# The Political Economy of Corporate

# Fraud: A Theory and Empirical Tests

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Abstract

Guided by a theory of governance known as the selectorate theory (Bueno de Mesquita et al, 2003), we examine how governance structures within publicly traded companies affects corporate performance, the ease with which corporate executives lose their jobs for poor performance, and the incentives of executives to misstate corporate performance to protect their jobs. Firms are classified according to the number of individuals who have a say in who should lead them (the selectorate) and the size of the group of supporters a leader needs to gain or maintain control (the winning coalition). Using publicly available data, we develop measures of these concepts within the corporate setting and show that these governance structures influence corporate performance and compensation packages used to reward management and stockholders. We compare compensation packages and reported performance with those expected given governance structures. Deviations from expectations provide predictors of fraudulent reporting that allow for discrimination between firms that subsequently commit fraud (within two years) and those that do not.

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I Introduction

Cases of fraudulent corporate reporting by managers who then cash out their

holdings are widely thought to corroborate the risk highlighted in principal-agent models

of the firm.[1] The risk is that inadequate governance-constraints free managers to

expropriate the investments of financial backers (Coase 1937; Jensen and Meckling 1976;

Fama and Jensen 1983a, b; Baumol 1959; Marris 1964; Williamson 1964; Grossman and

Hart 1988; see Schleifer and Vishny 1997 for review). Yet, to our knowledge the

principal-agent framework has thus far not been shown to account for or adequately

predict accounting fraud. Alexander and Cohen (1996) and Baucus and Near (1991), to

be sure, examine how corporate performance and governance influences the likelihood

that firms engage in economic crime, but they do not focus specifically on accounting

fraud. Hansen, McDonald, Messier and Bell (1996) use a neural network to attempt to

predict accounting fraud but, as is the nature of neural network models, they do not

provide micro-foundations for their predictions.

In developed equity markets with adequate legal protection for investors, we

believe that securities fraud (also referred to as accounting fraud) is typically the result of

management trying to preserve shareholder value in order to protect their jobs in the face

of poor performance rather than as a result of a desire to defraud investors per se.

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[1] For instance, both President George W. Bush in his weekly radio address (June 29, 2002) and Federal Reserve chairman Allan Greenspan in testimony before Congress (New York Times, July 17 2002, p. A17) called for curbs on greed and in a recent Harris Interactive poll 90% of the public thought the recent collapses of such companies as Enron and Worldcom were the result of unfettered management greed (Roper Center 2002).

Building on this assumption, we model the likelihood of fraudulent reporting as a function of each corporation's reported performance; ownership oversight; and institutionally induced incentives to govern truthfully. We then test key propositions and offer out-of-sample evidence of the potential of the model discussed here – referred to as the selectorate model (Bueno de Mesquita, Smith, Siverson, and Morrow [hereafter BdM2S2] 2003)– to predict fraudulent corporate reporting among publicly-traded US firms.

The paper proceeds as follows. Section II explains the model. Like others, we focus on the principal-agent relationship between shareholders and firm managers (Berle and Means 1932, Schleifer and Vishny 1997). However, we diverge from the standard view that the agency problem arises because unconstrained managers maximize their compensation at the expense of shareholders (Fama and Jensen 1983a, b; Aggarwal and Samwick 1999). Rather, we assume that the primary interest of managers is to retain their jobs and that the agency problem arises because of this motivation. Job retention is thought to be primary because managers value their long-term income stream over short-term gains and because they attach value to exercising control (Caplow 1968; Holmstrom 1999). The selectorate model shows how variations in internal governance structures influence the tradeoff between management's urge to increase its compensation and its desire to retain its corporate leadership position.

Others, of course, consider job retention as a potential motivator of actions by firm managers. Jensen and Ruback (1983) drew attention to the costs for firms associated with efforts by unsuccessful managers to retain their jobs. Jensen and Meckling (1976) and Fama (1980) investigated how the contractual risk of termination creates incentives

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for managers to try to produce good corporate performance. While studies, such as Weisbach (19880), Yermack (1996) and Denis et al (1997), find evidence that poor performance increases the risk of CEO turnover, executive dismissal remains relatively uncommon. These studies highlight the role of management structure and firm ownership in shaping the threat of dismissal. Dismissals for poor performance are relatively rare. Weisbach (1988) estimates that if firms are ranked by stock return performance then, even in the lowest decile of firms, the CEO turnover rate is only 6.1%. As Jensen (1993) observes, boards of directors are generally captured by management, making it difficult for boards to dismiss managers. Warner, Watts, and Wruck (1988) demonstrate, however, that boards are willing to dismiss managers when faced with truly bad performance. These results are reinforced by Martin and McConnell (1991) in the context of corporate takeovers. As we emphasize, one reason for committing fraud is to cover up the firm's true record to avoid dismissal. If fraud is perpetrated successfully, it goes undetected and so few dismissals are observed. Only when circumstances preclude a successful cover-up is fraud likely to be uncovered. Dismissal follows once the truly disastrous circumstances of the firm come to light. Whether discovered ex post or not, the threat of dismissal can be the primary ex ante motivation for management's conduct.

Thus, a feature of the selectorate model is to highlight how and when the threat of termination following poor corporate performance encourages management to commit fraud rather than report the true record of the firm. Unlike the model proposed here, previous studies have not investigated the endogenous relationship between internal corporate governance structures, job security, and compensation in the face of incentives to misreport results.

Section III describes the data we use based on a random sample of publicly traded firms in the United States, as well as all publicly traded American firms alleged to have committed securities fraud over the period from 1989-2001. In Section IV we use the data to test propositions derived from the model. The evidence supports the proposition that senior managers who depend on a large coalition to retain their jobs are more likely to engage in fraudulent reporting than are managers who govern with the support of a small coalition. We also find that highly diffuse ownership and highly concentrated ownership both make fraud less likely, while intermediate levels of concentration of ownership substantially increase the risk of fraud. The results on ownership concentration reinforce empirical findings by McConnell and Servaes (1990) and theoretical implications derived by Stulz (1988) regarding corporate performance, albeit in a rather different context from that of the selectorate model.

The model implies and the evidence supports the expectation that in periods leading up to the commission of fraud, senior managers are under-compensated relative to expectations given the firm's governance structure and reported corporate performance. This finding undermines the view that there is a straightforward link between greed and fraud. The empirical analysis highlights a specific pattern of dividend payments, executive compensation, and growth in market capitalization that is indicative of firms that are likely to commit fraud.

In Section V we report the out-of-sample predictive capabilities of the model. We show that it can be a reliable tool for identifying the risk of fraud in specific firms, providing one to two years of early warning. In fact, the subset of firms in our highest ex ante risk category were subsequently alleged to have commit fraud over eighty percent of

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the time while those in the lowest ex ante risk grouping subsequently are alleged to have

committed fraud less than 2.5 percent of the time. Section VI provides conclusions.

Section II The Model

The essential features of any organization's governance structure can be depicted

within a two-dimensional space where one axis is the size of the organization's

selectorate (S) and the other dimension is the size of its winning coalition (W), $W < S$.

The selectorate is the set of people responsible for choosing the leadership – for

convenience referred to here as the CEO of a firm – and with the prospect of themselves

gaining access to special privileges or benefits as a result of their support for the

incumbent or a new management team. The winning coalition is the subset of the

selectorate whose support is essential for the leadership to remain in its position of

authority. In the CEO's quest to keep his or her job, these two political institutions – W

and S – influence corporate policies and the risk of misreporting financial results.

The focus of the game is political competition for control of the firm. The

incumbent corporate leader, L, attempts to defeat challenger C who seeks to become

CEO.[2] Both the challenger and CEO offer an allocation of private (g) and public (x)

goods subject to the budget constraint: $gW + px \leq R$. R represents the resources

(revenues) corporate leaders can allocate, g is the provision of private goods that are

benefits only to those "inside" the firm's governance structure (e.g. senior management,

members of the board of directors), with W being the size of the coalition who receive

these goods, x is the provision of public goods; that is benefits equally received by each

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[2] For technical convenience, we assume there is an infinite pool of potential challengers
so the incumbent faces a different rival in each period.

share held by the owners of the firm, and p is the price of providing public goods. The public goods, x, include such things as dividends and growth in market capitalization. While the provision of x benefits all shareholders, it does not satisfy the non-rival aspects of true public goods. However for ease of language we refer to these non-excludible benefits as public goods. We also abuse notation by referring to W as both the set of supporters in the winning coalition and the size of this set.

The selectors choose to retain the CEO or to replace her with a rival. Selectors, who could in principle be elevated to the board or senior management to form a new winning coalition, receive benefits from both private and public goods. In particular we assume selectors have additively separable, continuous, concave utility functions $V(x, g)$. We denote the partial derivatives of $V(x,g)$ with respect to x and g as $V_x(x,g)$ and $V_g(x,g)$, respectively. Corporate leaders receive a payoff of $\Psi > 0$ if they retain their job. This is the value they attach to exercising control. Additionally the leader receives benefits equivalent to the size of any resources she retains for her personal disposal. We can think of these retained resources as the CEO's salary and other benefits. Deposed CEOs or rivals who fail to attain control receive a payoff of zero.

Additional to the material benefits of being CEO, we assume corporate leaders have different affinities (idiosyncratic likes and dislikes) towards each selector. Affinities play an important role in shaping the survival of leaders so we pause to discuss our assumptions and the incentives they create within the game.

We assume that initially a potential leader's affinities are unknown and that each possible order of affinities over the pool of selectors is equally likely. In some specifications of the selectorate theory (BdM2S2 2002) we explicitly include these

affinities as part of players' payoffs. Here we treat them lexicographically and use them only to break ties if all else is equal. Once a potential leader becomes CEO, affinities are learned and become common knowledge. In all subsequent rounds the CEO forms her coalition with those selectors with whom she has the greatest affinity. The revelation of affinities reflects the risk of defecting to a challenger. An incumbent CEO can credibly commit to including current members of her coalition in future coalitions; she is after all already including her most preferred (highest affinity) selectors. In contrast, the challenger realigns his coalition once his affinities are revealed. Hence while a selector's decision to join the challenger's transitional coalition might be essential in the rival's ascendance, the challenger can not guarantee that selector long term membership in his coalition and the associated private goods paid to members of the coalition. As Weisbach (1988 p.432) states it "Inside directors' careers are tied to the CEO's and hence insiders generally are unable or unwilling to remove incumbent CEOs."

a. The Game

The game is infinitely repeated, with all payoffs discounted by a common discount factor $\delta$. The stage game is as follows:

1) The incumbent CEO (L) and rival (C) simultaneously announce compensation schemes and coalitions. The CEO's coalition ($W_L$) is the W selectors with whom she has the highest affinity. The CEO announces compensation of $g_L$ private and $x_L$ public goods. The rival challenger announces a coalition ($W_C$) of size W and compensation of $g_C$ private and $x_C$ public goods.

2) Selectors choose between the CEO and the rival. The CEO is replaced by the challenger if and only if fewer than W members of $W_L$ support the incumbent and W members of $W_C$ support the rival.

3) The affinities of the leader chosen in step 2 (be that the incumbent or the rival) are revealed and become common knowledge.

Proposition 1: There exists a Markov Perfect Equilibrium in which the incumbent CEO always survives spending m* resources to provide g* private and x* public goods (m*=x*p+g*W) and the challenger offers $\bar{g}$ private and $\bar{x}$ public goods (R=$\bar{x}$p+$\bar{g}$ W) in each period.[3] These policy provisions satisfy the following four equations:

$$\tfrac{1}{1-\delta}V(x^*,g^*) - V(\bar{x},\bar{g}) - \frac{\delta}{1-\delta}\frac{W}{S}V(x^*,g^*) - \frac{\delta}{1-\delta}(1-\frac{W}{S})V(x^*,0) = 0 \qquad (1)$$

$$WV_x(x^*,g^*) - pV_g(x^*,g^*) = 0 \qquad\qquad\qquad (2)$$

$$WV_x(\bar{x},\bar{g}) - pV_g(\bar{x},\bar{g}) = 0 \qquad\qquad\qquad (3)$$

$$R - p\bar{x} - W\bar{g} = 0 \qquad\qquad\qquad\qquad (4)$$

Proof and discussion: We start by characterizing optimal spending. Specifically, for any given level of spending, M, on a coalition of size W, we define $\overset{\wedge}{g}(M,W)$ and $\overset{\wedge}{x}(M,W)$ as the level of private and public goods that maximize the payoffs of a coalition member. Formally, $\overset{\wedge}{x}(M,W), \overset{\wedge}{g}(M,W) = \arg\max_{g\in\mathbf{R}^+, x\in\mathbf{R}^+}V(x.g)$ subject to the budget constraint M = W g + px. The first order conditions of this maximization problem imply that

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[3] Here we do not examine the model in an incomplete information setting in which incumbent CEOs do not always retain their jobs because our interest is less in identifying when a CEO will be deposed than in identifying what CEOs can do to offset threats to their job retention.

$WV_x(x,g) = pV_g(x,g)$. Equations (2) and (3) ensure both the incumbent and rival

maximize the payoff to coalition members for the given level of resource expenditure.

We define the indirect utility function associated with these optimal compensations as

$v(M, W) = V(\hat{x}(M,W), \hat{g}(M,W))$ and the value of receiving only the public benefits

associated with this compensation scheme as $u(M, W) = V(\hat{x}(M,W), 0)$.

By the deposition rule in step 2 of the stage game, to come to power the rival

needs to convince at least one member of the incumbent's coalition to defect. The rival

then makes the best possible offer he can in order to persuade at least one current

coalition member to defect to him. In the immediate period the challenger can do no

better than offer to spend all resources optimally; that is, $\hat{x}(R,W)$ and $\hat{g}(R,W)$, providing

$v(R,W)$ rewards to his coalition. Should the rival succeed in displacing the incumbent

CEO then in the next period he will provide g* private goods and x* public goods to the

coalition of W selectors for whom he has the highest affinity. Since the rival's affinities

are not known and all possible affinity orderings are equally likely, the probability of any

individual selector being included in the rival's future winning coalition is $\dfrac{W}{S}$. With

probability $(1 - \dfrac{W}{S})$ a selector is excluded from the rival's future coalition. Therefore, the

present value of the rival's best possible compensation scheme is:

$$v(R,W) + \frac{\delta}{1-\delta}\frac{W}{S}v(m^*,W) + \frac{\delta}{1-\delta}(1-\frac{W}{S})u(m^*,W).$$

The first term represents the best possible immediate compensation the rival can

offer. The second represents the discounted value of being included in the rival's

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coalition in every future period. The probability of such inclusion is $\frac{W}{S}$. The third term is

the discounted value of being excluded from the rival's coalition in future rounds.

Exclusion occurs with probability $(1 - \frac{W}{S})$.

If the CEO is retained, then members of her coalition receive the immediate

benefits of her compensation plus the net present value of receiving payoff of v(m*,W) in

the form of x* public and g* private goods in each future period. Hence selectors in $W_L$

remain loyal to the CEO provided that:

$$V(x_L, g_L) + \frac{\delta}{1-\delta} v(m^*, W) \geq v(R, W) + \frac{\delta}{1-\delta} \frac{W}{S} v(m^*, W) + \frac{\delta}{1-\delta} (1 - \frac{W}{S}) u(m^*, W)$$

(5). This decision defines optimal voting in undominated strategies by coalition

members.[4]

The incumbent CEO does best while keeping her job by satisfying equation (5)

with equality through optimal spending, equation (2). The stationarity of MPE implies

that the CEO's behavior in the current period is identical to behavior in future periods.

Therefore,

$$\frac{1}{1-\delta} v(m^*, W) = v(R, W) + \frac{\delta}{1-\delta} \frac{W}{S} v(m^*, W) + \frac{\delta}{1-\delta} (1 - \frac{W}{S}) u(m^*, W)_{(6).}$$

Equation (6) is simply equations (1)-(4) written in terms of the indirect utility function.

Since the CEO minimizes expenditures while maintaining office, the challenger can not

improve his prospects of attaining the top job and the selectors choose optimally between

candidates for the CEO position, equations (1)-(4) characterize a MPE.[5]

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[4] Those selectors outside of $W_L$ obviously vote for the challenger since this gives them
increased immediate returns and the prospect of inclusion in future winning coalitions.
[5] The above model provides the simplest exposition of the selectorate theory. Elsewhere
we relax the strict assumptions on the choice of coalition membership used here. We also

b. Institutional determinants of compensation and survival

Now we discuss the comparative static results utilized here. The first important comparative static indicates that the ratio of private to public goods is decreasing in the size of the winning coalition: $\dfrac{d\frac{g*}{x*}}{dW} < 0$. As W increases, corporate leaders direct more resources towards providing public benefits such as increased share price or dividends to stockholders. This result follows directly from equation (2).

The second comparative static examines R-m*, the difference between the total available resources, R, and the amount of resources the CEO must spend to match the challenger's best possible offer. It provides a metric of the ease of survival for CEOs. When R-m* is large, the incumbent CEO can retain plenty of resources for her own discretionary purposes (Baumol 1959; Marris 1964; Williamson 1964; Grossman and Hart 1988). Having such discretionary resources cushions the CEO against exogenous shocks that might otherwise endanger her control of the corporation. In contrast when R-m* is small, the CEO's control of the firm is less secure as she has fewer resources available to compensate for short falls.

The ease with which CEOs can survive in office (R-m*) is increasing in the size of the selectorate and is decreasing in the size of the winning coalition: $\dfrac{d(R - m*)}{dS} > 0$

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extend the theoretical model to consider the endogenous generation of resources and examine the consequences of alternative deposition rules (BdM2S2 1999, 2002, 2003).

and $\dfrac{d(R-m^*)}{dW} < 0$.[6] This indicates that CEOs who depend on a relatively large coalition

of, say, directors, are at greater risk of deposition as a result of poor performance than are

those who depend on a small coalition. As a consequence, the former group of CEO's has

the greatest incentive to misrepresent performance to preserve their jobs.

Selectorate size also influences the risk to a CEO's tenure. When ownership is

diffuse (S is large), such that current insiders have little prospect of also being insiders

under new management, CEO's jobs are relatively safe despite poor performance.

However, as ownership becomes concentrated in fewer hands (S is small), such that

current insiders are more likely to be included within a new management team,

supporters become less loyal and CEO's have increased incentives to misrepresent

performance to protect their jobs.


Section III Data and Measurement

Our data set consists of 372 randomly selected US publicly traded firms plus 91

firms alleged to have committed fraud. Fraud allegations are based on firms investigated

by the SEC for material misstatements in their financial reports. The compilation of cases

was provided by Arthur Andersen, LLP for 1989-1999 and updated with comparable data

from Stanford's securities fraud web site maintained by Joseph Grundfest for 2000-2001

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[6] These comparative static results are most easily seen by rearranging equation (6) to produce identity $I = v(m^*,W) - v(R,W) + (\delta/(1-\delta))(1-W/S)(v(m^*,W) - u(m^*,W)) = 0$, with partial derivatives $I_m = v_m(m^*,W) + (\delta/(1-\delta))(1-W/S)(v_m(m^*,W) - u_m(m^*,W)) > 0$, $I_W = v_W(m^*,W) - v_W(R,W) - (\delta/(1-\delta))(1/S)(v(m^*,W) - u(m^*,W))) + (\delta/(1-\delta))(1-W/S)(v_W(m^*,W) - u_W(m^*,W)) < 0$, and $I_S = (\delta/(1-\delta))(W/S^2)(v(m^*,W) - u(m^*,W)) > 0$. By Cramer's rule, $dm^*/dW = -I_W/I_M > 0$ and $dm^*/dW = -I_W/I_M < 0$.

(http://securities.stanford.edu/info.html). The unit of analysis is the company year, with that being the frequency of SEC mandated financial reports.

The dependent variable, Future Fraud, is coded as 1 in year t if the firm was subsequently alleged by the SEC to have committed securities fraud in year t+1 or t+2. Otherwise, Future Fraud is coded as zero. In the process of testing our theoretical perspective, we initially compare the compensation and performance of honest firms with policies within fraudulent firms. For these comparisons, we define fraudulent firms as those alleged to commit fraud in year t, t+1 or t+2.

The dataset over-represents the known instance of fraud since we use the population of such cases, but only a sample of firm-years. We have complete data for 1,395 observations, with 141 instances for which Future Fraud=1. As we use logit analysis for the principal tests of the predictive capacity of the model, the mix of sample and population does not alter the underlying estimated probability function though, of course, it does alter the actual predicted probability values. To partially correct for this, we will report predicted results based on the percentile in which predicted values fall.

In addition to the distributional issues already addressed, the dependent variable must also suffer from selection effects. The reported instances of fraud surely understate its true occurrence. Consequently, it is likely that our predictions include an unknown number of seemingly false positives; that is, cases for which the theory correctly predicts a high probability of fraud but with no allegation of fraud having been levied against the company. There is also a prospect of false negatives; that is, firm years predicted to have a low probability of fraudulent reporting with no allegation of fraud having been made against the firm but where there was an unknowable (to the observer) successful cover up

of false financial statements. Firm managers would not commit fraud unless they had a sufficient belief that their actions would go undetected. Therefore, we must believe that the cases of alleged fraud are only a subset of all frauds. There does not appear to be any basis for making judgments about the distribution of false positives or false negatives.

Data regarding the independent variables are all constructed from publicly available information derived from 10K's and proxy forms filed with the SEC and in a very few instances from annual reports. The data were coded from Edgar and from the Disclosure database.

Unfortunately, firms do not directly report coalition or selectorate size. We next examine how publicly reported measures of management structure and ownership serve as indicators for the number of supporters a CEO is beholden to (W) and the size of the pool from which these supporters are drawn (S). In general we rely on multiple indicators since no single measure alone completely captures the underlying theoretical concepts.

We start with indicators of coalition size-- that is the number of insiders whose support the CEO needs to maintain control of the company. Estimates of coalition size (W) are based on the following three indicators: (1) Number of Officers and Directors (#OfficersDirectors); (2) Number of Officers Receiving Stock (#StockOfficers); and (3) Number of External Directors (#Ex. Dir).

These indicators provide estimates of the number of individual who play a prominent role in supporting and implementing the CEO's policies. The first measure is a direct count of the number of corporate officers and directors. Unfortunately, not all of these officers and directors need play a critical role in determining political control of the firm. Some might simply carry out functions on behalf of the firm in exchange for

monetary compensation, in much the same manner that regular employees work for the firm. The second measure, number of officers receiving stock, attempts to restrict the measure of coalition size to political insiders by counting only those executives with an important role within the politics of the firm that they receive stock options.

The third measure of coalition size is the number of external director. These individuals were part of the first measure. They are less likely to be important insiders relative to officers or internal directors so that for a given number of officers and directors, the more external directors, the smaller the winning coalition is likely to be.

To gain further leverage on the role of external directors in our estimates of fraud we include their compensation and their compensation squared. External directors who are paid little more than a nominal fee for attending meetings are unlikely to be corporate insiders. As their compensation increases it becomes likely that they are in the winning coalition. However, if external directors' compensation is substantial (indicative of a private goods focus), then the theory suggests the winning coalition is quite small. Although studies such as Weisbach (1988), Denis et al (1997) and Yermack (1996) have highlighted the importance of external directors relative to company insiders in shaping company performance and CEO retention, they have not considered this non-monotonicity and contingency based on compensation. Given the additional complexities that these contingencies imply, in our initial tests of private and public goods we restrict our attention to the former two measures only.

Because we investigate only publicly traded companies, the data necessarily reflect truncated variance on W. The largest winning coalitions in businesses are probably associated with partnerships, a set of companies that do not report the data

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required for our estimates. In large accounting partnerships, for instance, this number can readily be in the thousands. This truncation in our data operates against the theory and so makes the tests particularly demanding in that there must be sufficient impact of small changes in coalition size to discern the predicted effects. Given that W is relatively small in our entire sample, much of the variance in the ease with which CEOs are deposed for poor performance stems from how the Selectorate size shapes the risk of exclusion from future coalitions (1-W/S).

The Selectorate (S) reflects the size of the pool from which a CEO could form her winning coalition. When the selectorate is large, the CEO has great discretion in whom to include in her coalition. This discretion means that coalition members under the current corporate leadership are reluctant to defect because they know that under new management they are not assured of the well-compensated executive or board positions they currently enjoy (Hermalin and Weisbach 1988, 1998).

We estimate Selectorate size (S) as: (1) The logarithm of outstanding shares (Ln(shares)); (2) Of total stock not held by small investors (the "man on the street"), the proportion held by the largest stockholder (Big Owner, (Big Owner)$^2$); (3) Concentration of shares held by officers, directors and institutions (Concentration, Concentration$^2$); and (4) The proportion of stock held by institutional investors relative to the number of individuals who own at least one percent of the company's shares; that is, the proportion of large owners who are outsiders but have a large stake in the firm (Inst. Owner).

These measures deserve justification. The first measure is the order of magnitude of the number of outstanding shares. At first glance this variable might appear of little relevance since a one percent stake is still one percent whether it is as a result of holding

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one of a hundred shares or 10,000 of a million shares. Yet the number of shares to issue is a strategic policy decision that has important implications. In addition to a firm repurchasing its own stock, or raising new capital through additional stock offerings, the most common reason for a change in the number of outstanding shares is stock splits. Stock splits, of course, do not alter the percentage of the firm owned by any given shareholder. Yet stock splits are frequently followed by an increase in share prices (Grinblatt, Masulis and Titman 1984; McNichols and Dravid 1990). Many recent attempts to explain this phenomenon focus on stock splits as a signal of future performance (Peterson, Millar and Rimbey 1996). Additionally, stock splits also influence the liquidity of shares and hence the breadth of ownership (Dolley 1933; Barker 1956; Lakonishok and Lev 1987; Baker and Gallagher 1980).

It is worth pausing to examine, through stylized examples, why the number of outstanding shares influences selectorate size. While the number of shares in publicly traded firms is typically in the tens of millions, we start by considering an extreme case in which the company only issues 100 shares. With such a limited number of shares only a small number of extremely rich individuals or institutional investors could afford to purchase a share. Anyone seeking to become CEO must find support from within this pool of 100 supporters—the selectorate is relatively small. Since the typical firm in our sample has about 12 officers and directors, each shareholder has about a 12 percent chance of inclusion in a future coalition.

Suppose instead that the company issued one million shares owned by a million individuals. The selectorate is now many orders of magnitude larger. This makes the CEO's problem of finding and maintaining 12 loyal supporters much easier since each

insider realizes that given the enormous pool of potential supporters he or she has only a negligible chance of receiving the valuable private compensations associated with board or executive positions under a new corporate leader. Given this massive selectorate, the CEO faces little risk of deposition even in the face of appalling performance.

The number of outstanding shares shapes the size of the selectorate. While the above examples illustrate the point, they are obviously unrealistic. Each share is not held by a separate individual. Ownership tends to be concentrated among a few individuals and institutions. In reality only these large owners have a significant prospect of coalition membership. The "man on the street," owning only a handful of shares, has almost no prospect of board membership. In practice this means that the effective size of the selectorate is much smaller than the number of shares and depends strongly on the extent to which shares become concentrated. Our measures (2) through (4) are indicators of the effective number of individual or institutional investors who form the selectorate. As ownership becomes more concentrated, the selectorate becomes smaller. This contraction in the pool of potential candidates for board and executive positions makes insiders more willing to depose CEOs who perform poorly (Shleifer and Vishny 1986). It is this increased jeopardy that creates incentives to misrepresent performance.

Although increasing ownership concentration reduces selectorate size and hence increases the risk to under-performing CEOs, at high levels of share concentration the effects are offset as the CEO becomes the effective owner of the company. Just as a sole proprietor has no incentive to depose herself or misrepresent her performance, as ownership becomes extremely concentrated neither does the CEO. Of course this does not mean that the CEO needs to own 50% of the stock. A controlling share can be much

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smaller if the remaining shares are distributed diffusely. To account for this non-monotonicity at high level of concentration, we included quadratic terms for several of our concentration measures. There is considerable extant evidence regarding this non-monotonicity in ownership concentration (Stulz 1988; McConnell and Servaes 1990; Wruck 1989; Morck, Shleifer and Vishny 1988).

The selectorate theory predicts that governance institutions affect corporate policy and compensation packages. Public goods are goods that are attributable to all share holders. We have two such measures: dividends (as a percentage of market capitalization) and market capitalization. Private goods are those benefits received only by winning coalition members. Again we use multiple indicators for this concept: (1) Perquisites (non-salary) compensation paid to internal directors, (2) external directors and senior management (Perqs); (3) Cash payments to external directors (Ex. Dir. Cash, (Ex. Dir. Cash)$^2$); and (4) The proportion of allocations that go to private goods (Private Ratio). As previously discussed the second measure-- cash payments to external directors -- has a contingent influence on the number of external directors. The final variable measures private goods as a proportion of both private and public rewards, where private goods are measured as salary and other compensation for internal directors, external directors and senior management and public goods are measured as market capitalization.

In addition to these variables, we also include in our analyses two stock options indicators (Stk. Opt. Int. Directors and Stk. Opt. Executives) that measure how many options are received by internal directors and by the top five senior managers as these

variables play a prominent role in current debate over firm governance.[7] The details

behind the construction of each variable are reported in the Appendix while Table 1

provides the summary statistics.

<center>Tables 1 About Here</center>

Section IV Empirical Tests of Corporate Performance

Before considering the probability that a company will commit fraud, we examine

key hypotheses derived from the theoretical model. These tests are restricted to firms

whose audits within two years of a given observation have not been alleged to be

fraudulent. We do so to establish baseline expectations as to how firms behave. We will

use these baselines to compare firms alleged to have committed fraud to their apparently

more honest counterparts. Each of these tests includes fixed effects dummy variables for

the year so that we control for general market trends.

a.          Private and Public Goods

The selectorate theory indicates that private goods decline as the size of the

winning coalition increases ($\dfrac{d\frac{g*}{x*}}{dW} < 0$). The theory is ambiguous about the net effect of

S on private goods allocations. The ambiguity arises because selectorate size influences

how much the CEO gets in private benefits in a manner opposite to its impact on rewards

to coalition members, a subtlety of the theory not explored here, but borne out in other

investigations (BdM2S2 2003).

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[7] For instance, Yermack (1997) provides evidence that managers time the release of
corporate reports and grants of stocks to increase management's take.

Table 2 shows two different specifications designed to test the effect that coalition

size has on private goods as a proportion of overall rewards. Both tests use two variables

to approximate coalition size: #OfficersDirectors and #StockOfficers.  The first variable,

the number of officers and directors, varies between 2 and 31. The number of officers

who receive stock options, the second indicator, varies between 0 and 25. The correlation

between the two indicators is 0.37 (N = 2,136). As we have no basis for preferring one

coalition indicator over the other, we are interested in the hypothesis that they are jointly

negative in their effect on private goods provision. This, in fact, is the case in each of the

tests. For instance, the joint hypothesis test in the first model that both indicators of W are

less than zero yields an $F(2, 1545) = 6.62$ which is significant at $0.0014$.[8]

Table 2 About Here

How are we to interpret the substantive implication of this result? Imagine a

corporation whose coalition increases by three members (about a one standard deviation).

The average firm allocates about four percent of its total benefits to private rewards to

senior officers and directors. Increasing the size of the winning coalition by three

members reduces these private payments from 4 percent to about 3 percent.[9]

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[8] The correlation between our third indicator of W, #Ext. Dir and #Off. Dir. is 0.82 (N = 2136). Specifying any two of the three indicators of W in the regression with Private Ratio as the dependent variable produces two negative coefficients and a highly significant result for the test that they are jointly negative.

[9] There is also indirect evidence in the literature that corporate governance structures influence the relative value of private and public goods. Barclay and Holderness (1989, 1992) find that large blocks of shares trade at premium prices relative to smaller stock quantities. Presumably, only large stockholders have a realistic chance of future membership in the winning coalition. This evidence is reinforced by comparisons of shares that grant only dividend rights with those that also grant voting rights. Voting shares offer their owners the chance to enter the winning coalition, thereby gaining access to private goods, and they trade at higher prices (Lease, McConnell and Mikkelson 1983, 1984; DeAngelo and DeAngelo 1985; Zingales 1995). Although these differences

In addition to the two variables used to specify W, table 2 offers two models based on different ways of estimating the impact of selectorate size.[10] The first uses the logarithm of total outstanding shares. In contrast the second model focuses on the lagged logarithm of outstanding shares and also changes in the number of shares relative to the previous year. We see later, when we explore additional measures of selectorate size, that changes in the structure of company ownership can significantly influence corporate actions. Neither of the selectorate indicators in models 1 and 2, nor alternative measures reported later, alter the impact of coalition size on private goods allocations.

The second hypothesis draws attention to whether shareholder value is increasing or decreasing over time. We examine the change in market capitalization as a function of coalition size. The theory showed that as coalition size increases CEOs place a greater emphasis on public rather than private goods ($d(g^*/x^*)/dW<0$). They also retain fewer discretionary resources and expend more resources to provide rewards ($d(R-m^*)/dW<0$). Further, though not modeled here, BdM2S2 (2003) show that endogenously generated resources increase as coalition size increases ($dR/dW>0$).[11] The theory predicts that corporate leaders who depend on a large coalition must be more attentive to overall corporate performance than those who answer to a small coalition.

Probably the best indicator of overall corporate performance is the rate of growth in market capitalization. To measure this growth we compare the logarithm of market

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between voting and non-voting stock are typically small in the US, in the comparative context the difference can be much larger, 82% in Italy for example (Zingales 1994).

[10] When we examine fraud we expand the number of ways of estimating selectorate size. For the sake of brevity we do not report all of the alternative indicators of S in table 2 as selectorate size is not the focus of the hypotheses.
[11] Ryngaert (1988), Malatesta and Walkling (1988), DeAngelo and Rice (1983) and Jarrell and Poulsen (1988) show that such measures as poison pills to deter takeovers and supermajority rules that make replacing the management team more difficult reduce company value.

capitalization in year t with its value in the prior year. The inclusion of year fixed effects in these regressions is particularly important to control for bull or bear market conditions. We are interested in the marginal impact on growth associated with variation in coalition size. Extant studies, Morck, Shleifer and Vishny (1988) for instance, have already demonstrated a link between profitability and governance structure. However, the literature is not unanimous in its conclusions. Yermack's (1996) paper finds that increasing board size reduces firm value, as measured by Tobin's Q.[12]

Models 3 and 4, reported in table 2, show that coalition size is an important independent determinant of growth in market capitalization. In fact, the substantive impact of increasing the size of W by three members is to increase growth in market capitalization by about 10 percent. Again the inclusion of different selectorate measures does not materially alter the effect of the winning coalition's size.

Thus far we have discussed growth in market capitalization and the proportionate allocation of private goods. Firms can also reward shareholders with dividends. Models 5 and 6, shown in table 2, assess the effect of coalition size on dividends as a proportion of dividends and market capitalization. The theory provides no guidance about how public rewards are divided between dividends and monies reinvested to spur growth in market capitalization. Coalition size does not materially influence dividends although, as we saw, it influences growth. Tests on the combined value of dividends and market capitalization show that increasing coalition size sharply increases the total value of public rewards.

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[12] Himmelberg, Hubbard and Palia's (1999) reanalysis of Demsetz and Lehn's (1985) study of the impact of management on firm value, as measured by Tobin's Q, shows that the inclusion of fixed effects for each firm to model unexplained heterogeneity reduces the statistical impact of governance institutions on performance. We observe a similar result if we repeat our analyses with fixed effects. However, this result is unsurprising as our time series are generally short, on average 3.2 years, many companies experience little change in our measures of W.

b. Deviations from Expected Performance

When a company fails to perform up to expectation, CEOs have incentives to take actions to protect their now-at-risk jobs. They can argue that the firm is the victim of unforeseeable exogenous shocks for which they should not be held accountable. This may not be adequate to protect them. Instead, they might misrepresent the corporation's true performance. This possibility highlights a crucial difference between dividends and private compensation on the one hand and market capitalization on the other. Dividend payments can only be made if the funds are available. Writing bad checks is unlikely to save the CEO. Therefore, it is unlikely that large dividend payments are used to mask problems. Similarly, the payment of salaries and other private benefits requires sufficient cash on hand to meet obligations. Failing to meet these obligations reveals the company's problems and so fails to protect management. But it is difficult for outsiders to know the true volume of sales, revenue, costs, and profits. Market capitalization reflects these factors. Indeed, these are the factors that when falsely reported but subsequently detected, result in accusations of accounting fraud.

If revenues are exaggerated or costs are understated, then senior executives can temporarily lead the marketplace to misjudge the true worth of a company, making the company appear falsely to have met or exceeded expectations. This, we believe, is the essential motivation behind corporate fraud. We now test implications of these claims.

Figure 1 illustrates one way the theory can be used to predict fraud. The graph plots the variable Private Ratio – private goods as a proportion of total compensation – on the horizontal axis and the empirically predicted level of Private Ratio given each firm's

governance structure (as estimated in model 1) on the vertical axis.  The right-hand panel, labeled "Fraudulent," shows the graph for firms alleged to commit fraud in the current year or either of the two subsequent years. The left-hand panel shows the same graph, but for "Honest" firms, those against whom no allegations were made. The differences between the figures are striking in two ways.

Focusing just on the horizontal axis, with few exceptions fraudulent firms actually pay few private benefits. According to the theory this is a consequence of two features of large coalition organizations. Such organizations are expected to produce more public and fewer private benefits than are small coalition organizations. Additionally, executives are at greater risk of losing their jobs in large coalition organizations if performance is below expectations. Therefore, we expect that the firms that are most likely to commit fraud also are likely to produce few private goods.

The horizontal axis is insufficient to assess whether differences in private goods allocations can be attributed to the decision to commit fraud. The vertical axis, however, completes the story. Focusing on the vertical axis, we see that fraudulent firms average fewer private goods payments than are expected given their governance structure. This is seen by observing the distribution of points above and below the 45° line. In the panel displaying honest firms, firms fall equally on either side by construction. Recall that the predicted values are based only on honest firms. The fraudulent firms could have been distributed in any way relative to the 45° line. The theory anticipates that they will be disproportionately above the line, indicating smaller actual payments (x-axis) than predicted payments (y-axis). This is what the panel shows for fraudulent firms. Controlling for coalition size, firms that commit fraud tend to produce fewer private

goods than expected. While these findings are consistent with the theoretical arguments, we now move to more systematic tests of the story related by Figure 1.

Figure 1 About Here

Using models 1, 3, and 5 we calculate the expected level of private goods, growth in market capitalization, and dividend payments as a proportion of public goods. For each firm we record the difference between the observed level and the predicted value on each of these variables. That residual amount tells us whether the specific firm in a given year is over or underperforming relative to expectations given its governance structure. We then compare these residual values for the set of firms that were subsequently alleged to have committed fraud in the current year or either of the next two years to firms not alleged to be involved in fraud in this period.

Two of the three residual values for each firm reflect quantities whose true value is difficult to hide: private compensation rewards and dividend payments. Therefore, we expect in these cases to observe residuals that reflect underperformance in the set of firms alleged to have committed fraud. When it comes to comparing growth in market capitalization, if we are correct that fraudulent firms lie in ways that inflate their value, we should either see no statistical difference between those alleged to have committed fraud and those who apparently report performance honestly or we should see that fraudulent firms report especially large growth in market capitalization to compensate for their under-delivery of private goods or dividends. Table 3 shows the comparisons.

Table 3 About Here

The evidence in table 3 supports the predictions. What is more, the table emphasizes a result that casts doubt on accounts of venality as the primary cause of

fraud.[13] Firms that will be accused of fraud for their financial reports in the current year or the next two years provide fewer private benefits and fewer dividends than is expected of firms with their governance characteristics. Senior executives are receiving less, not more, than their counterparts in otherwise equivalent companies. However, in terms of growth in market capitalization, these firms are indistinguishable from honest companies with comparable governance arrangements.

Table 3 suggests that it is possible to tell the difference ex ante between firms likely to commit fraud and those who are not. To test this implication more carefully, we now turn to a strictly prospective dependent variable: Future Fraud. The data for the independent variables are all observed in year t and so can be known before fraud has occurred. Table 4 examines the likelihood of Future Fraud as a function of the degree to which a firm deviates from expected performance and as a function of the size of the winning coalition and the selectorate. The theory indicates that payment of dividends and private goods below expectation and growth in market capitalization equal to or above expectation heighten the risk of fraud. Furthermore, the marginal effect of large coalition size beyond its impact on private and public goods allocations is to put failed executives at risk. Therefore, executives in corporations that depend on a large coalition are more likely to misstate financial reports.

Table 4 About Here

The results are consistent with expectations. While supportive of the theory, the specification in table 4 is not optimal as it imposes significant artificial constraints on

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[13] That is not to say that fraud is never motivated by personal greed among managers. The case of Tyco, for example, is otherwise difficult to explain. However, as the *New Yorker* (February 17, 2003. "SPEND! SPEND! SPEND!" p. 132) concludes, Tyco's fraud is qualitatively different from accounting frauds such as Enron's and Worldcom's.

how we estimate the impact of governance structure on the risk of fraud. We shift now to a fuller specification of the model and its implications for predicting fraud.

Section V Predicting Fraud: In Sample and Out of Sample Tests

The selectorate model indicates that W, S, g, and x shape the risk of fraud, with g and x being partially dependent on W. Now we propose a statistical specification that includes indicators of all four elements in an attempt to provide ex ante estimates of the risk of fraud one or two years into the future. After demonstrating the general fit between the model and fraud in all cases, we divide the data into two samples. Specifically, we estimate the model on all observations between 1989 and 1996 and use these estimates to predict the likelihood of fraud in each company-year for the period after 1996. For presentational convenience we place our predictions in five risk categories, ranging from lowest (0) to highest (4) estimated probability of fraud. The category breakpoints are determined by assigning 70 percent of in-sample firm years to the lowest risk category; 15 percent to the second lowest risk group; 7.5 percent to the middle group; 5 percent and 2.5 percent to the two highest risk categories.[14]

We estimate a logit model with Future Fraud as the dependent variable. The independent variables are DIV/Public, Private Ratio, Perqs, Ex. Dir. Cash, $(Ex.Dir.Cash)^2$, #Ex. Dir, Inst. Owner, Ln(shares), Big Owner, $(Big Owner)^2$, Concentration, $Concentration^2$, #OfficersDirectors, #StockOfficers, Stk. Opt. Int.

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[14] Dividing the predicted values from the logit into quintiles yields comparable results, with observed fraud increasing significantly from quintile to quintile.

Directors, and Stk. Opts. Executives. Growth in market capitalization is not included to preserve observations.[15]

### a. Full Sample Estimates

Model 8, the full sample logit analysis, is consistent with expectations for each variable as seen in table 5. Its reliability is seen most clearly by looking at table 6 which shows the ex ante fraud risk and the incidence of fraud in the following two years. The table shows that the theory successfully discriminates between firms at risk and those that are not. Of firms predicted to be at greatest risk, 74 percent committed fraud within one of the following two years. Approximately 40% of all frauds fall within the highest two categories of risk. Yet only 7.5 percent of firm-years occur in these categories. The model not only predicts fraud successfully, but also successfully predicts honesty. Of 971 firm-years with the lowest risk of fraud only 3.4% are subsequently accused of fraud. Such strong results may be the product of over-fitting the model to the data. To test the genuine predictive power of the model we repeat the analyses using only information on firms prior to 1997. These estimates are also reported in table 5, and labeled as "Model 9: Out-of-Sample" We use these estimates to predict the pattern in subsequent years.

Tables 5 and 6 About Here

b. Out-of-Sample Estimates

Table 7 reports the risk of and the incidence of fraud by company year, paralleling table 6, but now only for out-of-sample observations. Of out-of-sample cases that fall

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[15] Including growth in market capitalization leads to results consistent with expectations but greatly reduces the total number of observations because it requires knowledge of data for the previous year in addition to the current year.

within the highest risk category, 85 percent subsequently committed fraud. Almost 60 percent of all out-of-sample frauds fall into the two highest risk categories. Likewise, the model successfully identifies honest firms. Fewer than 2.5 percent of firms in the lowest risk category subsequently were accused of fraud. The model apparently discriminates between honest and fraudulent firms. A statistic for summarizing that ability to discriminate is the Receiver Operator Characteristic (ROC) that estimates the ratio of signal to noise. A score of 0.50 indicates no discrimination. A score of 1.00 reflects perfect discrimination. The ROC score for the out-of-sample test is 0.88, supporting statistically what is evident from looking at table 7.[16]

c. Illustration of Performance on Specific Firms

The statistical findings encourage the belief that the selectorate theory provides a reliable tool for anticipating variations in corporate conduct and, in particular, the likelihood of fraudulent reporting. Table 8 provides a list of the ten largest companies accused of fraud during the time period for which we have data. This list includes many of the most notorious instances, including Enron, Waste Management, Rite Aid, and

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[16] We conducted additional out-of-sample tests in which we randomly assigned approximately half the firms to be in-sample and the remaining firms to be out-of-sample. We then estimated the model in table 5 based on the firms that were in-sample and used these estimates to predict the out-of-sample firms. We repeated this experiment 1,000 times. This is a far more demanding, less realistic, and less practically useful test than that reported in the text. The average ROC for the out-of-sample prediction was 0.785, with a standard deviation of 0.039.

others. The table shows the year-by-year prediction of the risk of fraud for each of these companies, with all predictions after 1996 being strictly out-of-sample. The out-of-sample results are shaded to draw attention to them. Cells for years in which fraud allegedly occurred contain an F as well as the predicted score. Of course, it is the score in either of the two years before fraud that are of greatest interest as these are the ex ante predictions for the period when fraud allegedly occurred. Cells that contain "ND" indicate that missing data precluded estimating a risk score for that company year. Companies are listed in alphabetical order.

Table 8 About Here

The companies listed in Table 8 have been accused of 25 instances of securities frauds during the period covered. Thirteen of these allegedly happened between 1997 and 1999, our out-of-sample period. Three more frauds for these companies, involving Cisco Systems, Xerox, and Enron, are alleged to have occurred in the year 2000. Thus, the out-of-sample predicted period includes 16 cases plus any allegations for these companies. Of these 16 largest, most notorious frauds involving massive numbers of shareholders and firms with extremely large market capitalization, 13 had a score of 4 at least one year in advance and all 16 had scores of 3 or 4 at least one year in advance. Eight provided 2 years of advance warning in the highest risk category.

The table also shows that during periods when these firms were not engaged in fraud, their scores often reflect their good behavior. The estimates for Xerox, for instance, between 1991 and 1994 suggest a very low risk company. Xerox was not accused of fraud for any of its reporting prior to 1998. The model shows that Xerox was slipping in its anticipated behavior, with scores of 2 in 1995 and 1996. Thus the model

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finds reason for growing, though still moderate concern about Xerox well before the markets suspected misconduct. A similar pattern of low risk behavior is reflected in the record for Rite Aid, with its risk jumping from 0 in 1993 to 2, then 3, then 4, the highest category, in 1996. Several years later, Rite Aid was accused of having committed fraud in 1998 and 1999. These illustrative cases suggest that the prudent use of the selectorate model could make a significant difference in identifying fraud risks.

Section VI Conclusion

The selectorate theory was used to derive hypotheses about how corporate governance institutions influence corporate actions. We showed that the theory provides an explanation for the amount paid in dividends and in salaries to senior management during years of honest reporting and years immediately preceding fraudulent reporting. In the latter years, senior management receive less compensation than expected given their corporate governance structure, but reported performance and, therefore, the firm's growth in market capitalization looks as expected given honest reporting. This wedge between lower than expected dividends and compensation for executives and normal growth in market capitalization is an early warning indicator of an elevated risk of fraud. Our model contributes to the literature on strategic accounting (Caplan 1999; Morton 1993; Shibano 1990) by identifying governance structures and reported performance statements that are consistent with strategic CEOs' attempts to protect their jobs.

We tested the theory's potential to predict fraud in advance. Our out-of-sample tests indicate that the model significantly reduces uncertainty about which firms are likely to commit fraud and which are likely to report their performance honestly. The signal to

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noise ratio in the out-of-sample test is 0.88 with more than 80 percent of company-years in the highest risk category involving subsequent allegations of fraud.

Our results call into question accounts in which greedy executives act to enrich themselves at the expense of shareholders. Rather, the theory and the evidence support the idea that fraud is more often committed to protect shareholder value, not out of altruism, but to protect the jobs of a firm's senior executives. At the same time, the results highlight features of corporate governance structure and the appropriate balance between compensation and that structure that is most likely to reduce the risk of fraud.

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Table 1: Summary Statistics (based on the 1,395 observations reported in Model 8)

| Variable | Mean | Standard Deviation | Minimum | Maximum |
|---|---|---|---|---|
| Future Fraud | 0.101 | 0.302 | 0 | 1 |
| Perqs | 0.758 | 5.806 | 0 | 186.364 |
| DIV/Public | 0.0012 | 0.0042 | 0 | 0.115 |
| Private Ratio | 0.037 | 0.068 | 0 | 0.761 |
| Ext. Dir. Cash | 0.068 | 0.121 | 0 | 1.200 |
| #Ext. Dir | 5.9441 | 3.2169 | 0 | 24 |
| Owner | 0.077 | 0.130 | 0.0008 | 1.01 |
| Ln(share) | 16.262 | 1.532 | 9.440 | 21.281 |
| Big Owner | 0.0055 | 0.0064 | 0 | 0.159 |
| Concentration | 0.151 | 0.155 | 0 | 0.882 |
| #OfficersDirectors | 12.527 | 4.332 | 2 | 31 |
| #Stock Officers | 2.579 | 2.721 | 0 | 25 |
| Stk. Opt. Int. Directors | 0.169 | 1.382 | 0 | 34 |
| Stk. Opt. Executives | 0.2104 | 1.096 | 0 | 28.642 |

Table 2: Governance Structures and the Performance of Firms. Regression analysis with fixed effect year dummies performed only on those firm not alleged to be fraudulent in the current year or two years into the future.

| Fixed-effect year dummies. | Model 1 Private Ratio | Model 2 Private Ratio | Model 3 Ln(MarketCap.) | Model 4 Ln(MarketCap.) | Model 5 DIV/Public (*1000) | Model 6 DIV/Public (*1000) |
|---|---|---|---|---|---|---|
| #OfficerDirectors | -0.00064 (0.0005) | -0.00074 (0.00066) | 0.017* (0.007) | 0.013* (0.007) | .086** (0.035) | .061 (.052) |
| #StockOfficers | -0.00222** (0.00077) | -0.0028** (0.0010) | 0.018* (0.010) | 0.014 (0.010) | -.030 (.055) | -.047 (.083) |
| Ln(share) | -0.015** (0.001) | | 0.069** (0.024) | | -.010 (.100) | |
| Ln(share)$_{t-1}$ | | -0.0139** (0.0018) | | 0.022 (0.025) | | .062 (.144) |
| %age Change in shares | | -0.042** (0.012) | | 1.004** (0.124) | | .408 (.956) |
| Ln(MarketCap.)$_{t-1}$ | | | 0.934** (0.020) | 0.960** (0.020) | | |
| Constant | 0.299** (0.021) | 0.285** (0.027) | -0.172 (0.269) | 0.117 (0.267) | 0.464 (1.463) | -.245 (2.110) |
| Observations | 1559 | 1057 | 1063 | 1061 | 1561 | 1057 |
| Joint hypothesis test: #OfficerDirectors=0 and #StockOfficers=0 | $F_{(2,1545)}$ = 6.62, p=0.0014 | $F_{(2,1044)}$= 5.25, p = 0.0054 | $F_{(2,1050)}$= 5.12, p = 0.0061 | $F_{(2,1047)}$ = 3.08, p = 0.0462 | $F_{(2,1547)}$ = 2.99, p= 0.0507 | $F_{(2,1044)}$ = 0.73, p = 0.4834 |

** p<.01, * p<.05, one tailed tests. Standard errors in parentheses.

Table 3: Differences Between Actual and Expected Provisions of Private Goods, Dividends and Growth in Market Capitalization.

| Comparison Between Fraudulent Firms (those accused of fraud in the current year or subsequent two years) and Honest Firms. | Private Goods: Private Ratio: Actual-Predicted | Dividends: DIV/Public Actual-Predicted | Growth in Market Capitalization: Ln(Mar. Cap.) Actual-Predicted |
|---|---|---|---|
| Honest Firms | Mean = 0 Std.dev.= .071 | Mean = 0 Std.dev. = .005 | Mean = 0 Std.dev. =.771 |
| Fraudulent Firms | Mean = -.0079 Std.dev. = .028 | Mean= -.0008 Std.dev. =.0015 | Mean = .096 Std.dev. =.810 |
| Hypothesis Test T-test | T = 2.93 p<.004 | T=4.86 p < .000 | T = 1.37 p < 0.17 |

Table 4: Logit Analysis of the Future Fraud Based Upon Deviations From Expected Performance and Governance Structure. The residual variables represent difference between actual values and values predicted by models 1, 3 and 5.

| Dependent Variable: Future Fraud. (Fraud alleged in either subsequent year) | Model 7 Future Fraud |
|---|---|
| Private Ratio Residuals | -28.524** (10.542) |
| Div/Public Residuals | -433.955** (124.536) |
| Ln(MarketCap.) Residuals | 0.402* (0.188) |
| #OfficerDirectors | -0.026 (-0.033) |
| #StockOfficers | 0.155** (0.048) |
| Ln(shares) | 0.815** (0.145) |
| Constant | -16.672** (2.605) |
| Observations | 921 |
| LogLikelihood | -262.488 |

** $p<.01$, * $p<.05$, one tailed tests. Standard errors in parentheses.

Table 5: Logit Analysis of Future Fraud: Full Sample and Out-of-Sample Estimates

| Dependent Variable: Future Fraud. (Fraud alleged in either subsequent year) | Model 8 Full Sample: All years | Model 9 Out-of-Sample: Only years prior to 1997 |
|---|---|---|
| DIV/Public | -0.185* | -0.176* |
| | (0.089) | (0.094) |
| Private Ratio | -24.185** | -22.527** |
| | (7.367) | (7.874) |
| Perqs | 0.202** | 0.139** |
| | (0.048) | (0.055) |
| Ex.Dir.Cash | -8.637** | -8.631** |
| | (2.473) | (2.760) |
| $(Ex.Dir.Cash)^2$ | 12.735** | 13.019** |
| | (4.365) | (4.908) |
| #Ex.Dir | -0.186** | -0.161* |
| | (0.064) | (0.069) |
| Inst.Owner | -2.748* | -2.246 |
| | (1.335) | (1.368) |
| Ln(shares) | 0.686** | 0.665** |
| | (0.115) | (0.125) |
| Big Owner | 89.406 | 90.663 |
| | (54.92) | (60.056) |
| $(Big Owner)^2$ | -1,799.85 | -1,848.84 |
| | (1,354.07) | (1,562.48) |
| Concentration | 7.314** | 7.626** |
| | (2.267) | (2.629) |
| $Concentration^2$ | -11.008 | -13.465** |
| | (4.576)* | (5.738) |
| #OfficerDirectors | 0.088* | 0.062 |
| | (0.044) | (0.047) |
| #StockOfficers | 0.075* | 0.087 |
| | (0.040) | (0.041)* |
| Stk.Opt.Directors | -1.395 | -1.649 |
| | (0.359)** | (0.820)* |
| Stk.Opt.Executives | 0.555 | 0.818 |
| | (0.307) | (0.526) |
| Constant | -13.975** | -13.409 |
| | (2.010) | (2.165)** |
| Observations | 1395 | 1140 |
| Log(likelihood) | -342.05 | -285.48 |

** p<.01, * p<.05, one tailed tests. Standard errors in parentheses.

Table 6: Fraud Risk Predictions Based Upon Full Sample Logit Estimates (Model 8)
Future Fraud measures whether fraud was alleged to have occurred in either of the
subsequent years. Figures in parentheses are column percentages.

|  | Future Fraud: NO | Future Fraud: YES | Total Number of Firm-Years |
|---|---|---|---|
| Lowest Risk (0) | 938 (96.6%) | 33 (3.4%) | 971 |
| Low Risk (1) | 184 (87.6%) | 26 (12.4%) | 210 |
| Moderate Risk (2) | 80 (74.8%) | 27 (25.2%) | 107 |
| High Risk (3) | 42 (61.8%) | 26 (38.4%) | 68 |
| Highest Risk (4) | 10 (25.6 | 29 (74.4%) | 39 |
| Total Number of Firm-Years | 1,254 | 141 | 1,395 |

$Chi2(4) = 312.65$, $Pr = 0.000$


Table 7: Out-of-Sample Fraud Risk Predictions Based Upon Pre-1997 Firm-Year Logit
Estimates (Model 9)
Future Fraud measures whether fraud was alleged to have occurred in either of the
subsequent years. Figures in parentheses are column percentages.

|  | Future Fraud: NO | Future Fraud: YES | Total Number of Firm-Years |
|---|---|---|---|
| Lowest Risk (0) | 159 (97.6%) | 4 (2.4) | 163 |
| Low Risk (1) | 40 (87.0%) | 6 (13.0%) | 46 |
| Moderate Risk (2) | 14 (87.5%) | 2 (12.5%) | 16 |
| High Risk (3) | 11 (64.7%) | 6 (35.3%) | 17 |
| Highest Risk (4) | 2 (15.4%) | 11 (84.6%) | 13 |
| Total Number of Firm-Years | 226 | 29 | 255 |

$Chi2(4) = 91.85$, $Pr = 0.000$
Receiver-Operator-Characteristic = 0.88

Table 8: Predictions for Recent, Notorious Cases of Alleged Fraud.
(F = Fraud Alleged; 0 = Lowest Fraud Risk; 1 = Low Fraud Risk; 2 = Moderate Fraud Risk; 3 = High Fraud Risk; 4 = Highest Fraud Risk; ND = No Data)

| Company | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 |
|---|---|---|---|---|---|---|---|---|---|
| Bank of America | ND | ND | 0 | 4 | 1 | 4 | 4 | 0 F | 0 |
| Boston Scientific | ND | ND | 3 | 3 | 3 | 3 | 4 F | F | ND |
| Cendant | ND | 1 | 4 | 3 | ND | 3 F | 0 F | 0 | 0 |
| Cisco | ND | ND | ND | 3 | ND | 3 | ND | 3 | F |
| Enron | 1 | 0 | 3 | 1 | 2 | 3 | 4 | 4 F | 4 F |
| Informix | 0 | 3 | 3 | 3 F | 4 F | 4 F | 2 F | ND | 4 |
| Medaphis | 1 | 1 | 2 | 3 F | 4 F | 4 F | 3 F | 1 | ND |
| Rite Aid | 1 | 1 | 0 | 2 | 3 | 4 | 3 | 4 F | 2 F |
| Waste Management | 4 | 4 F | 4 F | 3 F | 2 F | 4 F | 4 F | 1 | 0 |
| Xerox | 0 | 0 | 0 | 0 | 2 | 2 | 4 | 4 F | 4 F |

Figure 1: Private Goods Provision in Honest and Fraudulent Firms.
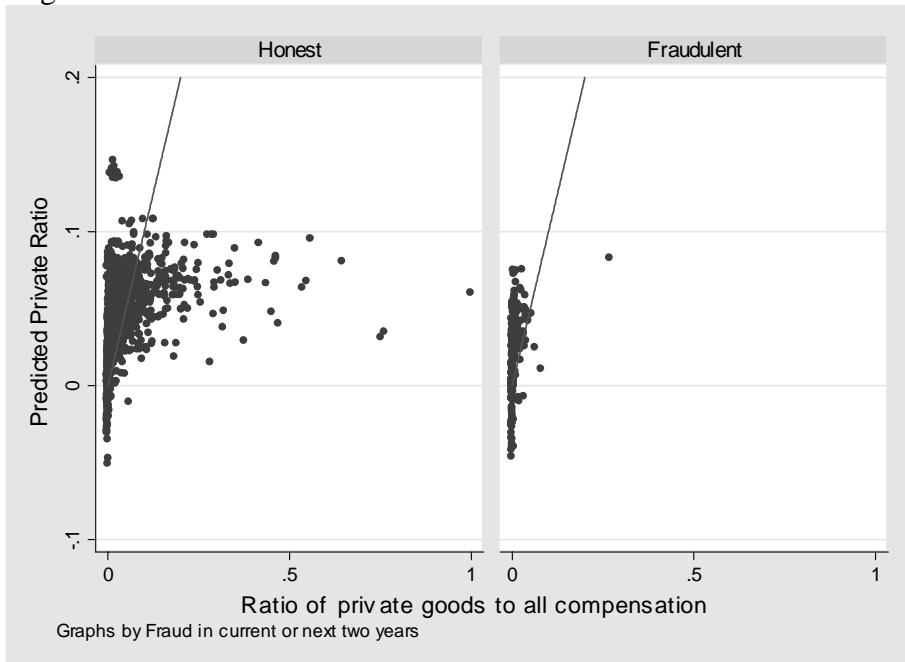
Appendix: Description and Construction of Variables

Identifying or sorting Variables:

Company name; Ticker; Date of the Report; Net income per share; Shares outstanding
(Shares) =Total company shares actually in the market place. (This does not include
shares that have been issued, but reserved for such things as options or future sale.) Share
price on last day of reported period; Fraudyn = 1 if fraud alleged for the given year, 0 if
fraud was not alleged for the given year.

Variables related to external directors:

Number of external directors (#Ext. Dir) = Number of directors who are not officers or
employees of the company. Being "Secretary" of the board of directors does not
constitute being an employee.

Cash compensation (Ext. Dir. Cash) = Fee per board meeting * number of board meetings
in year t.

Ext. director stock options (Ext. Dir. Stock) =Total number of stock options given, if any,
to the outside directors in the year.

Other compensation (Ext. Dir. Other) = All other compensation (exclusive of SARs), if
any, paid to the outside directors as a group.  This may include payment for
committee participation, insurance benefits, onetime cash payment for joining the
board, etc.


Variables related to internal directors:

Number of internal directors (#Int. Dir)

Aggregate salary of internal directors (Int. Dir. Cash)

Int. director stock options (Int. Dir. Stock) =Total stock options given in the year to all

internal directors, if any.

Other compensation (Ext. Dir. Other) =All other compensation (exclusive of SARs), if

any, paid to the internal directors as a group.


Variables related to management/executive officers:

Top five salary (Top5Sal)= Aggregate salary of the top five (5) employees (or fewer if

the company does not have five employees).

Top five % of common shares owned (T5%Stock) = Aggregate number of shares owned

by the top five executives divided by the total number of shares outstanding.

Top five stock options (T5Stock) =Aggregate number of stock options given in the year

to the top five executives.

Top five other compensation (T5Other) = Aggregate amount of other compensation

received by the top five executives.

Number of officers listed (#Officers) =Total number of all officers of the company listed

in 10K.

All officers stock options (Off%Stock) =Total number of stock options given, if any, to

all officers in the year.

Number of officers receiving stock options (#Stock Off.) =Total number of identified

officers who received stock options during the year


Variables related to distribution of common stock:

Number of individuals or firms listed by name as owning 1 % or more of common stock

(NumInd1)

Percentage of shares owned by all officers and directors (Off. Dir. %)

Percentage of shares listed as owned by institutional investors (Inst. %)

Percentage owned by the largest common stockholder (Big Stock %)


Constructed Variables based on directly collected variables described above:

Future Fraud = Fraudyn(t+1) = 1 or Fraudyn(t+2) = 1, then Future Fraud = 1; If

Fraudyn(t+1) = 0 and Fraudyn(t+2) = 0 then Future Fraud = 0

Perqs= Ext. Dir. Other + Int. Dir. Other+ T5Other

Total Dividends = Dividend per share * Shares

Public = Total Dividends + Market Capitalization

Private = Ext. Dir. Cash + Int. Dir Cash + Top5Sal + Ext. Dir Other + Int. Dir Other +

T5Other

Private Ratio = Private/(Public + Private)

Ln(share)= Ln(Shares outstanding)

Street = 100-(Inst. % + Off. Dir. %)

Big Owner = ((Big Stock %)/(100* Street))/100

Concentration = $((((\text{\#Stock Off.} * \text{Off. Dir \%} /(1+\text{\#Stock Off.} * 100))^2) + (\text{NumInd1} *$

$(\text{Inst. \%}/(100 *\text{NumInd1} + 1))^2)))^{1/2}$

Inst. Owner = ((Inst % + 1)/100)/(NumInd1 + 1)