $k$ . The relationship between  $k$  and  $\alpha_0$ ,  $\alpha_1$ , and  $i$  is described by the following equation:

$$1 - \frac{(1 - \alpha_1)}{(1 - \alpha_0)} = \frac{i}{(1 + i)}(1 - k) \quad (21)$$

Proof:

Start with Equation (2) for minority ownership after dilution ( $1 - \alpha_1$ ), and divide both sides by ( $1 - \alpha_0$ )

$$\frac{(1 - \alpha_1)}{(1 - \alpha_0)} = \frac{[1 + k * i]}{(1 + i)} \quad (22)$$

Now multiply by -1 and add 1 to both sides to reach:

$$1 - \frac{(1 - \alpha_1)}{(1 - \alpha_0)} = 1 - \frac{[1 + k * i]}{(1 + i)} \quad (23)$$

Equation (21) is then straightforward to derive after rearranging terms.

Q.E.D.

The left-hand-side of Equation (21) can be interpreted as a measure of dilution. It equals 1 if minority shareholders are completely diluted and 0 if they participate pro rata in new issues. It will be negative if the firm raises capital principally from outside investors. The term  $i/(1+i)$  is a measure of equity increase. It converges to 1 with the increase in the issue size. A regression of the dilution measure on the equity increase measure will provide an estimate of the exclusion parameter ( $1 - k$ ). Equation (21) thus permits an estimate of minority shareholder participation based on annual data on majority ownership stakes  $\alpha$  and equity increases  $i$ . An estimate for ( $1 - k$ ) of 1 will correspond to complete exclusion (zero participation of minority shareholders in new issues), an estimate of 0 will reflect pro-rata participation, and a negative estimate will indicate that the firm raised capital primarily from outside investors. If the 2002 changes in preemptive rights are effective, we expect shareholder participation to increase after the changes and ( $1 - k$ ) to decline.

Our second empirical prediction about the link between law and financial tunneling is that after the legal changes the average discount in freeze-outs  $d_{freeze}$  to decrease or even turn negative (freeze-out at a premium). We can test this prediction by first documenting the extent of

going dark transactions pre-2002. These transactions were essentially implemented at  $d_{freeze} = 1$  and banned by the 2002 legal changes. We can then compare the average discount in freeze-out tender offers before the legal changes with such transaction afterwards.

We do not have a formal model for the determinants of the probability of dilution and freeze-out. However, we conjecture that pre-2002 financial tunneling is more likely in smaller firms, and in firms with a private controller, and less likely in government-controlled firms.

Our main prediction about the link between tunneling and valuation is that the expected reductions in dilution and freeze-out discounts following the legal changes will translate into increased observed P/E ratios. We focus on P/E ratios because as stated in Proposition 4, P/E ratios are directly affected only by financial tunneling and remove, at least to a first order, the effect of operational tunneling. In addition, Proposition 5 shows that P/E ratios can be positively impacted by an increase in  $k$  and/or a decrease in  $d_{dilut}$  or  $d_{freeze}$ . Our estimating strategy will be to compare the P/E ratios of firms pre- and post-2002 (following the legal changes).

### **3. Data and Summary Statistics**

Testing our model requires firm-level stock ownership, accounting, trading, and price data. The availability of such detailed data makes Bulgaria an ideal setting to study the interaction of law and financial tunneling in an emerging market. In this section we describe our data sources and present some descriptive statistics on the Bulgarian market.

The list of all Bulgarian companies that have ever been publicly listed, the date of their listing on the Bulgarian Stock Exchange (BSE), and the date of their delisting (if any) are obtained from the online database provided by the Bulgarian Securities and Stock Exchange Commission (SSEC). The majority of publicly traded companies on the BSE, a total of 1,040 firms, are companies that participated in the Bulgarian mass privatization process and were listed on the exchange in May 1998. We restrict our sample to only these companies. Of the 1,040 firms, 191 were quickly de-listed during 1998, never traded publicly, and never filed with the

SSEC. Another nine companies were acquired or went bankrupt in 1998 and have no data available. Our final sample consists of the remaining 840 firms that were listed in mid-1998.

The Bulgarian mass privatization was executed via voucher auctions. The creation of large privatization funds, in which individuals invested, plus separate participation by more than two million individual investors, created a variety of post-privatization ownership structures. Atanasov (2005) and Miller and Petranov (2000) provide more details about the Bulgarian mass privatization process.

The most important data for our study consist of ownership levels and the number of outstanding shares at year-end for each of the companies in our sample. A unique feature of Bulgaria and some of the other transitional economies in Eastern Europe is that ownership levels and securities trades are recorded by an institution called the Central Depository. The Central Depository provides a complete record of ownership and trading data for all Bulgarian public companies. We were able to obtain from the Central Depository year-end ownership levels of the largest shareholder for each company and also the breakdown of shareholder ownership by type (state, private companies, individuals, financial intermediaries) for the period from 1998 to 2003. Stock trading and price data are compiled directly from the BSE tapes. We have trade data from the BSE through the end of 2002. We obtain individual firm's financial data for the years 1999-2002 from those firm's annual financial statements. Tender offer prices are collected from news tapes provided by the BSE, which are available beginning in 2001.

Figure 1 reports the number of companies traded on the Bulgarian Stock Exchange for each year in the period 1998-2003. We divide the 840 firms that were originally listed in May 1998 and filed with the SSEC into four size quartiles and then follow the number of still-active companies in each original quartile through time. The number of firms listed on the exchange drops dramatically in 2000 and 2001, and stabilizes in 2002 and 2003. The delisting phenomenon is a lot more pronounced in the smaller sized firms. The number of firms in the largest quartile

declines from 210 in 1998 to 150 in 2003, while only 40 firms of the 210 in the original smallest-size quartile are still trading in 2003.

Our BSE trade data cover all trades on the stock exchange during the period between January 1998 and December 2002. A total of 80,000 trades were executed during that time in the shares of 910 different securities. The market is thin, however, with an average of fewer than 100 trades per security for the whole period. Trading was especially thin for smaller firms, and for firms that were later de-listed.

#### **4. Analysis of Financial Tunneling**

We now turn to the empirical analysis of financial tunneling. First, we analyze dilution from secondary equity offers and document the effect of the legal changes in 2002 on minority shareholder participation. We then study going dark and freeze-out transactions before and after the legal changes and show the effect of the new fair price and minority shareholder veto statutes on the freeze-out discount.

##### *4.1. Analysis of Dilution*

Our first empirical test of financial tunneling documents the extent of dilution in the Bulgarian market. Based on Equation (21), we construct on a year-by-year basis the dilution measure  $1 - (1 - \alpha_t)/(1 - \alpha_0)$ , where we substitute the ownership of the largest shareholder of the firm for  $\alpha_t$  and  $\alpha_0$ . We then construct the equity increase measure  $i/(1+i)$  based on the shares outstanding  $S$  on a year-by-year basis. Note that by definition  $i = (S_1 - S_0)/S_1$ . We regress the dilution measure on equity increase (*EquityInc*) and an interaction term *law2002\*EquityInc*, where *law2002* is a dummy equal to 1 for years 2002 and 2003, and zero otherwise.

Table 5 reports the results for each year between 1999 and 2003. The results are strong and consistent with our first empirical prediction that dilution would decline following the

changes to minority investors' preemptive rights. Our estimate for  $(1 - k)$  in the pre-2002 period is very close to 1 and implies that minority shareholders are (on average) completely excluded from new equity issues. After the 2002 changes in corporate law, the estimate of  $(1 - k)$  is close to 0, meaning that  $k$  under the new legal regime is close to 100%. The drop in  $(1 - k)$  provides evidence that the changes in preemptive rights effective in 2002 basically eliminate dilution. Minority shareholders (or new investors who purchase warrants from minority shareholders) on average fully participate in new issues and no wealth is expropriated via dilution. The post-2002 estimate of  $(1 - k)$  is near 0, and is negative in some specifications. This indicates that, post-2002, companies issued shares primarily to raise capital, rather than to dilute minority investors.

One possible concern in interpreting Table 5 is that different types of firms issue equity pre-2002 and post-2002. A possible explanation for lower post-2002 dilution might be that firms whose controlling shareholders intend to treat minority shareholders better, for reasons other than the law, predominantly issued equity post-2002. We address these concerns in Table 6 by separating firms into three categories: firms that did not issue equity at all, firms that issued equity pre-2002, and firms that issued equity post-2002. We then estimate a multinomial logit model to determine whether the firms in these three categories differ in percent owned by the largest shareholder, percent owned by the state, and market capitalization. The results are not consistent with different types of firms issuing equity in the pre and post-2002 periods. In both periods larger firms with less state ownership and larger privately owned control blocks were more likely to issue equity.

#### *4.2. Freeze-outs*

We begin the analysis of freeze-outs by examining de-listings before the 2002 legal changes. Table 7 shows that more than 500 firms de-listed in this period. The average ownership of the largest shareholder in the de-listed firms is around 44%, while the ownership of the largest shareholder in the non-de-listed firms is around 49%. This suggests that in most of the de-listed

companies, the controlling owners did not even bother with secondary offerings to dilute minority shareholders' stake below 50% before launching the freeze-out tender offer. Almost 80% of the firms (402 out of 509) do not trade in a three-month window before the delisting date. They simply go dark, with no tender offer. In these firms the pre-2002 market-based rule that the freeze-out price should be higher than the three-month weighted average stock price offers no protection to minority shareholders. As discussed above, the effective freeze-out discount  $d_{freeze}$  is close to 100%.

The summary statistics in Table 7 imply that certain firm characteristics are related to delisting and freeze-out.<sup>11</sup> In support of Figure 1, de-listed firms have much smaller size and are much less frequently traded. They have smaller average government ownership and are less likely to be controlled by the government. The large government ownership in firms that continue to be listed suggests an interesting tradeoff for minority shareholders in a firm with the government as a controlling shareholder. On one hand, significant government ownership could lead to high agency costs if the government is a poor monitor. This could manifest itself through poor performance and operational tunneling by management. On the other hand, the expected level of operational tunneling under government control may be no worse than under private control, and government control reduces the probability of catastrophic wealth loss via financial tunneling. In the early stages of the Bulgarian market, the benefits of government majority ownership may well have outweighed the costs.

Of the 509 de-listed firms, 107 firms have at least one trade in a three-month window before their delisting. These firms tend to be larger and more liquid than the "going dark" firms. Their higher liquidity implies that these firms were seen as better investments for minority owners. To de-list these companies, the controlling block-holders often took advantage of another weakness of the market-based rule and engaged in dilutive offerings prior to the freeze-

out, manipulative block trades with related parties during the three-month price measurement period, or both.

Table 8 provides several examples of apparent wash trading. The table illustrates situations where large block trades reduced the weighted-average stock price in the three months before delisting. If the average price for the six months before the large (or block) trade is the basis, then large trades are done at an average discount  $d_{wash}$  of approximately 81% for the seven cases shown. The average weight of the block trades  $v_c$ , as a fraction of all trades during the three months preceding delisting, is 0.89. Using Equation (9) the freeze-out price, including the large manipulative trades, will be at an average discount  $d_{freeze}$  of  $0.81 * 0.89 = 72\%$  compared to the price excluding these trades. Table 8 provides a rare glimpse of market manipulation in connection with a tender offer (Hermalin and Schwartz, 1996). Recall that the un-manipulated market price is already well below intrinsic share value due to operational tunneling and anticipated risk of dilution and freeze-out. The results thus reflect the danger of relying solely on the market to determine freeze-out prices in an emerging economy (Black and Kraakman, 1996).

We next analyze the terms of freeze-outs and how these terms changed after the 2002 legal changes. The BSE news tapes cover tender offers from 2001. Table 9 provides data for the nine announced freeze-out tender offers completed during 2001, before the law changes, and the 19 offers announced afterwards. We exclude one case where the controlling shareholder offered more than an 800% premium in a revised tender offer. The pre-2002 tender offers premiums are close to zero and are never revised upwards due to shareholder or regulator pressure. The change in offer premiums post-2002 is striking. Even excluding one very high-premium outlier, the average premium of offers after the law changes come into effect is more than 40% for initial offers and over 60% for final offers. Half of the offers (10 of 20 post-law change offers, including the outlier that we excluded from Table 9) are revised upwards to secure minority

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<sup>11</sup> The univariate summary statistics results are confirmed by unreported multivariate logit models of

shareholder agreement and the approval of the SSEC of the tender offer price. These results are consistent with our second empirical prediction, namely that the freeze-out discount  $d_{freeze}$  would decline after the legal changes in appraisal rules. Indeed, the discount becomes highly negative (a large premium) on average.

The increased premium following the law changes is both statistically and economically significant, but *understates* the effect of the law change on minority shareholder wealth. The premium is computed based on the stock price before the tender offer. As we show below, share prices increase dramatically post-law. Pre-law share prices were also sometimes manipulated downward, as discussed above. The premium may also be a poor measure of firm value in an illiquid market. To address this issue we also report in Table 9 the ratios of initial and final offer price to sales in the year before the tender offer.<sup>12</sup> The average Final Price to Sales ratio increases by more than four times, from 0.16 x sales to 0.65 x sales.

The premiums following the changes in securities law in Bulgaria are very close to those found in DeAngelo et al. (1984) for going-private transactions in the United States (U.S.). As in the U.S., minority shareholders in Bulgaria can now veto the tender offer and put the majority into a bilateral monopoly with them over control rights (DeAngelo et al., 1984). Furthermore, even if minority shareholders are passive, the Bulgarian securities regulator has to approve all tender offer prices and frequently requires their upward revision (Glaeser, Johnson, and Shleifer, 2001).

## **5. Changes in Equity Valuation after the 2002 Law Changes**

The previous section established the effect of improved preemptive rights and freeze-out price rules in limiting minority shareholder expropriation through dilutive equity issues and

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delistings.

freeze-outs. We now turn to documenting the valuation effects of the decrease in financial tunneling in Bulgaria.

Upon coming into power in June 2001, the new Bulgarian government sought to make good on its campaign promise to improve the functioning of the capital markets. The changes in securities law affecting equity offerings and freeze-outs were proposed on December 14, 2001, and the first draft of the law was approved by Parliament on February 14, 2002. The final draft was accepted on June 6, 2002 and became effective on June 21, 2002. Because of effective government control of the Parliament, there were only limited changes in the draft between submission and adoption. The time series of the BSE SOFIX stock index is illustrated in Figure 2, which shows the BSE SOFIX index hitting a bottom in mid-2001. However, after the new government wins the elections in June 2001, the index jumps by almost 30%. A second rapid increase occurs around the time the new law is proposed in December 2001. Events D3 and D4 are less significant, as expected, because adoption of the law was not in significant doubt. The overall increase in the index following these changes is significant -- by the end of 2003, the index value was nearly six times its value in mid-2001.

An event study technique could be employed to isolate the effect of the statutory changes on shareholder value. As Bhagat and Romano (2002) argue, however, it is difficult to pinpoint an exact “event” date from a statutory adoption since the process involves so many events. Moreover, since the majority of firms on the Bulgarian Stock Exchange trade once a month or less, we cannot reliably estimate an abnormal stock price reaction using daily data. Given these constraints, we examine the broader event windows and substitute a measure of the increase in P/E ratios from the pre- to the post-law period for the usual cumulative abnormal return measure.

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<sup>12</sup> To be consistent with Proposition 4, we would have used P/E ratio. However, the most of the firms in our small sample of tender offers do not report positive earnings and have undefined P/E ratios. To avoid reducing sample size even further we look at Price/Sales ratios instead.

Figure 3 shows the changes in P/E ratios surrounding the new law. We calculate P/E ratios as the average stock price over each quarter divided by earnings per share for the previous fiscal year. We initially restrict our analysis to firms with positive earnings above 0.01 lev, and thus well-behaved P/E data for all eight quarters in 2001-2002. We have 17 such firms, ten with a non-government majority shareholder (Privately Controlled Firms), and seven that are either controlled by the government or have no majority shareholder (Other Firms). We expect the new law to affect the valuation of Privately Controlled Firms more strongly than Other Firms, because Privately Controlled Firms are at higher risk of freeze-out.

Figure 3 shows, for each quarter, the average P/E ratio for Privately Controlled Firms and Other Firms, respectively, normalized to 1.0 in the first quarter of 2001. The average P/E ratio for Privately Controlled firms triples from the fourth quarter of 2001 to the first quarter of 2002. The timing of this increase is consistent with the introduction of the new law in December 2001, and the government, around the same time, imposing a de facto moratorium on freeze-outs under the old rules. The moratorium was implemented by the SSEC, which suspended the authorization of freeze-out tender offers until the law came into effect. The increase in P/E ratio is over 400% measured from the fourth quarter of 2001 to the fourth quarter of 2002. In contrast, the P/E ratios for Other Firms remain unchanged. This result is consistent with our empirical prediction.

Because the number of firms with complete P/E data is small, in the right half of Figure 3 we also show the change in Price/Sales ratios using the same methodology as with the P/E ratios. We have 28 firms with complete Price/Sales ratio data — 16 Privately Controlled Firms and 12 Other Firms. Similar to P/E ratios, Price/Sales ratios for Privately Controlled Firms increase noticeably from the fourth quarter of 2001 to the first quarter of 2002, and increase further by the end of 2002, by a more modest but still economically significant 60% over the full year period, while the Price/Sales ratios for Other Firms stay unchanged. The smaller effect on Price/Sales ratios may arise because this ratio does not remove the effect of operational tunneling on valuations. For example, transfer pricing affects profits, and thus stock price, more strongly than

it affects sales. When Privately Controlled Firms majority owners lose the opportunity to extract wealth from minority shareholders through financial tunneling, may partly compensate by increasing the level of operational tunneling.

The P/E analysis in Figure 3 requires firms to have available P/E data for eight consecutive quarters, which reduces the sample size dramatically. For robustness, we estimate several P/E regressions where we also include firms that have one missing P/E ratio in the pre-law period (starting with the first quarter of 2000) and one in the post-law period (through fourth quarter of 2002). We report results from this regression analysis in Table 10. The table shows the effect of the 2002 legal changes on equity values through a firm fixed-effect regression of quarterly P/E ratios on a law change dummy and interaction effects of this dummy with dummies for private majority ownership and state majority ownership. The larger number of observations allows us to parse the Other Firms category into government- controlled firms and firms with no controlling owner. We estimate three models. Model 1 compares P/E ratios for all quarters through September 31, 2001 with all post-September 31, 2001 quarters. Model 2 uses a cutoff date for the pre-versus-post law analysis of December 31, 2001, while Model 3 compares the pre-September 31, 2001 period with the post-December 31, 2001 period. Finally, Model 4 drops the interaction variables to show the average post-law increase in P/E ratio for all firms.

With this specification, the coefficient on the post-law dummy measures the post-law change in P/E ratio for the omitted class of firms with no controlling owner. This coefficient is positive but not statistically significant in all specifications. Similar to the results in Figure 3, there is a large increase in P/E ratio for Privately Controlled Firms. The effect of the law on P/E ratios for state-controlled firms is negative but not significant in all specifications. These results suggest that the overall increase in valuations around the law changes is due to the post-law controls on financial tunneling, rather than to general economic factors that affect all firms to a similar extent. The increase in valuations for privately controlled firms is approximately 100%. These results are consistent with our empirical prediction that observed P/E ratios would increase

due to an increase in  $k$  (more shareholder participation in secondary offers) and/or a decrease in fractional discounts of secondary offers or freeze-outs ( $d_{dilut}$  or  $d_{freeze}$ ).

## 6. Summary

This paper examines how law affects finance through the control of financial tunneling. We first develop an equilibrium model of financial tunneling through dilutive equity offerings and freeze-outs. In the model, investors rationally discount the prices they pay for shares, and may rationally decline to participate in dilutive share offerings when legal protection is inadequate. We test the model's predictions with data from the emerging market of Bulgaria, where a legal change during the sample period provides a natural experiment. Unlike most prior studies on emerging markets, which provide macro- (economy) level analysis or case study evidence of expropriation, we perform a detailed empirical analysis on a sample of more than 800 companies.

Relying on detailed trade, price, and ownership data, we document the impact of provisions in the Bulgarian corporate law after the “Big Bang” privatization (1999-2001). Consistent with the model's predictions, minority shareholders rarely participate in dilutive offers and freeze-out is widespread during this period. Changes in Bulgarian corporate laws in 2002 meant that majority holders could no longer, in effect, unilaterally issue themselves shares, and provided strong minimum price rules for freeze-out tender offers. After adoption of the new rules, minority dilution via equity issuances virtually disappears, freeze-outs cease, and tender offers occur at an average premium of about 50%.

Our model also predicts that reduction in financial tunneling will result in higher equity valuation. We find results consistent with that prediction, including higher post-law P/E ratios for Bulgarian those firms most likely at risk for financial tunneling. The findings suggest that control of financial tunneling is necessary for emerging markets to emerge.

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Table 1  
Financial Tunneling Methods and Their Implementation in Bulgaria

Tunneling Method	Research Studies	Implementation in Bulgaria
Dilution	Black and Kraakman (1996) Black, et al (2000) Baek, Kang, and Lee (2006)	Majority shareholders initiate a large increase in equity capital at a price well below the current market price. The majority shareholder then makes the subscription process difficult for minority shareholders to participate in and buys all unsubscribed shares. The process results in a significant increase of the majority shareholder stake in the company at the expense of minority owners.
Freeze-out	Gilson and Gordon (2003) Bates et al. (2006) Subramanian (2004)	Tender offer close to three-month weighted-average stock price. Often this price is manipulated through large "wash" sales shortly before tender offer. The price is 70%-80% below the value of minority shares. Company is then de-listed from the public register.
Going dark (delisting without freeze-out)		Controlling shareholder proposes delisting at annual shareholder meeting and approves proposal based on majority ownership. Trading ceases, minority shareholders retain worthless or nearly worthless shares.
Transfer of control via merger	Gilson and Gordon (2003)	N/A
Targeted Repurchases	Kirchmaier and Grant (2005)	N/A

Table 2  
Notation for Model and Empirical Tests

Symbol	Description
<b>Model variables</b>	
$C$	Controlling shareholder
$m$	Minority shareholders
$t$	time period ( $t = 0, 1, \text{ or } 2$ )
$\alpha_t$	Ownership by controlling shareholder at time $t$ Estimated empirically before and after dilutive offering or freeze-out based on year-end data.
$E_{act}$	Actual per share earnings of the firm at $t = 0$ (before cash-flow tunneling)
$E_{obs}$	Earnings per share observed by minority shareholders at $t = 0$ (after cash-flow tunneling)
$r$	Minority shareholders' discount rate
$PE_{no-tun}$	Price/earnings ratio for firm with no tunneling = $1/r$
$PE_{no-fin}$	Price/earnings ratio for firm with cash flow tunneling but no financial tunneling = $1/r$
$PE_{fin}$	Price/earnings ratio for firm with cash flow tunneling but no financial tunneling = $E_{obs}/r$
$P_t$	Stock price at time $t$
$P_{dilut}$	Price at which new shares are issued in a dilutive offering
$P_{freeze}$	Price at which minority shares are frozen-out
$\pi_d$	Probability of dilutive offering
$\pi_f$	Probability of freeze-out, given that dilution has already occurred
$V_{no-tun}$	Intrinsic value of firm's shares with no tunneling
$V_{no-fin}$	Value of minority shares after operational tunneling but without financial tunneling
$V_{no-freeze}$	Value of minority shares after dilution, with no anticipation of a subsequent freeze-out or additional dilution
$V_{freeze}$	Value of minority shares after freeze-out (= $P_{freeze}$ )
$i$	fractional number of share issued in a dilutive offering, relative to shares outstanding before the offering. Estimated empirically based on year-end data as $i = (S_{year\_1} - S_{year\_0})/S_{year\_1}$ , for an offering during year 1
$k$	fractional participation of minority shareholders in a dilutive offering
$d_{cf}$	fraction of actual earnings that is diverted via operational tunneling
$d_{dilut}$	Fractional discount at which new shares are issued in a dilutive offering, relative to pre-issuance market price
$d_{freeze}$	Fractional discount at which minority shares are frozen out, relative to pre-freeze-out market price
$d_{wash}$	discount of "wash sale" price below pre-freeze-out value of minority shares $V_{no-freeze}$
$D_{dilut}$	fractional decrease in value of minority shares $V_{no-tun}$ due to dilutive offering
$D_{freeze}$	fractional decrease in value of minority shares $V_{no-freeze}$ due to freeze-out
$N$	number of firms in the economy
$n$	index variable for each firm (generally suppressed in the model)
$S_{n,t}$	Shares of firm $n$ outstanding at time $t$ (assumed in the model to = 1 before dilutive offering).
$v_c$	ratio of wash sales to total trading volume within the time period for measuring the minimum freeze-out price under a market price rule
<b>Empirical variables</b>	
<i>dilution measure equity increase</i>	$1 - (1-\alpha_0)/(1-\alpha_1)$ . Converges to 1 for total dilution, to 0 for prorata purchase of shares; negative if firm raises capital by issuing shares primarily to outside investors
	Estimated empirically as $i/(1+i)$ . Converges to 1 for large dilutive offerings.

Table 3  
Results from the Interaction of Legal Statutes and Financial Tunneling

Parameter in the Model	Legal Statute	Effect
<b><i>Dilution</i></b>		
$k$ – participation of minority shareholders in new issues	Preemptive rights without freeze-out protections (large $d_{freeze}$ )	Little protection
	Preemptive rights with good anti-freeze-out protections (See below)	Set $k$ as close to 1 as possible, minimize wealth expropriation
$d_{dilut}$ – discount of newly issued shares	Minimum price statutes	Set $d_{dilut}$ as close to 0 as possible, minimize wealth expropriation
	Shareholder approval/veto of equity issue	Set $d_{dilut}$ as close to 0 as possible, minimize wealth expropriation
<b><i>Freeze-out</i></b>		
$d_{freeze}$ – discount offered to minority shareholders in freeze-out	Mandatory cash tender offer	Set $d_{freeze} < 1$ , small reduction in wealth expropriation
	Market rule in illiquid market or without anti-market manipulation statutes	Set $d_{freeze}$ equal to $d_{wash} < 1$ , small reduction in wealth expropriation
	Market rule with anti-manipulation laws and liquid market	Set $d_{freeze}$ close to 0, minimize wealth expropriation
	Appraisal Rights based on valuation models	Set $d_{freeze}$ close to 0, minimize wealth expropriation, even increase shareholder wealth ( $d_{freeze} < 0$ )
	Shareholder approval/veto of freeze-out transaction	Set $d_{freeze}$ close to 0, minimize wealth expropriation, even increase shareholder wealth ( $d_{freeze} < 0$ )

Table 4  
Changes in Bulgarian Corporation Law in 2002

The changes in the law were introduced to Parliament by the Bulgarian government on December 14, 2001. The first draft of the law was approved by Parliament on February 14, 2002. The final version of the law was accepted by Parliament on June 6, 2002. It was published in the State Gazette and thus became effective on June 21, 2002.

Statute	Pre-2002	2002
<b>Preemptive Rights</b>	Minority shareholders can participate in new equity offerings. If they do not participate, the controlling shareholder can purchase all unsubscribed shares.	Stock warrants are required to be issued upon every capital increase—one warrant for each share. The preemptive rights of shareholders in public companies can still be extinguished if not exercised within the period determined by a general meeting of shareholders. This period cannot be less than one month from publication of the notice to subscribe shares in the State Gazette. The key difference is that shareholders can sell the warrants to other shareholders or third parties, as opposed to having to exercise their preemptive rights by buying the shares themselves. Majority shareholders are now put in the position of having to purchase the warrants in order to increase proportional ownership, rather than just taking control of unsubscribed shares when the minority did not buy them.
<b>Appraisal Rights</b>	In a going-private transaction, a controlling shareholder should offer at least the weighted-average stock price from the last three months of trading	<ol style="list-style-type: none"> <li>1. A controlling shareholder should extend a mandatory tender offer to remaining shareholders when reaching 50%, 67%, and 90% ownership in the firm. A controlling shareholder can initiate a going-private transaction only when reaching 90%.</li> <li>2. Minority shareholders should receive a fair price for their shares in tender offers and going-private transactions. A fair price is computed using discounted cash flow and comparable company multiples valuation methods and is compared to the average stock price for the last three months, excluding block trades. Minority shareholders should receive the higher of the two prices.</li> <li>3. A majority of minority shareholders has to approve going-private transactions.</li> <li>4. The SSEC/FSC has to evaluate the price in going-private transactions and approve tender offers only if they meet the “fair value” requirements.</li> </ol>

Table 5  
Dilution and Equity Issuance

The dependent variable is minority shareholder dilution. We define a minority shareholder dilution measure as  $(1 - (1 - a_1) / (1 - a_0))$ , where  $a_1$  and  $a_0$  are the fractional ownership by the largest owner before and after an equity issuance, respectively. We define the increase in equity capital as  $EquityInc = i/(1+i)$ , where  $i = (S_1 - S_0)/S_0$  and  $S_1$  and  $S_0$  are the number of shares at the end of year 1 and year 0, respectively. From Equation (21), the regression coefficient on *EquityInc* is our estimate for  $(1-k)$  pre-2002. We define a dummy variable *law2002*, which equals 1 for years 2002 and 2003 and create an interaction term *EquityInc* \* *law2002*. The coefficient on this interaction term is our estimate for the change in  $(1 - k)$  post-2002. The control variables in Model 2 and 3 are  $\alpha_0$  (the pre-offering stake of the largest shareholder), *stateown* (which is fractional state ownership prior to the offering), and *mktcap* (number of pre-offering shares x share price at the end of the pre-offering year, in millions of lev). Shareholder stakes and number of shares are measured at year-end. The regressions include only observations where the number of shares increases by more than 20% from one year to the next and companies that are not majority owned by the state. P-values are in parentheses. Significant results, at .05 or better, are in **boldface**.

	Model 1	Model 2	Model 3
Estimate for $(1 - k)$ pre-2002	<b>1.1637</b> (0.011)	<b>1.0553</b> (0.022)	1.1320 (0.146)
Change in $(1 - k)$ post-2002	<b>-1.1978</b> (0.001)	<b>-1.0110</b> (0.008)	<b>-1.3923</b> (0.013)
Resulting estimate for $(1 - k)$ post-2002	-0.0341 (0.950)	0.0443 (0.934)	-0.2602 (0.762)
Controls:			
$\alpha_0$		<b>-1.1911</b> (0.005)	<b>-1.8176</b> (0.014)
Stateown		-0.0001 (0.988)	0.0016 (0.914)
Mktcap			0.0074 (0.387)
Intercept	-0.5145 (0.078)	0.1262 (0.733)	0.4206 (0.551)
Number of Observations	142	142	87
Prob. F-stat	0.0007	0.0001	0.0043
Adjusted R <sup>2</sup>	0.0867	0.1280	0.1875

Table 6  
Characteristics of Issuing Firms

The dependent variable *Issue* equals 1 if a firm issued 20% or more additional shares pre-2002 and equals 2 if a firm does so post-2002. The independent variables are *Privown* (fractional stake of the largest shareholder prior to the offering), *stateown* (fractional state ownership prior to the offering), and *mktpcap* (number of pre-offering shares x share price at [date], in millions of lev). The largest shareholder stakes and number of shares are measured at year-end. The data on number of shares outstanding and the size of the largest block are obtained from the Bulgarian Central Depository. P-values are in parentheses. Significant results, at .05 or better, are in **boldface** (suppressed for intercept).

	Issue = 1	Issue = 2
<i>Privown</i>	<b>3.1002</b> <b>(0.000)</b>	<b>2.9000</b> <b>(0.000)</b>
<i>Stateown</i>	<b>-0.0559</b> <b>(0.010)</b>	<b>-0.1196</b> <b>(0.003)</b>
<i>Mktpcap</i>	.0050 (0.088)	<b>.0065</b> <b>(0.030)</b>
Intercept	-4.7166 (0.000)	-5.0625 (0.000)
Number of Observations	2057	
Prob. F-stat	0.0000	
Pseudo R2	0.1179	

Table 7  
 Characteristics of Firms Delisting from mid-1998 through end of 2001

This table shows delistings of public Bulgarian firms from May 31, 1998 to December 31, 2001. Sample is all 840 firms listed on the BSE in 1998. Privown is fractional stake of the largest shareholder, stateown is fractional state ownership. Privown, stateown, and number of shares are measured at the end of the year before delisting. The average (median) number of trades for delisted firms is computed using only the years before delisting.

<b>Characteristics</b>	<b>Firms going dark (no trading 3- months before delisting)</b>	<b>Firms frozen-out (at least one trade within 3-months before delisting)</b>	<b>Firms remaining public at end of 2001</b>
Mean (median) privown	43.95% (40.19%)	46.90% (43.67%)	49.89% (47.89%)
Mean (median) stateown	9.12% (6.01%)	8.63% (3.44%)	11.94% (6.55%)
No. of firms with government majority ownership	3	2	19
Mean (median) number of shares (firm size), in thousands	74 (55)	522 (87)	788 (238)
Mean (median) number of trades a year	3.97 (2.00)	21.92 (3.00)	23.75 (6.00)
Number of firms	402	107	331

Table 8  
Examples of Possible Use of Large Wash Trades to Reduce Delisting Price

The examples are identified from the BSE tapes, by finding companies where there are large trades (50+ times daily trading volume) within three months before delisting. The pre-trade price range is taken over the six months before the last trade. The discount  $d_{wash}$  is computed as (weighted average pre-trade price – price of trade)/(weighted average pre trade price). The weight of trade  $v_c$  is computed as (size of trade)/sum(size of all trades during 3 months preceding delisting).

<b>Firm Name</b>	<b>Trade date</b>	<b>Delisting date</b>	<b>Pre-Trade Price Range</b>	<b>Price of large trade</b>	<b>Discount of large trade (<math>d_{wash}</math>)</b>	<b>Weight of large trade (<math>v_c</math>)</b>
Plastimo, AD	4 Apr 2000	5 Jul 2000	5.00-8.00	1.00	0.857	0.663
Preslav –AH, AD	19 May 2000	25 May 2000	2.68-3.51	1.05	0.610	0.945
Sintermat, AD	4-6 Oct 2000	29 Nov 2000	11.99-13.00	2.50	0.790	0.952
Ropotamo, AD	9 Nov 2000	10 Jan 2001	13.66-20.70	1.12	0.943	0.971
Loviko Chirpan, AD	15 Mar 2000	8 Jun 2000	10.00-10.00	4.16	0.584	0.981
Himatech, AD	14 Aug 2001	4 Sep 2001	10.00-10.00	1.10	0.890	0.762
General Ganetzki, AD	1 Oct 2001	15 Dec 2001	4.00-4.00	0.12	0.970	0.938
<b>Average:</b>					<b>0.806</b>	<b>0.887</b>

Table 9  
 Characteristics of Tender Offers before and After 2002 Law Changes

Tender offers are identified using keyword searches in the BSE news archive. The BSE news archive starts identifying tender offers in 2001. We find 33 announcements in the 2001-2002 period. We exclude two announcements that have a missing offer price and two firms with no trades in the three months before the announcement, and one post-law offer in which the final price is revised upwards by over 800%. This reduces the sample to nine freeze-out offers during 2001 (pre-law change) and 19 offers post-law. Market price is the equally weighted average trading price for the three months before the announcement. The premium is computed as (offer price – market price)/(market price). Final offer premium is computed as (revised offer price – market price)/(market price). Similarly Offer Price to Sales is computed as (offer price)/(sales in year before tender offer), while Final Offer Price to Sales is (final offer price)/(sales in year before tender offer). P-values for the hypothesis that the premium is zero are in parentheses. Significant results, at 5% level or better, are in **boldface**.

Characteristics	Before 2002 Law	After 2002 Law	P-value of Difference
Number of tender offers	9	19	
Average premium to market price for initial tender offers	0.1363 (0.233)	<b>0.4059</b> <b>(0.003)</b>	0.162
Median premium to market price for initial offers	0.0382 (0.120)	<b>0.2014</b> <b>(0.003)</b>	0.312
Number of offer prices that are revised upwards	0	9	
Average increase of tender price of revised offers	n.a.	<b>0.4330</b> <b>(0.024)</b>	
Average premium for final offers	0.1363 (0.233)	<b>0.6291</b> <b>(0.000)</b>	<b>0.039</b>
Median premium for final offers	0.0382 (0.120)	<b>0.4526</b> <b>(0.000)</b>	<b>0.030</b>
Average (median) Offer Price to Sales	0.1557 (0.0670)	0.5346 (0.2223)	<b>0.092 (0.025)</b>
Average (median) Final Offer Price to Sales	0.1557 (0.0670)	0.6466(0.2965)	<b>0.097 (0.017)</b>

Table 10  
Regression of P/E Ratios before and after Law Changes

The dependent variable in the regressions is P/E ratio computed as the average stock price for each quarter divided by earnings per share for the previous year. Observations with earnings per share which are negative or less than 0.01 Bulgarian lev are dropped. Only firms with at least one non-missing P/E ratio both before and after the law change are kept. Each regression includes firm fixed effects. The post-law-change dummy in Model 1 (Model 2) equals one for calendar quarters after September 30, 2001 (December 31, 2001) and zero for prior quarters. The post-law-change dummy in Model 3 equals one for calendar quarters after December 31, 2001 and zero for quarters through and including September 30, 2001. We interact the post-law-change dummy with a dummy for private control, (privateown50 (equal to 1 if a firm has a non-government majority owner), and a similar stateown50 dummy (equal to 1 for firms where the government owns a majority stake). The reference group is firms that do not have a majority owner. Model 4 is similar to Model 3 but omits the interaction terms; the coefficient on post-law-change dummy then gives the average post-law increase in P/E ratio for all firms. P-values for the hypothesis that post-law-change dummies are equal to zero are in parentheses. Significant results, at 5% level or better, are in **boldface**.

	Model 1	Model 2	Model 3	Model 4
Post-law-change dummy	1.3247 (0.650)	0.8231 (0.826)	1.2237 (0.655)	<b>5.6341</b> <b>(0.001)</b>
Postlaw*privateown50	<b>7.6129</b> <b>(0.049)</b>	9.0698 (0.060)	<b>8.9458</b> <b>(0.014)</b>	n.a.
Postlaw*stateown50	-4.1634 (0.553)	-3.0859 (0.727)	-3.8578 (0.553)	n.a.
Average P/E when Post-law-change dummy equals 0	7.3341	8.7414	7.2339	7.2339
Number of firm fixed effects	79	62	61	61
Number of Observations	541	458	407	407

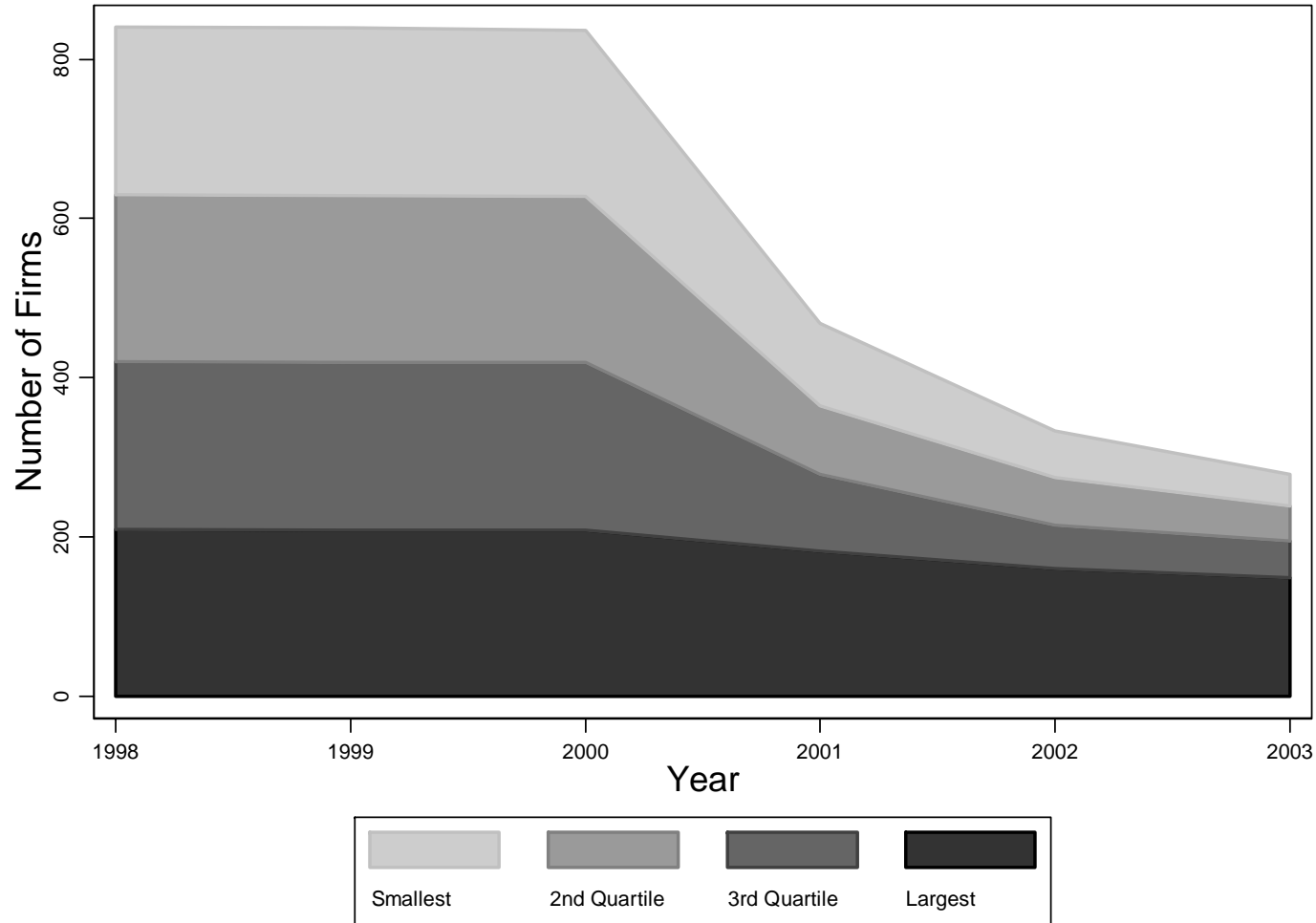


Figure 1. Number of firms listed on the Bulgarian Stock Exchange by Year and Size Quartile

Firm size is measured as book value of equity. The number of firms is measured on December 31 each year.

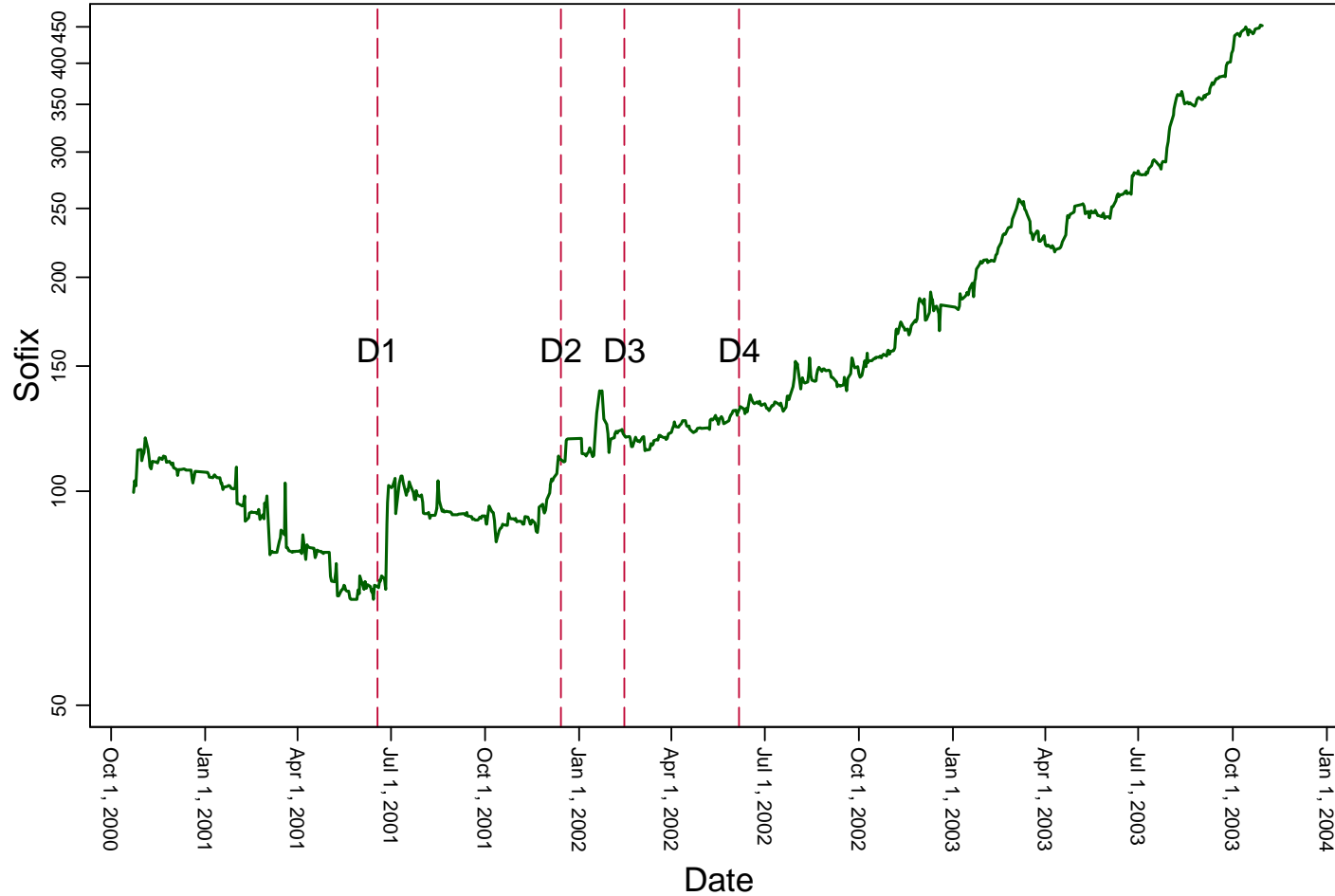


Figure 2. Performance of the Bulgarian Stock Exchange Index SOFIX from October 2000 to October 2003.

To compare percentage changes of similar size, the y-axis is shown in logarithmic scale. The index starts on October 23, 2000 and is set at 100 on this date. We show four relevant dates denoted by D1-D4. D1 equals June 21, 2001, the date of the parliamentary elections when the new government took power. D2 equals December 14, 2001, the date when the government introduced the new changes in the law to Parliament. D3 equals February 14, 2002, the date when the Parliament approved the first draft of the new law. Finally, D4 equals June 6, 2006, the date when the Parliament accepted the final version of the law.

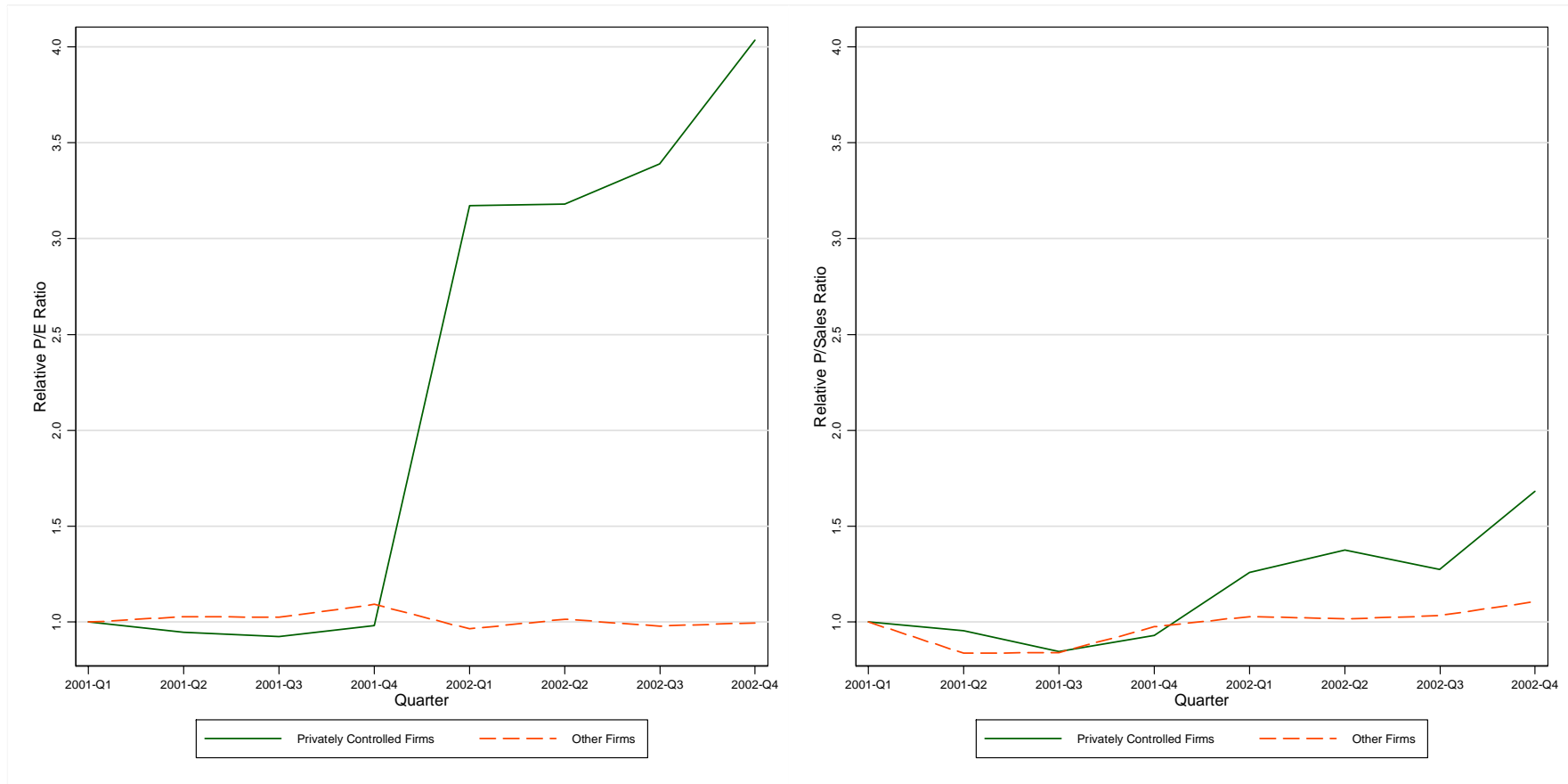


Figure 3. Relative P/E and Price/Sales Ratios during the 2001-2002 Period

Privately controlled firms are firms with a non-government majority shareholder as of [date]. Other firms are firms with a government majority owner or no majority owner. P/E Ratio for each quarter is computed as average stock price over the quarter divided by prior year's earnings, and similarly for price/sales ratios. We select only the firms which have non-missing P/E (Price/Sales) for all eight calendar quarters of 2001-2002. The final sample for the P/E graph consists of 10 privately controlled firms and 7 other firms. The final sample for the price/sales graph consists of 16 majority-owned firms and 12 other firms. The graphs show the average P/E (price/sales) ratio for each group, normalized to 1.0 in the first quarter of 2001