Real Investment, Economic Efficiency and Managerial Entrenchment

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October 20, 2009

Abstract

We uncover a positive relationship between the firm’s corporate governance quality, as measured by the degree of managerial entrenchment, and the quality of its real investment decisions. Firms whose managers are less entrenched invest more, invest more in line with their investment opportunities and have higher productivity of capital and labor. Rather than reducing overinvestment, our evidence suggests that good governance primarily mitigates underinvestment. These results are robust to alternative measures of investment opportunities and are not driven by product market competition or potential endogeneity between governance quality and investment opportunities.

Keywords: Real investments, corporate governance, financial constraints, underinvestment

JEL classification codes: E22, G31, G34

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1 Introduction

The only determinant of a firm’s optimal investment decision in a frictionless environment is its investment opportunities as measured by Tobin’s marginal $q$ (Tobin, 1969). However, several studies find that firms’ investment is sensitive to measures of internal funds, and in particular cash flows. Analyzing a broad sample of US manufacturing firms in the period 1990-2004, we find that in addition to financial constraints, managerial entrenchment is a statistically significant and economically important determinant of investment. First, firms with less entrenched managers as measured by the Gompers, Ishii and Metrick (2003) index invest more than poorly governed firms. Second, these investments are more in line with the growth opportunities when firms are well governed. Third, firms with less entrenched management have higher capital and labor productivity than poorly governed firms.

The finding that firms with less entrenched managers invest more and also more efficiently suggests that managers of such firms are less inclined to seek the ‘quiet life’. Therefore, they are less likely to underinvest. This result is consistent with the findings of Chemmanur, Paeglis and Simonyan (2009) that higher quality of firms’ management is associated with higher investment levels. This result is also consistent with Bertrand and Mullainathan (2003) who find that when managers are insulated from takeovers, worker wages rise, the destruction of old plants falls, and the creation of new plants slows down. Similarly, Atanassov (2007) finds a negative association between anti-takeover laws and firms’ innovation activity. We present additional evidence that supports this ‘quiet life’ conjecture. For instance, well governed firms have higher capital and labor productivity as measured by the sales to capital ratio and the labor to capital ratio. Therefore, the high level of investment they undertake does not seem to be consistent with overinvestment, since this would reduce productivity.

A possible explanation for the finding that firms whose managers are less entrenched
invest less is that their true financial constraints are not properly captured by our financial constraint proxies, which are cash flow and the Kaplan and Zingales (1997) measure. For example, weaker governance could reduce transparency and deter external capital suppliers, thereby causing firms to underinvest relative to the first best level (Jensen and Meckling (1976)). In fact, Chemmanur, Paeglis and Simonyan (2009) show that firms with more asymmetric information have higher leverage. We do find that firms with more entrenched managers have significantly higher leverage than firms with less entrenched managers. This suggests that when managers are more entrenched, firms are more financially constrained. However, poor governance that causes a firm to be financially constrained cannot fully explain the observed relationship between governance and investment. If the only impact of managerial entrenchment is to tighten financial constraints, capital productivity and labor productivity could even increase with entrenchment. This is clearly not the case in our sample. Consequently, managerial entrenchment has a separate, detrimental impact on real investment quality. Governance provisions that weaken shareholder rights and protect managers worsen the internal resource allocation within firms.

Our paper makes two contributions to the literature. First, we address the agency conflict between owners and managers by asking how the firm’s corporate governance mechanisms influence its real investment decisions. This is accomplished in three steps. The first is to analyze the relationship between the level of the firm’s real investments and the degree of its managers entrenchment as measured by the Gompers, Ishii and Metrick index. Thus, we examine whether managerial entrenchment drives investment levels. Subsequently, we analyze how managerial entrenchment influences the responsiveness of the firm’s investment decision to its investment opportunities. Note that throughout the paper we intermittently refer to firms whose managers are entrenched as poorly governed firms and to firms with unentrenched managers as well governed
firms. That is, we examine how corporate governance mechanisms relate to the capital budgeting process that allocates funds within the firm. As Stein (2003) notes, this question of firm-internal investment efficiency has been studied to a lesser extent than the efficiency of capital allocation across firms. Our approach is novel in the real investment literature, where the link to corporate governance has been missing.

The third step is to show how governance quality influences not just the firm’s responsiveness to investment opportunities, but the ability to respond in the appropriate way. Several possibilities exist, which relate to whether managers invest too much (overinvest) or too little (underinvest) relative the \( q \) theory. As noted by Jensen (1986), overinvestment may occur when self-serving managers build unprofitable empires at the owner’s expense.\(^1\) Underinvestment may happen for a number of reasons. First, when incentive problems create financial constraints by driving a wedge between the costs of internal and external capital (Jensen and Meckling (1976)). Second, when manager’s preference for a quiet life makes them reject new investment projects with positive net present value (Bertrand and Mullainathan (2003), Atanassov (2007)). Third, when management has private information about their skills (Holmström and Ricart i Costa (1986)). Fourth, when managers are short-termist (Narayanan (1985), Stein (1989)). Finally, risk averse managers may overinvest or underinvest in inefficient, diversified conglomerates with low risk rather than in efficient, specialized stand-alone projects (Denis, Denis and Sarin (1997)). We try to determine whether better governance typically reduces the costs of overinvestment or underinvestment.

Our second contribution to the literature is to rationalize the finding that a firm’s governance mechanisms relate systematically to its economic performance (Shleifer and Vishny (1997), Becht, Bolton and Roëll (2002), Gompers, Ishii and Metrick (2003)). While this result is now incontrovertible, the channel through which this happens re-

\(^1\)Roll (1986) and Heaton (2002) show that overinvestment may also be driven by managerial hubris.
mains underexplored. That is, the governance literature has not yet fully identified why well-governed firms produce superior performance. Since real investment determines the firm’s ability to produce output, real investment is a key intermediate variable between governance and performance. However, the observed positive association between governance quality and performance does not imply that better governance improves the allocation of resources. This will only be true if higher governance quality improves the way firms respond to investment opportunities. It could be that managers of well governed firms are not better than others at allocating real assets, but only at creating barriers to entry for competitors or at negotiating with labor unions. Thus, to understand whether governance drives the firm’s market value by way of efficiency or by rent extraction, the key is not the link between governance and market value. Rather, it is whether the governance mechanisms relate systematically to the way management allocates the firm’s resources. The answer to this question has policy implications as well, as it addresses the social benefits of governance enhancing regulations. We try to shed light on this question by linking governance quality as reflected by the degree of managerial entrenchment to investment quality. While firms choose between several governance mechanisms, such as board monitoring, market for corporate control, executive compensation and more, our focus in this paper is on managerial entrenchment, which is a central corporate governance mechanism.

Our result that better governance, as measured by less managerial entrenchment, increases the investment quality are not due to endogeneity of the governance mechanisms. Neither are they driven by product market structure. This is a potential explanation in the model of Grenadier (2002), where product market competition erodes the option value of waiting to invest. Thus, firms in competitive industries should exhibit

\footnote{The assumption that governance is exogenous in the model is a potential problem we share with most governance studies (Becht et al, 2002). One way endogeneity may materialize in our setting is if firms with attractive investment opportunities improve their governance in order to raise external funding at better terms. We find no evidence of such a relationship.}
a higher sensitivity of investment to investment opportunities than firms in less competitive (i.e., more concentrated) industries. Akdogu and MacKay (2007) study this issue empirically. Using Tobin’s $q$ as a proxy for growth opportunities and a Herfindahl index to measure industry concentration, they examine whether industry structure affects investment in a large sample of U.S. manufacturing firms. Consistent with a wait-lose trade-off, they find that investment by firms in high-concentration industries is about half as sensitive to changes in Tobin’s $q$ as in low-concentration industries. They also conduct a duration analysis and find that for large investments (both for fixed and firm-specific investment cutoff levels), firms in competitive industries invest sooner than firms in monopolistic industries. In view of this finding, we examine whether firms with high governance quality, as reflected by a low degree of managerial entrenchment, are also more likely to operate in competitive industries. We find that this is not the case. Thus, our results are not driven by differences in product market structure.

Overall, our findings constitute novel evidence on why there is a positive relationship between a firm’s corporate governance quality and its economic performance. It seems that well-governed firms allocate their resources more efficiently. This leads to higher capital and labor productivity relative to poorly governed firms. Even though the low level of investment by poorly governed firms may occur because they are more financially constrained, they do not invest efficiently. The investments that they undertake lead to a reduction in capital and labor productivity and to lower sales growth compared with well governed firms.

Our paper is related to the literature on how cross-country differences in investor protection influence investment behavior. Gugler, Mueller and Yurtoglu (2004) find that countries with a common law regime earn returns on investment that are at least as high as the cost of capital, whereas returns are below the cost of capital in civil law countries. Similarly, Wurgler (2000) concludes that investment in declining industries is more
effectively curbed in countries with strong minority investor protection, which is more prevalent in common law than civil law regimes. Several international studies find that strong shareholder rights are positively associated with capital market development, valuation multiples, and economic growth (see, for example, King and Levine (1993a, 1993b), La Porta et al (1997, 1998), Acemoglu and Zilibotti (1997), Allen and Gale (1997), Rajan and Zingales (1998), Demirgic-Kunt and Maksimovic (1998)).

Our approach differs from these studies in two ways. First, we keep the legal environment constant and study how managerial entrenchment differences across firms affect individual firms’ investment rather than studying the effects on aggregate investment of cross-country variations in governance quality. Second, we examine not just whether managerial entrenchment influences investment levels. We also analyze how managerial entrenchment influences responsiveness to investment opportunities and whether it works through mitigating overinvestment, underinvestment, or both.

A related paper to ours is by Hartzell, Sun and Titman (2006), who use a sample of Real Estate Investment Trusts (REITs) to investigate how governance mechanisms interact with investments. However, REITs are required to pay almost all their earnings as dividends in order to be exempted from corporate taxes. This restriction practically eliminates the free cash flow problem (Jensen, 1986) and hence management’s ability to finance value-destroying investments with internal funds. Thus, one would expect less severe agency conflicts within REITs than in most other firms. In contrast, we focus on a broad sample of US manufacturing firms with large cross-sectional variation in free cash flow.

The rest of this paper is organized as follows. Section 2 presents the data and the variable construction. Section 3 contains the empirical tests. Section 4 summarizes and concludes.
2 Data sources and variable construction

We match the Gompers, Ishii and Metrick (2003) measure of corporate governance quality (the $GQ$ index) with data from Compustat. Gompers, Ishii and Metrick construct their index using data from the Investor Responsibility Research Center (IRRC), which publishes detailed listings of corporate governance mechanisms for individual firms. The IRRC universe is drawn from the Standard and Poor’s 500 firms as well as the annual lists of the largest US corporations from Forbes, Fortune, and Business Week.

The IRRC describes the corporate governance quality of a firm based on 24 different provisions in the law and the corporate charter from 1990 to the present. Gompers, Ishii and Metrick split these characteristics into five major groups, which they call tactics to delay hostile bidders, voting rights, director protection, other takeover defences, and state laws, respectively. They use these characteristics to construct a governance index score per firm by adding one point for every provision that restricts shareholder rights and hence increases the managers’ power.

The sample period starts in 1990, ends in 2004, and includes all US manufacturing firms for which there is ranking by the $GQ$ index and for which Compustat has the data on items that we specify below. We focus on manufacturing firms, since they are capital intensive, implying that their economic performance depends crucially on the quality of their real investments.

The basic dependent variable is the ratio of investment to capital, $\frac{i}{k}$, where $i$ and $k$ are Compustat items 128 (capital expenditures) and 8 (net property, plant and equipment), respectively. We use two proxies for investment opportunities. The first is Tobin’s $q$, which we operationalize as the ratio of the market value of assets to their book value. The market value of assets is defined as its book value (item 6) plus the market value of common equity (the product of items 199 and 25) less the sum of the
book value of common stock (item 60) and deferred taxes (item 74). The second measure of investment opportunities is sales growth, which we compute from Compustat item 12.

As a measure for the marginal product of capital and of capital productivity, we use the output to capital ratio \( \frac{y}{k} \), where output is sales and capital is Compustat item 8.\(^3\) Low \( \frac{y}{k} \) implies the firm has excess capital capacity and low capital productivity. We measure labor productivity as the output to labor ratio \( \frac{y}{l} \) where output is sales and labor is Compustat item 29. A low value of \( \frac{y}{k} \) (\( \frac{y}{l} \)) implies the firm has low capital (labor) productivity.

Following the extant real investment literature on internal capital constraints, we use financial constraints as an investment determinant in addition to investment opportunities and managerial entrenchment. We measure financial constraints by cash flow and by the Kaplan and Zingales (1997) (hereafter KZ) index, respectively. Our proxy for internal financial constraints is cash flow, \( cf \), which we measure as earnings before extraordinary items (Compustat item 18) plus depreciation (item 14). We deflate this measure by the book value of assets (item 6). Following Lamont, Polk and Saa-Requejo (2001) (see their appendix in particular), we use the regression coefficients from the KZ model to categorize firms according to the seriousness of their external financial constraint. Unlike other methods, such as the Fazzari, Hubbard and Petersen’s (1988) approach of first ranking by dividend payout and then using cash flow as an investment determinant, the KZ index captures a wider set of characteristics that can reflect how financially constrained a firm is. The KZ measure classifies a firm as more financially constrained the higher the leverage, the lower the cash flow, and the lower the dividend payout.

\(^3\)The marginal product of capital is proportional to the firm’s output to capital ratio under a Cobb-Douglas production function (see Xing, 2008). We follow Xing (2006) by using sales as a proxy for output.
3 Empirical findings

We start by discussing descriptive statistics for our sample firms in section 3.1, subsequently analyzing how the firm’s managers’ entrenchment relates to the level of investment in section 3.2 and to its efficiency in section 3.3. In the latter section, we also link managerial entrenchment to the question of overinvestment and underinvestment. The robustness tests in section 3.4 analyze the sensitivity of our findings to alternative measures of investment opportunities, and to potential endogeneity between managerial entrenchment and investment opportunities. Finally, we examine whether a negative association between managerial entrenchment and product market competition drives our result that well governed firms (i.e. firms with less entrenched management) respond more precisely to investment opportunities.

Our statistical tests apply OLS regressions using fixed effects panel data techniques to control for unobserved heterogeneity at the firm level. Specifically, from each observation of every regression variable $x$ for firm $i$ at time $t$, we subtract the time series average of $x$ for $i$. The OLS technique applied to such demeaned data provides unbiased and efficient estimates (Hsiao (2003)).

3.1 Descriptive statistics

The $GQ$ index of Gompers, Ishii and Metrick (2003) ranges from 0 (highest governance quality) to 20 (lowest governance quality). We follow Gompers, Ishii and Metrick, defining a democracy group as firm years with a $GQ$ of 5 or lower, whereas a dictatorship group has firm years with a $GQ$ of 14 or higher. Thus, if a firm’s $GQ$ index varies over time, the firm can potentially move over time from one group of $GQ$ to another. In addition, like Gompers, Ishii and Metrick, we define a non-dictator group, which contains all firm years outside the dictator group, that is, those with $GQ$ below 14.
We avoid extreme outliers by disregarding firm years in the population of US manufacturing firms over 1990-2004 with investment to capital ratios above one. Only firms with at least three years of data are included, and we ignore observations in the 1% and 99% tails in our proxies for investment, investment opportunities, cash flow, and the KZ measure of financial constraints. We also exclude firm years in which firms disinvest more than their capital stock.

Table 1 presents summary statistics across firms classified by governance quality, as measured by the degree of managerial entrenchment. After filtering the data, the average number of firm years across the five key variables is 7741 for all firms, of which 772 belong to the democracy group and 476 to the dictatorship group. The mean and the standard deviation of the investment to capital ratio, \( \frac{i}{k} \), are higher for well governed firms than for firms with low governance quality. Thus, well governed firms invest more, and the investment also varies more from firm to firm. Similarly, these firms also have better investment opportunities as measured by our proxy for Tobin’s \( q \).

Cash flow, \( cf \), is fairly similar across the groups, whereas firms with poor governance are on average more financially constrained according to the KZ index, where a more negative value reflects a softer constraint. Thus, the availability of internal financing sources is rather independent of managerial entrenchment, but firms with less entrenched management have better access to outside financing than firms whose managers are more entrenched. This suggests the possibility that establishing good governance mechanisms may improve the firm’s access to outside financing sources.

These summary statistics show that, compared to firms with low governance quality, the average firm with good governance has better investment opportunities and invests more. To understand investment behavior better, however, we need to analyze how investment relates to investment opportunities in a way that more formally conditions this link on governance quality. For instance, the finding that the volatility
of the investment level is highest for well governed firms may suggest they are more, rather than less, liquidity constrained, as unconstrained firms should have a smooth investment patterns. On the other hand, the fact that their mean investment level is also higher suggests the opposite. Thus, capturing how managerial entrenchment, financial constraints, investment opportunities, and real investments interact requires a more comprehensive analysis.

3.2 Investment level

We start with a simple univariate model which regresses the level of investment on lagged governance quality:

$$\frac{i}{k_t} = a_0 + a_1 GQ_{t-1} + u_t$$

(1)

The results of an OLS estimation of equation (1) appear under model (a) in Table 2. The estimated coefficient for the $GQ$ index is negative and highly statistically significant at conventional levels. This result suggests that managerial entrenchment might be an important determinant of investment levels, as firms with less entrenched managers invest more (recall that the $GQ$ index is positively related to managerial entrenchment).

We run similar univariate regressions with the variables that have been used in the extant real investment literature. The firm’s investment opportunities as proxied by $q$ (model (b)) is motivated by the perfect markets hypothesis. Both cash flows (model (c)) and $KZ$ (model (d)) are based on the idea that information asymmetries may create financial constraints that cause underinvestment relative to the $q$ theory.

There is a positive and highly statistically significant relationship between investments and $q$, suggesting that investment increases with governance quality. Consistent with the extant literature, we find a positive relationship between investment and cash flow and a negative relationship between investment and the $KZ$ index. This suggests
firms invest less as they become more financially constrained. Taken together, the evidence from models (a)-(d) is consistent with both over- and underinvestment caused by agency problems, and with underinvestment due to financial constraints.

Next, we run a multivariate regression which includes all four variables from the univariate models:

\[
\frac{i}{k_t} = a_0 + a_1 GQ_{t-1} + a_2 q_{t-1} + a_3 c f_{t-1} + a_4 KZ_{t-1} + u_t
\]  

(2)

The results, which are reported under model (e) in table 2, support the findings from the univariate regressions. Firms with higher governance quality invest significantly more than firms with lower governance quality, as the estimated coefficient for \( GQ \) is -0.004 with a \( t \)-statistic of -2.98. The economic effect is considerable, as a two standard deviations fall in the \( GQ \) index entails a 2.25 percentage points increase in the investment to capital ratio. The estimated coefficient on investment opportunities is positive and highly statistically significant. This effect is also economically important, as an increase in \( q \) by two standard deviations increases the investment to capital ratio by almost six percentage points. Finally, the estimated coefficients for \( cf \) and \( KZ \) both have the expected sign and are statistically significant.\(^4\)

These results show that holding investment opportunities and financial constraints constant, firms with good governance quality invest more than firms with lower governance quality. Provided \( cf \) and \( KZ \) fully capture the extent to which a firm is financially constrained, this finding suggests that good governance directly reduces the underinvestment problem caused by entrenched managers seeking the 'quiet life'. Alternatively,\(^4\)

\(^4\)To deal with a possible measurement error in \( q \) problem, we implement the Erickson and Whited (2000, 2002) method that exploits the information contained in higher moments to generate measurement-error consistent GMM estimators of the relation between investment and \( q \). Consistent with their results and with the claim that there is measurement error in \( q \), we find that using this estimator increases the coefficient on \( q \) by an order of magnitude. Nevertheless, the coefficient on \( GQ \) remains economically and statistically significant. (These results are available on request.)
if the two proxies only partially capture financial constraints, higher governance quality might just alleviate financial constraints, thereby enabling firms to invest more. Either way, our results are consistent with the conjecture that poor governance, as reflected by entrenched managers, leads to lower investment.

An alternative interpretation for the finding that well governed firms invest more is that they overinvest, and more so than other firms. However, this is inconsistent with our earlier finding in Table 1 that well governed firms have higher Tobin’s $q$. Moreover, as shown in Table 4 below, $GQ$ is a significant explanatory variable of firms’ capital and labor productivity. Specifically, firms whose managers are less entrenched have higher capital and labor productivity, suggesting they they do not overinvest.

### 3.3 Investment efficiency

Table 2 shows that investment levels decline with managerial entrenchment. The next question is whether entrenchment also matters for how accurately firms respond to investment opportunities. i.e., for the efficiency of investment. The models in this section separately regress investment on investment opportunities for firms with different degrees of managerial entrenchment. This approach allows us to explore whether investment becomes more tightly linked to investment opportunities when governance quality improves. If this is the case, the regression coefficient on investment opportunities will be larger the better the firm’s governance. Our approach to measuring investment efficiency through the sensitivity of investment to $q$ is similar to that of Gertner, Powers and Scharfstein (2002) and Akdogu and MacKay (2008).

For each of the three groups of firms sorted by the degree of managerial entrenchment, we estimate the following investment equation using OLS:

$$\frac{i}{k_t} = a_0 + a_1 q_{t-1} + a_2 c_{t-1} + a_3 KZ_{t-1} + v_t \quad (3)$$
Table 3 reports the results. The first thing to notice is that firms in the democracy group respond much more strongly to their investment opportunities than firms in the dictatorship group. The sensitivity of investment to growth opportunities, as measured by $q$, is twice as large in well governed firms as in poorly governed firms, and it is highly statistically significant. In contrast, the coefficient is not statistically significant for the dictatorship firms. Thus, the difference between the sensitivity of investment to growth opportunities of well governed firms (as reflected by the fact that their managers are not entrenched) and of poorly governed firms is statistically significant. This is an important new finding showing that better corporate governance does improve the quality of real investment decisions.

Irrespective of managerial entrenchment, $cf$ has the expected positive coefficient and is statistically significant. Similarly, the coefficient on $KZ$ has the expected negative sign across all three managerial entrenchment groups, indicating that stronger financial constraints decrease investment. However, the $KZ$ effect for firms in the dictatorship group is statistically and economically strong and much larger than for firms in the democracy group. This evidence supports the notion that unlike in well governed firms, financial constraints reduce investment volume when the firm is poorly governed.

In order to better understand whether managerial entrenchment influences underinvestment or overinvestment, we analyze the relationship between entrenchment and productivity. From the analysis so far, it seems that managerial entrenchment entails underinvestment, since firms whose managers are entrenched invest less than firms with less entrenched managers. However, it is not clear whether managerial entrenchment just constrains a firm financially from making investments in general or if it allows for more investment decisions with low quality. One way to distinguish between these two explanations is by noticing that if entrenchment only influences financial
constraints, leverage would be higher in poorly governed firms. In addition, poorly and well governed firms should not differ in terms of labor and capital productivity. In fact, it is likely that the underinvestment caused by finance constraints cause firms with entrenched management to have a higher marginal product of capital (labor) and hence higher capital (labor) productivity. In contrast, if managerial entrenchment has a role over and above that of causing firms to be financially constrained, poor and well governed firms would also differ in terms of productivity. Specifically, if entrenched managers seek the quiet life and do not exert effort in searching for high productivity investment projects (highly skilled workers) then firms whose managers are less entrenched would exhibit lower capital and labor productivity.

We already have some indication from Table 3 that good governance, as reflected by lower managerial entrenchment, has a role beyond making a firm less financially constrained. In particular, we found that well governed firms invest more in line with investment opportunities. Table 4 takes this a step further by regressing leverage, capital productivity, and labor productivity on the first lag of $GQ$. The first regression helps to further understand the link between governance quality and financial constraints. The two other regressions link governance quality to productivity. We would expect that if poor governance is only related to making a firm more financially constrained, governance quality should be related to leverage but not to productivity.

There is a positive and marginally significant relationship between leverage and $GQ$, suggesting that managerial entrenchment increases financial leverage. This indicates that poorly governed firms are more financially constrained and hence have lower levels of investment. If managerial entrenchment only makes firms more financially constrained, however, it should not affect productivity. The table shows a strongly negative and statistically significant relationship between managerial entrenchment and

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5 Financial constraints are similar to fixed cost of adjustment of capital in that both can entail lumpy investment behavior.
both measures of productivity. This indicates that entrenchment not only leads to lower investment because of stronger financial constraints. It also leads to poor economic efficiency.

This section shows that managers’ entrenchment plays at least two roles in real investment decisions. First, it matters for how well firms respond to their investment opportunities. In particular, the real investments of firms whose managers are less entrenched are better aligned with their investment opportunities. Furthermore, firms with less entrenched management have higher capital and labor productivity. That is, improved governance quality improves investment and hiring quality. Taken together, this is evidence that corporate governance is an important determinant of real investment quality. In addition, these results may explain why researchers have found a positive relationship between governance quality and performance. This seems to happen because well governed firms make better real investment and hiring decisions. Since outside regulators can impose or at least encourage a given governance quality, this result has policy implications. Governance-enhancing regulatory measures would lead to better resource allocation and hence to higher national wealth.

3.4 Robustness

We first consider the sensitivity of our findings to measuring investment opportunities not by Tobin’s $q$, but by sales growth. Then, we explore the potential endogeneity between corporate governance quality and investment opportunities. Finally, we examine whether our results are driven by product market competition.

3.4.1 Investment opportunities

Table 5 reestimates our basic model (3), using sales growth ($\Delta y$) as an alternative measure of investment opportunities (Faccio, Lang and Young (2005), Billett, King and
Mauer (2007), among others, use sales growth as a measure for growth opportunities. The results are consistent with the findings under the base-case measure from Table 3. Investment is much more sensitive to sales growth in the democracy than in the dictatorship group. Consistent with the results in Table 3, we also find that the coefficient on investment opportunities for the dictatorship firms is not statistically significant. Thus, regardless of how we measure investment opportunities, well governed firms are responsive to investment opportunities while poorly governed firms do not respond at all. The other estimates are also in line with those in Table 3.

3.4.2 Endogeneity

We have so far assumed that a firm’s corporate governance quality is exogenous, both relative to the dependent variable (investment) and the other independent variables (investment opportunities and financial constraints). The most pressing endogeneity question in our setting is probably not whether the investment determinants are partially driven by investment itself (i.e., reverse causation). Rather, it is whether investment opportunities and governance quality are systematically related. This dependence could arise if firms with attractive investment opportunities improve their governance in order to raise external funding at better terms.

We want to assess whether we are safe to assume that the governance quality index is exogenous to our two alternative measures of investment opportunities (Tobin’s \( q \) and \( \Delta y \)). In particular, we want to rule out the possibility that the governance mechanisms

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6 Most empirical papers in corporate governance implicitly assume that causation runs from exogenous governance mechanisms to an endogenous performance measure. A typical framework of analysis is to regress Tobin’s \( q \) on a subset of governance mechanisms and some control variables in single-equation models, such as in McConnell and Servaes (1990) and Lehmann and Weigand (2000). As argued by for instance Demsetz (1983) and Agrawal and Knoeber (1996), however, both governance and performance are endogenous if the governance mechanisms respond to the firm’s performance and vice versa. Agrawal and Knoeber (1996) find that whereas several of their governance mechanisms are significantly related to performance in single-equation models, most of these relationship become insignificant under simultaneous equation estimation. Gompers, Ishii and Metrick (2003) note that causality cannot be inferred from their findings.
as captured by the $GQ$ index respond systematically to changes in our measures of investment opportunities. To this end we regress the changes in the governance index on lagged measures of investment opportunities. As this relationship may depend on firm size, we test for potential interactions separately in small firms (firms in the bottom 33% according to book value of assets and capital stock) and in large firms (firms in the top 66%).

Table 6 shows that there is never a statistically significant relationship between changes in the governance index and measures of past investment opportunities, regardless of how we measure the latter. Therefore, we appear to be safe in assuming that relative to each other, governance quality and investment opportunities are exogenous variables in our sample.

### 3.4.3 Product market competition

Akdogu and MacKay (2008) find that investment of firms in competitive industries are substantially more responsive to investment opportunities than the investment of firms in less competitive environments. They interpret their finding as consistent with the real options model of Grenadier (2002), which shows that competition erodes the real option value of waiting to invest. Intuitively, the value of waiting is dissipated if other firms can divert the investment opportunity to themselves. This threat and hence the cost of waiting is higher the stronger the competition. Based on this idea, we need to ensure that our main result is not driven by product market competition. That is, we need to rule out that the higher responsiveness to investment opportunities in well governed firms is not driven by a strong correlation between the $GQ$ index and industry concentration. If well governed firms are mostly found in competitive industries, then the higher quality of their investment decisions would not be due to their governance

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7If ownership concentration decreases with firm size, the free rider problem makes it more costly to adjust governance quality to investment opportunities in large firms than in small firms.
quality per se, but to a high cost of waiting to invest.

To examine this possibility, we follow Akdogu and MacKay (2008), Grullon and Michaely (2007) and others, who use a Herfindahl index (HI) of industry concentration to proxy for product market competition. Grullon and Michaely point to several shortcomings to using the Compustat data to form HI measures, particularly because Compustat does not contain data on private firms. Because the Census of Manufacturing measure includes all firms, and to be consistent with the definition of product market competition in Akdogu and MacKay (2007), we use the HI from the Census of Manufacturing to measure product market competition.

We split industries into three groups based on the HI. Table 7 shows that the average $GQ$ index is very similar across the three groups. Thus, there is no systematic association between corporate governance quality and industry concentration. We conclude that our finding that well governed firms exhibit greater investment efficiency is not driven by product market competition.

4 Conclusions

The real investment literature has so far paid much more attention to the role of asymmetric information and the consequent constraint on external financing than to conflicts of interest between owners and managers and the resulting role played by corporate governance. Using a broad sample of US manufacturing firms from 1990 to 2004, this paper analyzes empirically how the level and efficiency of real investments depend on the quality of the firm’s management entrenchment as measured by the Gompers, Ishii and Metrick (2003) (the $GQ$ index). We find that controlling for investment opportunities as measured by Tobin’s $q$, firms whose managers are less entrenched invest more than firms with entrenched managers. Thus, corporate governance matters for real
investment. This result is consistent with firm-level corporate governance rules mitigating agency conflicts stemming from managers’ tendency to seek the quiet life (as Bertrand and Mullainathan (2003) and Atanassov (2007) find) or alleviating financial constraints.

We also explore whether managerial entrenchment, as measured by the $GQ$ index, worsens investment efficiency. The findings are consistent with the notion that higher corporate governance quality leads to more efficient investment, as firms whose managers are less entrenched are more responsive to Tobin’s $q$. While one effect of managerial entrenchment is to create financial constraints which induce lower investment levels, we also find that badly governed firms invest less in line with their investment opportunities, and that these investments lead to lower capital and labor productivity. These results are not driven by endogeneity between investment opportunities and corporate governance quality or by a correlation between corporate governance quality and product market competition.

Overall, our evidence suggests that the positive relationship between governance quality and economic performance found in the extant corporate governance literature can be partially explained by a higher quality of real investments in firms with less entrenched managers. The existing empirical models of real investment behavior will benefit from adding managerial entrenchment as an determinant beyond investment opportunities and financial constraints.
References


Table 1
Descriptive statistics

The table reports the mean and standard deviation (in parentheses) of key variables used in the statistical analysis. The fraction $\frac{i}{k}$ is the investment to capital ratio, $q$ is Tobin’s $q$, $cf$ is the cash flow, $KZ$ is the Kaplan and Zingales (1997) measure of financial constraints, and $N$ is the average number of observations across the variables. Firms in the democracy (dictatorship) group have a $GQ$ index score of 5 or less (14 or more), whereas non-dictatorship firms have a score below 14. The $GQ$ index is a proxy for the firm’s corporate governance quality developed and estimated by Gompers, Ishii and Metrick (2003). The potential $GQ$ score for a firm ranges from 0 (highest governance quality) to 20 (lowest governance quality). The data are for US manufacturing firms sampled annually from Compustat over the period 1990–2004.

<table>
<thead>
<tr>
<th></th>
<th>All</th>
<th>Democracy</th>
<th>Non-dictatorship</th>
<th>Dictatorship</th>
</tr>
</thead>
<tbody>
<tr>
<td>$\frac{i}{k}$</td>
<td>0.224 (0.14)</td>
<td>0.242 (0.16)</td>
<td>0.226 (0.14)</td>
<td>0.193 (0.10)</td>
</tr>
<tr>
<td>$q$</td>
<td>1.849 (1.08)</td>
<td>1.834 (1.07)</td>
<td>1.867 (1.10)</td>
<td>1.574 (0.76)</td>
</tr>
<tr>
<td>$cf$</td>
<td>0.092 (0.12)</td>
<td>0.088 (0.13)</td>
<td>0.092 (0.12)</td>
<td>0.085 (0.09)</td>
</tr>
<tr>
<td>$KZ$</td>
<td>−2.615 (4.70)</td>
<td>−2.995 (5.71)</td>
<td>−2.666 (4.79)</td>
<td>−1.838 (2.85)</td>
</tr>
<tr>
<td>$N$</td>
<td>7741</td>
<td>772</td>
<td>7265</td>
<td>476</td>
</tr>
</tbody>
</table>
Table 2
Investment level and entrenchment

This table shows the results from four univariate regressions (models (a)-(d)) and one multiple regression (model (e)). We regress the investment to capital ratio $\frac{i}{k}$ on lagged values of the Gompers, Ishii and Metrick (2003) managerial entrenchment index ($GQ$), the measure of investment opportunities ($q$), the cash flow ($cf$) and the Kaplan and Zingales (1997) measure of financial constraints ($KZ$). $R^2$ is the adjusted $R^2$, $N$ is the number of observations, and $t$-statistics are in parentheses. The data are for US manufacturing firms sampled annually from Compustat over the period 1990-2004.

<table>
<thead>
<tr>
<th></th>
<th>(a)</th>
<th>(b)</th>
<th>(c)</th>
<th>(d)</th>
<th>(e)</th>
</tr>
</thead>
<tbody>
<tr>
<td>$GQ$</td>
<td>$-0.009$</td>
<td>$0.004$</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>$(-5.91)$</td>
<td>$(-2.98)$</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>$q$</td>
<td>$0.039$</td>
<td></td>
<td>$0.025$</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>$(21.06)$</td>
<td></td>
<td>$(12.08)$</td>
<td></td>
<td></td>
</tr>
<tr>
<td>$cf$</td>
<td></td>
<td>$0.570$</td>
<td></td>
<td>$0.406$</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>$(31.41)$</td>
<td></td>
<td>$(18.32)$</td>
<td></td>
</tr>
<tr>
<td>$KZ$</td>
<td></td>
<td></td>
<td>$-0.010$</td>
<td>$-0.006$</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>$(19.38)$</td>
<td>$(9.49)$</td>
<td></td>
</tr>
<tr>
<td>$R^2$</td>
<td>$0.48$</td>
<td>$5.82$</td>
<td>$11.27$</td>
<td>$5.04$</td>
<td>$14.48$</td>
</tr>
<tr>
<td>$N$</td>
<td>$7098$</td>
<td>$7162$</td>
<td>$7758$</td>
<td>$7062$</td>
<td>$6111$</td>
</tr>
</tbody>
</table>
This table regresses the investment to capital ratio (1) on lagged investment opportunities (q), cash flow (cf), and the Kaplan and Zingales (1997) measure of financial constraints (KZ). $\overline{R}^2$ is the adjusted $R^2$, N is the number of observations, and t-ratios are in parentheses. Firms in the democracy (dictatorship) group have a GQ index score of 5 or less (14 or more), whereas non-dictatorship firms have a GQ score below 14. The GQ index is a proxy for the firm’s managers’ entrenchment developed and estimated by Gompers, Ishii and Metrick (2003). The potential GQ score for a firm ranges from 0 (least entrenched management) to 20 (most entrenched managers). The data are for US manufacturing firms sampled annually from Compustat over the period 1990–2004.

<table>
<thead>
<tr>
<th></th>
<th>All</th>
<th>Democracy</th>
<th>Non-dictatorship</th>
<th>Dictatorship</th>
</tr>
</thead>
<tbody>
<tr>
<td>q</td>
<td>0.023</td>
<td>0.032</td>
<td>0.022</td>
<td>0.016</td>
</tr>
<tr>
<td></td>
<td>(11.44)</td>
<td>(4.73)</td>
<td>(10.29)</td>
<td>(1.49)</td>
</tr>
<tr>
<td>cf</td>
<td>0.440</td>
<td>0.415</td>
<td>0.441</td>
<td>0.423</td>
</tr>
<tr>
<td></td>
<td>(21.03)</td>
<td>(6.45)</td>
<td>(19.27)</td>
<td>(4.41)</td>
</tr>
<tr>
<td>KZ</td>
<td>−0.006</td>
<td>−0.003</td>
<td>−0.006</td>
<td>−0.009</td>
</tr>
<tr>
<td></td>
<td>(−10.13)</td>
<td>(−1.96)</td>
<td>(−9.83)</td>
<td>(−3.37)</td>
</tr>
<tr>
<td>$\overline{R}^2$</td>
<td>14.66</td>
<td>14.33</td>
<td>13.73</td>
<td>11.79</td>
</tr>
<tr>
<td>N</td>
<td>6851</td>
<td>660</td>
<td>5770</td>
<td>421</td>
</tr>
</tbody>
</table>
This table shows the results from four univariate regressions. We regress leverage \((lev)\), the output to capital ratio \((\frac{y}{k})\), and the output to labor ratio \((\frac{y}{l})\) on the lagged Gompers, Ishii and Metrick (2003) managerial entrenchment index \((GQ)\). \(\overline{R^2}\) is the adjusted \(R^2\), and \(t\)-statistics are in parentheses. The data are for US manufacturing firms sampled annually from Compustat over the period 1990–2004.

<table>
<thead>
<tr>
<th></th>
<th>(lev)</th>
<th>(\frac{y}{k})</th>
<th>(\frac{y}{l})</th>
</tr>
</thead>
<tbody>
<tr>
<td>(GQ)</td>
<td>(0.003)</td>
<td>(-0.002)</td>
<td>(-21.151)</td>
</tr>
<tr>
<td></td>
<td>(1.91)</td>
<td>(-3.68)</td>
<td>(-2.43)</td>
</tr>
<tr>
<td>(\overline{R^2})</td>
<td>(0.03)</td>
<td>(0.20)</td>
<td>(0.10)</td>
</tr>
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Table 5
Using sales growth as the proxy for investment opportunities

This table regresses the investment to capital ratio ($\frac{i}{k}$) on lagged sales growth ($\Delta y$), cash flow ($cf$), and the Kaplan and Zingales (1997) measure for financial constraints ($KZ$). $R^2$ is the adjusted $R^2$, $N$ is the number of observations, and t-ratios are in parentheses. Firms in the democracy (dictatorship) group have a $GQ$ index score of 5 or less (14 or more), whereas non-dictatorship firms have a $GQ$ score below 14. The $GQ$ index is a proxy for the firm’s corporate governance quality developed and estimated by Gompers, Ishii and Metrick (2003). The potential $GQ$ score for a firm ranges from 0 (least entrenched management) to 20 (most entrenched management). The data are for US manufacturing firms sampled annually from Compustat over the period 1990–2004.

<table>
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<tr>
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<th>Democracy</th>
<th>Non-dictatorship</th>
<th>Dictatorship</th>
</tr>
</thead>
<tbody>
<tr>
<td>$\Delta y$</td>
<td>0.072</td>
<td>0.066</td>
<td>0.079</td>
<td>0.001</td>
</tr>
<tr>
<td></td>
<td>(9.23)</td>
<td>(2.61)</td>
<td>(9.21)</td>
<td>(0.03)</td>
</tr>
<tr>
<td>$cf$</td>
<td>0.433</td>
<td>0.449</td>
<td>0.421</td>
<td>0.476</td>
</tr>
<tr>
<td></td>
<td>(19.96)</td>
<td>(6.57)</td>
<td>(17.80)</td>
<td>(4.96)</td>
</tr>
<tr>
<td>$KZ$</td>
<td>$-0.006$</td>
<td>$-0.004$</td>
<td>$-0.007$</td>
<td>$-0.009$</td>
</tr>
<tr>
<td></td>
<td>$(-10.87)$</td>
<td>--2.58)</td>
<td>$(-10.49)$</td>
<td>$(-3.39)$</td>
</tr>
<tr>
<td>$R^2$</td>
<td>14.01</td>
<td>13.22</td>
<td>14.34</td>
<td>11.64</td>
</tr>
<tr>
<td>$N$</td>
<td>6861</td>
<td>657</td>
<td>5781</td>
<td>423</td>
</tr>
</tbody>
</table>
Table 6
Potential endogeneity between managerial entrenchment and investment opportunities

This table shows the results of regressing the change in the firm’s corporate governance index from year t-1 to year t on its investment opportunities in year t -1. The alternative measures of investment opportunities are $q$ (Tobin’s $q$ operationalized as market value over book value of assets) and the growth rate of sales ($\Delta y$). Small firms are in the bottom 33% according to their book value of assets and capital stock, and large firms are in the top 66%. $\bar{R}^2$ is the adjusted $R^2$ and t-ratios are in parentheses. The data are for US manufacturing firms sampled annually from Compustat over the period 1991–2003.

<table>
<thead>
<tr>
<th></th>
<th>All firms</th>
<th>Small firms</th>
<th>Large firms</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lagged $q$</td>
<td>-0.028</td>
<td>-0.017</td>
<td>-0.031</td>
</tr>
<tr>
<td></td>
<td>(1.01)</td>
<td>(0.31)</td>
<td>(0.33)</td>
</tr>
<tr>
<td>$\bar{R}^2$</td>
<td>0.00</td>
<td>-0.00</td>
<td>-0.00</td>
</tr>
<tr>
<td>Lagged $\Delta y$</td>
<td>0.025</td>
<td>0.304</td>
<td>-0.106</td>
</tr>
<tr>
<td></td>
<td>(0.23)</td>
<td>(1.51)</td>
<td>(0.84)</td>
</tr>
<tr>
<td>$\bar{R}^2$</td>
<td>-0.00</td>
<td>0.00</td>
<td>-0.00</td>
</tr>
</tbody>
</table>
Table 7
Managerial entrenchment and product market competition

This table reports summary statistics of three groups of firms based on the Herfindahl Index (HI) of concentration for the industry that a firm belongs to. The HI index is taken from the Census of Manufacturing. The least competitive group consists of the 33.33% firms in the industries with the highest values of the HI index (high concentration), whereas the most competitive group is the top 33.33% firms that belong to industries with the lowest HI industries (low concentration). $q$ is the proxy for investment opportunities, $\frac{1}{k}$ is the investment to capital ratio, and $GQ$ is the Gompers, Ishii and Metrick index for corporate governance quality. The data are for US manufacturing firms sampled annually from Compustat over the period 1991–2003. Standard deviations are in parentheses.

<table>
<thead>
<tr>
<th>Industry Concentration</th>
<th>$q$</th>
<th>$\frac{1}{k}$</th>
<th>$GQ$</th>
</tr>
</thead>
<tbody>
<tr>
<td>High</td>
<td>1.86</td>
<td>0.21</td>
<td>9.66</td>
</tr>
<tr>
<td></td>
<td>(1.09)</td>
<td>(0.12)</td>
<td>(2.65)</td>
</tr>
<tr>
<td>Medium</td>
<td>1.98</td>
<td>0.22</td>
<td>9.46</td>
</tr>
<tr>
<td></td>
<td>(1.27)</td>
<td>(0.14)</td>
<td>(2.78)</td>
</tr>
<tr>
<td>Low</td>
<td>1.81</td>
<td>0.21</td>
<td>10.03</td>
</tr>
<tr>
<td></td>
<td>(0.96)</td>
<td>(0.12)</td>
<td>(2.83)</td>
</tr>
</tbody>
</table>