Governing Misvalued Firms

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Draft: September 28^{th} 2015

First Draft: August 2011

An undervalued firm is exposed to potential takeover or managerial turnover. Thus, bad corporate governance that prevents acquisition and management changes should have the largest impact in undervalued firms. Alternatively, equity overvaluation may create the potential for managerial misbehavior. In this case, the impact of better governance may occur when firms are highly valued. We combine these insights from the literatures on stock misvaluation and governance to ask whether better governance counters managerial misbehavior caused by high valuation, or worse governance insulates bad choices even though firms are undervalued. Examining performance as firms are shocked with governance and valuation changes, we provide consistent evidence that governance is much more important for firm performance when firms have high, potentially overvalued, stock prices. Our findings shift our understanding of the mechanism through which corporate governance works.

Key words: Corporate Governance, Valuation, Speculation.

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At least since Keynes (1936) economists have argued that stocks can get irrationally priced and that this divergence from fundamental value may impact managerial decisions.[1] Morck, Shleifer and Vishny (1990), Stein (1996), Baker, Stein and Wurgler (2003), Gilchrist, Himmelberg and Huberman (2005), Panageas (2005), Polk and Sapienza (2009), and Campello and Graham (2013), for example, all explore managerial investment decisions in the presence of speculative market prices.[2]

In a separate literature researchers have theorized and presented evidence that corporate governance can effectively alter managerial behavior. In the classic works by Manne (1965) and Scharfstein (1988), insulating managers from shareholders or from the takeover market increases shirking, empire-building, and the extraction of private benefits. Empirically papers such as Bertrand and Mullainathan (2001), Gompers, Ishii and Metrick (2003), Cremers and Nair (2005), Bebchuk and Cohen (2005), and Bebchuk, Cohen and Ferrell (2009) document evidence of the impact of corporate governance on firm performance.[3]

Governance, however, is affected by valuation. In the classical view of governance firms that become undervalued are exposed to a potential takeover and management may be fired. Therefore, undervalued firms should be the most impacted by poor governance that prevented takeovers and CEO turnover. In this view of governance the more undervalued a firm the greater the impact of poor governance.

Alternatively, high valuation causes managerial misbehavior. Jensen (2005), Bolton, Scheinkman and Xiong (2006) and Bolton, Scheinkman and Xiong (2005) argue that

gapore Business School, FSU SunTrust Conference, The Conference on Empirical Legal Studies (CELS), Research Institute of Industrial Economics (Stockholm, Sweden), University of Bergen, 2014 SFS Finance Cavalcade, Fourth Miami Behavioral Finance Conference, University of Utah, and Twelfth UBC Summer Finance Conference. Special thanks to Mozaffar Khan, Leonid Kogan, and George Serafeim for kindly providing us with data on stocks subject to mutual fund buying pressure. All errors are our own.

[1]See Shleifer (2000), Barberis and Thaler (2003), and Hirshleifer (2001) for summaries of literature on causes and evidence of price deviations from fundamentals.

[2]Shleifer and Vishny (2003), Rhodes-Kropf and Viswanathan (2004), Rhodes-Kropf, Robinson and Viswanathan (2005), Dong, Hirshleifer, Richardson and Teoh (2006), and Edmans, Goldstein and Jiang (2012) consider the effect of valuation on merger activity. Baker and Wurgler (2002), Welch (2004), Dong, Hirshleifer and Teoh (2012) and Khan, Kogan and Serafeim (2012) examine the effect of valuation on equity issuance and capital structure.

[3]Following this work many authors report evidence that firms' corporate governance alters corporate decisions and outcomes. For example, measures of better governance have been shown to predict higher return on assets (Core, Guay and Rusticus, 2006), better firing decisions (Huson, Malatesta and Parrino, 2004), better acquisitions (Masulis, Wang and Xie, 2007), more cash reserves (Harford, Mansi and Maxwell, 2008; Yun, 2009), etc.

market speculation is the root cause of much managerial misbehavior.[4] Bertrand and Mullainathan (2001) suggest CEOs tend to "skim" profits in good times and Hertzberg (2006) suggests managers have greater incentives to misreport during booms. Povel, Singh and Winton (2007) and Wang, Winton and Yu (2010) show that investor monitoring tends to fail to prevent fraud when the perceived industry conditions are good. If high valuation leads to bad decisions and if strong governance curbs this behavior, then governance should be particularly valuable if firms become too highly valued.

It is important to understand when governance is relevant in order to better understand how governance works. The different views on when governance might be important have implications on how companies are managed and for policies that impact the fundamental relationship between shareholders and managers.

We begin the paper with a simple extension of Holmstrom and Tirole (1997) to provide intuition for tests on the interaction between valuation and governance. In their model all managerial decisions are as desired by investors. However in our extension, some managers choose to shirk (or take on a weak projects) in equilibrium. Strong governance reduces the manager's ability to exploit the firm and thus reduces this behavior. Importantly, our extension demonstrates why undervaluation may not have the opposite symmetric effect - with overvaluation the incentive compatibility constraint is violated, while with undervaluation the constraint is simply slack. This implies that the importance of governance should increase with overvaluation but not decrease with undervaluation.[5] In the alternative classic view, overvaluation reduces the negative effects of entrenchment as all overvalued firms are effectively protected from an acquisition.

A direct empirical implication of the idea that governance counters behavior from overvaluation is that weakly governed firms should perform relatively poorly if they become

[4]See Kindleberger (1978) for a discussion of bubbles and fraud.

[5]This asymmetry does not arise in theories of misvaluation and managerial decisions that are not based on agency problems. For example, Derrien, Kecsks and Thesmar (2012) find that the role of investor heterogeneity in mitigating the effect of misvaluation on managerial decisions is symmetric for over- and undervalued firms.

overvalued. The classical prediction is that weakly governed firms should perform relatively poorly if they become undervalued.

We take this idea to the data using measures of price deviations from long-run fundamentals (Rhodes-Kropf et al., 2005; Hoberg and Phillips, 2010), as well as a measure of valuation shocks based on mutual fund flows (Coval and Stafford, 2007; Khan et al., 2012; Edmans et al., 2012).[6] We also use multiple different measures of corporate governance including the GIM from Gompers et al. (2003), board size, board independence, and state law changes to examine causality. We examine in a novel way both return-on-assets (ROA) as well as governance related portfolio returns.

In the Compustat/CRSP universe of US publicly traded firms, we show robust evidence that the positive correlation between governance and future ROA is increasing in measures of relative valuation. In numerous different specification (including firm fixed effects, eliminating technology firms, alternative valuation measures, etc) we find a strong positive relationship between the interaction of valuation and governance and future ROA. The relationship between governance and future ROA is strongest when a firm becomes highly valued. This is a surprising finding to many who expect undervalued, struggling firms to be the most protected by bad governance, and therefore the most influenced by entrenchment.

One alternative that this finding raises is that potentially weak governance is particularly detrimental to firms with high values due to unobservables such as growth options. Our novel finding is interesting with this interpretation also because it suggests the need to link governance and growth options. For example, a recent working paper Li and Li (2013) argues that better governed firms are better able to to take advantage of growth options in good times and disinvestment options in bad times and predicts time varying equity returns. Given this alternative, we attempt to distinguish whether theories of misvaluation or expected growth are more consistent with the data. First, we test our

[6]Measures similar to Rhodes-Kropf et al. (2005) have been used in much recent work (for examples, see Hertzel and Li (2010), Campello and Graham (2013), and Hoberg and Phillips (2010)).

theoretical prediction that overvaluation and undervaluation should not have symmetric effects. Second, we look for effects in portfolio returns since misvaluation implies an ability to find positive alphas. Finally, we reexamine our results using a natural experiment in which firm valuations are shocked by mutual fund flows (Coval and Stafford, 2007; Khan et al., 2012; Edmans et al., 2012). Overall, we find more support for the idea that governance matters more for overvalued rather than simply highly valued firms, but much evidence is consistent with both ideas. Thus, our paper both finds novel support for the theories of misvaluation and governance and simultaneously suggests the need for new theories about governance and growth that would allow sharper tests.

I. Summary of Main Findings

Our first test distinguishes the alternative theoretical predictions. Either overvaluation should cause the bad behavior that governance can counter, or undervaluation should expose management to discipline from the market for corporate control or executive turnover and poor governance protects them. We find that future ROA is positively correlated with corporate governance *only* after firm valuation is high. Thus, when firms are highly valued, those firms that already had strong governance outperform. On the other hand, in the set of firms with low or average values we find no difference in performance between those with different governance measures. These results are consistent with the prediction that the role of governance is important when firms are overvalued or have high growth options.

Our second approach is to examine stock market returns since misvaluation implies an ability to find abnormal returns (alphas). Thus, highly valued but weakly governed firms should subsequently not only have operating return underperformance, but also stock market return underperformance. Or, alternatively, undervalued firms with good governance should subsequently have higher stock performance. In order to test these

predictions, we examine returns from portfolios sorted by relative valuation in addition to the governance index. Our results show that the significant abnormal returns in the governance hedge portfolio, i.e. the portfolio that is long well-governed "democracy" firms and short poorly-governed "dictatorship" firms, are concentrated in firms that are highly valued (a monthly alpha of 119 bp). By contrast, abnormal returns to the governance hedge portfolio in normal or low-valuation firms are insignificantly different from zero. These results are also consistent with our model where the effects of misvaluation are asymmetric.

Any alpha can also potentially be explained by omitted, and in this case time-varying, risk factors. For example, Berk, Green and Naik (1999), Gomes, Kogan and Zhang (2003), and Carlson, Fisher and Giammarino (2005) show that growth options contain different risk factors and Li and Li (2013) builds on this to show equity returns can vary with governance. However, we also find that the out performance is concentrated in the shorts (poorly governed firms), i.e., when poorly governed firms become highly valued they significantly underperform - a finding that is somewhat difficult to square with a time varying risk premium.

To examine causality and to attempt to separate overvaluation from growth options, we re-run our tests using a plausibly exogenous firm-specific measure of overvaluation. Khan et al. (2012) and Edmans et al. (2012) build on Coval and Stafford (2007) and use mutual fund flows as a natural experiment that exogenously impacts stock stock valuation.[7] Khan et al. (2012) identify firms that become overvalued when they are subject to substantial buying pressure by mutual funds experiencing large capital inflows. They then show that these stocks experience a cumulative decline in market adjusted returns of 10% over the next six quarters, as well as a significantly higher probability of a seasoned equity offering,

[7]Khan et al. (2012) argue this measure is "exogenous to the firm since it is associated with who is buying–buyers with excess liquidity–rather than with what is being bought." Edmans et al. (2012) use a similarly constructed measure to identify exogenously undervalued stocks as stocks subject to selling pressure by mutual funds experiencing large capital ouflows. To avoid endogeneity of post-selloff events, the measure in Edmans et al. (2012) is constructed based on sales projected from the fund's previously disclosed portfolio, rather than actual, sales.

greater insider sales, and higher likelihood of equity M&A. Edmans et al. (2012) create a similar measure for outflows that results in undervaluation. Our results hold using this overvaluation measure and we find no effects in undervalued firms. In particular, we find that firms that become overvalued according to this measure subsequently perform relatively better (ROA) if they have better governance, while the performance is independent of governance in firms that are highly valued and being heavily purchased by mutual funds not receiving large inflows, i.e. not overvalued or in firms that are undervalued. Furthermore, buying the stocks of overvalued firms with good governance and selling the stock of overvalued firms with poor governance produces significant positive alpha, while there is no positive alpha from a long-short portfolio based on governance in the set of firms that are not overvalued. Instrumenting for overvaluation with mutual fund flows provides significant support for the idea that governance is most important when a firm becomes overvalued.

To address the remaining potential endogeneity concern, that our results are driven by some unobservable firm characteristic correlated with GIM, we follow Bertrand and Mullainathan (2003) and exploit the passage of state business combination laws as a source of exogenous variation in corporate governance. These laws, passed by states at various times between 1984 and 1991, effectively weakened corporate governance in these "treated" firms. This allows us to compare the impact of overvaluation on firms operating in the same state that incorporated in different states and thus have plausibly exogenous differences in corporate governance. Our results provide support for the idea that governance matters most when firms become overvalued.

In the last part of the paper we consider the channel through which governance may affect firm performance when firms become overvalued. We find that both well- and poorly-governed firms invest more and engage in more acquisition activity if they are highly valued, but poorly governed firms do so to a lesser extent. Furthermore, when we

examine the future operating efficiency of these firms, we find that labor productivity, cost efficiency, and sales growth are all superior for well-governed firms that get highly valued. Thus, there seems to be an effect of governance on highly valued firms' investment quantity as well as quality, and even though poorly governed firms invest less they also generate worse returns. This is consistent with the idea from our model that all managers invest when highly valued, but those with poor governance invest in projects with private benefits (projects that require less effort, for example) when they are overvalued. There are, however, many potentially interesting channels through which the governance-valuation relationship may impact the firm and much future work needs to be done here. One interesting recent paper by Schoar and Washington (2011) finds that after abnormally good firm performance, poorly governed firms tend to propose governance measures that go against shareholder interests. This could be a channel through which firm performance deteriorates in poorly governed firms.

One important implication of our results is that to the extent misvaluation tends to cluster in time, abnormal returns to the governance hedge portfolio should be time-varying and systematically related to market wide misvaluation. In an extension to Gompers et al. (2003), Core et al. (2006) demonstrate that the governance hedge portfolio returns are no longer statistically positive when they extend the sample to include the 2000-2004 time period – one hypothesis is that investors learned about the benefits of good governance. When we extend our tests to this time period, we find that among highly valued firms the democracy minus dictatorship portfolio returns are still positive and similar to other periods. However, fewer firms *become* highly valued during this period. These results suggest an alternative explanation for why returns to the governance hedge portfolio have declined after 1999 – this may be due to the limited number of overvalued firms during that period.

While no previous work has examined the goverance/misvaluation link there is work

considering time variation in the effects of governance. We are related to this work to the extent that firm misvaluation tends to cluster in time (although our central effects are based on the cross section). As mentioned above Li and Li (2013) produces a rational theory in which poorly governed firm's options to invest and disinvest are dampened, and shows that this can explain time variation in the governance hedge portfolio returns. Similarly, Cremers and Ferrell (2013) document that the relationship between governance and stock returns covaries with M&A activity. They suggest that this could be due partially to the Cremers, Nair and John (2009) takeover factor, but including this factor does not eliminate the positive alpha in the governance hedge portfolio. Our work would suggest that this time variation might be at least partially due to overvaluation, particularly since much work has suggested a link between overvaluation and M&A (Shleifer and Vishny, 2003; Rhodes-Kropf and Viswanathan, 2004; Rhodes-Kropf et al., 2005; Dong et al., 2006).

II. Misvaluation and Misbehavior

In this section we present a simple variation on the classic model of Holmstrom and Tirole (1997) to show how overvaluation and undervaluation can have asymmetric effects on 'misbehavior' and furthermore, how better governance can reduce the misbehavior. We do this not to argue that this is the only way in which overvaluation and governance can interact, but rather to provide a framework for looking at the asymmetric effects of misvaluation and governance in the data, as well as to demonstrate that the asymmetric effects we find in the data stem naturally from a small extension to a classic model. All proofs are in appendix I.

A. Standard Setup

The economy consists of two types of agents: firms and investors. All agents are risk-neutral and protected by limited liability.

Each firm has an amount of capital A and one economically viable idea that requires

an investment of $I > A > 0$ in period 1. Thus, the firm needs $I - A$ in external funds to be able to invest. In period 2 an investment in the project generates a verifiable return equaling either 0 (failure) or R (success). We can think of an economy or industry as containing a continuum of firms with different amounts of capital, A, required investment, I, and potential returns R.

The probability that the project succeeds (and returns R) is either p_H or p_L ($p_H \equiv \theta p_L$, $1 \geq \theta \geq 0$, $\Delta p = p_H - p_L = 1 - \theta > 0$) depending on the manager's project choice (or equivalently effort choice). Projects are run by managers who receive private benefits of 0, b or B where $0 < b < B$. Projects with a private benefit of b or B have a low success probability of p_L while the 'good', high probability, p_H, projects have no private benefits. This can be interpreted as reduced effort providing a private benefit of b or B, and reduced effort in turn reducing the probability of success, or as a managerial pet project with higher private benefits but lower expected returns. Thus, without proper incentives managers will choose lower expected return projects with higher private benefits. We will refer to managerial behavior that generates private benefits at the expense of expected return as 'misbehavior'.

As is standard, we assume that investors require a return γ and that only the good projects are economically viable, i.e., $p_H R - \gamma I > 0 > p_L R - \gamma I + B$. And better governance is assumed to eliminate the highest private benefit project B. This is the same as assuming that it reduces the private benefit from B to b.

All assumptions above are identical to Holmstrom and Tirole (1997). Now we add the possibility that uninformed investors may misperceive the probability of success or failure.

B. Misvaluation

We assume managers know p_H and p_L. However, investors are uninformed in that they do not know the true probabilities and instead perceive the probabilities to be p'_H and

p'_L. With a slight abuse of notation, let us define $p'_H \equiv p'_H(\mu)$, where p'_H is a continuous, differentiable and strictly increasing function of μ over its domain: $(-\infty, +\infty)$ and it is bounded between 0 and 1. Therefore $p'_L(\mu) = \theta p'_H(\mu)$, and we note that $p'_H(0) = p_H$; namely, in the absence of misvaluation ($\mu = 0$) the perceived probability p' coincides with the true probability, p, and since $0 \leq p' \leq 1$, we also require that $\lim_{\mu\to\infty} p'(\mu) = 1$ and $\lim_{\mu\to-\infty} p'(\mu) = 0$. Given this structure, $\mu > 0$ results in overvaluation while $\mu < 0$ results in undervaluation.

If investors are rational then $p'_H = p_H$ and $p'_L = p_L$ *on average* (or in expectation). However, whether or not investors are rational, at any given moment in time for any particular firm, sector or market investors may incorrectly judge the probability of success or failure. A difference between the probabilities used by managers and those used by investors could arise fully rationally due to asymmetric information as in Myers and Majluf (1984) (see also Greenwald, Stiglitz and Weiss, 1984).[8] And of course, any biases, irrationality, or limited cognitive ability could also cause a misperception in the probability of success (see Barberis and Thaler (2003), Hirshleifer (2001), and Shleifer (2000) for summaries). In this paper we take no stand on the source of the mistake only that it is possible for investors to be mistaken.

We assume that uninformed investors still require a return γ and have probability beliefs such that only the good projects are economically viable, i.e.

$$p'_H R - \gamma I > 0 > p'_L R - \gamma I + B \tag{1}$$

Given the setup, one optimal contract requires the firm to invest A, the uninformed investors to invest the balance of $I - A$. The contract then pays everyone nothing if the project fails and if the project succeeds divides the payoff R into $R_f > 0$ for the firm and

[8]Kumar and Langberg (2009) and Goldman and Slezak (2006) also consider the possibility that informed insiders strategically manipulate outside investors beliefs.

$R_u > 0$ for the uninformed investor, where $R_f + R_u = R$.

Given equation (1) uninformed investors will only invest if they believe the manager will choose the good project. Thus, $p'_H R_f \geq p'_L R_f + B$, and the incentive compatible investor belief requires that the firm receive at least

$$R_f \geq B/\Delta p'. \tag{2}$$

If this condition holds then uninformed investors will invest $I - A$ if they expect to earn γ on this investment. Thus, $p'_H R_u \geq \gamma(I - A)$. This leaves investors with the perception that there is at most $R_u = R - B/\Delta p'$ to compensate investors, so the maximum *perceived* pledgable expected income is $p'_H[R - B/\Delta p']$. We can conclude that only firms with enough assets, A, such that

$$A > \overline{A}(\gamma) = I - \frac{p'_H}{\gamma}[R - B/\Delta p'] \tag{3}$$

can finance their project, i.e. firms must have this minimum amount of cash in order to attract outside finance.

Given the required uninformed investor returns of γ on their investment of $I - A$, the firm's payoff if the project is successful is $R_f = R - \gamma(I - A)/p'_H$. Given this, the manager will only choose the good project if

$$Manager\ IC \qquad R_f = R - \gamma(I - A)/p'_H \geq B/\Delta p \tag{4}$$

Note that the Manager IC and the investors' beliefs about the manager IC, equation (2) are different. As the following proposition shows, this will lead to equilibrium manager misbehavior that comes as a surprise to investors.

PROPOSITION 1: *When investors overvalue firms ($\mu > 0$), firms with*

$$B/\Delta p > R - \gamma(I - A)/p'_H \geq B/\Delta p' \tag{5}$$

will receive investment and managers will choose the worse project in equilibrium. When investors correctly value or undervalue firms ($\mu \leq 0$) then all managers will choose the good project.

The investors invest expecting the manager to choose the good project. However, because investors have over estimated the probability of success they do not realize that the manager is better off shirking and getting larger private benefits. Furthermore as the following corollary shows, the more overvaluation there is the more misbehavior will occur.

COROLLARY 1: *When investors overvalue firms ($\mu > 0$), increased overvaluation (μ increases) will cause the managers of more firms to choose the worse project. When investors correctly or undervalue firms ($\mu \leq 0$), decreased undervaluation (μ decreases) will result in no change in managerial decisions.*

Thus, the proposition and corollary tell us that overvaluation leads to misbehavior and more overvaluation leads to more misbehavior. At the same time no misbehavior occurs when firms are undervalued because the conditions of proposition (1) cannot be met.

Even if investors know that misvaluation and misbehavior are possible, as long as they cannot detect or screen for it ex-ante then they cannot prevent it and must simply raise their return threshold to make up for the fraction with poor projects.

C. Governance

When firms can be overvalued corporate governance potentially has an enhanced role compared to the standard Holmstrom and Tirole (1997) setup. In the standard setup no firms choose the bad project in equilibrium. This is because investors will only invest in

projects where the firm has enough capital, A, such that the manager can be incented to choose the good project. In the standard set up, corporate governance lowers the amount of capital a firm must have to attract investment but it does not alter equilibrium managerial behavior. The following proposition shows that with overvaluation corporate governance actually mitigates the amount of shirking or poor project decisions.

PROPOSITION 2: *Better corporate governance reduces the managerial decisions caused by overvaluation that are bad for shareholders. However, better corporate governance does not alter managerial decisions in undervalued firms.*

Intuitively, when private benefits are reduced the perceived IC and the true IC are closer, so fewer CEOs choose the worse project in equilibrium. In undervalued firms the true IC is always slack so increased governance has no effect.

When prices do not reflect fundamentals correctly, better governance prevents investments in worse projects. With overvaluation, mechanisms that delegate (incentives/takeover market/etc) do not work as well. Thus, the central idea we wish to demonstrate with this simple model is that overvaluation increases poor managerial investment decisions while governance provisions that enhance discipline on management decrease this behavior. At the same time, undervaluation does not affect managerial decisions. This asymmetry stems naturally from the simple addition of misvaluation to a classic model of governance, and we will see, matches what we find in the data.

III. Data

Proposition (2) forms the basis for the key empirical prediction of our model: weak governance should be associated with poor operating performance only following periods of overvaluation. We take this prediction to the data using multiple different measures of valuation as well as corporate governance. This section details the construction of these measures and provides details on our main dataset.

To measure corporate governance, we initially use the GIM-index which is a simple sum over the 24 governance provisions in described in Gompers et al. (2003). While the GIM-index captures only a certain aspect of corporate governance (the strength of shareholder rights) and is by no means exhaustive, we find it attractive in our setting since it has remained remarkably stable during our sample period (1990-2006). This allows us to see how valuation shocks affect firms with different pre-existing governance statutes that do not endogenously change with valuation.

As argued in Gompers et al. (2003) and documented in Cremers and Ferrell (2012), most provisions comprising the index were adopted during the 1980s in response to the hostile takeover wave. By 1990, there was a lot of variation across firms in these provisions. This variation remained in place for the next two decades since firms did not dismantle antitakeover provisions even as the takeover market subsided. In fact, during our sample period, most of the variation in the GIM index is cross-sectional (86.5%), with only 13.5% of observations showing a change of at least one in the GIM-index. Most of these changes happened due to institutional investor and/or regulatory pressure. This reduces the concern that firms endogenously alter their governance in response to market valuation conditions, which would be the case with other popular measures of corporate governance such as institutional ownership or managerial compensation. In fact, when we replace the standard GIM-Index with the beginning of period score, we find very similar results.

We also use three alternative measures of governance. We use a measure of corporate governance based on the size of the board of directors as well as one based on the independence of the firm's board of directors. Finally, we also use plausibly exogenous state law changes. We find consistent results using all four measures of governance. We detail the construction of the GIM variables here and the others below as we utilize them.

The data on the GIM-index is drawn from the ISS *Riskmetrics* governance data set which

collects information on a set of 24 governance provisions for about 2,500 unique firms most of which are in the Standard & Poor's 1500 over the 1990-2006 period.[9] We use both the continuous version of the index as well as a dummy variable that indicates whether a firm uses only a few ("Democracy") vs. many ("Dictatorship") governance provisions. Firms are considered Democracy Firms if they have 5 or fewer and Dictatorship if they have 14 or more governance provisions, respectively. The median firm in our sample has 9 governance provisions.

In order to retrieve information on accounting variables, we match firm-year observations from *Riskmetrics* to *Compustat* and retain those with non-missing book value of assets. As is standard in the literature, we exclude dual class firms, financial firms (6000-6999 SIC range), and regulated utilities (4900-4999 SIC range). Finally, we exclude companies with missing data on ROA and explanatory variables. This selection process results in a final set of 15,467 firm-year observations for 2,099 firms from 1990 to 2006.

Our first measure of relative valuation is based on the measures developed in Rhodes-Kropf et al. (2005) and Hoberg and Phillips (2010). These measures are used in much recent work examining the effects of valuation. We start with estimating total relative valuation which is a measure of the difference between a firm's actual valuation and one implied by average industry pricing (using historical industry multiples). In particular, following Rhodes-Kropf et al. (2005) and Hoberg and Phillips (2010), for each industry j and year t, we first estimate a valuation model from the following industry-level regressions using ten years of lagged data:[10]

$$\begin{aligned}\log M_{ij\tau} = a_{0jt} + a_{1jt}\log B_{ij\tau} + a_{2jt}\log\left(NI\right)^{+}_{ij\tau} + a_{3jt}I_{(<0)}\log\left(NI\right)^{+}_{ij\tau} \\ + a_{4jt}LEV_{ij\tau} + \varepsilon_{ij\tau},\end{aligned} \tag{6}$$

[9]IRRC volumes are published about every two years (1990, 1993, 1995, 1998, 2000, 2002, 2004, 2006). We follow Gompers et al. (2003) in assuming that a provision remains in effect between publication dates. A detailed description of the 24 provisions can be found in Gompers et al. (2003), Appendix A.

[10]Note that the valuation model is estimated using enitre CRSP/Compustat universe of public firms.

$$\tau = t-10, ..., t-1$$

where i indexes firms, j indexes industries, and t indexes time. M_{ijt} is the market value of equity, computed by multiplying the common stock price at fiscal year-end (item 199) by common shares outstanding (item 25). B_{ijt} is the book value of equity, constructed as stockholders' equity (Compustat item 216) plus balance sheet deferred taxes and investment tax credit (Compustat item 35) minus the book value of preferred stock (Compustat item 56). NI is net income (Compustat Item 172). Since we estimate the regression in logs, we set negative values of net income to zero and include an indicator function for negative values of net income. LEV_{ijt} is the leverage ratio computed as the ratio of total long-term debt (Compustat item 9) to total assets (item 6). In order to reduce the impact of outliers, all variables are winsorized at the 1% level.

To obtain a measure of total relative valuation, we use estimated α_{jt-1}'s from our empirical model (6) to predict the following year's valuation for each firm i. We then take, for each firm, the difference between its actual valuation in year t and its predicted valuation. This is the estimated total relative valuation (Total RelVal) for each firm in every year. This captures relative firm valuation, however, endogeneity concerns cause us to make limited use of the total relative valuation measure (although it works in every specification). It is correlated with firm-level variables such as firm size. Thus, results using this measure may be driven by spurious correlation between the relative valuation measure and firm characteristics.

Instead, we focus on the three-digit SIC industry average of firm total relative valuation (excluding firm i) as our main measure of relative valuation, referred to as industry relative valuation (Industry RelVal) throughout the paper (see also Hoberg and Phillips (2010) for a similar measure). Industry RelVal is not correlated with firm characteristics, but is highly correlated with firm relative valuation. Thus, industry relative valuation captures

that part of a firm's relative valuation not related to firm characteristics. As in Hoberg and Phillips (2010), we only rely on historical data in the construction of our relative valuation measure in order to avoid a look-ahead bias.

We also explore robustness of our results to three alternative valuation models. The first alternative model employs a richer valuation model where market-to-book is regressed on a broader set of determinants than in (6) (as in Pastor and Veronesi (2009) and Hoberg and Phillips (2010)). The second alternative model augments the valuation model in (6) with the GIM index. As shown in Gompers et al. (2003), weak corporate governance can result in lower valuation multiples. While there is no evidence to suggest that overvaluation depends on corporate governance, we want to explore this possibility with this robustness check. Finally, the third model uses an entirely separate methodology based on mutual fund flows. We describe the fund flow methodology in more detail in Section VI. As discussed later, all of our results are robust to these other valuation models.

Panel A of Table I presents summary statistics for our sample. Appendix B provides sources and detailed definitions of the control variables, which are standard. Sample moments for corporate governance measures and firm characteristics are in line with previous governance studies that use the *Riskmetrics* sample (e.g., Gompers et al. (2003)). The industry relative valuation measure is in line with Rhodes-Kropf et al. (2005) and Hoberg and Phillips (2010). In particular, over our sample period, industry relative valuation is on average slightly positive (0.04) with a standard deviation of 0.24.

Panel B of Table I summarizes pairwise correlations between the industry relative valuation measure and all the other variables. The industry relative valuation is not correlated with our corporate governance measures (the GIM index and indicator variables for Democracy and Dictatorship firms). Moreover, the measure is not significantly correlated with any of our firm-level controls.

Panel C summarizes GIM index in subsamples formed by splitting the entire sample

into terciles by industry relative valuation. In all terciles, the mean GIM-index is similar and the median GIM-index is identical, suggesting that there is no systematic relation between the GIM index and our measure of relative valuation.

As in Rhodes-Kropf et al. (2005), we are careful to note that our industry relative valuation measure captures high relative valuation and not necessarily overvaluation. Almost certainly at least some of the highly valued firms are valued that way for a reason. However, Panel D of Table I shows that a value-weighted portfolio that is long firms that are low-valued according to our measure and short high-valued firms generates a statistically significant alpha of 49 bp per month (or, 57 bp per month in an equal-weighted portfolio).[11] Hoberg and Phillips (2010) also devote considerable time to demonstrating that this valuation measure contains alpha. These findings suggests that our measure captures some misvaluation. Furthermore, the Rhodes-Kropf et al. (2005) measure has had such impact because firms with high relative valuation have behaved as would be expected if their prices contained significant overvaluation, and in ways that are otherwise difficult to explain. To address this concern further, we also use a measure of overvaluation based on mutual fund flows - this generates a more limited sample of overvalued firms but our results will continue to hold in this sample. The bottom row of Panel D shows that a long-short portfolio based on mutual fund flows-based measure of overvaluation produces a statistically significant alpha of 63bp (74bp for equal-weighted portfolios) per month. Overall, we will report findings by how they relate to high relative valuation, but we will discuss them in relation to the misvaluation hypothesis as well as an alternative related to high valuation.

[11]Specifically, we form portfolios based on terciles of the distribution of three-month lagged Industry RelVal: overvalued firms are those in the top tercile of this distribution, while undervalued firms are in the bottom tercile.

IV. Corporate Governance, Misvaluation, and Firm Performance

Our model implies that agency costs should be greater in when a firm becomes overvalued. We start our empirical investigation by testing whether the relationship between corporate governance and operating performance is stronger for highly valued firms. In particular, if overvaluation leads to a worsening of agency problems and some of the high valuation is measuring overvaluation, then we should see the difference in performance between strongly and weakly governed firms to widen after period of high relative valuation.

A. ROA Results

In order to develop formal multivariate tests of the impact of high valuation and governance on future operating performance, we use the following baseline model:

$$ROA_{ijt+1} = \alpha_j + \alpha_t + \beta_1 GIM_{ijt} + \beta_2 GIM_{ijt} * MisV_{ijt} + \gamma' \mathbf{X}_{ijt} + \varepsilon_{ijt+1} \qquad (7)$$

where i indexes firms, j indexes industries, t indexes time, and ROA_{ijt+1} is next period's operating performance. The main explanatory variables are the index of antitakeover provisions (GIM_{ijt}) and its interaction with relative valuation proxy, $MisV_{ijt}$. As in Core et al. (2006), the vector of controls $\mathbf{X}_{ijt}$ includes firm size and year and industry fixed effects. In addition, $\mathbf{X}_{ijt}$ includes the level of relative valuation $MisV_{ijt}$. Finally, to allow for potential correlation of ROA in the same industry, we evaluate statistical significance using robust clustered standard errors adjusted for non-independence of observations within industries (see Wooldridge (2002), p. 275).

The key variable of interest is the coefficient β_2 on the interaction term. At the margin, the total effect of corporate governance on future operating performance can be calculated by examining the partial derivative of ROA_{ijt+1} with respect to the GIM index: $\frac{\partial ROA_{ijt+1}}{\partial GIM_{ijt}} = \beta_1 + \beta_2 MisV_{ijt}$. The null hypothesis is that b_2 equals zero.

Table II reports our estimates of baseline specification (7). The first column in the table assumes $b_2 = 0$, i.e. it does not allow for the interaction effect of governance with relative valuation. The next three columns examine our main hypothesis that the negative relation between operating performance and governance is magnified if firms become overvalued. Column (2) shows results from estimating (7) using Industry RelVal - our main measure for relative valuation - as a proxy for $MisV_{ijt}$. Consistent with our model, the coefficient on the interaction term is negative and statistically significant (t-statistic of 2.37). Quantitatively, the magnitude of the interaction effect is large. In particular, the estimated coefficient on the interaction term implies that a one standard deviation increase in relative valuation (0.24) makes each provision of the GIM index lower operating performance by about 0.1%. Given that Dictatorship firms have about 10 more provisions compared to Democracy firms, our results imply that the gap in operating performance between weakly and strongly governed firms widens to about 1% per year after firms become highly valued, which is a sizable effect given the sample average ROA of about 5%.

In Column (3), we report results from re-estimating (7) using total relative valuation as a proxy for $MisV_{ijt}$. Consistent with our model and confirming results in Column (2), the negative coefficient on the interaction term is statistically (t-statistic of 3.09) and economically significant: a one standard deviation increase in total relative valuation (0.63) makes each provision of the GIM index lower operating performance by about 0.1%. However, a potential concern with using total relative valuation measure is that it is correlated with some firm characteristics. Thus, the estimated coefficient on the interaction term between the GIM index and total relative valuation could reflect the presence of an interaction effect between corporate governance and some firm characteristic on operating performance as opposed to a greater importance of corporate governance for firms with high valuation.[12] By contrast, the industry relative valuation measure is

[12]For example, total relative valuation is positively correlated with firm size. If larger firms' operating performance is more sensitive to corporate governance, then this could potentially explain the total relative valuation results.

computed excluding the firm itself and, as seen from Panel B in Table I, is not correlated with firm-level variables. Thus, in the remainder of the paper, we will only use the industry relative valuation measure as results obtained with this measure are unlikely to be driven by spurious correlation with firm characteristics (although all results also hold using total relative valuation). Essentially we are using industry valuation to capture that part of high valuation that is unrelated to firm specific characteristics, and asking how firms with different levels of governance react when hit with a valuation shock. We also later use an alternative measure for misvaluation based on mutual fund flows to further reduce endogeneity concerns.

Finally, in Column (4) we restrict the sample to Democracy and Dictatorship firms and use a Dictatorship dummy as a proxy for corporate governance. Core et al. (2006) show that Democracy firms have superior operating performance compared to Dictatorship firms. We find an economically and statistically significant negative interaction effect between the Dictatorship dummy and our measure of relative valuation, further corroborating our interpretation of the result that weak corporate governance firms significantly underperform firms with strong corporate governance following times when firms become highly valued.

The results in Table II (and the robustness tests below) show that the relationship between good governance and future firm performance is stronger after high valuation shocks. This is a fascinating result as it suggest that governance may be more important at some points in a firm's life than in others. The theories of firm behavior surrounding overvaluation suggest the effects could be due to governance countering overvaluation. Alternatively, it is also possible that governance matters more for firms with high fundamental value.[13] We will not be able to definitively prove either alternative but we will

[13]It should be noted that our results are virtually unchanged when we control for interaction of GIM_{ijt} with a proxy for industry fundamental valuation, $\hat{M}_{ijt}$. The interaction term with $\hat{M}_{ijt}$ is not significant either economically or statistically.

spend the rest of the paper examining the data to see if other results are consistent with either alternative.

B. Asymmetric Effects

The results reported in Table II are obtained using continuous measures of relative valuation. While estimates obtained from interactions with continuous measures have the advantage of using the full available cross-sectional information in relative valuation, they do not tell us from which part of the distribution of relative valuation the result is coming. For example, the negative interaction effect that we find is consistent with both a positive effect of good governance on ROA in times of relatively low valuation and a negative effect of weak governance on ROA in times of relatively high valuation. The former is consistent with many priors as governance might be thought to be more important when firms are in trouble. However, only the latter is consistent with our model which makes a sharp prediction that there is scope for managerial misbehavior only in if the firm is overvalued and, thus, poor performance in weakly governed firms should be observed only if a firm becomes highly valued.

Our next set of results examines whether the negative interaction effect in Table II indeed comes from underperformance of weakly governed firms against strongly governed firms *only* after high relative valuation, as predicted by the theory. In particular, we estimate the effect of the GIM index on ROA within different subsamples based on the empirical distribution of the relative valuation measure. This distribution is estimated separately each year using 10 years of lagged data in order to avoid a look-ahead bias. We define three sets of subsamples: the upper and lower half (Columns (1)-(2)), the terciles (Columns (3)-(5)), and the quartiles (Columns (6)-(9)) of the sample relative valuation distribution. Thus, lowest quantiles correspond to subsamples of firms that are valued relatively low ("undervalued"), top quantiles correspond to subsamples of firms that are

valued relatively high ("overvalued"), and middle quantiles correspond to subsamples of relatively fairly valued firms. We then run our baseline ROA regression (7) separately in each of these subsamples.[14]

The results of the sample-split specification are reported in Table III. There is a negative and statistically significant relation between the GIM index and operating performance at the top of the distribution of relative valuation. Importantly, t-tests of the difference of the estimated coefficients of GIM index across relative valuation quantiles robustly confirm that, regardless of whether we use splits based on median, terciles, or quartiles, there are always strongly statistically significant differences at the top of the distribution of relative valuation, which is precisely where the misvaluation model tells us there are monitoring benefits from strong governance. Moreover, the negative effect of weak governance in highly (relatively) valued firms is quantitatively significant. For example, the coefficient estimates in Column 5 imply that for firms in the top tercile of relative valuation, each provision in the GIM index is associated with a 0.2 percentage point lower operating performance. Thus, the gap in operating performance between weakly and strongly governed firms is about 2% in highly valued firms, or double the average effect of weak governance when we don't take valuation into account (Column (1) of Table II). Finally, consistent with the scope for misbehavior being smaller in under- or fairly valued firms, the relation between the GIM index and operating performance in bottom and middle quantiles of relative valuation is weak, both economically and statistically.[15] Although this fits well with the theory of misvaluation and does not fit too well with current theories of growth options and governance it may still be consistent with a growth options story. Thus, after we check robustness we turn to tests that should more sharply differentiate these

[14]Results for an alternative specification with the GIM index interacted with indicators for each subsample are very similar.

[15]The asymmetry in our findings implies that poorly governed firms mean revert (in ROA terms) faster than well governed firms after they become highly valued but don't mean revert faster after they become relatively low valued. This is predicted by the theory of misvaluation and governance, and shows that it is not the case the poorly governed firms simply have a faster mean reverting ROA process.

alternatives.

The sample-split specification reported in Table III provides a sharp test of our model's prediction that negative effect of weak governance on performance should be manifested only following periods of high relative valuation, while there should be no strong relationship between governance and performance during periods of low or fair valuation. Thus, in the rest of our analysis we will adopt a baseline specification that replaces the continuous measure of $MisV_{ijt}$ (7) with indicators for terciles of the empirical distribution of the measure. The main variables of interest will be the interaction terms between the GIM index and the indicators for each terciles of the misvaluation measure.

C. Robustness

Table IV reports results of seven sets of robustness checks for our baseline estimates. We estimate the same ROA regression (7) as in Columns (3)-(5) of Table III, including controls for firm size, indicators for industry relative valuation terciles, and year and industry fixed effects in the estimation. t-statistics based on robust standard errors clustered at the industry level are in parentheses.

We start by showing that our results are robust to changing the baseline specification. First, Column (1) shows that our result that weak governance is associated with lower future operating performance only following periods of high relative valuation is robust to using median regressions rather than OLS. This robustness check addresses the concern that our results could be driven by outliers in ROA.

Second, we explore the robustness of our results to inclusion of controls for industry concentration and its interaction with the GIM-index. This control is important due to the results in Giroud and Mueller (2011) and Kadyrzhanova and Rhodes-Kropf (2011) who find that the effects of governance provisions depend on the level of industry concentration. If misvaluation is more pronounced in concentrated industries, then our main result

could be driven by the substitutability of product market competition and governance mechanisms instead of amplification of agency costs due to overvaluation.[16] Following Giroud and Mueller (2011) and Kadyrzhanova and Rhodes-Kropf (2011), we measure industry concentration with the sales-based Herfindahl index of all firms in Compustat in each industry and year. Column (2) shows that our baseline estimates are little changed when we control for industry concentration and its interaction with the GIM index.

Third, in Column (3) we exclude "new economy" firms, as defined in Hand (2003). Here we address the concern that our results could reflect a strongly negative relation between weak corporate governance and operating performance among new economy (high tech) firms rather than for firms with high relative valuation. In fact, Core et al. (2006) argue that the results in Gompers et al. (2003) are partly due to mispricing of these firms in the late 1990s. We find that the economic and statistical significance of the GIM index in the top relative valuation tercile remains unchanged.

Fourth, we verify robustness of our results to one additional specification. In Column (4) we estimate our baseline regression with firm fixed effects instead of industry fixed effects. This specification allows us to control for time-invariant determinants of ROA. We find that the interaction between the GIM-index and the top tercile of industry relative valuation remains reliably negative.

Columns (5) and (6) show that our results are robust to using two alternative measures of relative valuation. First, Column (5) shows that our results are robust to using a more elaborate valuation model where market-to-book is regressed on firm size, firm age, a dividend dummy, firm leverage, ROE, and volatility of profitability (as in Pastor and Veronesi (2009) and Hoberg and Phillips (2010)). Second, Column (6) shows that our baseline results are virtually unchanged when we augment the basic valuation model (6) with the GIM index. This robustness check addresses the concern that, as shown in Gompers et al.

[16]It should be noted that this interpretation of our results is inconsistent with the evidence in Hoberg and Phillips (2010) that overvaluation occurs primarily in competitive, not concentrated, industries.

(2003), weak corporate governance is related to valuation multiples. Overall, these results show that our main results are not driven by any particular choice of a valuation model nor by the failure to include relevant determinants into the valuation model.

Finally, our main results use data from the 1990-2006 period to match availability of the GIM index, which RiskMetrics does not provide after 2006. In Column (7), we explore robustness of our results to extending the sample period through 2010, where we assume that the GIM index does not change after 2006. The reported results show that the interaction between the GIM-index and the tercile of industry relative valuation remains reliably negative, with the point estimate virtually identical to the one reported in Table III.

D. Alternate Measures of Governance

Our results so far used the GIM index to show that weak governance leads to future underperformance but only following periods of high valuation. Since the notion of governance in Proposition (2) is quite general and encompasses any monitoring mechanism, we expect that our results should hold for other measures of governance, provided that they do not plausibly change too much with valuation. In this Subsection, we test whether our benchmark results hold when we use a different measure of corporate governance based on the size and independence of the firm's board of directors.

Previous literature has suggested that board of directors can be effective at curbing agency costs. A common hypothesis is that firms with large boards (see, for example, Yermack (1996)) and few independent directors (Bhagat and Black (2002)) should underperform firms with smaller and more independent boards. An important feature of these board characteristics for our empirical setting is that they tend to be very stable over time and do not change in response to valuation. For example, board size changes (Small to Large and vice versa) occur in only about 14% of the firm-years in our sample. Similarly,

board independence changes (from minority independence to majority and vice versa) occur only in about 7.8% of firm-years prior to 2002. In 2002, some firms experienced significant changes in board structure due to the passage of the Sarbanes-Oxley Act in 2002 (SOX) and the contemporaneous adoption of new rules by major US stock exchanges requiring higher standards on board and committee independence for listed firms. However, since SOX-induced changes in board structure were across the board and applied to all listed firms[17], we consider them exogenous to our measure of misvaluation. Thus, most of the changes in board independence in our sample happened due to institutional investor and/or regulatory pressure. Overall, using measures of board size and independence allows us to continue to interpret our results as showing how valuation shocks affect firms with different pre-existing governance mechanisms that do not endogenously change with valuation.

The data on board composition is obtained from the ISS Riskmetrics dataset, which contains detailed information on directors of about 2,500 unique firms in the Standard & Poor's 1500 over the 1998-2006 period. Following Coles, Daniel, and Naveen (2014), we match firm-year observations from Riskmetrics to Compustat assuming that the year of the annual shareholder meeting date corresponds to the company's fiscal year. After applying same exclusions as in our GIM dataset, we have 7657 firm-year observations for 1,492 firms from 1998 to 2006. The median board in our sample has 9 directors and is majority independent. We denote firms as having weak governance if they have have a board that is large (greater than 9 directors) or is least compliant with the board and committee requirements prescribed by SOX and the exchanges in 2002. The combined requirements are that boards have a majority of independent directors, an independent audit committee, an independent nominating committee, and an independent compensation committee. Following Chhaochharia and Grinstein (2007), we define firms as least compliant (Non-

[17]Very small firms with market capitalization less than $75mln were exempt from complying with SOX, but not from the listing rules.

compliant) if they have only one or none of these requirements. About 20% of firms in our sample are non-compliant with the 2002 board independence requirements. We then run our baseline sample-split regression, replacing the GIM index with the Weak Governance measure.

The results are reported in Table V. For both measures of internal governance (size and independence) we find that the effects of misvaluation are asymmetric, in line with the predictions of the misvaluation theory. There is a negative and statistically significant relation between board governance and operating performance, but only at the top of the distribution of relative valuation. Moreover, the negative effect of weak board governance on ROA in firms with high relative valuation is quantitatively significant. For example, the coefficient estimates in Column 2 imply that the gap in operating performance between firms with small and large boards is about 2% in highly valued firms, which is about 40% of sample average ROA. The magnitude of the effect of board and committee independence (Column (4)) is similar. On the other hand, the relation between board governance and operating performance in bottom and middle quantiles of relative valuation is weak, both economically and statistically.

E. Measuring Governance Through Passage of State Laws

In this subsection, we address the potential endogeneity concern that our results so far reflect the interaction effect of relative valuation and some unobservable firm characteristic, such as managerial quality, rather than relative valuation and governance. We follow Bertrand and Mullainathan (2003) and exploit the passage of state business combination (BC) laws as a source of exogenous variation in corporate governance. These laws, passed by states at various times between 1984 and 1991, adopted statutes that made it harder to take over any firm incorporated in the legislating state, effectively weakening corporate

governance in these "treated" firms.[18] Importantly, this quasi-natural experiment setting addresses the omitted variable concern since passage of a BC law at the state level is plausibly exogenous to any given firm's characteristics.

Based on Bertrand and Mullainathan (2003), we use a difference-in-differences approach and adopt the following specification:

$$ROA_{ilt+1} = \alpha_t + \alpha_i + \boldsymbol{\beta}' \left(BC_{lt} \times \mathbf{I}_{ilt}\right) + \gamma' \mathbf{X}_{ilt} + \varepsilon_{ilt+1} \tag{8}$$

where i indexes firms, l indexes states of incorporation, t indexes time, and ROA_{ilt+1} is next period's operating performance. BC_{lt} is a dummy variable that equals one if a state BC law was passed in state l by time t. The vector $\mathbf{X}_{ijt}$ includes firm size and its squared term, as well as controls for shocks at the state-year and industry-year level proxied by averages of the dependent variable across all firms in the same industry and state of location in that year, excluding the firm itself. Note that our specification includes year and firm fixed effects and we cluster standard errors at the state of incorporation level.

The innovation of our specification with respect to Bertrand and Mullainathan (2003) is that equation (8) allows for an interaction of the indicator for BC laws with $\mathbf{I}_{ilt}$, a (3×1) vector of industry relative valuation terciles. By doing so, we effectively implement a triple difference estimator that allows us to examine whether the effect of valuation on operating performance changes after a state passes BC laws. In particular, the interaction term $BC_{lt} \times \mathbf{I}_{ilt}$ reflects the difference in the sensitivity of future ROA to valuation between firms in the treated group, i.e. firms incorporated in states that passed the BC laws by time t, to those in the control group that includes states that never passed a BC law by

[18] As in previous literature, we only focus on the most restrictive types of antitakeover laws, the Business Combination laws. These laws impose a long-term (three to five year) moratorium on (hostile) change of control transactions, such as mergers, divestitures, consolidations, and asset sales between the firm and a large shareholder who obtains more than a specified percentage of the shares. A large empirical literature finds results consistent with increased managerial entrenchment in firms subject to BC laws (see, for example, Bertrand and Mullainathan (1999), Bertrand and Mullainathan (2003), Karpoff and Malatesta (1989), Easterbrook and Fischel (1991), Garvey and Hanka (1999), Giroud and Mueller (2011), and Atanassov (2013)). For a list of states that passed BC laws and years of passage, see Table I in Bertrand and Mullainathan (2003).

time t, i.e. firms that never passed a BC law as well as firms that passed a BC law after time t. The null hypothesis is that the coefficient on the interaction terms, $\boldsymbol{\beta}$, are zero.

Our baseline estimates of (8), reported in Column (1) of Table VI, show that high valuation predicts weak operating performance in the future, but only for firms incorporated in states that have previously passed BC. In fact, both the coefficients on the BC dummy and on its interaction with medium tercile of industry relative valuation are close to zero and not statistically significant, suggesting that the passage of BC laws has no effect on firms' operating performance in normal or undervalued times. However, consistent with all the results so far, the coefficient on the interaction with the top industry relative valuation tercile is negative and statistically significant (t-statistic of -2.69). Quantitatively, the estimated coefficient on the interaction term implies that following passage of BC laws, firms incorporated in these states tend to underperform firms in the control group by about 1.2%, or 24% of ROA sample mean, when their stock gets highly valued. As state laws are plausibly exogenous to firm characteristics, these results strongly suggest that our finding of the interaction effect between valuation and corporate governance is not spurious, further supporting our main hypothesis that governance is most important when a firm becomes overvalued.

One common concern with this approach has to do with reverse causality, e.g. underperforming firms potentially lobbying for the passage of the laws, especially firms in undervalued industries. Evidence in Romano (1987) suggests that BC laws have been typically adopted to protect a specific firm subject to a takeover threat, and were largely exogenous to practically all firms in the legislating state except those very few. To further address this concern, however, in Column (2) we follow Bertrand and Mullainathan (2003) and estimate (8) replacing the BC dummy with a set of dummies designed to capture dynamic effects around the passage of these laws: $Before(-1)$ is a dummy variable for a firm incorporated in a state that will pass a BC law one year from now, $Before(0)$

is a dummy variable for a firm incorporated in a state that passed a BC law that year, $After(+1)$ is a dummy variable for a firm incorporated in a state that passed a BC law in the previous year, and $After(+2)$ is a dummy variable for a firm incorporated in a state that passed a BC law two or more years ago. The interaction term between $Before(-1)$ and the top tercile of industry relative valuation allows for investigation of the possibility of reverse causality since a significant coefficient would suggest that there was a more negative relation between operating performance and valuation in the legislating states even before the laws were enacted. Results in Column (2) show that the estimated coefficient on this term is economically and statistically insignificant. Moreover, consistent with a causal interpretation of our results, the estimated negative coefficient is strongest on the interaction of the top valuation tercile with the $After\,(+2)$ dummy.

Overall, our results in this section offer evidence of a significant variation in the agency costs of weak corporate governance. We find that firms with weak corporate governance significantly underperform firms with strong corporate governance but only when firms become relatively highly valued. These results are consistent with the theory that strong corporate governance is especially important when firms become overvalued because agency costs are high and managers make poor decisions. However, if our valuation measure has only captured highly but correctly valued firms, then alternatively our findings suggest the need for a new theory of governance that accounts for the asymmetry in ROA – governance matters in highly valued firms but not in low or average valued firms.

V. Corporate Governance, Misvaluation, and Equity Returns

We have shown evidence that weak governance is correlated with worse future operating performance if the firm has high relative valuation and not if the firm has an average or low relative valuation. These results are consistent with our theory that governance counters the effects of overvaluation and has little effect on undervalued firms. If the variation in

agency costs we document is indeed driven by overvaluation and this overvaluation is (by definition) unanticipated by the market, then we expect that overvaluation will not only result in operating return underperformance, but also stock market return underperformance of weakly governed firms relative to well-governed firms. Alternatively, a rational theory of governance and high valuation would not predict a consistent ability to find alpha.

In order to test this hypothesis, we examine returns to trading strategies that are jointly based on measures of corporate governance and our measures of relative valuation. In particular, in Table VII, we examine returns to portfolios sorted by our measure of relative valuation in addition to governance proxies. As is standard in the literature, we compute abnormal returns to such trading strategies using a four-factor calendar-time portfolio method. The abnormal return is the intercept α of the following regression:

$$R_t = \alpha + \beta_1 \times \ RMRF_t + \beta_2 \times \ SMB_t + \beta_3 \times \ HML_t + \beta_4 \times \ UMD_t + \varepsilon_t,$$

where R_t is the excess return on a given portfolio in month t, $RMRF_t$ is the return on the market portfolio minus the risk-free rate, SMB_t is the size factor, HML_t is the book-to-market factor, and UMD_t is the momentum factor. All factors are from Kenneth French's web site.

Gompers et al. (2003) show that a portfolio that is long in strong governance (Democracy) firms and short in weak governance (Dictatorship) firms has generated a significant abnormal return in the period between September 1990 and December 1999. To facilitate comparison with these results, in Columns (1)-(4) we limit our analysis to the same time period. We sort all sample firms first on governance (Democracy and Dictatorship) and then on relative valuation (terciles of industry relative valuation measures), which gives us a total of 2x3=6 portfolios: one Democracy portfolio and one Dictatorship portfolio for

each tercile of industry relative valuation. For each industry relative valuation tercile, we then construct a value- and equal-weighted hedge portfolio, analogous to Gompers et al. (2003), that is long in Democracy firms and short Dictatorship firms.[19] Thus, our portfolios are not long low-valued firms and short highly valued firms. Rather, within each tercile of valuation the portfolios are long better governed and short worse governed firms.

If corporate governance is indeed more important when firms are overvalued, then we expect the significant abnormal returns in the governance hedge portfolio to be concentrated in the portfolio with firms with high relative valuation. In Column 1, we present standard result for both value-weighted (Panel A) and equal-weighted (Panel B) portfolios ignoring valuation levels. We find economically and statistically significant abnormal returns for the value-weighted governance hedge portfolio with average abnormal monthly returns of 49 basis points.[20]

In Columns (2)-(4), we examine the returns to hedge portfolios by relative valuation terciles. We find that the governance hedge portfolio generates statistically and economically significant monthly abnormal returns only for firms with high relative valuations (132 bp). Furthermore, a portfolio of firms with low or fair relative valuations that is long well-governed and short poorly-governed firms does not generate any significant abnormal returns, and the difference in abnormal returns between the high and low relative valuation terciles is highly statistically significant. The results for equal-weighted portfolios are similar. Thus, governance is associated with abnormal returns only within the highly-valued set of firms.

The bottom two rows of both panels show the abnormal returns separately for the long

[19] Analogous to Gompers et al. (2003), we rebalance all portfolios in September 1990, July 1993, July 1995, and February 1998, which are the months after which new IRRC data became available. Following Giroud and Mueller (2011), in the extended sample period we rebalance in November 1999, January 2002, January 2004, and January 2006. In addition, we rebalance all portfolios each July using industry relative valuation measure computed using Compustat data in the previous year. For each industry relative valuation tercile, a hedge portfolio consists of an average of 76 stocks per month, with an average of 30 Dictatorship stocks and an average of 46 Democracy stocks.

[20] Note that because we use momentum factor from Kenneth French's website, our results on equal-weighted governance hedge portfolio are not directly comparable to Table V in Gompers et al. (2003). Instead, they should be compared to results in Row 2 in Table IV in Giroud and Mueller (2011).

(Democracy) and the short (Dictatorship) portfolios. Column (1) shows that, consistent with Gompers et al. (2003), the performance difference between the Democracy and Dictatorship portfolios is driven both by (weak) overperformance by the Democracy portfolio and underperformance by the Dictatorship portfolio. In Columns (2)-(4), we examine how this differential performance varies across relative valuation terciles. We find that, both in value- and equal-weighted porfolios, the significant abnormal returns to the governance hedge portfolio in high relative valuation tercile are mostly driven by strong underperformance of the Dictatorship portfolio, with the difference in abnormal returns between the high and low relative valuation terciles highly statistically significant. While Panel A suggests that the Democracy portfolio also outperforms in high valuation tercile, the evidence is mixed as the result does not hold in equal-weighted porfolios (Panel B). Overall, the evidence suggests that the abnormal returns to the hedge portfolio in times of high relative valuation are driven by strong underperformance by the Dictatorship portfolio during these times.

Next, we extend the sample period to December 2006 to examine whether our results hold outside of the original Gompers et al. (2003) sample period (Columns (5)-(8)). The literature that followed Gompers et al. (2003) documents that abnormal returns to the governance hedge portfolio disappear when the sample period is extended to December 2004 (Core et al. (2006)) or December 2006 (Giroud and Mueller (2011)). In Column (5), we replicate these findings: in our sample, abnormal returns to the governance hedge portfolio over the September 1990 - December 2006 period are small and insignificant. However, the alpha of the hedge portfolio in the highest industry relative valuation tercile (Column (8)) is both statistically and economically significant. Further, as shown in the bottom two rows of Panel A, the continuing strong abnormal returns to hedge portfolio in the highest industry relative valuation tercile are entirely due to significant underperformance by the Dictatorship portfolio during high relative valuation times. The Democracy

portfolio does not seem to have a significant alpha overall (Column (5)) and in any of the relative valuation terciles (Columns (6)-(8)). The results for equal-weighted portfolios are similar. Quantitatively, the magnitude of the estimated abnormal return to the governance hedge portfolio is remarkably similar to what we found in the original Gompers et al. (2003) sample period (119 bp vs 132 bp per month). Thus, governance still seems to matter, one just has to focus on the overvalued firms.

Previous literature had proposed several reasons why the abnormal returns to the governance hedge portfolio in the full sample have disappeared: there is some evidence that this is partly driven by "new economy" firms (Core et al. (2006)) and investors learning about the role of governance (Bebchuk, Cohen and Wang (2012)). Our results suggest a complementary explanation for why returns to the governance hedge portfolio have declined after 1999 – very few firms became highly valued during this period, especially between 2000 and 2002. In fact, in a typical year in our sample, the share of firms in the governance hedge portfolio with relative valuation above zero is about 55%. However, in these three years this share drops to only about 20%. Thus, the fact that the overall effect of holding the democracy - dictatorship portfolio over the 1990-2006 period is not different from zero may be due to the virtual absence of high misvaluation during the 2000-2002 period. Consistent with this interpretation, we find that results in Columns (6)-(8) become stronger when we exclude the 2000-2002 period: for example, in the top tercile by relative valuation measure, the VW alpha goes up to 134bp (t=3.21) and the EW alpha goes up to 64bp (t=2.09).

Finally, we address the concern that the return to the governance hedge portfolio is driven by some firm characteristics that are correlated with the GIM index but are not captured in the four-factor model in Table VII. To this end, we estimate the Fama-MacBeth return regressions that allow for the interaction of the GIM index with indicators for

terciles of our industry relative valuation measure:

$$r_{it} = \alpha_t + \boldsymbol{\beta}' \left(GIM_{it-1} \times \mathbf{I}_{it-1} \right) + \gamma' \mathbf{X}_{it-1} + \varepsilon_{it} \tag{9}$$

where r_{it} is the return on firm i's stock in month t, GIM_{it} is either the G-index or a Dictatorship dummy, and $\mathbf{I}_{ilt}$, a (3×1) vector of industry relative valuation terciles. The vector $\mathbf{X}_{it}$ includes the indicators for industry relative valuation terciles in addition to the full set of control variables used in GIM: firm size, book-to-market ratio, stock price, returns from months t - 3 to t - 2, from t - 6 to t - 4, and from t - 12 to t - 7, trading volume of NYSE or Amex stocks, trading volume of NASDAQ stocks, a NASDAQ dummy, an S&P 500 dummy, dividend yield, sales growth over the previous five years, and institutional ownership.

Table VIII reports the results. Columns (1) and (2) describe results from the baseline model (9). Consistent with our model, the coefficient on the interaction with the top industry relative valuation tercile is negative and statistically significant for both the GIM index and the Dictatorship dummy. By contrast, both the coefficients on the GIM index and on its interaction with medium tercile of industry relative valuation are close to zero and not statistically significant, suggesting that weak governance has no effect on abnormal returns in normal or undervalued times. In addition, in Columns (3) and (4), we show that these results are robust to inclusion of controls for industry concentration and its interaction with the GIM-index. This control is important due to the results in Giroud and Mueller (2011) who find that the relationship between governance provisions and abnormal returns depends on industry concentration. These results show that our main finding of lower abnormal returns in weak governance firms following period of high valuation is not likely to be driven by an omitted variable bias.

A theory of misvaluation can explain the existence of abnormal returns to the governance

hedge portfolio: to the extent that high valuation captures some overvaluation then our results are consistent with the idea that overvaluation is correlated with (and potentially causing) poor managerial decisions and better governance is countering this behavior. Poor managerial decisions eventually result in worse performance – both in ROA as well as in stock market returns. Our story can also explain why governance abnormal returns are time-varying (as documented in Core et al. (2006), for example): since the governance hedge portfolio outperforms only following periods of high valuation, we expect it to outperform in the second half of the 1990s when valuation is high for many firms in the sample, and to underperform in the subsequent years when average valuation subsided. In fact, as we have shown, the governance hedge portfolio that contains only those firms that are highly valued continues to outperform.

Of course, any non-zero alpha can be potentially explained by an unmeasured risk factor. For example, growth options have been shown by Berk et al. (1999), Gomes et al. (2003), and Carlson et al. (2005) to have different risk from assets-in-place and to exhibit time-varying expected returns. Li and Li (2013) interacts this idea with governance to argue that well-governed firms should outperform in good times and underperform in bad times. Li and Li (2013) also presents evidence that a value-weighted portfolio of well governed firms has positive alpha in boom times and negative returns during busts. Using our measure of relative valuation based only on historical information, we find outperformance in ROA and stock returns for well-governed firms following periods of high relative valuation but no underperformance. In the next section, we use a non-market multiples based measure of overvaluation to determine if our results so far are due to overvaluation or just high valuation, and to examine potential causality.

VI. Measuring Misvaluation Through Mutual Fund Flows

Industry relative valuation is plausibly exogenous to an individual firm's valuation, but, since our measure is derived from market multiples, it is possible that times when an industry is highly valued are times with greater industry-wide growth options, rather than times of overvaluation. In the previous two sections, we consider whether our results are more consistent with misvaluation or growth options by considering our theoretical prediction of asymmetric effects for over and undervaluation, as well as by directly examining trading strategies that should contain alpha if our measure indeed contains overvaluation. In this section we take an alternative approach that uses a measure of overvaluation based on mutual fund flows rather than market multiples that follows the work of Coval and Stafford (2007) and Khan et al. (2012).

Coval and Stafford (2007) develop a method to identify misvalued stocks as stocks with large fractions of trading volume from mutual funds experiencing severe outflows or inflows. Severe flows are defined as those below the 10th percentile or above the 90th percentile of incoming or outgoing assets. The authors show robust evidence that these stocks under or outperform over the next 12 months. The authors note that their "empirical results provide considerable support for the view that concentrated mutual fund sales forced by capital flows exert significant price pressure in equity markets, often resulting in transactions prices far from fundamental value." Edmans et al. (2012) use a similar approach to identify undervalued stocks, but refine the method by using projected sales based on mutual funds' previously disclosed portfolio rather than actual sales. They look at mergers and acquisitions and find that misvaluation has a strong effect on takeover activity.

While Coval and Stafford (2007) and Edmans et al. (2012) focus on identifying undervalued stocks, a similar approach can be used to identify overvaluation. Khan et al. (2012) build on Coval and Stafford (2007) and distinguish between what they call inflow-driven

buying pressure (IBP) stocks indicating overvaluation, and widespread buying pressure (WBP) stocks. The latter are experiencing significant purchases from a wide swath of mutual funds that are not receiving large inflows, and so are unlikely to be overvalued. More specifically, IBP stocks are defined as stocks subject to buying pressure by mutual funds in the top flow decile, but not subject to buying pressure from mutual funds in other flow deciles. WBP stocks are defined as stocks subject to buying pressure by all mutual funds other than those in the top decile of capital flows. Khan et al. (2012) report that IBP stocks "experience a cumulative decline in market-adjusted returns of 10% over the six quarters subsequent to the buying pressure quarter." In contrast, WBP stocks experience a slight market-adjusted increase in value over the same period. The authors also find that IBP stocks have a significantly higher probability of completing seasoned equity offerings, as well as greater insider selling, and higher likelihood of equity M&A. In Panel D of Table I, we confirm that a portfolio that is short IBP stocks and long WBP stocks statistically significantly outperforms with an alpha of 63bp (74bp for equal-weighted portfolios) per month.

Overall, these results suggests that IBP captures overvaluation, while highly valued firms, potentially with high growth options, are more likely to be indicated by WBP. Thus, if our results so far are driven by overvaluation, they should continue to hold when we replace our relative valuation measure with IBP. Alternatively, if our results so far reflect growth options, then they will hold if our relative valuation measure is replaced by WBP, rather than IBP. Importantly, these measures are not derived from market multiples and are based on something plausibly exogenous to the firm and its industry.[21]

Table IX reports the results. In Panel A, we re-run our baseline operating performance regression using the same model as Table II but replacing our measure of relative valuation

[21]Both IBP and WBP are also uncorrelated with whether or not a firm's GIM score makes it a Democracy or a Dictatorship. Correlation of the Dictatorship dummy with IBP: -0.027 (p-value of 0.20) and with WBP: -0.002 (p-value of 0.92).

with a dummy for whether the firm's stock was subject to either inflow-driven (IBP) or widespread (WBP) buying pressure. IBP and WBP dummies are constructed at quarterly frequency, so we convert them to annual observations by taking the sum of respective dummies over the previous calendar year. Thus, this measure captures the intensity of mutual fund buying pressure.[22] By construction, the selection of firms with stocks subject to IBP in a given year results in 526 firm-year observations when merged with our governance dataset. In the baseline ROA regression, we use a Dictatorship dummy as a proxy for corporate governance instead of the full GIM-index:

$$ROA_{ijt+1} = \alpha_j + \alpha_t + \beta_1 Dict_{ijt} + \beta_2 Dict_{ijt} * BP + \gamma \mathbf{X}_{ijt} + e_{ijt+1} \tag{10}$$

where i indexes firms, j indexes industries, t indexes time, and ROA_{ijt+1} is next period's operating performance. The main explanatory variables are a dummy for whether the firm's GIM-index is above 14 ($Dict_{ijt}$), and the interaction of this dummy with either IBP (Column (2)) or WBP (Column (3)). The vector of controls $\mathbf{X}_{ijt}$ includes the respective BP measure itself. In addition, as in Table II, we control for firm size, and also include year and industry fixed effects. Standard errors are adjusted for non-independence of observations within industries.

Column (2) shows results from estimating (10) using IBP as an indicator of overvaluation. Consistent with our model of misvaluation, the coefficient on the interaction term is negative and statistically significant (t-statistic of -2.15). Quantitatively, the estimated coefficient on the interaction term implies that the gap in operating performance between weakly and strongly governed firms widens to about 2.7% following times when these firms' stock was overvalued due to buying pressure by funds with severely high inflows (IBP). This is a sizable effect given the sample average ROA of about 5%, and similar to

[22] Our results are robust to using an indicator for whether the firm's stock was subject to IBP (WBP) in any of the quarters of the preceding calendar year.

the results from using relative valuation in Table II. By contrast, as shown in Column (3), weak governance does not lead to either economically or statistically significant underperformance following episodes when the firm's stock was subject to widespread buying pressure (WBP).

In Panel B, we re-estimate portfolio returns from 1990-2006 as in Table VII, but sort based on IBP and WBP instead of our measure of industry valuation. We first consider all firms and then look at four subsamples. Columns (2) and (3) look at overvalued (IBP=1) and correctly valued (IBP=0) stocks, while columns (4) and (5) look at stocks with high widespread buying pressure (WBP=1) and those without widespread buying pressure (WBP=0). These subsamples are formed based on IBP and WBP in the previous quarter. Then, in each of these subsamples we construct portfolios that are long strong governance (Democracy) firms and short weak governance (Dictatorship) firms, both value- and equal-weighted portfolios. We find positive and statistically significant alpha only in Column (2), i.e. in the sample of overvalued firms (IBP=1), for both value-and equal-weighted portfolios. The size of the coefficients in Column (2) are quite large, seemingly suggesting a monthly out performance of 3.72% to 5.31%. However, these returns can only be earned in months when there are firms with IBP=1 and both Dictatorship (GIM$\geq$14) and Democracy (GIM$\leq$5) firms. This only occurs in 45 months over the September 1990-December 2006 time frame (196 months) thus, assuming investors earn zero alpha in the other months, the average monthly alpha over this period is about a 1/4 of the reported coefficients.

Overall, Table IX shows that firms that become overvalued due to mutual fund flows subsequently have significantly better ROA if they have better governance, but better governance does not correlate with future ROA in fairly valued firms. Furthermore, buying the stocks of overvalued firms with good governance and selling the stock of overvalued firms with poor governance produces significant positive alpha, while there is no positive

alpha from a long-short portfolio based on governance in the set of firms that are not overvalued. This second measure of overvaluation is free from market value measurement and provides significant support of the idea that governance is most important when a firm becomes overvalued.

VII. Corporate Governance, Misvaluation, and Investment

Our results so far show that weak corporate governance firms tend to underperform after they become highly valued. Performance is the result of an array of corporate decision making and thus provides compelling evidence of a difference between well governed and poorly governed firms if they become overvalued. However, the results above do not provide a channel through which governance affects performance. Gompers et al. (2003) suggests that "some combination of inefficient investment, reduced operational efficiency, or self-dealing" may result in lower performance in poorly governed firms. Our findings on performance suggest that these actions mainly occur when the firm becomes highly, possibly over, valued. Our theory also proposes that all managers invest more when they are highly valued, but managers of firms with poor governance make worse investment choices (or shirk more) during overvalued times. In this section, we directly examine whether weak corporate governance firms tend to have different investment policies and operating efficiency than strong governance firms during periods of high relative valuation.

We start by studying whether the relation between weak governance and the amount of investment activity is more or less pronounced during periods of high relative valuation. Following Gompers et al. (2003), we examine capital expenditures (scaled by assets), the likelihood of making an acquisition in a given year, and the total number of acquisitions in a year. In addition, we examine investments in R&D since such investments can also affect future performance. We use the same empirical specification as our baseline regression, adding controls for lagged Tobin's q and lagged cash flow as standard in the large empir-

ical literature on investment (see, for example, Fazzari, Hubbard and Petersen (1988)). Following Gompers et al. (2003), we estimate median regressions for capital expenditures and R&D, negative Poisson regressions for acquisition count, and probit regressions for acquisition probability.

Columns (1)-(4) of Table X report the results. The coefficient on the non-interacted GIM term corresponds to observations with low relative valuation. Consistent with the results in Masulis et al. (2007), the point estimate on GIM index in Column (2) is positive and statistically significant suggesting that weak governance firms on average engage in more acquisitions. Turning to the interaction term, the point estimate is negative but not statistically significant in all specifications. These results imply that the underperformance of weak governance firms after they become highly valued is not driven by over-investment.

We next examine operating efficiency. If becoming highly valued brings about investment in inefficient projects (or other poor decisions) in weak governance firms, their operating efficiency should diverge from that of strong governance firms. Our model suggests that overvaluation leads to an increase in managers choosing lower value pet projects with higher private benefits. We measure operating efficiency with proxies for labor productivity (measured as the log of (deflated) sales scaled by total employment) and cost inefficiency (cost of goods sold scaled by sales and log of (deflated) wages scaled by total employment). In addition, we study cumulative sales growth over the following two years. We estimate all these measures using the baseline specification and same controls as in Columns (1)-(4). All dependent variables are trimmed at 5th and 95th percentile of their sample distribution to reduce the impact of outliers.

Columns (5)-(8) of Table X report the results. Across all measures of operating efficiency, higher values of the GIM index are associated with lower efficiency, but only when interacted with the top Industry RelVal tercile. The interaction term is significant in all

regressions except wages.[23] The coefficients on the interaction term suggest that the operating inefficiency of weak governance firms relative to strong governance firms tends to significantly worsen when firms become highly valued.

Finally, we examine the same set of investment policies and production efficiency proxies using the passage of state BC laws as a source of exogenous variation in governance. Table XI reports results of the difference-in-differences regressions as in (8), replacing the dependent variable with the measures of investment activity (Columns (1)-(4)) and operating efficiency (Columns (5)-(8)) as in Table X. The results are broadly in line with those in Table X, with one marked exception: the interaction term between the BC dummy and top tercile of industry relative valuation is negative and statistically significant for all measures of investment activity except the acquisition dummy. Thus, protection by state BC laws appears to result in managers engaging in less investment, M&A, and R&D, while achieving lower ROA, especially when relative valuation is high.

The second set of results are on operating efficiency. Columns (5)-(8) show that, consistent with previous literature (e.g., Bertrand and Mullainathan (2003)), passage of BC laws appears to worsen the operating efficiency of these firms, but this result holds only when they become highly valued. Combined, these results demonstrate that the poorly governed firms seem to both underinvest and invest poorly when they are highly valued. Our findings suggest that the underperformance of weak governance firms after they become highly valued is driven by the ability of their managers to pursue quiet life and that this ability is particularly detrimental to firm value during times of high relative valuation.

Overall, the evidence in this section is consistent with the idea that all firms tend to expand (increase their investment in capital expenditures and R&D and make more acquisitions) when they become highly valued. However, managers of firms with weak gov-

[23] In fact, none of the regressors are significant in the wages regression. This is most probably due to the fact that coverage of wage data in Compustat is very sparse making the sample substantially smaller (about 1200 observations). In addition, coverage is spotty across time even within reporting firms. Overall, the data on wages is very noisy resulting in very imprecise estimates.

ernance seem more likely to invest less and to undertake inefficient projects or make other choices that lead to lower sales growth, lower labor productivity, greater cost inefficiency, and to eventual operating underperformance. These results are consistent with our idea that strong corporate governance helps curb the tendency for managers to behave poorly when they become overvalued, but are also consistent with idea that managers with good growth options make better choices when when they are better governed and governance does not matter for decisions made when they have fewer growth options.

VIII. Conclusion

Jensen (2005) and Bolton et al. (2006) and others argue that overvaluation is the root cause of managerial misbehavior. At the same time, we know from Manne (1965), Gompers et al. (2003), Bertrand and Mullainathan (2003) and others that corporate governance is important in countering managerial misbehavior. If overvaluation causes managerial misbehavior and governance counters managerial misbehavior then governance should have a larger effect on firms when they are overvalued. We test this simple yet powerful idea.

Previous work has looked at the role of governance without controlling for valuation and thus found results that blended firms where governance was countering valuation effects with those where it was not. Our findings suggests that governance may be most important when a firm is valued too highly since that is when agency costs are at their worst.

Our empirical work implements joint tests of the perverse effects of overvaluation and the ability of governance to counteract them. Our findings provide support for the ideas from both literatures, suggesting that overvaluation may cause poor managerial decisions and that governance may counter it. Our work suggests that boards and shareholders looking to create long-run value need to increase vigilance and oversight just when the firm's stock is outperforming.

Overall we must be cautious with the interpretation of our findings. The data seem most consistent with a theory of misvaluation, particularly the alpha regressions and the instrumented misvaluation results. However, the results are not definitive. We have shown a robust relationship that calls for much more work on the link between valuation and effective governance.

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Table I: Summary Statistics

This table displays summary statistics of all variables in the sample (Panel A), the correlations of these variables with industry relative valuation measure (Panel B), the joint distribution of the main governance proxy and the relative valuation proxy (Panel C), and the alphas from four-factor regressions of monthly returns of value-weighted and equal-weighted portfolios that long low-valued and short high-valued firms using industry relative valuation measure and mutual fund flows based measure. To compute industry relative valuation, we start by estimating total relative valuation (Total RelVal) measured as the difference between a firms actual (log) market value of equity in year t and one implied a valuation model estimated by regressing market value of equity on book equity, net income, and leverage. The valuation predictive regressions are run at the 3-digit SIC industry level every year using firm observations from years t-10 to t-1 for all firms in the Compustat universe. The three-digit SIC industry average of these differences (excluding firm $\dot{\imath}$) is our measure of industry relative valuation (Industry RelVal). The measures of mutual fund buying pressure are from Khan et al. (2012): an indicator for stocks subject to inflow-driven buying pressure (IBP) by mutual funds in the top decile of capital flows and an indicator for stocks subject to widespread buying pressure (WBP) by mutual funds not experiencing significant flows. The governance measures are based on the sample of 2,023 firms from the ISS Riskmetrics database in the 1990 to 2006 period. GIM-index is the index of 24 provisions from Gompers et al. (2003). Dictatorship firms have values of the GIM index of at least 14. Democracy firms have values of the GIM index of at most 5. ROA is operating income after depreciation scaled by year-end total assets. Firm size is the logarithm of the book value of assets. Industry HHI is defined as the sum of the squares of the individual company market shares for all the companies in the three-digit SIC industry. The four factors are the market factor (RMRF), the size factor (SMB), the book-to-market factor (HML) and the momentum factor (MOM). All factors are obtained from Kenneth French's website. Coefficients on the four factors are omitted from the table for brevity and are available upon request. For additional details on variable definitions and sources see Appendix B.

Panel A: Summary statistics

Variable	Mean	Median	Std Dev
Total Relative Valuation	0.04	0.01	0.63
Industry Relative Valuation	0.04	0.06	0.24
GIM	9.21	9	2.71
Share of Democracy Firms (GIM<=5)	0.11	0	0.31
Share of Dictatorship Firms (GIM>=14)	0.05	0	0.22
ROA	0.05	0.04	0.13
Firm Size	7.10	6.92	1.52
Industry HHI	0.15	0.11	0.14

Panel B: Correlations with industry relative valuation measure

Variable	Correlation with Industry RelVal
GIM	0.01
Share of Democracy Firms (GIM<=5)	0.01
Share of Dictatorship Firms (GIM>=14)	0.01
Firm Size	-0.001
Industry HHI	-0.01

Panel C: Empirical distribution of the G-index across industry relative valuation terciles

	Industry RelVal		
	Low	Medium	High
Mean GIM index	8.86	9.01	9.00
Median GIM index	9	9	9
Range of GIM values	(2,19)	(2,19)	(2,18)

Panel D: Alphas of portfolios that long low-valued and short highly-valued firms, using industry relative valuation and IBP measures

	Four-factor alpha	
	VW portfolios	EW portfolios
By Industry RelVal		
Low Tercile-High Tercile	0.49*	0.57**
	(1.83)	(2.46)
By IBP		
(IBP=1)-(WBP=1)	0.63**	0.74***
	(2.02)	(3.59)

Table II: Operating Performance

This table reports results for OLS regressions of operating performance (ROA) on governance and its interaction with measures of relative valuation. Governance is measured by the shareholder rights index from Gompers et al. (2003) (GIM). In Column (1), the GIM index is not interacted with relative valuation measures. In Columns (2) and (3), the GIM index is interacted with measures of industry and total relative valuation, respectively. In Column (4), the sample is restricted to Democracy (GIM≤5) and Dictatorship (GIM≥14) firms and governance is measured by a dummy for Dictatorship firms. Controls for firm size (log of the book value of assets), and year and industry fixed effects are included in all regressions. Coefficients on these variables are omitted from the table for brevity and are available upon request. Variable definitions are in Appendix B. All right-hand side variables are lagged by one year. t-statistics based on robust standard errors clustered at industry level are in parentheses. Levels of significance are indicated by *, **, and *** for 10%, 5%, and 1% respectively.

	(1)	(2)	(3)	(4)
GIM	-0.001*	-0.001	0.001**	
	(-1.88)	(-1.38)	(2.26)	
Industry RelVal		0.055***		0.020***
		(4.31)		(3.73)
Industry RelVal*GIM		-0.003**		
		(-2.37)		
Total RelVal			0.113***	
			(18.55)	
Total RelVal*GIM			-0.002***	
			(-3.09)	
Dictatorship				-0.020***
				(-3.30)
Industry RelVal*Dictatorship				-0.047**
				(-2.43)
Year Fixed Effects	Yes	Yes	Yes	Yes
Industry Fixed Effects	Yes	Yes	Yes	Yes
Adjusted-R^2	0.17	0.18	0.31	0.23
Observations	15467	15467	15467	2231

Table III: Operating Performance: High vs Low Relative Valuation

This table reports results for OLS regressions of operating performance (ROA) on governance in subsamples split on industry relative valuation. Governance is measured by the shareholder rights index from Gompers, Ishii, and Metrick (2003) (GIM). In Columns (1) and (2), we rank observations into two groups based on the lower and upper half of the distribution of the relative valuation measure. In Columns (3)-(5), we rank observations into three groups based on the lower, middle, and upper third of the distribution of the relative valuation measure. In Columns (6)-(9), we rank observations into four groups based on the lower, mid-low, mid-high, and upper quarter of the distribution of the relative valuation measure. Controls for firm size (log of the book value of assets), group averages, and year and industry fixed effects are included in all regressions. Coefficients on these variables are omitted from the table for brevity and are available upon request. Variable definitions are in Appendix B. t-statistics based on robust standard errors clustered at industry level are in parentheses. p-values of tests of differences with respect to the Low group are in square brackets. Levels of significance are indicated by *, **, and *** for 10%, 5%, and 1% respectively.

	Split Industry RelVal into:								
	Median		Terciles			Quartiles			
	Low	High	Low	Medium	High	Q1	Q2	Q3	Q4
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
GIM	0.001	-0.002***	0.001	-0.001	-0.002***	0.001	0.0002	-0.001	-0.003***
	(1.29)	(2.85)	(1.17)	(-1.05)	(-2.64)	(0.82)	(0.18)	(-0.83)	(-2.96)
		[0.01]			[0.01]				[<0.01]
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted-R^2	0.22	0.19	0.24	0.25	0.36	0.24	0.25	0.35	0.36
Observations	7903	7564	5367	4991	5109	4153	3750	3662	3902

Table IV: Operating Performance - Robustness

This table reports results for OLS regressions of operating performance (ROA) on governance and its interaction with dummies for three groups based on the lower, middle, and upper third of the distribution of the industry relative valuation measure as in Table 3. Governance is measured by the shareholder rights index from Gompers et al. (2003) (GIM). Column (1) reports results for median regression. In Column (2), we include industry concentration and its interaction with the GIM index as additional controls. Industry concentration is measured as the HHI index of the three-digit SIC industry. In Column (3), we exclude new economy firms defined as in Hand (2003). In Column (4), we use firm instead of industry fixed effects. Column (5) reports results for relative valuation measure based on a richer valuation model where market-to-book is regressed on a broader set of determinants as in Hoberg and Phillips (2010). Column (6) reports results for industry relative valuation measure based on a valuation model that includes the GIM index. Column (7) reports results for the 1990-2010 sample where we use the value of 2006 GIM index for the years until 2010. Controls for firm size, group averages (Low, Medium, and High Industry RelVal), and year and industry fixed effects are included in all regressions (except in Column (4) where we use firm fixed effects). Coefficients on these variables are omitted from the table for brevity and are available upon request. Variable definitions are in Appendix B. t-statistics based on robust standard errors clustered at industry level are in parentheses. Levels of significance are indicated by *, **, and *** for 10%, 5%, and 1% respectively.

	Median regression	Control for HHI	Exclude hi-tech	Firm f.e.	HP measure	GIM in the valuation model	Extended sample
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
GIM_t	0.0004	0.001	0.001	-0.001	0.001	0.001	0.0004
	(1.06)	(0.77)	(0.98)	(-0.97)	(1.30)	(1.30)	(0.70)
Medium Industry $RelVal_t$*	-0.001	-0.001	-0.0007	-0.001	-0.001	0.001	-0.001
GIM_t	(-1.41)	(-1.25)	(-0.82)	(-1.47)	(-0.68)	(0.80)	(-1.07)
High Industry $RelVal_t$*	-0.002**	-0.002**	-0.002***	-0.002**	-0.003***	-0.003***	-0.002**
GIM_t	(-2.42)	(-2.73)	(-2.61)	(-2.38)	(-4.03)	(-2.90)	(-2.13)
Firm Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted-R^2	0.11	0.19	0.18	0.66	0.19	0.20	0.17
Observations	15467	15467	14516	15467	15467	11165	18188

Table V: Operating Performance - Alternate Measures of Governance

This table reports results for OLS regressions of operating performance (ROA) on proxies for weak governance and their interaction with industry relative valuation. In Columns (1) and (2), Weak Governance is a dummy that takes the value of one if board size exceeds nine directors. In Columns (3) and (4), Weak Governance is a dummy that takes the value of one if the firm's board score is less than or equal to one. The board score is from Chhaochharia and Grinstein (2007) and is based on the sum of four indicator variables for having a majority of independent directors and a fully independent audit, nominating, and compensation committees. Further, we only use firm-years up to 2003 since all firms are compliant with SOX rules after 2003. In Columns (2) and (4), Weak Governance is interacted with dummies for three groups based on the lower, middle, and upper third of the distribution of industry relative valuation measure as in Table 3. Controls for firm size (log of the book value of assets), Industry RelVal dummies, and year and industry fixed effects are included in all regressions. Coefficients on these variables are omitted from the table for brevity and are available upon request. Variable definitions are in Appendix B. t-statistics based on robust standard errors clustered at industry level are in parentheses. Levels of significance are indicated by *, **, and *** for 10%, 5%, and 1% respectively.

	Weak Governance Measured by:			
	Board Size		Compliance with SOX	
	(1)	(2)	(3)	(4)
Weak Governance$_t$	-0.002	-0.0002	-0.005	-0.002
	(-0.50)	(-0.05)	(-1.29)	(-0.44)
Medium Industry RelVal$_t$*		-0.006		-0.002
Weak Internal Governance$_t$		(-0.69)		(-0.15)
High Industry RelVal$_t$*		-0.020**		-0.025**
Weak Internal Governance$_t$		(-1.99)		(-2.12)
Firm Controls	Yes	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes	Yes
Industry Fixed Effects	Yes	Yes	Yes	Yes
Adjusted-R^2	0.18	0.19	0.22	0.23
Observations	5915	5915	5915	5915

Table VI: Operating Performance around State Laws

This table reports results for the difference-in-differences estimator using staggered passages of state business combination (BC) laws. The sample is a panel of all firms in Compustat, excluding firms in financial and utilities sectors, from 1977 to 1995. BC is a dummy that equals one if the firm is incorporated in a state that passed a BC law by year t. State BC law passage years are from Bertrand and Mullainathan (2003). Data on states of incorporation and state of location are from historical Compustat tapes. Before(-1) is a dummy for firms incorporated in states that will pass a BC law one year from now, Before(0) is a dummy for firms incorporated in states that passed a BC law that year, After (+1) is a dummy for firms incorporated in states that passed a BC law in the previous year, and After (+2) is a dummy for firms incorporated in states that passed a BC law two or more years ago. Controls omitted for brevity include firm size (log of the book value of assets), its squared term, averages of the dependent variable across all firms in the same industry and state of location in that year, excluding the firm itself. All regressions control for group averages (Low, Medium, and High Industry RelVal), and year and firm fixed effects. Variable definitions are in Appendix B. t-statistics based on robust standard errors clustered at the state of incorporation level are in parentheses. Levels of significance are indicated by *, **, and *** for 10%, 5%, and 1% respectively.

	(1)	(2)
BC	0.005	
	(0.73)	
Before(-1)		-0.002
		(-0.33)
Before(0)		-0.002
		(-0.21)
After(1)		-0.0002
		(-0.02)
After(2+)		0.009
		(1.29)
Medium Industry RelVal*		
BC	-0.008	
	(-1.13)	
Before(-1)		-0.005
		(-0.34)
Before(0)		-0.0003
		(-0.05)
After(1)		-0.004
		(-0.53)
After(2+)		-0.013***
		(-3.32)
High Industry RelVal*		
BC	-0.012***	
	(-2.69)	
Before(-1)		-0.005
		(-0.51)
Before(0)		-0.0006
		(-0.15)
After(1)		-0.002
		(-0.39)
After(2+)		-0.033**
		(-2.42)
Year Fixed Effects	Yes	Yes
Firm Fixed Effects	Yes	Yes
Adjusted-R^2	0.62	0.62
Observations	62653	62653

Table VII: Democracy-Dictatorship Hedge Portfolio Returns

This table reports the alphas from four-factor regressions of monthly returns of value-weighted (Panel A) and equal-weighted (Panel B) portfolios based on firms' GIM index, where GIM index is the shareholder rights index from Gompers, Ishii, and Metrick (2003). The first row in each panel reports alphas for the hedge portfolio that is long in Democracy (GIM$\leq$5) firms and short in Dictatorship (GIM$\geq$14)firms. The bottom two rows in each panel report alphas for the long (Democracy) and the short (Dictatorship) portfolios separately. The sample period is from September 1990 through December 1999 in Columns (1)-(4), and from September 1990 through December 2006 in Columns (5)-(8). In Columns (1) and (5), the portfolios are formed based on all firms in the sample. In Columns (2)-(4) and (6)-(8), we form separate equal-sized portfolios for firms in the lower, middle, and upper terciles of historical industry relative valuation measure. The four factors are the market factor (RMRF), the size factor (SMB), the book-to-market factor (HML) and the momentum factor (MOM). All factors are obtained from Kenneth French's website. Coefficients on the four factors are omitted from the table for brevity and are available upon request. Variable definitions are in Appendix B. t-statistics are in parentheses. p-values of tests of differences with respect to the Low group are in square brackets. Levels of significance are indicated by *, **, and *** for 10%, 5%, and 1% respectively.

	Original GIM Period (1990-1999)				Entire Sample Period (1990-2006)			
	All	Industry RelVal			All	Industry RelVal		
	Firms	Low	Medium	High	Firms	Low	Medium	High
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Panel A: Value Weighted Portfolios								
Democracy-Dictatorship	0.49*	-0.11	0.53	1.32***	0.32	-0.20	0.21	1.19**
	(1.84)	(-0.22)	(1.34)	(2.67)	(1.48)	(-0.53)	(0.68)	(2.48)
				[<0.01]				[<0.01]
Long portfolio (Democracy)	0.16	-0.13	0.11	0.67*	0.02	-0.14	0.05	0.28
	(0.98)	(-0.37)	(0.45)	(1.76)	(0.15)	(-0.50)	(0.20)	(0.69)
				[0.04]				[0.38]
Short portfolio (Dictatorship)	-0.33*	-0.02	-0.43	-0.65**	-0.29*	0.07	-0.16	-0.92***
	(-1.68)	(-0.06)	(-1.39)	(-2.01)	(-1.86)	(0.24)	(-0.69)	(-2.99)
				[0.05]				[<0.01]
Panel B: Equal Weighted Portfolios								
Democracy-Dictatorship	0.20	0.08	0.08	0.71**	0.19	-0.11	0.03	0.62*
	(1.07)	(0.19)	(0.28)	(1.97)	(1.17)	(-0.33)	(0.14)	(1.73)
				[0.05]				[0.05]
Long portfolio (Democracy)	0.003	0.36	-0.26	0.06	-0.06	0.07	-0.22	0.09
	(0.02)	(1.08)	(–1.20)	(0.18)	(-0.38)	(0.30)	(–1.07)	(0.30)
				[0.85]				[0.72]
Short portfolio (Dictatorship)	-0.20	0.28	-0.34	-0.66**	-0.24*	0.18	-0.25	-0.53**
	(-1.23)	(0.87)	(–1.48)	(-2.42)	(-1.75)	(0.77)	(–1.26)	(-1.96)
				[0.02]				[0.02]

Table VIII: Fama-MacBeth Return Regressions

This table reports the Fama-MacBeth coefficients from 112 monthly cross-sectional regressions of individual stock returns on governance and its interaction with dummies for three groups based on the lower, middle, and upper third of the distribution of the industry relative valuation. In Columns (1), (3), and (5), governance is measured by the shareholder rights index from Gompers et al. (2003) (GIM). In Columns (2), (4), and (6), the sample is restricted to Democracy (GIM$\leq$5) and Dictatorship (GIM$\geq$14) firms and governance is measured by a dummy for Dictatorship firms. In Columns (3) and (4), we include industry concentration and its interaction with the GIM index as additional controls. Industry concentration is measured as the HHI index of the three-digit SIC industry. As in Gompers et al. (2003), we include controls for lagged firm size, book-to-market ratio, stock price, returns from months t-3 to t-2, from t-6 to t-4, and from t-12 to t-7, trading volume of NYSE or Amex stocks, trading volume of NASDAQ stocks, a NASDAQ dummy, an S&P 500 dummy, dividend yield, sales growth over the previous five years, institutional ownership, and group averages (Low, Medium, and High Industry RelVal). Coefficients on these variables are omitted from the table for brevity and are available upon request. Variable definitions are in Appendix B. The sample period is from September 1990 through December 1999. t-statistics are in parentheses. Levels of significance are indicated by *, **, and *** for 10%, 5%, and 1% respectively.

	Baseline		Control for HHI	
	(1)	(2)	(3)	(4)
GIM	0.000		0.000	
	(0.43)		(0.52)	
Medium Industry RelVal*GIM	-0.0002		-0.0003	
	(-0.50)		(-0.78)	
High Industry RelVal*GIM	-0.001**		-0.001**	
	(-2.51)		(-2.23)	
Dictatorship		0.002		0.001
		(0.89)		(0.41)
Medium Industry RelVal*Dictatorship		0.003		0.003
		(0.58)		(0.57)
High Industry RelVal*Dictatorship		-0.011**		-0.010*
		(-1.98)		(-1.75)
Months	112	112	112	112

Table IX: Mutual Fund Buying Pressure

This table reports results of regressions that examine the effect of governance on operating (Panel A) and stock market (Panel B) performance of firms whose stock was subject to overvaluation following inflow-driven mutual fund buying pressure. The measures of mutual fund buying pressure are from Khan et al. (2012): an indicator for stocks subject to inflow-driven buying pressure (IBP) by mutual funds in the top decile of capital flows and an indicator for stocks subject to widespread buying pressure (WBP) by mutual funds not experiencing significant flows. The sample is restricted to Democracy (GIM$\leq$ 5) and Dictatorship (GIM$\geq$ 14) firms, where GIM-index is the shareholder rights index from Gompers et al. (2003). Panel A reports results for OLS regressions of operating performance (ROA) on a dummy for Dictatorship firms and its interaction with IBP and WBP. In Column (1), the Dictatorship dummy is not interacted with IBP or WBP. In Columns (2) and (3), the Dictatorship dummy is interacted with measures of flow-motivated (IBP) vs information-motivated buying pressure (WBP), respectively. Controls for firm size (log of the book value of assets), and year and industry fixed effects are included in all regressions. t-statistics based on robust standard errors clustered at industry level are in parentheses. Panel B reports the alphas from four-factor regressions of monthly returns of a value-weighted (VW) and equal-weighted (EW) hedge portfolio that is long in Democracy firms and short in Dictatorship firms. In Column (1), the Democracy-Dictatorship hedge portfolio is formed based on all firms in the sample. In Columns (2)-(3), we form separate hedge portfolios for firms were subject to IBP in the previous quarter (Column (2)) and those that were not (Column (3)). In Columns (4)-(5), we form separate hedge portfolios for firms that were subject to WBP in the previous quarter (Column (4)) and those that were not (Column (5)). The four factors are the market factor (RMRF), the size factor (SMB), the book-to-market factor (HML) and the momentum factor (MOM). All factors are obtained from Kenneth French's website. Coefficients on the four factors are omitted from Panel B for brevity and are available upon request. The sample period in both panels is from September 1990 through December 2006. t-statistics are in parentheses. Variable definitions are in Appendix B. Levels of significance are indicated by *, **, and *** for 10%, 5%, and 1% respectively.

Panel A: ROA

	(1)	(2)	(3)	(4)
Dictatorship$_t$	-0.010***	-0.010***	-0.009**	-0.014***
	(-2.92)	(-2.63)	(-2.33)	(-3.17)
IBP$_t$		0.008**		
		(2.18)		
IBP$_t$*Dictatorship$_t$		-0.016**		
		(-2.05)		
WBP$_t$			0.005***	
			(2.92)	
WBP$_t$*Dictatorship$_t$			-0.004	
			(-1.00)	
MFFlow$_t$				0.001
				(0.24)
MFFlow$_t$*Dictatorship$_t$				-0.002
				(-0.97)
Year Fixed Effects	Yes	Yes	Yes	Yes
Industry Fixed Effects	Yes	Yes	Yes	Yes
Adjusted-R^2	0.19	0.19	0.19	0.19
Observations	15467	15467	15467	15467

Panel B: Democracy-Dictatorship Hedge Portfolio Returns: (1990-2006)

	All	IBP		WBP		MFFlow	
	Firms	Yes	No	Yes	No	Yes	No
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
α (VW)	0.31	5.32***	0.26	1.41	0.21	0.22	0.34
t-statistic	(1.16)	(2.80)	(1.27)	(1.49)	(0.99)	(0.34)	(0.30)
α (EW)	0.13	3.72**	0.15	0.78	0.14	0.26	0.30
t-statistic	(0.83)	(2.04)	(0.95)	(1.02)	(0.84)	(0.33)	(0.12)

Table X: Investment and Operating Efficiency

This table reports results for panel regressions of measures of investment activity and operating efficiency on governance and its interaction with dummies for three groups based on the lower, middle, and upper third of the distribution of the industry relative valuation. Governance is measured by the shareholder rights index from Gompers, Ishii, and Metrick (2003) (GIM). In Column (1), the dependent variable is capital expenditures scaled by total assets. In Column (2), the dependent variable is the acquisition likelihood defined as a dummy variable that takes the value of one if a firm makes an acquisition bid in a given year. In Column (3), the dependent variable is the number of acquisition bids a firm makes in a given year, conditional on making at least one bid during that year. In Column (4), the dependent variable is R&D expenditures scaled by assets. In Column (5), the dependent variable is labor productivity defined as log of sales in 1996 dollars scaled by number of employees. In Column (6), the dependent variable is cost of goods sold scaled by sales. In Column (7), the dependent variable is log of wages in 1996 dollars scaled by number of employees. In Column (8), the dependent variable is the log of two-year ahead sales to current year's sales. All dependent variables are winsorized at 5% level. Controls for firm size (log of the book value of assets), Tobin's q, cash flow, group averages (Low, Medium, and High Industry RelVal), and year and industry fixed effects are included in all regressions. All controls are lagged one period. Coefficients on these variables are omitted from the table for brevity and are available upon request. Variable definitions are in Appendix B. t-statistics based on robust standard errors clustered at industry level are in parentheses. Levels of significance are indicated by *, **, and *** for 10%, 5%, and 1% respectively.

Dependent Variable:	Investment and Acquisitions				Operating Efficiency			
	Capex	Acq Dummy	Number of acquisitions	R&D	Labor Prod	Cost of Goods Sold	Wages	Sales Growth
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
GIM	0.0001	0.020**	0.001	0.0002	-0.010	-0.145	0.014	0.002
	(0.19)	(2.27)	(0.14)	(0.58)	(-1.48)	(-0.73)	(1.30)	(0.96)
Medium Industry RelVal*	0.001	-0.0002	-0.009	-0.0003	-0.007	0.288**	-0.009	-0.003
GIM	(1.57)	(-0.02)	(-1.12)	(-0.98)	(-1.38)	(2.16)	(-0.79)	(-1.49)
High Industry RelVal*	-0.001	-0.003	-0.008	-0.0004	-0.017**	0.359**	-0.008	-0.006**
GIM	(-1.33)	(-0.24)	(-1.14)	(-0.61)	(-2.17)	(2.08)	(-1.25)	(-1.98)
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted-R^2	0.45	0.11	0.17	0.49	0.60	0.46	0.89	0.10
Observations	15467	15467	5207	15467	15467	15467	1406	15467

Table XI: Investment and Operating Efficiency around State Laws

This table reports difference-in-differences estimates of the effect of staggered passages of state business combination (BC) laws on investment activity and operating efficiency on staggered passages of state business combination (BC) laws. Measures of investment activity and operating efficiency are as in Table X. The sample is a panel of all firms in Compustat, excluding firms in financial and utilities sectors, from 1977 to 1995. BC is a dummy that equals one if the firm is incorporated in a state that passed a BC law by year t. State BC law passage years are from Bertrand and Mullainathan (2003). Data on states of incorporation and state of location are from historical Compustat tapes. The BC dummy is interacted with dummies for three groups based on the lower, middle, and upper third of the distribution of the industry relative valuation. Dependent variables and controls are as in Table VI. In addition, controls for averages of the dependent variable across all firms in the same industry and state of location in that year, excluding the firm itself, and for group averages (Low, Medium, and High Industry RelVal) are included. All regressions control for year and firm fixed effects. All controls are lagged one period. Coefficients on these variables are omitted from the table for brevity and are available upon request. Variable definitions are in Appendix B. t-statistics based on robust standard errors clustered at the state of incorporation level are in parentheses. Levels of significance are indicated by *, **, and *** for 10%, 5%, and 1% respectively.

Dependent Variable:	Investment and Acquisitions				Operating Efficiency			
	Capex	Acq Dummy	Number of acquisitions	R&D	Labor Prod	Cost of Goods Sold	Wages	Sales Growth
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
BC	0.006**	0.002	0.010	0.001	0.019	-0.002	0.019	0.01
	(2.06)	(0.30)	(0.28)	(0.51)	(0.43)	(-0.56)	(0.49)	(1.37)
Medium Industry RelVal*	-0.006**	0.002	-0.040	-0.001	0.003	0.005***	0.011	-0.01
BC	(-2.25)	(0.35)	(-1.22)	(-0.57)	(0.78)	(2.89)	(0.40)	(-1.01)
High Industry RelVal*	-0.009**	-0.004	-0.086**	-0.003**	-0.025*	0.008**	0.018	-0.055***
BC	(-2.65)	(-0.50)	(-2.65)	(-2.08)	(-1.80)	(2.53)	(1.31)	(-2.85)
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted-R^2	0.45	0.27	0.21	0.71	0.80	0.74	0.91	0.38
Observations	62653	62653	8858	27131	50945	58119	6063	62653

I. Appendix A

A. Proof of Proposition 1:

If $R-\gamma(I-A)/p'_H \geq B/\Delta p'$ then from equation (2) we know the investors will invest. However if $B/\Delta p > R-\gamma(I-A)/p'_H$ from equation (4) we know that the manager will choose the bad project with higher private benefits. Both inequalities in equation (5) can only hold when $\mu > 0$ since $\mu \leq 0 \Rightarrow B/\Delta p \leq B/\Delta p'$. QED

B. Proof of Corollary 1:

$\frac{\partial B/\Delta p'}{\partial \mu} < 0$ while $\frac{\partial (B/\Delta p)}{\partial \mu} = 0$, therefore $B/\Delta p - B/\Delta p'$ increases with μ and more firms satisfy equation (5). Also, ($\frac{\partial \overline{A}}{\partial \mu} < 0$) so more firms can get financing and those firms who get financing due to overvaluation will misbehave. QED

C. Proof of Proposition 2:

By assumption, increased corporate governance reduces the private benefits from the bad project. If the private benefits, B, are reduced then $B/\Delta p - B/\Delta p'$ falls (i.e. $\frac{\partial}{\partial B}(B/\Delta p - B/\Delta p') > 0$.) Thus, when the private benefits are reduced to b then only firms for which $b/\Delta p > R-\gamma(I-A)/p'_H \geq b/\Delta p'$ will misbehave - which is fewer firms since $B/\Delta p - B/\Delta p' > b/\Delta p - b/\Delta p'$. QED

II. Appendix B

The variables used in this paper are extracted from four major data sources: ISS Riskmetrics Database, COMPUSTAT, CRSP, and SDC Platinum. For each data item, we indicate the relevant source in square brackets. The specific variables used in the analysis are defined as follows:

- Governance [Riskmetrics]:
  - GIM-index is the sum of all antitakeover provisions in a firm's charter that varies between 0 and 24 (Gompers et al. (2003)).
  - Dictatorship is a dummy which takes the value of one for observations with GIM index of at least 14. [Riskmetrics]
  - Democracy is a dummy which takes the value of one for observations with GIM index of at most 5. [Riskmetrics]
- Relative valuation:
  - Total (or raw) relative valuation: the difference between a firm's actual valuation and one implied by average industry pricing using historical industry multiples. To get implied valuation, for each industry j and year t, we first estimate a valuation model from the following industry-level regressions that use ten years of lagged data:

$$\log M_{ij\tau} = a_{0jt} + a_{1jt} \log B_{ij\tau} + a_{2jt} \log (NI)^{+}_{ij\tau} \quad (1)$$

$$+ a_{3jt} I_{(<0)} \log (NI)^{+}_{ij\tau} + a_{4jt} LEV_{ij\tau} + \varepsilon_{ij\tau},$$
$$\tau = t-10, ..., t-1$$

where i indexes firms, j indexes industries, and t indexes time. M_{ijt} is the market value of equity, computed by multiplying the common stock price at fiscal year-end (item 199) by common shares outstanding (item 25). B_{ijt} is the book value of equity, constructed as stockholders' equity (Compustat item 216) plus balance sheet deferred taxes and investment tax credit (Compustat item 35) minus the book value of preferred stock (Compustat item 56). NI is net income (Compustat Item 172). Since we estimate the regression in logs, we set negative values of net income to zero and include an indicator function for negative values of net income. LEV_{ijt} is the leverage ratio computed as the ratio of total long-term debt (Compustat item 9) to total assets (item 6). In order to reduce the impact of outliers, all variables are winsorized at the 1% level. [Compustat]

- Industry relative valuation: average total relative valuation of all firms in the three-digit SIC industry, excluding firm i.

- Firm variables:

  - ROA is defined as operating income after depreciation (item 178) scaled by year-end total assets (item 6). [Compustat]
  - Firm size is defined as log of the book value of assets (item 6), deflated by CPI in 1990. [Compustat]
  - Industry concentration is the Herfindahl-Hirschman Index (HHI) of the industry, defined as the sum of the squares of the individual company market shares for all the companies in the three-digit SIC industry. [Compustat]
  - Investment is capital expenditures (item 128) over assets at the beginning of the fiscal year (item 6). [Compustat]
  - Number of acquisitions is the number of all transactions in which a sample firm acted as an acquirer in a given year. [SDC]
  - Acquisition probability is a dummy variable that takes the value of one if a firm makes an acquisition bid in a given year and zero otherwise. [SDC]
  - R&D is research and development expenditures (item 46) over sales (item 12). [Compustat]
  - Labor productivity is the log of sales (item 12) in 1996 dollars scaled by number of employees (item 29). [Compustat]
  - Cost of goods sold is the ratio of cost of goods sold (item 41) to sales (item 12). [Compustat]
  - Wages is the log of wages (item 42) in 1996 dollars scaled by number of employees (item 29). [Compustat]
  - Sales growth is log of sales (item 12) in year t, scaled by sales in year $t-2$. [Compustat]

- Tobin's Q is the market value of assets divided by the book value of assets (item 6), where the market value of assets equals the book value of assets plus the market value of common equity less the sum of the book value of common equity (item 60) and balance sheet deferred taxes (item 74). [Compustat]
- Cashflow is the sum of earnings before extraordinary items (item 18) and depreciation (item 14) over assets at the beginning of the fiscal year (item 6). [Compustat]