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## Monitoring Managers: Does it Matter?

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Editor: Fausto Panunzi

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### Summary

We test under what circumstances boards discipline managers and whether such interventions improve performance. We exploit exogenous variation due to the staggered adoption of corporate governance laws in formerly Communist countries coupled with detailed ‘hard’ information about the board’s performance expectations and ‘soft’ information about board and CEO actions and the board’s beliefs about CEO competence in 473 mostly private-sector companies backed by private equity funds between 1993 and 2008. We find that CEOs are fired when the company underperforms relative to the board’s expectations, suggesting that boards use performance to update their beliefs. CEOs are especially likely to be fired when evidence has mounted that they are incompetent and when board power has increased following corporate governance reforms. In contrast, CEOs are not fired when performance deteriorates due to factors deemed explicitly to be beyond their control, nor are they fired for making ‘honest mistakes.’ Following forced CEO turnover, companies see performance improvements and their investors are considerably more likely to eventually sell them at a profit.

**Keywords:** Corporate Governance, Large Shareholders, Boards of Directors, CEO Turnover, Legal Reforms, Transition Economies, Private Equity

**JEL Classification:** G34, G24, G32, K22, O16, P21

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## Monitoring Managers: Does it Matter? \* †

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# Monitoring Managers: Does it Matter?

## Abstract

We document how gathering ‘hard’ and ‘soft’ information helps boards of directors to learn a CEO’s ability over time; test under what circumstances boards discipline managers; and show that such interventions lead to improved firm performance. Our empirical design exploits detailed hard information about performance relative to pre-agreed, firm-level targets and soft information reflecting the board’s views of CEO actions, CEO decisions, and CEO competence coupled with plausibly exogenous variation due to the staggered adoption of corporate governance laws in formerly Communist countries. We find that boards act only on signals that are informative about CEO skill: CEOs are fired when a firm underperforms its targets and, especially, when evidence has mounted that they are incompetent, but not when poor performance reflects factors deemed explicitly to be beyond their control or for making ‘honest mistakes.’ The level of CEO turnover increases following corporate governance reforms that increase board power, as does the sensitivity of CEO turnover to soft information relative to that of hard information. Following forced CEO turnover, firms see performance improvements and their investors are considerably more likely to eventually sell them at a profit.

*Key words:* Corporate governance, large shareholders, boards of directors, active monitoring, CEO turnover, legal reforms, transition economies, private equity.

*JEL classification:* G34, G24, G32, K22, O16, P21.

Most growing corporations sooner or later exhaust their internal cash flow and so turn to external sources to fund investment and growth. If potential investors are concerned about either the manager's ability or his motivation, they will insist on corporate governance safeguards to minimize the agency problems that arise once ownership and control are separated (Berle and Means (1932), Jensen and Meckling (1976)). For example, they might demand a sufficiently large ownership stake to make it worth their while to monitor the manager (Stiglitz (1985), Shleifer and Vishny (1986)). And they may demand formal control rights, such as representation on the board of directors, to enable them to monitor and, if necessary, discipline management (see Hermalin and Weisbach (1998) for a formal treatment and Adams, Hermalin, and Weisbach (2008) for a recent survey).

The aim of corporate governance, as Shleifer and Vishny (1997) note, is thus to overcome funding frictions. Much of the academic literature, surveyed in Stein (2003) and Becht, Bolton, and Röell (2003), focuses on frictions due to moral hazard. But Tirole (2001) reminds us not to neglect adverse selection. He defines a good corporate governance structure as "one that selects the most able managers and makes them accountable to investors" (p. 2). This requires what Tirole calls active monitoring. An active monitor is someone with a large stake in the outcome (i.e., a large shareholder), who collects information about the firm's operations or management's ability, and who is in a position to interfere in the running of the firm (say, because he is on the board of directors) to prevent value-decreasing actions and, as a last resort, fire incompetent managers.

In this paper, we ask how well boards discharge their duties to monitor and hold managers to account. Our results suggest that boards monitor managers actively in exactly the way Tirole describes. They collect both 'hard' and 'soft' (i.e., unverifiable) information about the firm's operations and, ultimately, about the CEO's ability. This information then informs the board's decisions. Focusing on CEO dismissal, one of the most important decisions a board can take, we find that CEOs are usually fired when the board has concluded that their skills are a poor fit for the firm's needs. This is consistent with Tirole's view that corporate governance involves learning about the manager's ability. Finally, removing an incompetent CEO leads to a large improvement in performance.

To examine how boards monitor management and under what circumstances they discipline CEOs, we exploit unique data for 473 private-sector companies from Central and Eastern Europe and Central Asia that were funded by 43 private equity funds following the fall of Communism. The managers of these funds, as large shareholders, have board representation. We have access to the information the fund managers and their fellow board members collect and the conclusions they draw from it, and we know what actions the board takes in response to this information. Our data thus allow us to overcome the perennial black-box problem in empirical corporate governance research: While the board may learn the CEO's ability over time through observation, researchers can usually only *infer* the board's beliefs from rare interventions, such as CEO changes; and telling a forced from a voluntary CEO change usually involves guess work since boards rarely announce the true reason a CEO departed.

To establish whether active monitoring in turn improves performance, we exploit a natural experiment that significantly increased board power through staggered legal reforms in the 19 home countries of our sample companies.<sup>1</sup> We need a natural experiment to identify causal effects because we do not observe the counterfactual, that is, what performance would have been had the board not held the CEO to account. Naïvely comparing the performance of firms with interventions to that of those without leads to a selection problem: Boards presumably intervene in firms expected to *otherwise* perform poorly. A naïve comparison would likely pick up unobserved differences in the quality of management or of the firm, and not just the effect of an intervention by the board. In the cross-section, one might even find that firms whose CEOs are fired continue to underperform their peers, but of course such underperformance would not have been caused by the intervention.

Our results show that boards actively monitor CEOs. They update their beliefs about a CEO's ability from both hard information (specifically, how the firm has performed relative to the board's expectations as formally recorded in the annual budget) and soft information (obtained, for example, through interacting with the CEO). Boards then act on their beliefs: Both poor performance relative to budget and – especially – the realization that a CEO is incompetent increase the likelihood of dismissal,

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<sup>1</sup> Staggered law changes are widely used as an instrument in empirical research. For an example that exploits variation in the adoption of anti-takeover legislation across U.S. states, see Bertrand and Mullainathan (2003).

usually quite rapidly. As legal reforms shift the power to dismiss the CEO from the annual shareholders' meeting to the board, board decisions increasingly rely on soft rather than hard information. The importance of soft information for board decisions has not previously been recognized in the economics literature, which instead has studied soft information in the context of financial transactions (especially lending decisions) and the scope of the firm; see Petersen (2004) for a review.<sup>2</sup>

By contrast, boards take no action in response to observations that are uninformative about the CEO's ability: CEOs are not fired if, in the board's view, poor performance was the result of bad luck or of a managerial decision that was wrong *ex post* but reasonable *ex ante*. This is consistent with Tirole's (2006) view that "active monitoring is *forward looking* and analyzes the firm's past actions only to the extent that they can still be altered to raise firm value or that they convey information (say, about the ability of current management) on which one can act to improve the firm's prospects" (p. 27). We also find little evidence that CEOs engage in moral-hazard behavior such as shirking (Holmström (1979)), 'enjoying the quiet life' (Bertrand and Mullainathan (2003)), or building empires (Baumol (1959)) – perhaps because private equity funds tend to give CEOs sufficiently strong incentive contracts – and none that boards fire CEOs in response.

There is a large literature on the role of firing in dynamic agency models. In the interest of brevity, we place our results in the context of the canonical adverse selection and moral hazard models. We interpret our findings to suggest that active monitoring by the board largely serves to solve an adverse selection problem, at least in private equity settings such as ours. When a CEO is hired, his true ability and the match between his skills and the firm's needs are not perfectly known. Over time, the board collects information and, once it has learnt his true ability, takes corrective action if necessary. This view of the board's role echoes models of learning and worker turnover in labor economics, such as Harris and Holmström (1982) and Jovanovic (1979).<sup>3</sup> It contrasts with the received view in much of the

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<sup>2</sup> Our paper is complementary to Kaplan, Klebanov, and Sørensen (2008) who ask what *ex ante* observable (and possibly verifiable) characteristics boards look at when hiring a CEO and whether these characteristics correlate with subsequent performance. In contrast, we take hiring as given and ask whether monitoring enables boards to learn about CEO characteristics that were *not* observable *ex ante*.

<sup>3</sup> Taylor (2010) develops a dynamic model of CEO turnover that is consistent with this view and with our empirical results.

corporate governance literature, which, as Tirole (2001) notes, has mainly focused on moral hazard problems rather than CEO ability.<sup>4</sup> Our finding that CEOs are fired for incompetence rather than moral-hazard behavior (which anyway appears to be rare in our data) confirms that adverse selection plays an important part in corporate governance, precisely as Tirole (2001) argued.

Does intervention by the board improve performance? When we naïvely relate performance to CEO turnover, we fail to find evidence of performance improvements. If anything, subsequent performance is worse. This reflects the selection bias discussed earlier. To solve this identification problem, we exploit a natural experiment that occurred as a result of the transition from centrally-planned to market economies after the fall of the Soviet Union: Since 1991, many transition economies have replaced Soviet-era with Western-style corporate law, in the process strengthening the powers of the board relative to the CEO. We use the staggered adoption of corporate governance reforms across the 19 countries in our sample as an instrument for board intervention. Note that our focus on transition economies greatly improves identification. Unlike developed countries such as the U.S., which experience relatively little variation in corporate governance rules over time, transition economies experienced dramatic variation in the laws governing board actions.<sup>5</sup>

Our identification strategy assumes that boards are more likely to intervene after the adoption of a law empowering the board to dismiss the CEO than before. The data support this assumption: CEO dismissals increase substantially, from around 3% to more than 13% a year, when the law changes. Identification also requires that changes in board power affect performance only through their effect on CEO dismissals. A leading concern is that greater board power makes it harder for CEOs to get away with moral-hazard behavior such as shirking. The law changes might thus induce better performance directly, as CEOs react to an increased threat of being fired, violating the exclusion restriction for identification. However, this seems unlikely. As discussed, our results indicate that boards fire CEOs for being incompetent, not for behavior that could be altered through better incentives, and boards rarely

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<sup>4</sup> Hermalin and Weisbach (1998) and Dominguez-Martinez, Swank, and Visser (2008) are notable exceptions.

<sup>5</sup> In other words, we exploit variation along the extensive margin as transition economies adopt corporate governance laws for the first time. In developed countries, by contrast, empirical work necessarily focuses on variation along the intensive margin. The 2002 Sarbanes-Oxley Act, for example, increased U.S. boards' already considerable powers a little further.



complain about moral-hazard behavior. Moreover, we show that performance improves when the law is enacted, not when it is first mooted, which is inconsistent with a moral hazard story. Nor do our data support several other potential violations of the exclusion restriction, including concerns that the reforms may have coincided with other country-level shocks that in turn affected performance, lobbying and other reverse-causality stories, or the idea that reform affected performance through channels other than the removal of low-quality CEOs.

Once we use the natural experiment, the effect of board intervention on performance flips sign and becomes positive. The point estimates are not only statistically significant, they are also economically large. To illustrate, firing the CEO nearly doubles the probability that a sample firm will be successful on one performance measure and on another helps a firm move from underperforming the board's expectations to beating its targets the following year. Not firing a CEO the board has come to view as incompetent, on the other hand, hurts subsequent performance.

A natural limitation of our performance analysis is that we cannot say whether and to what extent our performance results generalize to developed countries. Similarly, the nature of our data is such that the results may only pertain to firms with large, sophisticated shareholders, such as the private equity funds in our sample. Moreover, private equity funds may target firms that benefit especially from active monitoring. Thus, we cannot say whether firms with more dispersed ownership, or those with a majority of independent directors who may only nominally be accountable to shareholders (see Kumar and Sivaramakrishnan (2008)), would experience similar performance improvements.

This paper contributes to the economic literatures on corporate governance, boards, law and finance, venture capital, and economic development. Our results illustrate that active monitoring matters, in the sense that it helps boards learn a CEO's ability, rather than relying solely on easily observable but noisy output measures such as accounting performance as the contracting literature tends to assume. While there are many papers that analyze the determinants of CEO turnover, we believe we are the first to have access to the soft information directors collect, which turns out to be the most important correlate of CEO turnover in our data.

In contrast to the existing literature on boards, which largely focuses on what boards look like and how board characteristics such as size or independence correlate with performance or firm value, we focus on the information boards collect, what they learn from it, and what actions they take in response. We also ask whether these actions have a causal and beneficial impact on performance and find that they do. This novel result suggests that CEO dismissal is a valuable monitoring mechanism.

Moreover, performance improves dramatically when boards are given the legal power to discipline the CEO. This suggests that a legal framework that supports boards can make active monitoring more effective and echoes the result from the law and finance literature that shareholder-friendly laws are associated with more vigorous corporate activity (see, for example, La Porta, Lopez-de-Silanes, and Shleifer (2008)). However, while the law and finance literature has mainly made its point through cross-country comparisons, we can exploit within-country variation to identify the channel more directly.

Unlike us, much of the VC literature focuses on the positive side of monitoring. Bottazzi, Da Rin, and Hellmann (2008), for example, show that VCs improve the performance of their portfolio firms by helping to recruit board members or arranging follow-on funding. Hellmann and Puri (2000, 2002) and Acharya, Hahn, and Kehoe (2008) provide related evidence. Kortum and Lerner (2000) study VCs' beneficial effect on innovation, addressing causality concerns using a 1979 policy change that made it easier for pension funds to invest in venture capital. We add to this literature by focusing on the *disciplinary* role of boards, which is the focus of much of the corporate governance literature.

Finally, the development literature has demonstrated the importance of the rule of law and institutions for a country's macroeconomic growth. We provide parallel microeconomic evidence by showing that corporate governance laws can have a strong influence on corporate performance, at least in the presence of sophisticated investors such as the private equity funds in our dataset.

## **1. Sample and Data**

Our data come from the European Bank for Reconstruction and Development (EBRD). The EBRD was established to assist formerly Communist countries in transitioning to a market economy. As a part of this mission, the EBRD has sought to foster the emergence of a commercial private equity industry. It

has done so by investing in private-sector investment partnerships with standard profit-maximizing objectives. These differ from those studied in the venture capital literature only in having a regional focus on transition economies. The following fund description, taken from our sample, illustrates:

*“[The fund] provides capital for private, medium-sized companies with strong prospects for growth and profitability. Specifically, the fund will target companies that have: (i) a leading or prominent position within their industry, (ii) a good management team, [and] (iii) a large and growing market for their products and services.”*

We have detailed data for all 43 funds the EBRD invested in, which in turn made (mostly minority) investments in 473 private-sector firms across 19 transition economies in Central and Eastern Europe and the former Soviet republics in Central Asia. We estimate that the 43 funds account for around two-thirds of all private equity funds that focused on transition economies over our sample period.<sup>6</sup> The data we use in this paper were originally gathered for a special EBRD report on its private equity program.<sup>7</sup> The EBRD also publishes a detailed annual analysis of the program on its website.<sup>8</sup>

Sample funds were raised between 1992 and 2004 and range in size from €15.3 million to €300.8 million, with an average of €93.1 million – comparable to VC funds in the U.S. (see Hochberg, Ljungqvist, and Lu (2007)). Thirty-three funds were sponsored by experienced Western fund managers, mostly from the U.S. and U.K.; the remaining 10 were sponsored by Western-trained local managers.

The earliest portfolio investment dates from 1993. We ignore investments made after 2005 as it is too soon to measure their performance. Table 1 describes the sample. The five most active countries are Poland (with 171 investments), Russia (75), Hungary (59), the Czech Republic (44), and Romania (30). Nine countries – Azerbaijan, Georgia, Kazakhstan, Latvia, Moldova, Serbia-Montenegro, Slovenia, Turkmenistan, and the Ukraine – are home to fewer than 10 investments each. Across all countries, the number of deals increases from 14 in 1993 to 59 in 2000 and then falls to 20 in 2005.

Unlike most studies using VC data, we have detailed information on the status of each portfolio firm. This allows us to follow each deal from inception to the earlier of ‘exit’ or December 2008, when our data end. Of the 473 deals, 319 (67.4%) were exited (i.e., sold to a strategic acquirer or through an

<sup>6</sup> The EBRD invested in almost all funds meeting the minimum due-diligence requirements established by a firm of investment consultants, Cambridge Associates, alleviating sample selection concerns. For an overview of these requirements, see [http://www.ifc.org/ifcext/cfn.nsf/AttachmentsByTitle/Patricia+Dinneen/\\$FILE/Panel4-PatriciaDinneen.pdf](http://www.ifc.org/ifcext/cfn.nsf/AttachmentsByTitle/Patricia+Dinneen/$FILE/Panel4-PatriciaDinneen.pdf).

<sup>7</sup> See <http://www.ebrd.com/pubs/econo/6813.htm> for the special report.

<sup>8</sup> See <http://www.ebrd.com/country/sector/fi/funds/perf.08.pdf> for the most recent data and statistics

initial public offering, or IPO), 95 (20.1%) were written off, and 59 (12.5%) remained in the funds' portfolios as of 2008. Tracking each investment across time gives us an unbalanced panel of 2,616 firm-years. Accounting for the right-censoring caused by the 59 investments that remain alive as of 2008, the average (median) firm spends 5.5 (5) years in a sample fund's portfolio before being exited or written off. This is comparable to holding periods in U.S. VC funds (see Gompers (1995)).

Our data include precisely dated cash flows to and from portfolio firms, including the fund's initial (and any subsequent) investment, dividends, and the proceeds (if any) from the firm's IPO, sale, or liquidation. This allows us to compute the lifetime profitability of each investment. We measure profitability using a deal's internal rate of return (IRR, calculated as the time-weighted return on the investment before the fees a fund charges its investors). Across the 473 deals, IRRs average 7.5% and 14.7% on an equal-weighted and value-weighted basis, respectively.

Sample investments come from a wide range of industries. The EBRD classifies firms into 11 industries: Telecoms and media (90 firms), manufacturing (71), high-tech, electronics, and internet (69), services, hotels, and restaurants (57), retail (51), food & beverages (49), construction (27), oil, gas, and mining (20), financial services (18), pharmaceuticals and medical (16), and energy (5).

Normally, the information fund managers collect about their portfolio firms is confidential and would not be available to researchers. Luckily for us, the EBRD 'audits' each fund manager's portfolio firms twice a year. These audits result in candid, confidential, and standardized 'monitoring reports' to which we have been given unrestricted access. Audits involve EBRD staff summarizing detailed information about each portfolio firm's performance, material events, board decisions, etc. The information comes from the quarterly reports fund manager send to their investors; interviews with fund managers, other directors, and portfolio-firm CEOs; the confidential notes of the funds' representatives on portfolio-firm boards; audited and internal financial statements; and site visits.<sup>9</sup> As we will describe, monitoring reports contain both 'hard' information, such as accounting data, and 'soft' information concerning key developments, CEO competence, etc. It is important to note that monitoring reports are

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<sup>9</sup> In most funds, the EBRD has a representative on the fund's advisory board.

written by the EBRD, and not by the fund managers, and that they are aimed exclusively at an internal audience at the EBRD. There is thus no reason for the reports to be deliberately biased.<sup>10</sup>

Funds typically buy minority stakes. Their average (median) equity stake is 33.7% (26%), and 372 of the 473 deals (78.6%) are minority investments.<sup>11</sup> Data on CEO ownership or their incentive contracts are not systematically available, nor do we have data on board composition or the number of board seats a fund manager controls (though material *changes* in these variables are routinely noted in the monitoring reports). Thus, in contrast to extant work on boards, we do not know what the board looks like. Uniquely, however, we have good data on what the board knows and what actions it takes.

## 2. An Empirical Model of Active Monitoring

Our empirical analysis proceeds in three steps. First, we model the evolution of the board's views about the CEO's competence to see what kinds of signals, events, and managerial decisions lead to beliefs being updated. Next, we estimate the conditions under which the board intervenes in a firm by firing the CEO. For this, we relate intervention in year  $t$  to the hard and soft information the board has collected as of  $t-1$  (denoted  $I_{t-1}$ ), controlling for other exogenous variables,  $x$ :

$$\text{intervention}_t = \gamma_1' I_{t-1} + \delta_1' x_{1,t-1} + \varphi_1' (\lambda_k + \lambda_t + \lambda_j) + u_{1,t} \quad (1)$$

The lambdas capture fixed effects for country  $k$ , year  $t$ , and industry  $j$ . Since we have a panel, we can also estimate equation (1) with portfolio-firm effects. These help control possible omitted-variable biases due to unobserved firm heterogeneity, caused for example by our lack of data on the CEO's ownership or compensation or the board's quality or composition. To the extent that such omitted variables are constant over time (e.g., the CEO owns a majority of the equity in every panel year), they can be removed using firm effects. As we will see, their inclusion makes little difference in practice.

Finally, we estimate the effect board intervention has on the firm's subsequent performance:

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<sup>10</sup> While the monitoring reports are standardized, the EBRD reviewers vary in the level of detail they record. As long as assignments of firms to reviewers do not correlate with performance, this generates noise, not bias. This appears to be so. Each reviewer is assigned a group of funds (rather than a subset of a particular fund's investments, say the underperforming ones), and the main assignment criterion is that, if possible, she speak the language of the country the fund invests in.

<sup>11</sup> We do not attempt to model the determinants of fund managers' investment strategies or the causal effects of ownership on performance. Ownership is endogenous, likely reflecting in part firm characteristics that we do not observe. Thus, to identify the causal effects of ownership on performance would require another instrument.

$$performance_t = \beta_2 intervention_t + \gamma_2' I_{t-1} + \delta_2' x_{2,t-1} + \varphi_2' (\lambda_k + \lambda_t + \lambda_j) + u_{2,t} \quad (2)$$

In contrast to equation (1), equation (2) poses a tricky identification challenge. Presumably, the intervention treatment is not administered randomly but reflects the board's information set and beliefs. Boards likely intervene when firms are badly managed (in ways that are not necessarily observed by the econometrician) or are expected to otherwise perform poorly, and such firms might well underperform better-managed (i.e., untreated) firms in future, even if they subsequently perform better than they would have done absent the treatment. Unless we have perfect controls for management quality and expected performance, the disturbances of equations (1) and (2) will be negatively correlated, so a naïve regression of performance on intervention will yield a downward-biased estimate of  $\beta_2$ . To ensure identification of  $\beta_2$ , we require an instrument, i.e., a variable that affects intervention but not subsequent performance.<sup>12</sup>

### 2.1 Instrument

Our instrument exploits plausibly exogenous variation in the timing of the introduction of laws governing the relationship between the CEO and the board in transition economies. The identifying assumption is that a CEO is more likely to be fired after the adoption of a law empowering the board to dismiss management without a shareholder vote than before. The exclusion restriction requires that the law change affect performance only via board intervention. We investigate the validity of the instrument in Section 4.2 and the plausibility of the exclusion restriction in Sections 5.7 and 5.8.

Since we focus on transition economies, the legal change we exploit is not a subtle one. The notions that the CEO serves at the pleasure of the board and that the board's role is to monitor the CEO do not exist in Soviet-era laws. Reviewing Azerbaijan, for example, the World Bank (2005) commented that:

*“There are no detailed guidelines for the roles, responsibilities, operation, qualifications or structure of supervisory boards. In practice, boards tend to be dominated by the controlling shareholder, have not assumed an independent oversight function, and are considered to play a relatively minor role in providing strategic guidance for corporations. Regular supervisory board meetings are not held in most companies.”*

Table 2 provides an overview of the relevant introductions of corporate governance laws and lists

<sup>12</sup> Lack of data on non-sample firms rules out weaker identification strategies, such as propensity-score matching. While we have unique and detailed data on sample firms, we lack even rudimentary data on firms outside our sample. The one database tracking unlisted European firms, Amadeus, suffers from a severe form of survivorship bias because the historical data of dead firms are eliminated from the database. See Popov and Roosenboom (2009) for further details.

the source texts we consulted. All but one of our sample countries – the aforementioned Azerbaijan – enacted corporate governance laws. These come in two forms. Boards can either be given statutory power to dismiss the CEO without a shareholder vote or the law can permit the shareholders' meeting to delegate its power to dismiss the CEO to the board through an amendment to the corporate charter.

Our instrument is based solely on reforms that increase the board's statutory power. This is the type of reform adopted in 13 of the 19 sample countries, accounting for 351 of the 473 sample firms. The reason we exclude reforms requiring a charter amendment from the instrument is as follows. To dismiss the CEO pre-reform, a sample fund needs a majority of the votes in the annual shareholders' meeting. To change the charter post-reform, it likewise needs a majority of the votes in the shareholders' meeting. Thus, reforms that require a charter amendment do not affect the distribution of power within the firm and so are unlikely to have an effect on forced CEO turnover. We test this prediction in Section 4.2.

When we follow a given firm over time, we expect the likelihood of intervention to jump once the country it is incorporated in strengthens the board's powers, all else equal. Figure 1 suggests that it does. It shows the annual rate of CEO turnover relative to the year boards in the country in question gained the statutory power to dismiss CEOs. In the five years prior to reform, CEO turnover is low: CEOs are fired on average in only 3.2% of firm-years. In the year the corporate governance law comes into force, CEO turnover jumps to 13.3% and then stays on average at 8.2% a year for the next several years.

## *2.2 Further Testable Implications*

Before reform, the power to dismiss a CEO rests with the shareholders' meeting. Reform thus redistributes power from the shareholders' meeting to the board. The following examples, taken from the EBRD's monitoring reports of two different Polish companies, illustrate:

*Pre-law change: "The fund manager's efforts to [dismiss management] were unsuccessful so far, as other shareholders rejected the Fund's motion in this respect put forward at the Shareholders Meeting."*

*Post-law change: "[The fund manager] continues to be disappointed with ... management, but has been unable to convince a sufficient number of the Directors of the Company to replace them. [The fund manager] has made its displeasure of managerial and financial issues known to the Company ... [and] has put the entire Board ... on notice as to certain issues that [the fund manager] believe[s] would give cause for the Board to remove the CEO."*

A testable implication of power shifting to the board is that the importance of soft information in

CEO firing decisions might increase following reform, compared to that of hard information. This will be the case if soft information, which is unverifiable by definition, is more difficult to communicate persuasively to shareholders at large than to fellow board members – who after all have first-hand experience of dealing with the CEO. Hard, verifiable information, on the other hand, could be equally effective with either audience. We thus expect CEO turnover to become more sensitive to soft information, relative to hard information, following governance reform. This will, of course, be true only to the extent that shareholders and board directors do not overlap perfectly.

Furthermore, soft information should become more important after a law change *only if* the fund is a minority shareholder. A majority shareholder can fire a CEO at will, so changes in the board’s statutory powers should not affect whether a CEO is fired in response to negative soft information.

### **3. Variable Definitions and Descriptive Statistics**

#### *3.1 Board Intervention Measures*

Unlike the extant CEO turnover literature, we are able to distinguish unambiguously between voluntary and forced departures. Here are examples of each:

*Voluntary: “The general manager of four years, who was deemed highly capable ..., has left and a replacement has just been hired.”*

*Forced: “At the year end the board of the company decided to change the CEO.”*

It is clear from the EBRD’s monitoring reports that boards typically complain of management problems some time before firing, rather than after the fact. For example:

*“The relationship with the company’s Managing Director ... remains difficult. [He] is unable to adjust to the needs and opportunities now arising ... Going forward, [he] would need to be replaced as a General Manager.”*

*“It has been agreed that [the CEO] would have to leave in the near future. [He] has disappointed with his lack of leadership, exaggerated and biased involvement in ... debates ... and overall lack of discipline and political skill.”*

Our data contain 178 forced CEO departures. Only 42 of these (24%) occurred prior to governance reform (see Table 2). The average (median) CEO dismissal takes place 3.4 (3) years after a fund first invested in a firm. Most firms (330) see no forced CEO turnover; those that do typically fire only one CEO over the sample period (116 firms), though some fire two (19 firms) or three (eight firms). Taking voluntary CEO departures into account, the sample contains 659 separate CEOs. The monitoring reports



also record 169 dismissals of managers below the rank of CEO and 201 cases of boards authorizing the hiring of additional managers (so called ‘management strengthening’).

### *3.2 Hard Information: Board Performance Expectations*

Our data allow us to measure each firm’s performance relative to a good proxy for the board’s expectations. Each fiscal year, the board and the CEO agree a formal budget for the year ahead which contains sales and profit targets as well as strategic and investment plans. At the end of the fiscal year, the monitoring reports record how the firm has performed relative to budget. Both budgeted and actual performance are verifiable by outside parties, such as shareholders or a court, and thus constitute hard information. We are not aware of similar data having been used in prior research. Instead, researchers either do not benchmark performance at all or they benchmark it against an industry average.

EBRD reviewers have access to both budgets and audited accounts when preparing their monitoring reports, but they make explicit reference to both budgeted and realized accounting numbers in only a quarter of firm-years. Fortunately, in around 80% of firm-years, the monitoring reports provide enough information to allow us to score portfolio firms’ performance relative to budget on a coarse five-point scale, where a 3 denotes performance in line with expectations (“making budget”); 4 and 5 denote performance above and greatly above budget; and 2 and 1 denote underperformance and severe underperformance relative to budget. Here is an example of performance that we score as a 2:

*“Sales were 9% below budget; EBITDA was negative as opposed to US\$2.8m budgeted profit.”*

Performance scores average 2.8 and are distributed fairly normally: 9.5% of investments score a 1, 33.4% a 2, 31.2% a 3, 20.7% a 4, and 5.2% score a 5. This distribution suggests that boards have realistic, achievable expectations which in turn form a suitable benchmark against which we can judge a firm’s performance. The following quote illustrates that boards do indeed aim for realistic budgets:

*“The budgeted numbers prepared by management for ... 2004 are sales of \$242 million and EBITDA of \$32 million. [H]owever, the ... budget was challenged by the Board ... and not approved due to concerns [about] how achievable these targets are. Currently management is reworking the operational budget for 2004.”*

### *3.3 Soft Information*

The EBRD monitoring reports contain a wealth of other textual information. Of particular interest

are fund managers' and other directors' confidential comments regarding the CEO's ability and their views of what, if anything, may have caused a firm to underperform. Unlike accounting data, these comments are potentially difficult to verify (say, in the annual shareholders' meeting or in court) and so constitute soft information. We use three time-varying indicators to capture different types of soft information. The first equals one if in a given year directors view the CEO as incompetent or think that his skills are a poor match for the firm's needs, and zero otherwise. Representative examples include:

*Competence: "The top management team is strong."*

*Incompetence: "It is now evident that the CEO lacks sufficient skills in some areas and we are searching for a suitable candidate to complement the current CEO in the senior management team."*

*Incompetence: "Given the more competitive environment on the Polish post-[EU] Accession market, the Fund Manager sees the need for a more efficient sales and marketing strategy. The CEO is being replaced with someone more competent in these areas effective January 1, 2006."*

On average, CEOs are viewed as incompetent or a poor match in 6.7% of firm-years. In total, boards complain about the competence of 132 of the 659 CEOs in the sample (20%). Of these, 82 (62.1%) are eventually fired and 17 (12.0%) lead their firms into bankruptcy. The remaining 33 are not fired within our sample period, perhaps because the board lacked the statutory power to do so (15 cases) or, presumably, because the fund manager couldn't muster the necessary number of votes.

Does this proxy correlate with true ability, or do directors express their concerns to the EBRD only when they have already decided to fire a CEO? If concerns were voiced strategically, we might expect to see more complaints once board power has increased. Figure 2 shows that this is not so. It graphs the annual rate of directors rating a CEO as incompetent, with time measured relative to the year in which the country in question adopted its corporate governance law. Boards complain just as frequently after a law change as before (namely, 7% of the time), suggesting that directors express their views of CEO competence whether or not they have the statutory power to act on them. It also suggests that by the time the law has changed, there is pent-up pressure to fire CEOs, consistent with the jump in CEO turnover we saw in Figure 1. This, of course, is the identifying assumption behind our instrument.

Our second soft-information indicator captures cases in which directors are critical of a CEO's specific actions or decisions which, in their view, caused the firm to underperform. These complaints

span the spectrum from what might be called honest mistakes to traditional moral-hazard behavior.

Honest mistakes are by far the most common complaint. The following two examples illustrate:

*“Management made a serious mistake and signed FX options to hedge against the strengthening PLN [Polish zloty] shortly before the currency substantially weakened.”*

*“[This food manufacturer] had a bad year and will end 2003 below both last year’s exceptionally good performance and this year’s budget. The company allocated insufficient funds for marketing and sales support, focusing instead on better management of the existing freezer network through a team of temporary merchandisers. This proved a flawed strategy.”*

Even with the most expansive interpretation of what constitutes moral hazard, complaints about moral hazard are quite rare relative to the sample size of 2,616 firm-years. Exercising some judgment, we group such complaints into the following four categories familiar from the moral-hazard literature:

*Enjoying the quiet life (12 firms): “Management was unable to control wages and salaries which were 8% higher than in the first half of 98, despite the fact that the employment was reduced by approx. 20% in 4Qtr 98.”*

*Shirking (7 firms): “The CEO has not been properly managing the business.”*

*Self-dealing (7 firms): “... management was discovered to produce false invoices to inflate the 1997 results.”*

*Empire-building (1 firm): “The company made four acquisitions in 1998 with one additional acquisition in 1Q99. The fund admits it gave [the CEO] excessive free-hand in the acquisitions.”*

The small number of complaints about moral hazard suggests that CEO compensation contracts and board monitoring are, on the whole, effective at controlling moral hazard problems. Given our private equity setting, this is in fact not surprising. In private equity, management’s and investors’ interests are relatively well aligned: Everyone gets rich only if the investment can be successful sold.

Our third soft-information indicator captures 326 cases in which, in the board’s opinion, underperformance was caused by factors beyond management’s control (‘bad luck’). For example:

*“On 10 September the finished goods warehouse ... caught fire. The fire completely destroyed the company’s warehouses as well as the main [production] facility.”*

### 3.4 Deal Characteristics

Converted at historical exchange rates, average and median investment sizes are €6.1 million and €4.1 million, respectively, comparable to VC investments in the U.S. The largest deal is €43.4 million. The average and median ‘post-money’ valuations (i.e., deal size divided by equity stake) are €65.7 million and €15.7 million, respectively. Most investments finance expansion at private-sector firms (255 out of 473) or go into start-ups (124 deals). Privatizations are rare in our sample, accounting for only 40

of the 473 portfolio firms. Our sample is thus quite different from the types of firms studied in the transition-economics literature (see Djankov and Murrell (2002) and references therein).

Riskier firms likely require more intervention and have systematically different performance. Traditional risk proxies (such as the volatility of equity returns or operating cash flows) cannot be computed as few sample firms are stock-market listed and accounting data is patchy. Instead, we (crudely) proxy for risk based on the fund's investment approach. Specifically, we code whether the fund 'staged' a deal, that is, whether the fund intended *ex ante* to make continued funding dependent on the firm's subsequent performance (as opposed to providing the entire funding upfront). Gompers (1995) argues that VCs stage investments to maintain the option to discontinue funding if performance disappoints. This option is more valuable, the riskier the firm. Of the 473 investments, 125 were staged.

### *3.5 Macroeconomic Conditions and Reform Progress*

To remove confounding influences that are contemporaneous with the instrument, we control for macroeconomic conditions and reform progress using real GDP growth and the EBRD transition indicator.<sup>13,14</sup> The latter measures progress towards a market economy in a range of categories, such as restructuring, securities markets, banking reform, and competition policy. It varies from 1 (centrally planned economy) to 4.33 (fully functioning market economy) and is updated annually.

## **4. Determinants of Board Interventions**

In this section, we show that boards monitor CEOs actively by modeling the evolution of a board's view of the CEO's ability. We then show that boards act on the information they collect by modeling the determinants of CEO dismissals. Finally, we examine the plausibility of our instrument by modeling the firing of a junior manager (anyone below the rank of CEO) as well as actions designed to strengthen the management team through new hiring. Governance reform is not a necessary condition for firing junior managers or new hiring, so we expect the instrument to have no effect on these types of intervention.

We relate intervention at  $t$  to the board's information set as of  $t-1$ , consisting of hard information

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<sup>13</sup> The data are available at <http://www.ebrd.com/country/sector/econo/stats/sei.xls> and [.../sci.xls](http://www.ebrd.com/country/sector/econo/stats/sci.xls), accessed February 2009.

<sup>14</sup> Our results are robust to using a set of crisis indicators along the lines of Frankel and Rose (1996) or using the Hodrick-Prescott (1997) filter to isolate business cycles from GDP data.

(i.e., performance relative to budget) and soft information (i.e., the board's view of CEO competence, CEO decisions, and bad luck). We control for deal characteristics, lagged macroeconomic conditions, other country-level reforms, a limited set of country effects,<sup>15</sup> and a full set of year and industry effects. We also include the instrument which equals one if, at the beginning of year  $t$ , there is a law in place empowering the board to dismiss the CEO, and zero otherwise. (We will explore other timing conventions later.) Given the binary nature of the dependent variable, we estimate probits. Linear probability models are reported in the Internet Appendix. Recall that we track each investment in an annual panel from inception to the earlier of exit, write-off, or December 2008. As a result, the disturbances may be correlated within firm, so our baseline models cluster the standard errors at the firm level.<sup>16</sup> In Section 4.2, we validate the key significance levels using bootstrapped Placebo regressions.

#### 4.1 Results

Table 3 reports the results. Column 1 first asks what prompts a board to complain about CEO incompetence and shows evidence of learning. Boards update their beliefs based on hard information in the form of prior-year performance relative to plan, but not in response to specific managerial decisions that amount to honest mistakes, and they discount bad luck. This fits Tirole's (2006) view that boards use past information in a forward-looking way, ignoring signals that are uninformative about the CEO's likely future performance. Importantly, complaints about incompetence are persistent: A board is four times more likely to complain about the CEO's incompetence if it complained about it in the previous year ( $p=0.001$ ). Given the relatively low pseudo- $R^2$  of 13%, boards clearly update partly based on soft-information signals that we as econometricians do not observe, such as their interactions with the CEO.<sup>17</sup>

Columns 2 to 7 report CEO dismissal models. Soft information about CEO competence is by far the strongest determinant of CEO firing. The point estimate in column 2 suggests that boards are 27.8

<sup>15</sup> As Table 1 makes clear, a full set of country dummies would over-determine our equations. Instead, we control for the five most active countries. Our results are not sensitive to reasonable alternatives.

<sup>16</sup> We could ignore within-firm correlations and instead cluster at the country level, to capture serial correlation within countries. As the alternative specifications reported in the Internet Appendix show, this has no material effect on inference.

<sup>17</sup> We find no significant change in complaints about CEO competence after corporate governance reform. This mirrors the non-parametric results of Figure 2 and supports our claim that such complaints are not reported to the EBRD strategically.

percentage points, or 408%, more likely to remove CEOs they have come to view as incompetent than if they did not complain about the CEO's competence in the previous year.<sup>18</sup> The  $t$ -statistic is 9.52 clustered by firm and 7.49 clustered by country. This provides novel evidence that boards act on the soft information that forms the basis of their beliefs about CEO type.<sup>19</sup> Moreover, they appear to do so in a considered way: The next two coefficients in column 2 suggest that boards do *not* fire a CEO if they attributed the previous year's poor performance to bad luck or to honest mistakes. The absence of sanctions for making mistakes suggests that boards, on average, avoid punishing CEOs ex post for decisions that were reasonable ex ante.<sup>20</sup> Virtually identical results obtain when we include portfolio-firm effects, which are in fact not statistically significant ( $p=0.192$ ; see column 3).

Boards also react to hard information, though the effect is smaller economically than that of soft information. Specifically, a unit drop in lagged performance (say, from making budget to missing budget) increases the probability of CEO dismissal by 12.9 percentage points, or 189%, from the unconditional probability of 6.8%. The  $t$ -statistic is -6.24. Further performance lags (not tabulated) are not significant, suggesting that boards take disciplinary action quickly. That CEO dismissal is sensitive to hard information is not new, though ours is the first set of results based on the board's expectations.<sup>21</sup>

To see if soft and hard information capture distinct signals, column 4 asks whether CEO turnover is sensitive to soft information about CEO competence even among firms that evidently perform well according to hard information. For this purpose, we partition the sample by prior-year performance. We find that the incompetence indicator predicts CEO dismissal even among firms that make or beat budget ( $p<0.001$ ). Thus, soft and hard information appear to capture distinct signals.

Recall that some board complaints about specific CEO actions relate to behavior that could be

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<sup>18</sup> Recall that the soft information proxies are lagged by one year. Our results thus suggest that boards act this year on beliefs they formed last year, rather than merely reporting negative opinions to the EBRD this year to justify their current actions.

<sup>19</sup> This is consistent with Taylor's (2010) dynamic model of CEO turnover which stresses the importance of boards basing their decisions on what they have learnt about the CEO's ability.

<sup>20</sup> Jenter and Kanaan (2008) and Kaplan and Minton (2006) document that CEOs at large U.S. firms are punished for industry shocks. While we have no data on industry shocks, CEOs in our sample are *not* fired for bad performance caused by events beyond their control. Neither do we find that CEO turnover increases after macroeconomic shocks.

<sup>21</sup> For related findings, see Coughlan and Schmidt (1985), Warner, Watts, and Wruck (1988), Weisbach (1988), Kim (1996), and Fee and Hadlock (2004) who relate CEO turnover to prior-year stock price performance, and Denis and Denis (1995) and Huson, Malatesta, and Parrino (2004) who relate CEO turnover to prior-year operating performance.

viewed as moral hazard. Column 5 controls separately for the small number of cases where boards complain about shirking, enjoying the quiet life, self-dealing, or empire-building. We find no significant effect on CEO turnover. The likelihood of CEO dismissal increases by 0.6 of a percentage point with a  $p$ -value of 0.539. This is consistent with the view that boards in our sample respond to moral hazard problems by taking some action other than firing.<sup>22</sup>

The instrument has a positive effect on turnover in these models, confirming the non-parametric result in Figure 1 that a board is more likely to fire the CEO after the adoption of a law empowering it to do so. The effect is sufficiently significant to reject the Staiger-Stock (1997) null of a weak instrument. It is also large economically. Holding the other covariates in column 2 constant, for example, CEOs are 99% more likely to be fired after boards acquire the statutory power to dismiss them than before.

Column 6 tests if the importance of soft information in explaining CEO turnover increases following an increase in board power, compared to that of hard information, by interacting the performance-relative-to-budget and CEO incompetence variables with the instrument. Unlike before, this specification is estimated as a linear probability model since interaction terms in probits do not capture marginal effects correctly (see Ai and Norton (2003) for formal proofs). The results suggest that a law change makes it easier for the board to act on soft information but leaves the board's ability to act on hard information unchanged. This is consistent with the interpretation that fund managers can communicate soft information more easily to fellow board members (whose majority consent is sufficient to fire a CEO after a law change) than to shareholders at large (whose majority consent is necessary to fire a CEO before a law change), while hard information is equally effective in either case.

Column 7 tests the follow-on prediction that soft information becomes more important after an increase in board power *only if* the fund is a minority shareholder. This triple-difference estimate requires us to include a full set of interaction terms involving incompetence, law changes, and ownership. As in column 6, boards are more likely to fire CEOs they deem incompetent, especially once

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<sup>22</sup> Not even CEOs suspected of self-dealing are necessarily fired. Of the seven such CEOs in our sample, two are fired, one leads his firm into bankruptcy, three were majority shareholders and so could not be dismissed, and one was subjected to intense board scrutiny which eventually absolved him of wrong-doing.

given the statutory powers to do so. The additional interaction terms support the follow-on prediction. Absent statutory powers, majority ownership significantly increases the sensitivity of CEO turnover to soft information ( $p=0.001$ ). After a law change, majority ownership no longer makes a significant difference (summing the relevant coefficients, the  $p$ -value is 0.281). Thus, law changes affect the importance of soft information in firing decisions only if the fund is a minority shareholder.

As expected, law changes have no effect on the likelihood that a junior manager is fired (column 8) or that the board takes ‘friendly’ actions such as expanding the management team (column 9). These non-results are consistent with our identifying assumption. Absent statutory powers, a board finds it hard to remove an obstinate CEO. By contrast, a junior manager can be removed at any time, not least by the CEO himself, regardless of the statutory powers the board has at the time. Similarly, there is no a priori reason to believe that friendly board actions should become more frequent after a law change.

#### *4.2 Instrument Validity Tests*

This section provides four tests of the validity of our instrument. Recall from the discussion in Section 2.1 that governance reforms that require a corporate charter amendment should have no effect on CEO turnover, for they do not alter the fact that the fund manager needs the support of a majority of shareholders to remove a CEO. Our sample contains five countries which adopted this weaker form of corporate governance law (see Table 2). Column 1 of Table 4 shows that this type of reform indeed has no significant effect on CEO turnover, as predicted ( $p=0.893$ ).

Second, if the instrument behaves as we hypothesize, the probability of board intervention should jump in the year the board’s statutory power increases and then stay higher for a while. If it increased any earlier, our argument would be quite implausible: For boards to fire the CEO, according to our argument, they need statutory powers; the mere prospect of such powers should not be sufficient. Figure 1, discussed earlier, investigated this hypothesis non-parametrically. We now provide a formal test. Specifically, if law changes provide an exogenous source of variation in board interventions, *future* law changes should not be driving *current* interventions. To test this, we estimate the effect on the probability that a CEO is fired in year  $t$  of a law change that took place two or more years earlier; one



year earlier; in the same year; one year later; or two years later. (The omitted category is law changes that took place more than two years later.)

The results, reported in column 2 of Table 4, support our hypothesis. All else equal, we find no significant increase in intervention in the year before or two years before a law change, either economically or statistically. The year the board's statutory power increases, however, the likelihood of intervention increases significantly, by 192%. In the following years, it remains significantly higher. This pattern – which mirrors Figure 1 – supports our identifying assumption.

A third way to validate the instrument is to test whether it is speculation about possible governance reform or, as our argument implies, its actual enactment that affects boards' propensity to fire a CEO. To do so, we search local newspapers in each country for the first mention of reform. In Russia, for example, the local press reported on March 16, 2000, that parliament was preparing reforms to the 1996 Federal Law on Joint Stock Companies with a view to empowering boards to dismiss management. The reforms were passed in 2001 and came into force on January 1, 2002. Our test asks whether CEO turnover increased in 2000, when reform was first mooted, or in 2002, when it became law.<sup>23</sup> The results are shown in column 3 of Table 4. While we continue to find a significant increase in CEO turnover when the laws come into force ( $p=0.001$ ), we find no effect – statistically or economically – when reform is first mooted ( $p=0.38$ ). This too supports our identifying assumption.

As a final validation, we estimate placebo models (Bertrand, Duflo, and Mullainathan (2004)). We randomly generate a placebo law-change date for each country, estimate the intervention equation as per column 2 in Table 3, and record the law-change coefficient along with the size of a test that intervention is unrelated to the law change. We repeat this 1,000 times. Since the placebo dates are random, we expect to incorrectly reject the true null at the  $\alpha\%$  level in  $\alpha\%$  of the trials. This is indeed what we find. We falsely reject the true null at the 1% level in 1.8% of the trials; at the 5% level in 6.0% of the trials; and at the 10% level in 12.0% of the trials. These results suggest that the standard errors reported in

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<sup>23</sup> Reform was faster in some countries than in others. The time between first press reports of reform and final enactment ranges from zero years (in Croatia) to three (in Latvia), with most countries taking one or two years.

Table 3 are reasonably close to unbiased, which supports the validity of the instrument.<sup>24</sup>

#### 4.3 Alternative Specifications

Identification comes from within-country law changes, but our sample does not always cover both the pre- and post-law change periods. In Bulgaria, for example, all 17 sample investments were made after the 1991 law change. Table 2 reports the sample coverage relative to the year of each country's law change. There are eight countries with in-sample variation in corporate governance laws, and boards were given statutory powers to fire the CEO in five of these (Croatia, Poland, Romania, Russia, and Serbia Montenegro). Column 4 of Table 4 focuses only on these five countries. This reduces the sample size from 2,058 to 1,323 firm-years but has no material effect on the results.<sup>25</sup>

Finally, as noted earlier, our baseline models include only a limited set of country effects, due to sample size concerns. In column 5 of Table 4, we restrict the sample to the five countries with the most investments (Poland, Russia, Hungary, the Czech Republic, and Romania) for which we can include individual country-level fixed effects. This again has no material effect on the results.

### 5. Effect of Board Intervention on Investment Success and Performance

Section 4 shows that boards update their views of a CEO's ability over time, based on hard and soft information, and that they fire him once they have concluded that he is not up to the job. In this section, we ask if such board interventions improve performance and so whether active monitoring is desirable.

Our sample firms are privately-held, so performance cannot be measured using share prices. Instead, we measure performance either relative to budget or using the exit information shown in Table 1. For the latter, we code an indicator equal to one in year  $t$  if the firm is exited in years  $t$  through  $t+2$ .<sup>26</sup> Exits are a popular performance measure in the literature on privately-held firms (see Gompers and Lerner (1998, 2000), Brander, Amit, and Antweiler (2002), Sørensen (2007), and Hochberg, Ljungqvist, and Lu (2007)). We look up to two years out because the effect of intervention on the probability of exit need

<sup>24</sup> For example, the Table 3, column 2 point estimate of 0.610 for the effect of law changes on the likelihood of CEO turnover exceeds 998 of the 1,000 simulated coefficients, giving a simulated  $p$ -value of 0.002. This is nearly identical to the estimated  $p$ -value of 0.001 reported in Table 3, where the standard errors are clustered on portfolio firm.

<sup>25</sup> We could further refine the sample by removing *firms* (rather than *countries*) that did not experience an in-sample law change, that is, those portfolio firms not experiencing a law change while being in a sample fund's portfolio. This cuts the sample to 810 firm-years but again does not affect the results (not tabulated).

<sup>26</sup> By construction, every intervention must precede an exit or write-off, so there is no problem including exits in year  $t$ .

not be instantaneous; robustness results for shorter horizons are reported in Section 6.

Exit rates and IRRs do not correlate perfectly. While firms written-off have lower mean IRRs than do exited investments (-81.6% versus 32.3%), 82 of the 311 exits have in fact negative IRRs, indicating that some sales are fire sales. To capture this, we alternatively refine the simple exit indicator by coding as a successful exit only those investments that were exited at a positive IRR.<sup>27</sup>

### 5.1 Naïve Models of Exit Performance

Table 5 reports the results of estimating a naïve version of equation (2), i.e., treating CEO dismissal as exogenous. We estimate four probits, for exits (columns 1-2) and exits at a positive IRR (columns 3-4), without (columns 1 and 3) or with portfolio-firm effects (columns 2 and 4).<sup>28</sup> In all cases, we find a *negative* and at times statistically significant relation between intervention and performance. In column 1, for example, firing the CEO ‘results’ in a 7.8 percentage point reduction in the probability of exiting over the next two years (from the unconditional probability of 40.3%), all else equal. The negative sign is consistent with the expected endogeneity problem: Boards intervene in badly managed or under-performing firms, so when we compare the exit rates of firms with and without intervention, we are likely picking up unobserved differences in CEO or firm quality rather than the effect of intervention.

The controls behave as expected. Firms that perform better relative to budget are more likely to be exited and to be exited at a positive IRR, as are larger deals. Staged deals are less likely to be exited, consistent with the interpretation that they are riskier. Favorable macroeconomic conditions improve a firm’s exit chances, as does a country’s reform progress. The three sets of country, year, and industry effects are each statistically significant, as are the portfolio-firm effects in columns 2 and 4.

### 5.2 Reduced-form Performance Models

To solve the endogeneity problem evident in Table 5, we employ law changes as an instrument. Before discussing the IV results, we check whether the instrument has a *reduced-form* effect on

<sup>27</sup> Why not use the IRRs to measure performance directly? In a private equity setting, a firm’s IRR does not vary annually – it can be computed only upon exit. If we were to model IRRs, the panel would hence collapse into a single cross-section and we could not use our instrument, which relies on time variation in the legal environment relative to the date of the intervention.

<sup>28</sup> We use random firm effects since fixed-effects probit suffers from a well-known incidental-parameters problem. Results from linear probability models, which can accommodate fixed effects, look qualitatively similar; see the Internet Appendix.

performance. Given the evidence in Section 4 that intervention becomes more likely after corporate governance laws come into force, there should be a positive reduced-form relation between law changes and performance, as long as intervention improves performance. As Angrist and Krueger (2001) note, if we do not see the causal relation of interest in the reduced form, it is probably not there.

The four probit specifications reported in Table 6 point to a strong, statistically significant reduced-form relation between the instrument and performance, for either exit measure and whether or not we include firm effects. Importantly, it has the expected positive sign: Law changes strengthening the power of the board over the CEO are associated with improved exit performance. As we show in the Internet Appendix, this remains true in linear probability models.

### *5.3 IV Estimates of the Causal Effect of Board Intervention on Performance*

We can now estimate the causal effect of board intervention on performance using law changes as an instrument. The binary nature of both dependent variables (we observe whether or not a board intervenes and whether the investment is exited rather than written off) poses no particular problem (Maddala (1983, p. 118)): As long as it is identified, Greene (1998) shows that a system of two equations with binary dependent variables can be consistently and efficiently estimated using a seemingly unrelated bivariate probit. In our case, this amounts to *jointly* estimating CEO dismissal as in Table 3 with an exit performance model as shown in Table 5. As an alternative to Greene's approach, Angrist (2001) advocates using a simple 2SLS approach based on linear probability models in both stages. While linear probability models have the drawback that the coefficients can imply probabilities outside the unit interval and the marginal effects can be unrealistic, they have the advantage over probit models that they can accommodate fixed effects. We obtain similar results either way and report both.

The probit results of modeling exit and exit at a positive IRR are shown in columns 1 and 4 of Table 7, respectively. A likelihood ratio test rejects the null that the disturbances in the CEO firing and exit equations are uncorrelated. This confirms that intervention is endogenous and needs to be instrumented. As expected, the correlation is negative, suggesting that boards intervene in lower-quality firms. Importantly, the effect of intervention flips sign in both columns, compared to the naïve models in Table

5. The point estimates are statistically significant ( $p \leq 0.025$  clustered on firm and  $p \leq 0.015$  clustered on country). This provides direct causal evidence of the monitoring role of boards: Once we instrument it, intervention improves performance. The economic effects are large. Holding all covariates at their sample means, firing the CEO increases the probability of exit over the next two years by 36.9 percentage points from the unconditional probability of 40.3% (column 1), while the probability of a profitable exit improves by 48.7 percentage points from the unconditional probability of 29.3% (column 4). In sum, even though boards intervene in lower-quality firms, doing so makes a successful investment outcome significantly more likely.

Not surprisingly, poor managerial skill has a negative and at least marginally significant effect on performance. To illustrate, the presence of a CEO the board deems incompetent reduces the chances of a successful investment outcome from 40.3% to 27.1% in column 1. Since incompetence often leads to firing, according to Table 3, this suggests that failure (or inability) to get rid of a bad CEO increases the chances that the investment will have to be written off.

#### *5.4 Adding Portfolio-Firm Effects*

Are these findings robust to including portfolio-firm effects to control for unobserved firm heterogeneity? A standard result in IV estimation holds that the equation of interest can be estimated consistently even if the equation modeling the troublesome covariate (here: intervention) is not estimated consistently. Thus, omitting firm effects from the intervention equation should not affect the consistency of the estimated effect of intervention on performance. This general result will cease to hold, however, if the unobserved firm effects are correlated across the two equations. If they are, they will affect both intervention and performance, so their omission could cause bias in the estimated intervention effect. For example, some CEOs may have majority ownership, making it near impossible to fire them; such entrenched CEOs may also be associated with worse performance.

To fix this, we include in Greene's (1988) seemingly unrelated bivariate probit model a set of random portfolio-firm effects that are allowed to be correlated across the two equations. The resulting estimates, shown in columns 2 and 5 in Table 7, suggest that the bias is minimal. Compared to columns

1 and 4, including firm effects increases the point estimate of the intervention variable a little in column 2 and reduces it a little in column 5, leaving our conclusions unchanged.

For readers who, like Angrist (2001), prefer linear probability models which can accommodate firm *fixed* effects, columns 3 and 6 show that our causal inferences are entirely unaffected. Note that unlike the random-effects probits in columns 2 and 5, linear probability models allow us to cluster the standard errors. Clustering at the country level to allow the errors to be autocorrelated over time within countries gives *p*-values of 0.045 and 0.015 for the intervention effects in columns 3 and 6, respectively.

### 5.5 Modeling Performance Relative to Expectations

So far, we have measured performance as successful exits. We now use performance relative to budget as an alternative measure. We treat the five-point performance score as a continuous variable, which allows us to estimate standard linear least-squares regressions rather than probits. Specifically, we relate the performance score in year  $t+1$  to an indicator that equals 1 if the board intervened in year  $t$  and zero otherwise and to a set of control variables dated  $t-1$ .

When we estimate naïve OLS regressions without firm effects or with random or fixed firm effects, shown in columns 1-3 of Table 8, we do find evidence that CEO turnover has a small, positive and, in columns 2 and 3, significant effect on subsequent performance. This contrasts with the *negative* effects we found in the naïve exit models shown in Table 5. Thus, the Table 8 models appear to be less biased. Still, the estimated magnitudes may be downward biased. The coefficients suggest that intervention improves performance by only between 0.166 and 0.356 on a five-point scale whose mean is 2.8.

Columns 4-6 report IV models that treat intervention as endogenous, instrumented using the law changes. Because intervention is a binary variable, column 4 is estimated as a Heckman (1978) treatment model. This increases the estimated intervention effect eight-fold relative to the corresponding naïve model in column 1. Specifically, forced CEO turnover now leads to a 1.382-point improvement on our five-point scale.<sup>29</sup> (The *t*-statistic is 3.83 clustered by firm and 4.01 clustered by country.) Columns

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<sup>29</sup> The normality assumption underlying the Heckman (1978) model may be violated, since the performance score has support on a bounded interval. Applying a standard logistic transform and re-estimating the Heckman model does not materially change our results (not tabulated), suggesting that normality is an acceptable approximation for these data.

5 and 6 include random and fixed firm effects, respectively. These specifications similarly yield larger point estimates than their naïve counterparts, of 1.879 ( $p=0.039$ ) and 1.961 ( $p=0.001$ ), respectively.

Among the controls, firms whose performance in  $t-1$  was poor due to ‘bad luck’ later perform better. This adds credence to this variable: Bad luck should not be persistent, so firms should bounce back later. Finally, firms run by managers who are deemed incompetent later perform significantly worse.

### 5.6 Discussion

Whether we measure performance as exit or relative to budget, we get the same result: As long as we instrument it, intervention has a large, positive, and significant effect on performance. This is echoed in the way fund managers comment on the beneficial effects of CEO dismissals. For example:

*“The turnaround under new management has been extremely impressive. From a disastrous 2002, when under former management there was a period of liquidation risk, [the company] has [re]turned to profit.”*

We find strong evidence of simultaneity bias, in the sense that the naïve probit estimates are negative and significant. This appears to be due to a negative correlation between the disturbances in the intervention and performance equations, indicating that boards intervene in badly managed or poorly performing firms. Our instrument appears to do a good job breaking this endogeneity.

### 5.7 Exclusion Restriction

For our identification strategy to work, law changes must affect performance only through their effect on board decisions rather than directly. A first-order concern is that merely by increasing the *threat* of dismissal, the reforms could induce CEOs to raise their game. If so, law changes could affect performance directly, violating the exclusion restriction.

At a conceptual level, this seems unlikely. This story presupposes that the agency problem boards seek to solve through firing is moral hazard, not adverse selection, since the CEO can surely change only his actions, not his type, in response to an increased threat of dismissal.

At a theoretical level, firing in equilibrium requires an element of initial uncertainty about the CEO’s type and subsequent learning by the board. In a pure moral-hazard model à la Holmström (1979), for example, a board that is unhappy with the CEO’s effort or actions would simply adjust his incentives. It wouldn’t fire him. Firing him would be pointless: In the absence of adverse selection, all CEOs are

equally capable so his replacement would behave the same way if given the same incentives.

Theory thus suggests adverse selection should play a role in firing decisions, but it does not, of course, imply the absence of moral hazard. However, the evidence in Table 3 shows that moral hazard plays no role in boards' firing decisions in our sample. Instead, there is strong evidence that boards fire CEOs they have come to view as incompetent, consistent with adverse selection. Moreover, as noted earlier, there are few complaints about moral hazard in the first place in our data, perhaps because CEO incentive contracts generally work quite well in a private equity setting.

Even if CEOs *could* raise their game, it is reasonable to expect that they would begin doing so as soon as it is clear that corporate governance laws *will* be changed, rather than wait for the new laws to come into effect. In terms of the reduced-form models introduced in Table 6, we would thus expect performance to improve *before* the laws come into force. In Table 9, we run a horse race between the actual law-change date and the date when the law changes were first mooted in the local press. The results, shown in columns 1 and 3, are unambiguous: Performance only improves once the law *has* changed, not when the press first reports that reform is on its way. This evidence is hard to reconcile with performance improving as CEOs work harder to avoid being fired.

We also find no evidence that CEOs do, in fact, raise their game in response to law changes. Focusing only on firms affected by a change in the law, we split the sample into firms whose CEO will be fired in years 0, 1, or 2 following reform and those where the CEO will remain in post. If the story were a moral hazard one, then the CEOs who were fired should be the ones who did not raise their game when the law was changed. We find that when reforms are announced, firms whose CEOs will later be fired experience a zero average change in performance relative to budget. But so do the other CEOs: their average change is an insignificant 0.03. The difference in differences is not statistically significant ( $p=0.893$ ). The same is true at enactment: The two groups see average performance changes of 0.14 ( $p=0.304$ ) and 0.01 ( $p=0.923$ ), respectively, and the difference in differences is insignificant ( $p=0.511$ ). Thus, CEOs do not appear to raise their game simply because the law changes, or is known to change,



consistent with adverse selection being the main driver of interventions.<sup>30</sup> In contrast, in the year after a CEO is actually fired, performance improves by an average of 0.65 ( $p=0.03$ ), in line with Table 8.

Finally, if boards were seriously concerned about moral hazard, rather than adverse selection, we might expect them to restructure CEO incentive contracts when board power increases. After all, if corporate governance mainly solves a moral hazard problem, greater board power should reduce the incentive pay a CEO needs to be offered (see Core et al. (1999)). However, only six sample firms make changes to CEO incentive contracts, and the timing of these changes does not coincide with the law changes. This suggests that the tradeoff between board power and incentive contracts is not first order in our data, possibly because moral hazard is not the primary concern in private-equity backed companies.

### 5.8 Other Concerns

We discuss five further possible violations of the exclusion restriction. First, changes in governance laws may have coincided with other beneficial shocks affecting performance. An obvious concern stems from the fact that governance reforms were often part of broader reforms of commercial law affecting contracts, employment, intellectual property, etc., not just board power. It is thus possible that adopting Western commercial law affects performance independently of any changes in board power. To shed light on this, we exploit a convenient feature of our data. Three sample countries – Russia, Croatia, and Romania – amended articles pertaining to board power some years after enacting Western commercial law. If it is the enactment of commercial law that affects performance, rather than changes in board power, then corporate governance *amendments* should have no reduced-form effect on performance.

In Table 9, we restrict the sample to the three countries with such amendments. In each, a Western-style corporate law was already in place at the time a sample fund invested in the country, so the law-change instrument isolates the effect of governance amendments on performance.<sup>31</sup> The point estimates, shown in columns 2 and 4, confirm that strengthening board power affects performance independently

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<sup>30</sup> Boards might raise their expectations as soon as the law changes while CEOs might simultaneously raise their game, leading us to see no significant changes in performance relative to budget around law changes. However, we find no evidence that profit or sales targets are changed differently around law changes than at any other time. Modeling how budgets evolve over time, though interesting, is beyond the scope of this paper.

<sup>31</sup> Running a horse race between the adoption of Western-style corporate law and the adoption of laws strengthening the board in the whole sample, we find that the former has no significant effect on exits ( $p=0.861$ ) while the latter does ( $p=0.01$ ).

of the adoption of Western-style commercial law. They are positive and statistically significantly different from zero, and if anything somewhat larger than the equivalent point estimates shown in Table 6 where we include all 19 countries. This lends further credibility to the exclusion restriction.

Second, there could be other contemporaneous shocks besides the enactment of Western commercial law. However, the staggered adoption of governance laws mitigates this potential bias to an extent. Unless each country strengthens board power at the same time as some other beneficial economic shock hit, the exclusion restriction is likely to be satisfied. To further reduce the chances that the instrument correlates with other economic shocks, we have explicitly controlled for macroeconomic conditions and a country's reform progress. The latter is routinely used as a control for a myriad of economic shocks in transition economies; see for example Glaeser, Johnson, and Shleifer (2001).

Third, the timing of governance reforms may have been influenced by lobbying which in turn may correlate with performance. This also seems unlikely. Legal reform in transition countries was aided by the World Bank and the European Commission. These bodies provided technical assistance on their own timetables and according to their own resource constraints, and they are unlikely to have been swayed by the relatively small firms in our sample.<sup>32</sup>

Fourth, governance reform may have resulted in better qualified directors being appointed to boards, which in turn could have led to better board decisions and thus performance improvements independently of CEO changes. While this may be true in the wider economy, this alternative channel is easy to dismiss for our private equity-backed firms. According to the EBRD reports, board composition does not change around governance reform and indeed changes very little at other times. Moreover, the key board director – the private equity fund manager – is present on the board in every panel year.

Finally, governance reform may have increased the supply of equity or debt, loosening financial constraints and so perhaps leading to performance improvements. According to the monitoring reports, the supply of equity to our sample firms is unchanged around law changes. As for the supply of debt,

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<sup>32</sup> We formally test lobbying and other reverse-causality stories by replacing the instrument with the set of five time-varying indicators from Table 4. Though not tabulated, we find no evidence that *future* law changes affect performance, while *past* law changes do. This is consistent with the claim that the timing of law changes is orthogonal to the performance of sample firms.

data for which is not available at the firm-level, we regress a country's domestic credit to the private sector relative to GDP on the law change indicator, year effects (to capture trends), and country fixed effects allowing for auto-correlation in domestic credit/GDP. We find no evidence of an increased supply of debt around governance reforms at the macro level. The point estimate suggests that domestic credit/GDP is only 0.18% higher after reform, with a  $t$ -statistic of 0.06. This represents a negligible increase relative to the average annual change in domestic credit/GDP of 2.4% per year.

### *5.9 Robustness Tests*

Table 10 reports variations on the IV specifications reported in Table 7. To save space, we report only the intervention coefficients. All other Table 7 covariates are, of course, included in the estimation.

Panel A explores whether the results are sensitive to the horizon over which exit is measured. Previously, we related exit in years  $t$  through  $t+2$  to intervention in year  $t$ . When we shorten the horizon to  $t$  through  $t+1$ , we continue to find that CEO turnover improves the probability of exit. When we shorten the horizon further, to simply  $t$ , the effect disappears (not tabulated). This suggests, not unreasonably, that it takes time for a new CEO to affect a firm's performance.

Panels B and C restrict the sample to the set of countries with in-sample variation in corporate governance laws and the five countries with the most investments, respectively. This mirrors the CEO dismissal models shown in columns 4 and 5 of Table 4, respectively. In either sub-sample, we continue to find a significant and large effect of board intervention on performance.

So far, we have constrained the effect of law changes on intervention to be constant across time and across countries, by using a simple intercept shift in the law-change year. In Panel D, we allow the effect to vary over time by replacing the instrumental variable with the set of five indicator variables introduced in Table 4, column 2. In Panel E, we allow the effect to vary across countries by including country-level law change indicators. In either case, the coefficients estimated for the effect of intervention on performance are again barely changed.

## **6. Conclusions**

Our aim in this paper is to open up the corporate governance black box by investigating how boards

of directors monitor management, under what circumstances they fire CEOs, and whether these actions improve performance. We do so by exploiting unique and detailed data on boards' actions, expectations, and beliefs about CEO ability for a large sample of private-held firms from countries that experienced large and plausibly exogenous shocks to their corporate governance rules.

We show that boards update their beliefs about CEO ability in part based on how the firm performs relative to their expectations and that CEOs are fired when the firm underperforms these expectations. That boards respond to hard information such as performance data is perhaps not surprising. But we also document that they weigh soft information gathered through their monitoring activities. Specifically, we find that CEOs are especially likely to be fired when evidence has mounted that they are incompetent, even if readily observable signals such as accounting performance are satisfactory. However, CEOs are *not* fired when performance has deteriorated due to factors deemed explicitly to be beyond their control or for making 'honest mistakes.' These results suggest that one benefit of active monitoring is to allow boards to identify which signals convey information worth acting upon in order to improve the firm's future performance, precisely as Tirole (2006) conjectures. Finally, we find that CEOs are fired more often, and more often in response to negative soft information, once board power has increased following governance reforms.

Given our evidence that boards intervene in underperforming firms, it is not surprising that a naïve model, which treats intervention as exogenous, spuriously suggests intervention 'hurts' performance. Instrumenting board interventions using staggered corporate governance law changes leads to the opposite conclusion: Following forced CEO turnover, firms see performance improvements and their investors are considerably more likely to eventually sell them at a profit.

These results suggest that active monitoring, and especially the gathering of soft information, can be quite beneficial. They also provide a potential justification for the incomplete contracts approach common in theory models of corporate governance or of boards: Since soft information is by definition unverifiable, it cannot be included in a contract. It is thus important for someone – a board or a large shareholder – to collect soft information and to have the power to act upon it.

Our analysis focuses mostly on the disciplinary role of the board. Recent theoretical work has stressed that boards also perform an advisory role (see Adams and Ferreira (2007)). The reason we refrain from modeling advisory activities is that our instrument doesn't apply to them: The board doesn't need statutory power to dismiss the CEO in order to offer strategic advice, help strengthen the management team, or make introductions to potential customers or suppliers. We leave this interesting topic for future research.

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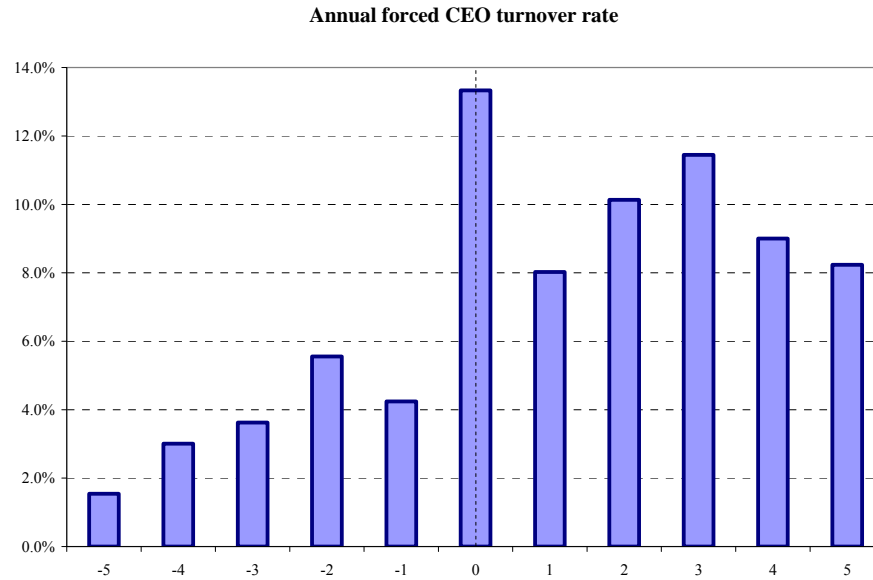
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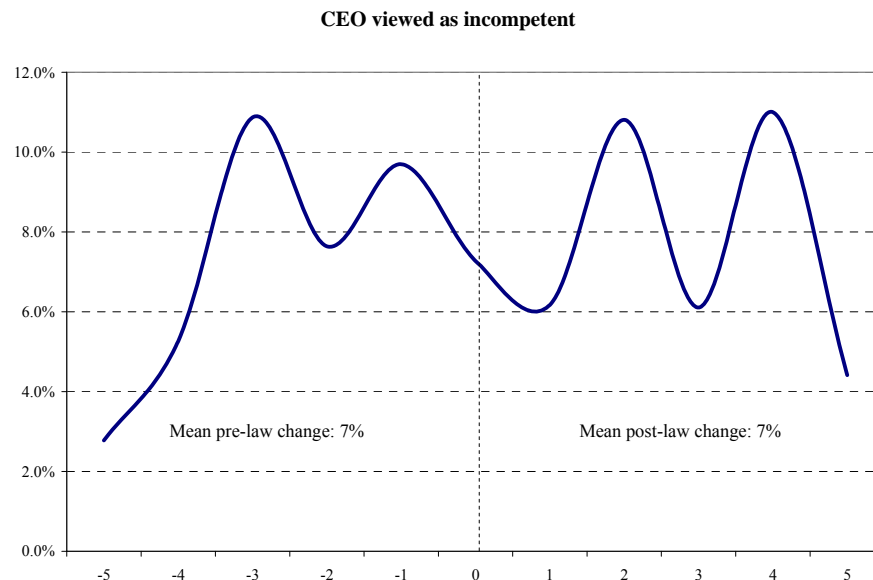
### Figure 1. Forced CEO Turnover Around Law Changes.

The graph shows the annual incidence of forced CEO turnover. Time on the horizontal axis is measured relative to the year in which the country in question reformed its corporate governance laws by giving boards the statutory power to dismiss CEOs, denoted year 0; see Table 2 for a list of these dates. Countries without a law change, or where the law change only empowered the shareholders' meeting to amend the corporate charter to delegate the power to dismiss the CEO, are excluded. Year -5 includes prior years; year 5 includes later years.



### Figure 2. CEO Competence Around Law Changes.

The EBRD regularly reviews the performance of each portfolio firm, resulting in a monitoring report based on both quantitative and qualitative criteria. The graph shows the annual incidence of a monitoring report mentioning that a fund manager privately viewed the CEO as incompetent. (Some CEOs are recorded as being incompetent repeatedly. Results are unaffected if we focus instead on unique CEOs.) Time on the horizontal axis is measured relative to the year in which the country in question reformed its corporate governance laws by giving boards the statutory power to dismiss CEOs, denoted year 0; see Table 2 for a list of these dates. Countries without a law change, or where the law change only empowered the shareholders' meeting to amend the corporate charter to delegate the power to dismiss the CEO, are excluded. Year -5 includes prior years; year 5 includes later years.



**Table 1. Sample Overview.**

The sample consists of 473 investments by 43 private equity funds investing in Central and Eastern Europe and the Central Asian republics of the former Soviet Union. The private equity funds were raised between 1992 and 2004 and made investments between 1993 and 2005. We track each investment through the earlier of the final outcome or the end of 2008 and record whether it has been ‘exited’ through an IPO or a sale, written off, or is still alive, as of 2008. Tracking each investment across time gives us an unbalanced panel. We compute the profitability of each investment as the time-weighted return on investment (i.e., as the IRR) using precisely dated cash flows to and from portfolio firms. In the 59 still-alive cases, the IRRs are in part based on unrealized capital gains. In all other cases, they are based solely on cash flows. All IRRs are calculated from cash flows denominated in the fund’s home currency. Results are robust to converting cash flows into euros or dollars before computing IRRs. We report equal-weighted mean IRRs. The value-weighted mean IRR across the 19 countries, weighted by the size of each investment in euros, is 14.7%.

country	Number of investments by year of initial investment														Percent of sample that are			Mean IRR (%)
	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	Total	exited	written off	still alive	
Azerbaijan							1							1	0.0	100.0	0.0	-100.0
Bulgaria				1	3		2		2		1	8		17	94.1	5.9	0.0	54.1
Croatia						1	1	2	3	2		3		12	66.7	8.3	25.0	-7.8
Czech Republic	3	5	5	1	4	4	8	9	2	2			1	44	72.7	22.7	4.5	29.9
Estonia				2		4	1	1	1		3	2	1	15	73.3	0.0	26.7	31.7
Georgia				1						1				2	100.0	0.0	0.0	15.3
Hungary	1	2	3	6	7	11	6	8	6	3	2	4		59	57.6	20.3	22.0	6.8
Kazakhstan						1	2							3	100.0	0.0	0.0	54.8
Latvia										1	1	3	2	7	14.3	0.0	85.7	10.1
Lithuania				2	1	2	4	1	2			1	2	15	53.3	40.0	6.7	-15.0
Moldova												1		1	100.0	0.0	0.0	158.5
Poland	10	12	14	14	20	12	16	26	14	8	12	5	8	171	69.0	22.8	8.2	-3.2
Romania				6		6	8	2	2		1	1	4	30	86.7	3.3	10.0	23.0
Russia		9	18	11	6	5		4	9	5	3	4	1	75	56.0	30.7	13.3	-2.8
Serbia Montenegro											2			2	0.0	0.0	100.0	-24.2
Slovakia						1		4	5			1	1	12	83.3	8.3	8.3	7.2
Slovenia								1						1	100.0	0.0	0.0	23.3
Turkmenistan			1			1	1	1	1					5	100.0	0.0	0.0	44.6
Ukraine					1									1	100.0	0.0	0.0	11.7
All countries	14	28	41	44	42	48	50	59	47	22	25	33	20	473	67.4	20.1	12.5	7.5

**Table 2. Overview of Legal Changes Strengthening Supervisory Boards in Central and Eastern Europe and in Central Asia.**

The table lists legal changes strengthening supervisory boards relative to executive boards. Most countries in our sample adopted the German system of a dual board structure. In the text, we use the terms ‘management’ and ‘board’ as a short-hand for the executive and supervisory boards, respectively. In addition to the laws themselves, we have consulted the following sources: EBRD Corporate Governance Legislation Assessment Project, 2007 (<http://www.ebrd.com/country/sector/law/corpgov/assess/index.htm>); EBRD Country Strategy Overview (<http://www.ebrd.com/country/index.htm>); World Bank Reports on the Observance of Standards & Codes ([http://www.worldbank.org/ifa/rosc\\_cg.html](http://www.worldbank.org/ifa/rosc_cg.html)); International Law Office (<http://www.internationallawoffice.com>); International Financial Law Review (<http://www.iflr.com/Countries.aspx>); OECD Corporate Governance Regional Roundtables ([www.oecd.org/daf/corporateaffairs/roundtables](http://www.oecd.org/daf/corporateaffairs/roundtables)); Doing Business country reports (<http://www.doingbusiness.org>); Federation of Euro-Asian Stock Exchanges (<http://www.feas.org/MemberIndex.cfm>); “New Joint Stock Company Law in Kazakhstan” by V.V. Markov (<http://rusenergylaw.ru/2-2003/kaz13.html>); the EBRD’s legal journal, Law in Transition (<http://www.ebrd.com/pubs/legal/series/lit.htm>); “Corporate Governance and Securities Market Legislation in Transition” by G.P. Cigna (Journal of International Banking and Financial Law 21:11); “Guide to the Russian Law on Joint Stock Companies” by B. Black, R. Kraakman, and A. Tarassova (Kluwer Law International, 1998, The Hague); and Yefymenko (2009). We are grateful to Gian Piero Cigna, Senior Counsel of the EBRD, for expert advice.

Country	Year board acquired power to dismiss CEO	Name of law	Part of law pertaining to board powers	Board is given statutory power to dismiss CEO?	Shareholder meeting can amend corporate charter to delegate power to dismiss CEO to the board?	Power to dismiss CEO brought in by amendment to previously enacted corporate law?	Number of firms	Maximum number of firm-years	Sample coverage relative to year of law change	Number of CEO dismissals	Percent of which occurred post-law change
Azerbaijan	-	-	-	No	No		1	4	only before	1	0
Bulgaria	1991	Commercial Act	Article 241	Yes			17	80	only after	8	100
Croatia	2004	Companies Act	Section 204	Yes		Yes	12	63	both	3	67
Czech Rep.	(2001)	Commercial Law	Article 194	No	Yes		44	247	both	14	50
Estonia	1995	Commercial Code	Sections 308, 309	Yes			15	79	only after	4	100
Georgia	1995	Law on Entrepreneurs	Article 55.8	Yes			2	8	only after	1	100
Hungary	(1998)	Act on Company Law	Section 37.1	No	Yes		59	322	both	30	83
Kazakhstan	1998	Law on Joint Stock Companies	Article 62	Yes			3	12	only after	0	
Latvia	2002	Commercial Law	Section 292	Yes			7	34	only after	3	100
Lithuania	1990	Law on Stock Corporations	Article 25.1	Yes			15	62	only after	4	100
Moldova	(1997)	Joint Stock Company Law	Article 50.4	No	Yes		1	4	only after	0	
Poland	2001	Code of Commercial Companies	Article 368.4	Yes			171	977	both	74	81
Romania	2006	Company Law	Article 153	Yes		Yes	30	174	both	8	0
Russia	2002	Federal Law on Joint Stock Cos.	Articles 48, 65	Yes		Yes	75	440	both	24	75
Serbia-MN	2004	Companies Act	Article 322	Yes			2	10	both	1	100
Slovakia	(1992)	Commercial Code	Article 187(1)	No	Yes		12	62	only after	2	100
Slovenia	1993	Companies Act	Article 250	Yes			1	7	only after	1	100
Turkmenistan	(1999)	Joint-Stock Companies Law	Article 48	No	Yes		5	27	both	0	
Ukraine	2009	Law on Joint-Stock Companies	Paragraph 52	Yes			1	4	only before	0	
All countries							473	2,616		178	76

**Table 3. Determinants of Board Intervention.**

The sample consists of an unbalanced annual panel of 473 firms which we observe from the year of the initial investment to the year of exit or write-off or to 2008, whichever is earlier. Column 1 studies the evolution of the board's beliefs about the CEO's competence. The tests reported in columns 2-9 focus on the determinants of board intervention, i.e., the removal of an executive (columns 2-8) or actions to strengthen the management team by hiring additional senior managers (column 9). A junior manager in column 8 is any named executive below the level of the CEO. Estimation uses probit except in columns 6 and 7, which are estimated as linear probability models due to the presence of interaction effects (see Ai and Norton (2003) for why probits with interaction terms are problematic). "n.m." in columns 6 and 7 denotes "not meaningful." The explanatory variables are listed in the table and defined further in Section 3. Columns 2 through 7 include law changes as an instrumental variable and so estimate the reduced form of the board intervention equation (1) in Section 2. The instrument equals one if at the beginning of year  $t$ , the corporate law in country  $k$  allows the firm's board to dismiss the CEO. Table 2 provides details of the staggered adoption of such laws in the 19 countries in our sample. The Staiger-Stock (1997) test is a Wald test of the null hypothesis that the instrument does not correlate with board interventions. It has a critical value of 10 in an  $F$ -test. While we report a  $\chi^2$  statistic with one degree of freedom instead of an  $F$ -test, for our sample size,  $\chi^2 \approx F$ . All specifications include country, industry, and time effects. Column 3 includes random portfolio-firm effects to control for unobserved heterogeneity. These are not statistically significant ( $p=0.192$ ). Linear probability models, which can accommodate firm fixed effects, are reported in the Internet Appendix. The number of observations is 2,058 except in column 4, where we restrict the sample to the 1,196 firm-years with lagged performance at or above plan. Heteroskedasticity-consistent standard errors, clustered on portfolio firm, are reported in italics beneath the coefficient estimates. Results clustering by country instead are reported in the Internet Appendix. We use \*\*\*, \*\*, and \* to denote significance at the 1%, 5%, and 10% level (two-sided), respectively.

Table 3. Continued.

	=1 if CEO viewed as incompetent	Dependent variable =1 if fire ...							=1 if streng- then mgt
	(1)	CEO (2)	CEO (3)	CEO (4)	CEO (5)	CEO (6)	CEO (7)	junior manager (8)	(9)
<b>Board's information set and beliefs</b>									
performance relative to board's expectations in $t-1$	-0.153*** <i>0.049</i>	-0.311*** <i>0.050</i>	-0.314*** <i>0.057</i>	-0.206** <i>0.100</i>	-0.310*** <i>0.050</i>	-0.039*** <i>0.007</i>	-0.036*** <i>0.006</i>	-0.130*** <i>0.050</i>	-0.027 <i>0.046</i>
... x (=1 if corporate governance law enacted)						0.008 <i>0.010</i>			
=1 if poor perf. blamed on manager's decisions in $t-1$	0.126 <i>0.207</i>	0.128 <i>0.181</i>	0.125 <i>0.216</i>		0.097 <i>0.233</i>	0.031 <i>0.034</i>	0.041 <i>0.035</i>	0.303 <i>0.211</i>	0.343* <i>0.205</i>
=1 if board complained about moral hazard probs in $t-1$					0.059 <i>0.331</i>				
=1 if poor performance blamed on bad luck in $t-1$	-0.240* <i>0.123</i>	-0.030 <i>0.129</i>	-0.028 <i>0.132</i>		-0.029 <i>0.129</i>	-0.007 <i>0.021</i>	-0.014 <i>0.020</i>	0.005 <i>0.126</i>	0.263** <i>0.127</i>
=1 if manager viewed as incompetent in $t-1$	1.149*** <i>0.124</i>	1.264*** <i>0.133</i>	1.294*** <i>0.132</i>	1.510*** <i>0.296</i>	1.264*** <i>0.133</i>	0.205*** <i>0.052</i>	0.189*** <i>0.051</i>	0.760*** <i>0.130</i>	0.380*** <i>0.136</i>
... x (=1 if corporate governance law enacted)						0.255*** <i>0.085</i>	0.313*** <i>0.097</i>		
... x (=1 if fund has majority ownership)							0.464** <i>0.227</i>		
... x (=1 if corporate governance law enacted)							-0.614** <i>0.244</i>		
<b>Deal characteristics</b>									
log investment cost through $t-1$	0.086*** <i>0.033</i>	0.002 <i>0.037</i>	0.002 <i>0.030</i>	0.089 <i>0.074</i>	0.002 <i>0.037</i>	0.001 <i>0.004</i>	0.001 <i>0.004</i>	0.014 <i>0.039</i>	0.025 <i>0.034</i>
=1 if privatization	0.380*** <i>0.141</i>	0.348** <i>0.173</i>	0.360** <i>0.172</i>	0.389 <i>0.259</i>	0.349** <i>0.174</i>	0.038 <i>0.025</i>	0.036 <i>0.026</i>	0.147 <i>0.154</i>	0.498*** <i>0.173</i>
=1 if deal is staged	-0.028 <i>0.086</i>	0.193** <i>0.093</i>	0.198** <i>0.100</i>	0.051 <i>0.157</i>	0.193** <i>0.093</i>	0.018 <i>0.012</i>	0.018 <i>0.012</i>	0.116 <i>0.093</i>	0.467*** <i>0.092</i>
=1 if fund has majority ownership							-0.001 <i>0.023</i>		
... x (=1 if corp governance law enacted)							0.018 <i>0.030</i>		
<b>Macroeconomic conditions</b>									
lagged EBRD transition indicator	-0.117 <i>0.157</i>	0.089 <i>0.168</i>	0.082 <i>0.248</i>	-0.233 <i>0.437</i>	0.091 <i>0.169</i>	0.012 <i>0.015</i>	0.007 <i>0.015</i>	-0.067 <i>0.229</i>	-0.499*** <i>0.163</i>
lagged real GDP growth	-0.009 <i>0.012</i>	-0.010 <i>0.014</i>	-0.010 <i>0.016</i>	-0.035 <i>0.025</i>	-0.010 <i>0.014</i>	0.000 <i>0.001</i>	-0.001 <i>0.001</i>	0.009 <i>0.017</i>	-0.004 <i>0.013</i>
<b>Instrument</b>									
=1 if corp governance law enacted	0.024 <i>0.127</i>	0.610*** <i>0.132</i>	0.623*** <i>0.141</i>	0.991*** <i>0.253</i>	0.611*** <i>0.132</i>	0.028 <i>0.035</i>	0.049*** <i>0.014</i>	0.115 <i>0.138</i>	0.053 <i>0.128</i>
<b>Diagnostics</b>									
Wald test: all coeff. = 0 ( $\chi^2$ )	152.5***	264.5***	182.9***	99.4***	264.8***	204.4***	209.4***	99.2***	115.1***
Staiger-Stock (1997) test ( $\chi^2$ )	0.0	21.3***	19.6***	15.3***	21.4***	n.m.	n.m.	0.7	0.2
Pseudo $R^2$ (adjusted $R^2$ in columns 6 and 7)	13.0%	19.3%	19.3%	20.7%	19.3%	14.4%	15.1%	9.5%	10.8%

**Table 4. Instrument Validity Tests and Alternative Specifications.**

The table reports three instrument validity tests and two alternative specifications. There are two types of corporate governance reforms. Boards can either be given statutory power to dismiss the CEO, or the law can reserve this power for the shareholders' meeting but allow for such power to be delegated to the board through an amendment to the corporate charter. Our instrument is based solely on changes in the board's statutory power, as identified in Table 2. For the instrument to be valid, it has to be the case that law changes that require a corporate charter amendment have no effect on CEO turnover. To change the charter post-law change, a sample fund needs a majority of the votes in the shareholders' meeting. To dismiss the CEO pre-law change, it also needs a majority of the votes in the shareholders' meeting. Thus, this type of law change should not affect the distribution of power within the firm. Column 1 tests this prediction. Second, if the instrument behaves as we hypothesize, the probability of board intervention should jump in the year the law was changed and then stay higher for a while. If it increased any earlier, our argument would be quite implausible: For boards to fire the CEO, according to our argument, they need statutory powers; the mere prospect of such powers should not be sufficient. Accordingly, column 2 investigates the time profile of the effect of law changes empowering boards to dismiss the CEO on the probability of board intervention. Third, we test whether it is speculation about possible corporate governance reform or, as our argument implies, its actual enactment that affects boards' propensity to fire a CEO. To test this, column 3 distinguishes between the year corporate governance reform was first mooted in the local press and the year it was enacted. The two alternative specifications in columns 4 and 5 explore two subsamples. Column 4 restricts the sample to the five countries (Croatia, Poland, Romania, Russia, and Serbia Montenegro) in which the law was changed to give boards the statutory power to dismiss the CEO and our data cover both the pre-law change and the post-law change regime (for details, see Table 2). Column 5 restricts the sample to the five countries with the most investments (Poland, Russia, Hungary, the Czech Republic, and Romania). All specifications include country, industry, and time effects. Estimation uses probit. The number of observations is 2,058 in columns 1 and 2, 1,323 in column 3, and 1,705 in column 4. Heteroskedasticity-consistent standard errors, clustered on portfolio firm, are reported in italics beneath the coefficient estimates. We use <sup>\*\*\*</sup>, <sup>\*\*</sup>, and <sup>\*</sup> to denote significance at the 1%, 5%, and 10% level (two-sided), respectively.

Table 4. Continued.

	Dependent variable = 1 if CEO is fired in year $t$				
	(1)	(2)	(3)	(4)	(5)
<b>Board's information set and beliefs</b>					
performance rel. to expectations in $t-1$	-0.310*** <i>0.050</i>	-0.307*** <i>0.050</i>	-0.310*** <i>0.050</i>	-0.291*** <i>0.067</i>	-0.284*** <i>0.056</i>
=1 if poor performance blamed on CEO's decisions in $t-1$	0.131 <i>0.180</i>	0.118 <i>0.181</i>	0.132 <i>0.180</i>	0.099 <i>0.212</i>	0.222 <i>0.196</i>
=1 if poor performance blamed on bad luck in $t-1$	-0.029 <i>0.130</i>	-0.032 <i>0.130</i>	-0.035 <i>0.129</i>	-0.057 <i>0.165</i>	0.067 <i>0.139</i>
=1 if CEO viewed as incompetent in $t-1$	1.263*** <i>0.133</i>	1.252*** <i>0.131</i>	1.258*** <i>0.132</i>	1.424*** <i>0.175</i>	1.262*** <i>0.142</i>
<b>Deal characteristics</b>					
log investment cost through $t-1$	0.003 <i>0.036</i>	0.005 <i>0.038</i>	0.002 <i>0.037</i>	0.079 <i>0.061</i>	-0.020 <i>0.032</i>
=1 if privatization	0.347** <i>0.174</i>	0.351** <i>0.174</i>	0.344** <i>0.174</i>	-0.085 <i>0.221</i>	0.095 <i>0.203</i>
=1 if deal is staged	0.193** <i>0.093</i>	0.199** <i>0.092</i>	0.192** <i>0.092</i>	0.118 <i>0.129</i>	0.189* <i>0.106</i>
<b>Macroeconomic conditions</b>					
lagged EBRD transition indicator	0.094 <i>0.170</i>	0.167 <i>0.186</i>	0.071 <i>0.176</i>	-0.428 <i>0.393</i>	0.086 <i>0.412</i>
lagged real GDP growth	-0.009 <i>0.014</i>	-0.015 <i>0.014</i>	-0.014 <i>0.014</i>	-0.028 <i>0.017</i>	-0.006 <i>0.017</i>
<b>Instrument</b>					
=1 if corp gov. law enacted	0.605*** <i>0.135</i>		0.529*** <i>0.164</i>	0.726*** <i>0.178</i>	0.676*** <i>0.169</i>
=1 if change in board power requires charter change	-0.030 <i>0.221</i>				
=1 if corp gov. law enacted in $t+2$		0.066 <i>0.223</i>			
=1 if corp gov. law enacted in $t+1$		0.089 <i>0.247</i>			
=1 if corp gov. law enacted in $t$		0.767*** <i>0.194</i>			
=1 if corp gov. law enacted in $t-1$		0.470** <i>0.211</i>			
=1 if corp gov. law enacted in $t-2$ or earlier		0.564*** <i>0.172</i>			
=1 if corp gov. reform mooted			0.157 <i>0.179</i>		
<b>Diagnostics</b>					
Wald test: all coeff. = 0 ( $\chi^2$ )	265.3***	269.5***	263.2***	1999.0***	250.5***
Staiger-Stock (1997) instrument strength test ( $\chi^2$ )	20.0***	17.1***	10.4***	16.6***	16.0***
Pseudo- $R^2$	19.3%	19.3%	19.4%	23.1%	19.8%

**Table 5. Naïve Performance Models.**

To establish a baseline, we relate performance to board intervention ignoring the potential endogeneity of intervention. In other words, we estimate equation (2) in Section 2 without reference to equation (1). We expect the probit coefficient on intervention to be downward biased. To allow for lags in interventions affecting performance, we measure performance over the years  $t$  to  $t+2$ . (Results are robust to using shorter windows.) In columns 1 and 2, we measure performance using an indicator variable set equal to one if the portfolio firm is exited through an IPO or a sale, and zero otherwise. In columns 3 and 4, we additionally require that the IRR is strictly positive in the event of an exit. All specifications include country, industry, and time effects. The number of observations is 2,058. In columns 1 and 3, heteroskedasticity-consistent standard errors, clustered on portfolio firm, are reported in italics beneath the coefficient estimates. In columns 2 and 4, we include random portfolio-firm effects which rules out clustering in Stata. We use <sup>\*\*\*</sup>, <sup>\*\*</sup>, and <sup>\*</sup> to denote significance at the 1%, 5%, and 10% level (two-sided), respectively.

	Dependent variable = 1 if ...			
	... exit in years $t$ to $t+2$		... exit at positive IRR in years $t$ to $t+2$	
	(1)	(2)	(3)	(4)
<b>Board interventions</b>				
=1 if CEO dismissed in year $t$	-0.210 <sup>*</sup> <i>0.127</i>	-0.092 <i>0.174</i>	-0.334 <sup>**</sup> <i>0.148</i>	-0.394 <sup>*</sup> <i>0.228</i>
<b>Board's information set and beliefs</b>				
performance rel. to expectations in $t-1$	0.121 <sup>***</sup> <i>0.041</i>	0.083 <i>0.053</i>	0.306 <sup>***</sup> <i>0.043</i>	0.238 <sup>***</sup> <i>0.064</i>
=1 if poor performance blamed on CEO's decisions in $t-1$	0.227 <i>0.179</i>	0.058 <i>0.236</i>	0.086 <i>0.185</i>	0.457 <i>0.307</i>
=1 if poor performance blamed on bad luck in $t-1$	-0.059 <i>0.106</i>	-0.105 <i>0.139</i>	0.072 <i>0.112</i>	0.162 <i>0.169</i>
=1 if CEO viewed as incompetent in $t-1$	-0.005 <i>0.150</i>	-0.108 <i>0.200</i>	0.026 <i>0.170</i>	0.306 <i>0.267</i>
<b>Deal characteristics</b>				
log investment cost through $t-1$	0.062 <sup>**</sup> <i>0.025</i>	0.213 <sup>***</sup> <i>0.051</i>	0.096 <sup>***</sup> <i>0.037</i>	0.311 <sup>***</sup> <i>0.072</i>
=1 if privatization	0.188 <i>0.144</i>	0.680 <sup>*</sup> <i>0.390</i>	0.272 <i>0.180</i>	1.185 <sup>**</sup> <i>0.484</i>
=1 if deal is staged	-0.368 <sup>***</sup> <i>0.085</i>	-0.922 <sup>***</sup> <i>0.228</i>	-0.281 <sup>***</sup> <i>0.098</i>	-0.854 <sup>***</sup> <i>0.274</i>
<b>Macroeconomic conditions</b>				
lagged EBRD transition indicator	0.487 <sup>***</sup> <i>0.162</i>	0.378 <sup>***</sup> <i>0.025</i>	0.154 <i>0.167</i>	0.349 <sup>***</sup> <i>0.029</i>
lagged real GDP growth	0.036 <sup>***</sup> <i>0.012</i>	0.133 <sup>***</sup> <i>0.017</i>	0.044 <sup>***</sup> <i>0.013</i>	0.165 <sup>***</sup> <i>0.022</i>
Portfolio-firm effects?	No	Yes	No	Yes
<b>Diagnostics</b>				
Wald test: all coeff. = 0 ( $\chi^2$ )	146.7 <sup>***</sup>	310.9 <sup>***</sup>	250.9 <sup>***</sup>	248.4 <sup>***</sup>
Likelihood ratio test: portfolio-firm effects = 0 ( $\chi^2$ )	n.a.	337.7 <sup>***</sup>	n.a.	392.1 <sup>***</sup>
Pseudo- $R^2$	7.9%	20.1%	13.7%	29.5%



**Table 6. Reduced-form Performance Models.**

To validate our instrument, we estimate reduced-form probit models of the performance equation, that is, we estimate the effect of law changes empowering the board to dismiss the CEO on performance, controlling for our set of explanatory variables. Given that board intervention becomes more likely after changes in corporate governance laws, then if interventions improve performance, we should find a positive reduced-form relation between law changes and performance. To allow for lags in interventions affecting performance, we measure performance over the years  $t$  to  $t+2$ . (Results are robust to using shorter windows.) In columns 1 and 2, we measure performance using an indicator variable set equal to one if the portfolio firm is exited through an IPO or a sale, and zero otherwise. In columns 3 and 4, we additionally require that the IRR is strictly positive in the event of an exit. All specifications include country, industry, and time effects. The number of observations is 2,058. In columns 1 and 3, heteroskedasticity-consistent standard errors, clustered on portfolio firm, are reported in italics beneath the coefficient estimates. In columns 2 and 4, we include random portfolio-firm effects which rules out clustering in Stata. We use \*\*\*, \*\*, and \* to denote significance at the 1%, 5%, and 10% level (two-sided), respectively.

	Dependent variable =1 if ...			
	... exit in years $t$ to $t+2$		... exit at positive IRR in years $t$ to $t+2$	
	(1)	(2)	(3)	(4)
<b>Board's information set and beliefs</b>				
performance rel. to expectations in $t-1$	0.137*** <i>0.043</i>	0.068 <i>0.055</i>	0.324*** <i>0.044</i>	0.234*** <i>0.066</i>
=1 if poor performance blamed on CEO's decisions in $t-1$	0.226 <i>0.178</i>	0.435 <i>0.246</i>	0.075 <i>0.186</i>	0.389 <i>0.321</i>
=1 if poor performance blamed on bad luck in $t-1$	-0.020 <i>0.107</i>	-0.081 <i>0.146</i>	0.112 <i>0.111</i>	0.140 <i>0.178</i>
=1 if CEO viewed as incompetent in $t-1$	-0.059 <i>0.144</i>	-0.155 <i>0.197</i>	-0.069 <i>0.164</i>	0.109 <i>0.257</i>
<b>Deal characteristics</b>				
log investment cost through $t-1$	0.069*** <i>0.026</i>	0.212*** <i>0.051</i>	0.096** <i>0.038</i>	0.267*** <i>0.065</i>
=1 if privatization	0.156 <i>0.161</i>	0.059 <i>0.038</i>	0.243 <i>0.191</i>	0.106** <i>0.047</i>
=1 if deal is staged	-0.396*** <i>0.090</i>	-0.100*** <i>0.023</i>	-0.301*** <i>0.102</i>	-0.094*** <i>0.028</i>
<b>Macroeconomic conditions</b>				
lagged EBRD transition indicator	0.361** <i>0.178</i>	0.311*** <i>0.026</i>	0.033 <i>0.182</i>	0.284*** <i>0.031</i>
lagged real GDP growth	0.045*** <i>0.012</i>	0.169*** <i>0.019</i>	0.053*** <i>0.014</i>	0.203*** <i>0.024</i>
<b>Instrument</b>				
=1 if corp governance law enacted	0.513*** <i>0.119</i>	1.686*** <i>0.176</i>	0.428*** <i>0.127</i>	1.586*** <i>0.205</i>
Portfolio-firm effects?	No	Yes	No	Yes
<b>Diagnostics</b>				
Wald test: all coeff. = 0 ( $\chi^2$ )	160.3***	425.9***	236.4***	310.7***
Likelihood ratio test: portfolio-firm effects = 0 ( $\chi^2$ )	n.a.	420.9***	n.a.	446.1***
Pseudo- $R^2$	9.9%	25.1%	14.8%	32.7%

**Table 7. Structural Performance Model Using Law Changes as an Instrument.**

In columns 1-3, we measure performance using an indicator variable set equal to one if the portfolio firm is exited through an IPO or a sale, and zero otherwise. In columns 4-6, we additionally require that the IRR is strictly positive in the event of an exit. Given the binary nature of the dependent variable (exit) and of the potentially endogenous variable (CEO dismissal), models 1-2 and 5-6 are estimated using a seemingly unrelated bivariate probit model that treats intervention as endogenous using column 2, Table 3, to model CEO dismissal. Models 1 and 3 are estimated without random portfolio-firm effects while models 2 and 4 include random portfolio-firm effects to control for time-invariant firm-level omitted variables which we allow to be correlated across the intervention and performance equations. (We use random effects since fixed-effects probit is inconsistent.) All four probit specifications include country, industry, and time effects. In models 1 and 4, heteroskedasticity-consistent standard errors, clustered on portfolio firm, are reported in italics beneath the coefficient estimates. In models 2 and 5, where we include random firm effects, it is impossible to cluster in Stata. The exogeneity test reported for the probit models is a likelihood ratio test of the null that the disturbances in the two equations are uncorrelated. Based on Monte Carlo evidence, Monfardini and Radice (2008) conclude that this test performs well even when the distribution of the errors is misspecified. (A probit model assumes, of course, normality.) The same is not true of a simple  $t$ -test on the correlation coefficient, so we report the LR test. In columns 3 and 6, we alternatively estimate linear probability models using 2SLS with portfolio-firm fixed effects and standard errors clustered at the country level. Inclusion of firm fixed effects implies that time-invariant regressors (such as country and industry effects, the staging variable, and the privatization indicator) must be dropped from these two models. The Staiger-Stock test is a Wald test of the null hypothesis that the instrument does not correlate with board interventions. It has a critical value of 10. We use \*\*\*, \*\*, and \* to denote significance at the 1%, 5%, and 10% level (two-sided), respectively. The number of observations is 2,058.

	Dependent variable = 1 if ...					
	... exit in years $t$ to $t+2$			... exit at positive IRR in $t$ to $t+2$		
	Bivariate probit (1)	2SLS (2)	2SLS (3)	Bivariate probit (4)	2SLS (5)	2SLS (6)
<b>Board interventions</b>						
=1 if CEO dismissed in year $t$	0.971** <i>0.432</i>	1.611*** <i>0.253</i>	4.655*** <i>1.061</i>	1.309*** <i>0.342</i>	1.124** <i>0.472</i>	2.946*** <i>0.576</i>
<b>Board's information set and beliefs</b>						
performance rel. to expectations in $t-1$	0.160*** <i>0.042</i>	0.112** <i>0.046</i>	0.142*** <i>0.035</i>	0.333*** <i>0.042</i>	0.200*** <i>0.062</i>	0.114*** <i>0.023</i>
=1 if poor performance blamed on CEO's decisions in $t-1$	0.218 <i>0.167</i>	0.609** <i>0.238</i>	0.079 <i>0.215</i>	0.074 <i>0.179</i>	0.756** <i>0.326</i>	0.038 <i>0.153</i>
=1 if poor perf. blamed on bad luck in $t-1$	-0.020 <i>0.103</i>	-0.078 <i>0.127</i>	0.029 <i>0.110</i>	0.102 <i>0.107</i>	0.238 <i>0.174</i>	0.073 <i>0.090</i>
=1 if CEO viewed as incompetent in $t-1$	-0.362* <i>0.220</i>	-0.732*** <i>0.194</i>	-1.753*** <i>0.360</i>	-0.420** <i>0.208</i>	-0.343 <i>0.356</i>	-1.065*** <i>0.200</i>
<b>Deal characteristics</b>						
log investment cost through $t-1$	0.067*** <i>0.025</i>	0.295*** <i>0.038</i>	0.003 <i>0.010</i>	0.101*** <i>0.038</i>	0.900*** <i>0.075</i>	0.005 <i>0.004</i>
=1 if privatization	0.116 <i>0.147</i>	0.087*** <i>0.017</i>		0.189 <i>0.175</i>	0.273*** <i>0.027</i>	
=1 if deal is staged	-0.367*** <i>0.085</i>	-0.139*** <i>0.011</i>		-0.277*** <i>0.096</i>	-0.135*** <i>0.015</i>	
<b>Macroeconomic conditions</b>						
lagged EBRD transition indicator	0.564*** <i>0.170</i>	0.706*** <i>0.034</i>	1.799*** <i>0.395</i>	0.212 <i>0.171</i>	0.980*** <i>0.057</i>	1.228*** <i>0.265</i>
lagged real GDP growth	0.045*** <i>0.012</i>	0.192*** <i>0.016</i>	0.036*** <i>0.012</i>	0.051*** <i>0.013</i>	0.277*** <i>0.026</i>	0.027*** <i>0.007</i>
Portfolio-firm effects?	No	Yes	Yes	No	Yes	Yes
<b>Diagnostics</b>						
Wald test: all coeff. = 0 ( $\chi^2$ ; $F$ in cols 3, 6)	681.9***	903.6***	94.0***	907.5***	630.1***	52.5***
Exogeneity test (LR test) ( $\chi^2$ )	7.4***	407.7***	n.m.	11.8***	480.8***	n.m.
Staiger-Stock test ( $\chi^2$ ; $F$ in cols 3, 6)	20.5***	14.0***	61.4***	18.5***	10.8***	61.4***
Pseudo- $R^2$ ; within-groups $R^2$ in cols. 3, 6	12.4%	22.6%	32.9%	16.5%	29.5%	23.2%

**Table 8. Effect of Board Intervention on Performance Relative to Expectation.**

The dependent variable measures a portfolio firm's performance relative to expectations on a five-point scale. Specifically, firms are scored from 1 to 5, where 3 denotes performance in line with expectations (as set out in the firm's budget for the year); 4 and 5 denote performance above and greatly above budget; and 2 and 1 denote underperformance and severe underperformance relative to budget. We estimate linear least-squares models with an integer dependent variable; results are somewhat stronger if we use a logistic transform of the dependent variable instead. Columns 1 and 2 are naïve models that ignore the potential endogeneity of intervention. Column 1 is estimated using OLS. Columns 2 and 3 include random and fixed portfolio-firm effects, respectively, and are estimated using GLS. Columns 4 through 6 are the second stages of instrumental-variable models that treat intervention as endogenous (see Table 3, column 2 for the first stage). Because the intervention variable is binary, column 4 is estimated as a Heckman (1978) treatment model. In columns 5 and 6, we include random and fixed portfolio-firm effects, respectively. Because Heckman's model cannot accommodate firm effects, these models are estimated using generalized two-stage least-squares. All specifications include time effects as well as country and industry effects except, due to the presence of firm fixed effects, in column 3 and 6. Inclusion of firm fixed effects also implies that time-invariant regressors (such as the staging variable and the privatization indicator) must be dropped in columns 3 and 6. The Staiger-Stock test in columns 4-6 is a Wald test of the null hypothesis that the instrument does not correlate with board interventions. It has a critical value of 10. Heteroskedasticity-consistent standard errors are reported in italics beneath the coefficient estimates. They are clustered on portfolio firm in columns 1, 2, 4, and 5, and on country in columns 3 and 6. We use \*\*\*, \*\*, and \* to denote significance at the 1%, 5%, and 10% level (two-sided), respectively. Due to the lagging structure, the number of observations is 1,418.

	Dep. variable: Performance rel. to expectations in year $t+1$					
	Naïve model			IV model		
	(1)	(2)	(3)	(4)	(5)	(6)
<b>Board interventions</b>						
=1 if CEO dismissed in year $t$	0.166 <i>0.103</i>	0.227** <i>0.100</i>	0.356*** <i>0.005</i>	1.382*** <i>0.361</i>	1.897** <i>0.921</i>	1.961*** <i>0.001</i>
<b>Board's information set and beliefs</b>						
performance rel. to expectations in $t-1$	0.311*** <i>0.039</i>	0.142*** <i>0.037</i>	0.096*** <i>0.006</i>	0.372*** <i>0.044</i>	0.297*** <i>0.055</i>	-0.030 <i>0.442</i>
=1 if poor performance blamed on CEO's decisions in $t-1$	0.272 <i>0.181</i>	0.333* <i>0.171</i>	0.372 <i>0.255</i>	0.196 <i>0.178</i>	0.220 <i>0.166</i>	0.288 <i>0.446</i>
=1 if poor perf. blamed on bad luck in $t-1$	0.294*** <i>0.093</i>	0.273*** <i>0.090</i>	0.222*** <i>0.001</i>	0.327*** <i>0.100</i>	0.335*** <i>0.094</i>	0.300*** <i>0.000</i>
=1 if CEO viewed as incompetent in $t-1$	-0.209* <i>0.119</i>	-0.135 <i>0.113</i>	-0.043 <i>0.659</i>	-0.660*** <i>0.171</i>	-0.824** <i>0.375</i>	-0.747*** <i>0.002</i>
<b>Deal characteristics</b>						
log investment cost through $t-1$	0.037*** <i>0.014</i>	0.026** <i>0.013</i>	0.003 <i>0.808</i>	0.041*** <i>0.015</i>	0.034** <i>0.016</i>	-0.002 <i>0.868</i>
=1 if privatization	0.197 <i>0.138</i>	0.233 <i>0.165</i>		0.156 <i>0.152</i>	0.153 <i>0.148</i>	
=1 if deal is staged	-0.079 <i>0.067</i>	-0.095 <i>0.081</i>		-0.119* <i>0.070</i>	-0.138* <i>0.078</i>	
<b>Macroeconomic conditions</b>						
lagged EBRD transition indicator	-0.194 <i>0.118</i>	-0.222 <i>0.142</i>	-0.350 <i>0.282</i>	-0.199* <i>0.105</i>	-0.215 <i>0.139</i>	-0.326 <i>0.143</i>
lagged real GDP growth	0.007 <i>0.009</i>	0.006 <i>0.009</i>	0.002 <i>0.009</i>	0.015 <i>0.009</i>	0.015* <i>0.009</i>	0.009 <i>0.005</i>
Portfolio-firm effects?	No	Yes	Yes	No	Yes	Yes
<b>Diagnostics</b>						
Wald test: all coeff. = 0 ( $\chi^2$ ; $F$ in cols 3, 6)	277.5***	176.5***	7.5***	249.2***	147.4***	33.3***
Wald test: independent equations	n.a.	n.a.	n.a.	9.2***	n.a.	n.a.
Staiger-Stock test ( $\chi^2$ ; $F$ in cols 3, 6)	n.a.	n.a.	n.a.	15.6***	19.3***	34.3***
$R^2$	17.1%	14.4%	5.5%	11.4%	7.9%	4.7%

**Table 9. Tests of the Exclusion Restriction.**

We explore two ways in which the exclusion restriction might be violated: Managers might raise their game in response to an increase in the threat of dismissal; and changes in corporate governance laws might capture the performance-improving effects of broader reforms of corporate law, which they were often introduced as part of. To test the first story, we run a horse race between actual law changes empowering the board to dismiss the CEO and the date when such changes were first mooted in the local press using the same reduced-form specification as in Table 6. The results are reported in columns 1 and 3. To test the second story, we restrict the sample to the three countries that strengthened the power of the board relative to the CEO through an amendment to a commercial law enacted some years earlier. As per Table 2, the three countries are Croatia, Romania, and Russia. Note that each of these countries replaced its Soviet-era corporate law with Western-style corporate law *before* sample funds made any investments. Thus, there is no need to include separate indicators for commercial law reform and subsequent corporate governance amendments; the instrument isolates the effect of changes in corporate governance law on performance. The results are reported in columns 2 and 4. All specifications include country, industry, and time effects. Estimation uses probit. The number of observations is 2,058 in columns 1 and 3 and 546 in columns 2 and 4. Heteroskedasticity-consistent standard errors, clustered on portfolio firm, are reported in italics beneath the coefficient estimates. We use \*\*\*, \*\*, and \* to denote significance at the 1%, 5%, and 10% level (two-sided), respectively.

	Dependent variable =1 if ...			
	... exit in years $t$ to $t+2$		... exit at positive IRR in years $t$ to $t+2$	
	(1)	(2)	(3)	(4)
<b>Board's information set and beliefs</b>				
performance rel. to expectations in $t-1$	0.138*** <i>0.043</i>	0.224** <i>0.092</i>	0.327*** <i>0.044</i>	0.383*** <i>0.096</i>
=1 if poor performance blamed on CEO's decisions in $t-1$	0.236 <i>0.178</i>	0.247 <i>0.338</i>	0.094 <i>0.184</i>	0.530 <i>0.340</i>
=1 if poor performance blamed on bad luck in $t-1$	-0.026 <i>0.107</i>	0.358 <i>0.226</i>	0.103 <i>0.112</i>	0.326 <i>0.244</i>
=1 if CEO viewed as incompetent in $t-1$	-0.067 <i>0.145</i>	-0.069 <i>0.320</i>	-0.077 <i>0.164</i>	-0.387 <i>0.291</i>
<b>Deal characteristics</b>				
log investment cost through $t-1$	0.069*** <i>0.026</i>	0.061 <i>0.062</i>	0.096** <i>0.039</i>	0.030 <i>0.070</i>
=1 if privatization	0.153 <i>0.161</i>	1.731** <i>0.717</i>	0.240 <i>0.192</i>	1.627** <i>0.786</i>
=1 if deal is staged	-0.397*** <i>0.090</i>	-0.154 <i>0.186</i>	-0.303*** <i>0.101</i>	-0.124 <i>0.205</i>
<b>Macroeconomic conditions</b>				
lagged EBRD transition indicator	0.334* <i>0.184</i>	1.643*** <i>0.436</i>	-0.009 <i>0.189</i>	1.027** <i>0.522</i>
lagged real GDP growth	0.042*** <i>0.013</i>	0.058*** <i>0.020</i>	0.048*** <i>0.014</i>	0.052** <i>0.025</i>
<b>Instrument</b>				
=1 if corp gov. reform mooted	0.138 <i>0.134</i>		0.194 <i>0.137</i>	
=1 if corp gov. law enacted	0.431*** <i>0.135</i>		0.317** <i>0.144</i>	
=1 if corp governance strengthened by amendment		1.036*** <i>0.220</i>		0.707*** <i>0.204</i>
<b>Diagnostics</b>				
Wald test: all coeff. = 0 ( $\chi^2$ )	159.4***	165.5***	233.1***	127.7***
Pseudo- $R^2$	10.0%	23.9%	14.9%	23.4%

**Table 10. Robustness Tests.**

This table reports variations on the bivariate probit specifications reported in Table 7. In Panel A, we redefine the horizon over which exit is measured. Panels B and C restrict the sample to the set of countries with in-sample variation in corporate governance laws and the five countries with the most investments, respectively. See Table 4 for further details. In Panel D, we replace the instrumental variable with a set of five indicator variables to capture the timing of the law changes relative to the panel year in question. Specifically, the board intervention equation now relates intervention to whether a law change took place two or more years earlier, one year earlier, in the same year, one year later, or two years later. (The omitted category is law changes that took place more than two years later.) In Panel E, we allow for country-level heterogeneity in the effect of law changes on CEO turnover by including country-specific law change indicators in the intervention equation. To save space, each panel reports only the coefficient estimates and standard errors for the intervention variable in the performance equation. All other covariates shown in Table 7 are included in the estimation but not reported. The number of observations is 2,058 in Panels A, D, and E; 1,323 in Panel B; and 1,705 in Panel C. Heteroskedasticity-consistent standard errors, clustered on portfolio firm, are reported in italics beneath the coefficient estimates. We use \*\*\*, \*\*, and \* to denote significance at the 1%, 5%, and 10% level (two-sided), respectively.

<i>Firm effects?</i>	Dependent variable = 1 if exit		Dependent variable = 1 if exit at positive IRR	
	No	Yes	No	Yes
	(1)	(2)	(3)	(4)
<b>Panel A: Alternative exit horizons</b>				
exit in years $t$ to $t+1$	0.744* <i>0.394</i>	1.136*** <i>0.269</i>	1.552*** <i>0.413</i>	1.402*** <i>0.255</i>
<b>Panel B: Country exclusions</b>				
exclude countries without within-sample-period law changes	1.452*** <i>0.395</i>	1.708*** <i>0.298</i>	1.024* <i>0.592</i>	1.243*** <i>0.476</i>
<b>Panel C: Most active countries</b>				
five most active countries	0.885** <i>0.424</i>	1.632*** <i>0.266</i>	1.190** <i>0.600</i>	1.316*** <i>0.490</i>
<b>Panel D: Time-varying law changes</b>				
IV uses indicators for law change in year $t-i$ , $i = -2, -1, 0, +1, +2$	1.121** <i>0.538</i>	1.724*** <i>0.219</i>	1.417*** <i>0.335</i>	1.712*** <i>0.158</i>
<b>Panel E: Heterogeneous country effects</b>				
use country-level law change indicators	0.950** <i>0.421</i>	1.626*** <i>0.249</i>	1.284*** <i>0.355</i>	1.111** <i>0.475</i>

**INTERNET APPENDIX**

**(NOT INTENDED FOR PUBLICATION)**

### **Alternative Table 3.**

#### **Determinants of Board Intervention (Linear Probability Models).**

This alternative version of Table 3 uses linear probability models with standard errors clustered at the country level. Results are similar if we cluster the firm level instead; see Table 3 in the paper. Columns 2 through 9 include firm fixed effects. Inclusion of firm fixed effects implies that time-invariant regressors (such as country and industry effects, the staging variable, and the privatization indicator) must be dropped from the estimation. In all other respects, the specifications are identical to those in Table 3 in the paper. “n.m.” in columns 5 and 6 denotes “not meaningful.” The number of observations is 2,058 except in column 4, which restricts the sample to the 1,196 firm-years with lagged performance at or above plan. Heteroskedasticity-consistent standard errors, clustered at the country level, are reported in italics beneath the coefficient estimates. We use *\*\*\**, *\*\**, and *\** to denote significance at the 1%, 5%, and 10% level (two-sided), respectively.

**Alternative Table 3. Continued.**

	=1 if CEO viewed as incompetent (1)	Dependent variable =1 if fire ...						junior manager (8)	=1 if streng- then mgt (9)
		CEO (2)	CEO (3)	CEO (4)	CEO (5)	CEO (6)	CEO (7)		
<b>Board's information set and beliefs</b>									
performance relative to board's expectations in $t-1$	-0.015** <i>0.006</i>	-0.033*** <i>0.004</i>	-0.029*** <i>0.004</i>	0.007 <i>0.011</i>	-0.029*** <i>0.004</i>	-0.038*** <i>0.007</i>	-0.030*** <i>0.005</i>	-0.009 <i>0.009</i>	-0.007 <i>0.008</i>
... x (=1 if corporate governance law enacted)						0.015* <i>0.008</i>			
=1 if poor perf. blamed on manager's decisions in $t-1$	0.032 <i>0.031</i>	0.024 <i>0.038</i>	-0.002 <i>0.057</i>		-0.031 <i>0.066</i>	0.007 <i>0.058</i>	0.010 <i>0.058</i>	0.016 <i>0.076</i>	0.049 <i>0.060</i>
=1 if board complained about moral hazard probs in $t-1$					0.051 <i>0.099</i>				
=1 if poor performance blamed on bad luck in $t-1$	-0.021 <i>0.018</i>	-0.004 <i>0.031</i>	-0.008 <i>0.026</i>		-0.007 <i>0.026</i>	-0.010 <i>0.025</i>	-0.012 <i>0.024</i>	-0.012 <i>0.021</i>	0.031 <i>0.022</i>
=1 if manager viewed as incompetent in $t-1$	0.241*** <i>0.024</i>	0.319*** <i>0.051</i>	0.371*** <i>0.051</i>	0.274*** <i>0.089</i>	0.371*** <i>0.051</i>	0.247*** <i>0.077</i>	0.229*** <i>0.068</i>	0.148*** <i>0.044</i>	0.033 <i>0.050</i>
... x (=1 if corporate governance law enacted)						0.257*** <i>0.079</i>	0.312*** <i>0.067</i>		
... x (=1 if fund has majority ownership)							0.422 <i>0.312</i>		
... x (=1 if corporate governance law enacted)							-0.559* <i>0.269</i>		
<b>Deal characteristics</b>									
log investment cost through $t-1$	0.003 <i>0.003</i>	0.001 <i>0.004</i>	0.002 <i>0.002</i>	0.001** <i>0.001</i>	0.002 <i>0.002</i>	0.002 <i>0.002</i>	0.003 <i>0.002</i>	0.001 <i>0.004</i>	0.002 <i>0.002</i>
=1 if privatization		0.041 <i>0.038</i>							
=1 if deal is staged		0.022** <i>0.009</i>							
=1 if fund has majority ownership							0.103** <i>0.047</i>		
... x (=1 if corp governance law enacted)							-0.024 <i>0.016</i>		
<b>Macroeconomic conditions</b>									
lagged EBRD transition indicator	0.012 <i>0.014</i>	0.010 <i>0.015</i>	-0.117*** <i>0.035</i>	-0.091*** <i>0.031</i>	-0.117*** <i>0.035</i>	-0.105*** <i>0.033</i>	-0.125*** <i>0.038</i>	-0.147** <i>0.058</i>	-0.090* <i>0.045</i>
lagged real GDP growth	-0.001 <i>0.002</i>	0.000 <i>0.001</i>	-0.002 <i>0.002</i>	-0.002 <i>0.002</i>	-0.002 <i>0.002</i>	-0.002 <i>0.002</i>	-0.003 <i>0.002</i>	0.000 <i>0.001</i>	-0.003* <i>0.002</i>
<b>Instrument</b>									
=1 if corp governance law enacted	-0.005 <i>0.012</i>	0.069*** <i>0.013</i>	0.077*** <i>0.010</i>	0.068*** <i>0.021</i>	0.078*** <i>0.010</i>	0.015 <i>0.020</i>	0.064*** <i>0.008</i>	0.006 <i>0.015</i>	-0.016 <i>0.019</i>
<b>Diagnostics</b>									
Wald test: all coeff. = 0 ( $\chi^2$ )	14.0***	314.5***	95.6***	4.3***	82.8***	169.8***	238.7***	11.3***	77.9***
Staiger-Stock (1997) test ( $\chi^2$ )	0.2	26.7***	61.3***	11.0***	65.3***	n.m.	n.m.	0.1	0.7
Pseudo $R^2$ (adjusted $R^2$ in columns 6 and 7)	8.9%	13.2%	33.9%	42.5%	33.9%	34.8%	35.2%	29.8%	27.6%



### Alternative Table 4.

#### Instrument Validity Tests and Alternative Specifications (Linear Probability Models).

This alternative version of Table 4 uses linear probability models with firm fixed effects and standard errors clustered at the country level. Results are similar if we cluster the firm level instead; see Table 4 in the paper. Inclusion of firm fixed effects implies that time-invariant regressors (such as country and industry effects, the staging variable, and the privatization indicator) must be dropped from the estimation. In all other respects, the specifications are identical to those in Table 4 in the paper. The number of observations is 2,058 in columns 1 and 2, 1,323 in column 3, and 1,705 in column 4. Heteroskedasticity-consistent standard errors, clustered at the country level, are reported in italics beneath the coefficient estimates. We use <sup>\*\*\*</sup>, <sup>\*\*</sup>, and <sup>\*</sup> to denote significance at the 1%, 5%, and 10% level (two-sided), respectively.

	Dependent variable = 1 if CEO is fired in year $t$				
	(1)	(2)	(3)	(4)	(5)
<b>Board's information set and beliefs</b>					
performance rel. to expectations in $t-1$	-0.029 <sup>***</sup>	-0.029 <sup>***</sup>	-0.029 <sup>***</sup>	-0.027 <sup>***</sup>	-0.025 <sup>***</sup>
	<i>0.004</i>	<i>0.004</i>	<i>0.004</i>	<i>0.004</i>	<i>0.002</i>
=1 if poor performance blamed on CEO's decisions in $t-1$	0.001	-0.001	-0.002	-0.036	0.003
	<i>0.058</i>	<i>0.058</i>	<i>0.057</i>	<i>0.083</i>	<i>0.084</i>
=1 if poor performance blamed on bad luck in $t-1$	-0.007	-0.006	-0.007	-0.025	0.004
	<i>0.027</i>	<i>0.028</i>	<i>0.027</i>	<i>0.027</i>	<i>0.033</i>
=1 if CEO viewed as incompetent in $t-1$	0.371 <sup>***</sup>	0.370 <sup>***</sup>	0.372 <sup>***</sup>	0.372 <sup>***</sup>	0.369 <sup>***</sup>
	<i>0.051</i>	<i>0.052</i>	<i>0.050</i>	<i>0.073</i>	<i>0.059</i>
<b>Deal characteristics</b>					
log investment cost through $t-1$	0.002	0.002	0.002	0.004 <sup>*</sup>	0.001
	<i>0.002</i>	<i>0.003</i>	<i>0.002</i>	<i>0.002</i>	<i>0.003</i>
<b>Macroeconomic conditions</b>					
lagged EBRD transition indicator	-0.104 <sup>***</sup>	-0.100 <sup>*</sup>	-0.115 <sup>***</sup>	-0.085 <sup>**</sup>	-0.096 <sup>**</sup>
	<i>0.033</i>	<i>0.050</i>	<i>0.035</i>	<i>0.019</i>	<i>0.027</i>
lagged real GDP growth	-0.002	-0.002	-0.002	-0.005 <sup>***</sup>	-0.003
	<i>0.002</i>	<i>0.002</i>	<i>0.002</i>	<i>0.001</i>	<i>0.002</i>
<b>Instrument</b>					
=1 if corp gov. law enacted	0.075 <sup>***</sup>		0.080 <sup>***</sup>	0.066 <sup>***</sup>	0.077 <sup>***</sup>
	<i>0.010</i>		<i>0.012</i>	<i>0.011</i>	<i>0.008</i>
=1 if change in board power requires charter change	-0.041 <sup>*</sup>				
	<i>0.023</i>				
=1 if corp gov. law enacted in $t+2$		-0.005			
		<i>0.020</i>			
=1 if corp gov. law enacted in $t+1$		-0.010			
		<i>0.026</i>			
=1 if corp gov. law enacted in $t$		0.088 <sup>***</sup>			
		<i>0.022</i>			
=1 if corp gov. law enacted in $t-1$		0.048			
		<i>0.049</i>			
=1 if corp gov. law enacted in $t-2$ or earlier		0.064 <sup>*</sup>			
		<i>0.037</i>			
=1 if corp gov. reform mooted			-0.007		
			<i>0.023</i>		
<b>Diagnostics</b>					
Wald test: all coeff. = 0 ( $F$ )	136.7 <sup>***</sup>	269.5 <sup>***</sup>	87.8 <sup>***</sup>	125.0 <sup>***</sup>	29.2 <sup>***</sup>
Staiger-Stock (1997) instrument strength test ( $F$ )	59.0 <sup>***</sup>	20.1 <sup>7***</sup>	44.3 <sup>***</sup>	35.1 <sup>***</sup>	104.3 <sup>***</sup>
Adjusted $R^2$	33.9%	33.9%	33.9%	36.2%	34.4%

## Alternative Table 5/6.

### Naïve and Reduced-form Performance Models. (Linear Probability Models).

This alternative version of Tables 5 and 6 uses linear probability models with firm fixed effects and standard errors clustered at the country level. Results are similar if we cluster the firm level instead; see Tables 5 and 6 in the paper. Inclusion of firm fixed effects implies that time-invariant regressors (such as country and industry effects, the staging variable, and the privatization indicator) must be dropped from the estimation. In all other respects, the specifications are identical to those in Tables 5 and 6 in the paper. The number of observations is 2,058. Heteroskedasticity-consistent standard errors, clustered at the country level, are reported in italics beneath the coefficient estimates. We use <sup>\*\*\*</sup>, <sup>\*\*</sup>, and <sup>\*</sup> to denote significance at the 1%, 5%, and 10% level (two-sided), respectively.

	Dependent variable = 1 if ...			
	... exit in years $t$ to $t+2$		... exit at positive IRR in years $t$ to $t+2$	
	Naïve (1)	Reduced- form (2)	Naïve (3)	Reduced- form (4)
<b>Board interventions</b>				
=1 if CEO dismissed in year $t$	0.012 <i>0.011</i>		0.010 <i>0.007</i>	
<b>Board's information set and beliefs</b>				
performance rel. to expectations in $t-1$	-0.042 <i>0.032</i>	0.007 <i>0.016</i>	0.027 <i>0.029</i>	0.029* <i>0.016</i>
=1 if poor performance blamed on CEO's decisions in $t-1$	-0.008 <i>0.023</i>	0.071 <i>0.075</i>	0.049* <i>0.024</i>	0.033 <i>0.055</i>
=1 if poor performance blamed on bad luck in $t-1$	0.010 <i>0.020</i>	-0.006 <i>0.034</i>	-0.018 <i>0.021</i>	0.051* <i>0.024</i>
=1 if CEO viewed as incompetent in $t-1$	0.098 <i>0.080</i>	-0.024 <i>0.025</i>	0.050 <i>0.056</i>	0.030 <i>0.031</i>
<b>Deal characteristics</b>				
log investment cost through $t-1$	1.618 <sup>***</sup> <i>0.483</i>	0.012 <i>0.008</i>	1.113 <sup>***</sup> <i>0.330</i>	0.010 <sup>**</sup> <i>0.005</i>
=1 if privatization				
=1 if deal is staged				
<b>Macroeconomic conditions</b>				
lagged EBRD transition indicator	2.095 <sup>***</sup> <i>0.516</i>	1.256 <sup>**</sup> <i>0.440</i>	1.762 <sup>***</sup> <i>0.237</i>	0.884 <sup>***</sup> <i>0.284</i>
lagged real GDP growth	0.000 <i>0.000</i>	0.026 <sup>***</sup> <i>0.002</i>	0.000 <sup>*</sup> <i>0.000</i>	0.021 <sup>***</sup> <i>0.003</i>
<b>Instrument</b>				
=1 if corp governance law enacted		0.358 <sup>***</sup> <i>0.060</i>		0.227 <sup>***</sup> <i>0.029</i>
Portfolio-firm effects?	Yes	Yes	Yes	Yes
<b>Diagnostics</b>				
Wald test: all coeff. = 0 ( $\chi^2$ )	45.8 <sup>***</sup>	7458 <sup>***</sup>	45.2 <sup>***</sup>	877.0 <sup>***</sup>
Adjusted $R^2$	59.9%	62.7%	63.8%	65.1%

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