Earnings Manipulation and Incentives in Firms∗

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Abstract

We study the effect of earnings manipulation on incentives within the corporate hierarchy. Division managers have to be compensated for not blowing the whistle when top managers manipulate earnings. We show that it is easier for division managers to prove top management’s manipulations when the performance of their own division is low. Earnings manipulation therefore undermines middle managers’ incentives to exert effort and destroys value. We show that earnings manipulation is more likely to occur in flatter hierarchies. We also discuss implications of our model as regards the Sarbanes Oxley Act regulations on auditing and the protection of whistle-blowers.

Keywords: agency costs, Sarbanes Oxley Act, whistleblowing, flat hierarchies.

JEL Classification Codes: D23, G30, M40, M52

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1 Introduction

Recent corporate scandals have reinforced existing skepticisms about the efficiency of financial markets and have triggered regulatory reforms like the Sarbanes-Oxley Act. Our understanding of these rather numerous and sizeable\(^1\) corporate misfortunes is far from complete. In this paper, we offer a new perspective on earnings manipulation. We open the “black box” of the corporate hierarchy, and investigate explicitly the intra-firm agency conflicts that are associated with earnings manipulation.

Our paper is motivated by a number of questions that are now increasingly discussed in economics, accounting and finance: Why did the mechanisms of corporate governance fail to detect massive earnings manipulation by management? What are the costs of earnings manipulation for society? What effect can regulatory reforms have on avoiding earnings manipulation in the future?

First, the literature has focused on external gatekeepers such as non-executive board members, financial institutions and auditors. We look at the role of firm insiders as internal gatekeepers. Firm insiders can be crucial in revealing to the public that executives engage in manipulation, as they often have direct evidence for it. However, it appears that this inside information rarely reaches the outside world.

Concerning the second question, we do not investigate the external costs of earnings manipulation, such as the transfer of utility from less sophisticated players to more sophisticated players or the undermined confidence of shareholders in financial markets. Rather, we identify a very direct cost: earnings manipulation undermines the functioning of companies, because it destroys incentives in firms and thus obstructs value creation.

Third, our perspective provides some new insights about the role of regulations like Sarbanes-Oxley. It also highlights the importance of organisational structure as a determinant of earnings manipulation. In particular, we show that the recent tendency to flatten hierarchies has made earnings manipulation easier.

A growing literature has shown that executive stock options and other short-term incentives have played an important role in explaining the incidence of earnings manipulation.\(^2\) In our theory, both top management and initial shareholders have an interest in

\(^1\)Beyond such household names as Enron, Tyco, WorldCom (in the US) or Ahold and Parmalat (in Europe), there are many other, less known cases of earnings manipulation. The Forbes (2002) “Scandal Sheet”, for instance, lists more than 20 large corporate scandals, in many of which earnings falsification reached several hundred million USD. Xerox, for instance, inflated its earnings over five years. Its earnings manipulation reached 1.5 billion USD.

inflated short-term earnings, because they can sell stocks at inflated prices to overconfident investors. While this assumption is in line with empirical evidence showing that even sophisticated investors may fail to fully account for the possibility of earnings manipulation (for instance, Louis, 2004), it is important to note that our results do not hinge on the existence of overconfident shareholders. Any other reason for short-term incentives (discussed in the next section) will have similar effects in our model.

The first channel through which short-term incentives of top management affect the incentives inside firms is straightforward; as top managers have incentives to report high earnings even if outcomes are low, they provide weaker incentives to their subordinates. The second, more interesting, channel relates to the policies top management undertakes in order to prevent the leakage of information to the outside world. A division manager may have evidence that top management inflates earnings. Then, if she can prove that top management tries to lie about earnings, the threat of blowing the whistle allows her to claim part of top management’s benefits of hiding the truth from the public. Our theory thus explains why firms cannot maintain two accounting systems, one for the outside world, potentially reporting inflated figures, and one as the basis of internal decisions and incentives for insiders. Insiders with sensitive information would have a credible threat to blow the whistle unless their compensation relates to the reported, rather than the true earnings.

The important feature of the model is that it is easier for a division manager to prove earnings manipulation by top management if her own division has underperformed. The knowledge about earnings manipulation and the threat of blowing the whistle can provide division managers with an additional payment. Hence, the spread between the division’s payoffs associated with high vs low output decreases. This either distorts the division managers’ effort choices, or, if top management increases successful divisions’ payoffs, reduces overall profits.

It is important to notice that whistle-blowing may not only be prevented ex post, at the bargaining table. Rather, we show that top managers can neutralize the incentive to blow the whistle ex ante – by providing lower level managers with similar short-term incentives as they have. This may explain why in recent booms, stock options and other

and Shrieveres (2002) measure earnings manipulation through the value of discretionary current accruals and find that it is related to stock holdings and options of executives. Interventions by the SEC are another measure: Johnson et al (2003) find that in 43 firms that committed fraud, stock-based compensation and vested options were higher than in a matched control sample. Erickson et al (2003) control for endogeneity of stock-based compensation and find similar effects. Peng and Roell (2004) themselves use yet a different measure, namely, allegations of executive misbehavior in shareholder class actions. They show that the incidence of such lawsuits are positively related to stock option components in executive compensation.
short-term incentives propagated in corporate hierarchies. In the light of our theory, short-term incentives align insider incentives with the ones of top managers and ensure that sensitive information does not reach the outside world.

From the point of view of initial shareholders, the trade-off is as follows. On the one hand, if top managers manipulate earnings, stocks can be sold at inflated prices. On the other hand, earnings manipulation involves long-term costs reducing firm value, and it goes along with weaker internal incentives. Nonetheless, we show that in some parameter range, shareholders may encourage short-termism and manipulation through the provision of short-term incentives. Then, in equilibrium, division managers face suboptimal incentives and less value is created.

To illustrate our results, consider the quintessential example of corporate governance troubles: *Enron*, once the world’s seventh largest company, now bankrupt, with several top managers facing legal charges. Earnings manipulation in *Enron* was so widespread, that CFO Andy Fastow (backed by CEO/COO Jeff Skilling) perceived his job being mostly, if not exclusively, about arranging “structured finance”: the use of aggressive accounting to deliver high earnings quarterly reports (Maclean and Elkind, 2003, ch. 10). *Enron*’s ubiquitous book-cooking resulted in the inability to monitor projects even internally. A deputy CEO once complained about Fastow’s aggressive accounting: “With Fastow, you could never tell whether [individual] deals were clean because they were too complicated” (Maclean and Elkind, 2003, p. 152). Healy and Palepu (2003) document how widespread earnings manipulation induced *Enron* managers to take unfounded and often excessively risky decisions. This may explain why despite of the very talented staff and profitable core business, *Enron* ended up not only having its value below the reported numbers but simply destroyed (Maclean and Elkind, 2003, Partnoy 2002, 2003).

*Enron*’s top management had substantial equity stakes or options (allegedly, the top executives managed to cash stock options for USD 35-250 million each, Maclean and Elkind, 2003), and hence little incentives to communicate earnings truthfully. But, there were a few attempts of blowing the whistle by those who were not enjoying the stock option bonanza. The famous “smoking gun memo” by Vice President Sherron Watkins to the Chairman Kenneth Lay opens with “Has *Enron* become a risky place to work? For those of use who didn’t get rich over the last few years, can we afford to stay?” (Watkins, 2001, our italics.) Even though it appears that Sherron Watkins had been aware of the scale of Enron’s earning manipulation, she did not insist on disclosing to public; the memo never reached outsiders before the collapse (Ackman, 2002).

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3The sheer scale of Fastow’s activities is striking. Between 1997 and 2000 he created about 3000 corporate entities, including more than 800 of which were offshore (Maclean and Elkind, 2003, p. 310).
The paper proceeds as follows. In Section 2, we discuss related literature. In Section 3, we set up a simple model whose solution, in Section 4, establishes the main results. In Section 5 we discuss robustness issues and extensions that allow to investigate the role of organisational structure. In particular, we argue that at given size, it is harder for firm insiders to provide evidence of earnings manipulation in flatter hierarchies. Section 6 discusses the Sarbanes-Oxley Act in the light of our theory. We argue that the Act will reduce the frequency of earnings manipulation, because it decreases insiders’ costs of whistle-blowing and induces auditors to monitor more carefully. This reduces top management’s benefit from earnings manipulation as they have to share with a larger number of firm insiders and auditors. Section 7 concludes.

2 Related literature

A growing literature investigates the effects of short-termism and earnings manipulation on managerial incentives. A list that is far from complete includes Bebchuk and Stole’s (1993) model, which shows ambiguous effects of short-term incentives on managerial effort. In Stein (1989), both short-termism and earnings manipulation emerge in a non-cooperative equilibrium between managers and rational investors. Bolton et al (2004) show that in the presence of overconfident shareholders, managers may choose sub-optimal projects with higher variance. Jensen (2004) argues that overvalued equity aggravates the agency problems between investors and managers.

While these papers point to the agency relationship between the outside world and corporate management, we explicitly analyze the effect of earnings manipulation on the agency relationship inside firms. Our model of a corporate hierarchy highlights the potential role of firm insiders as gatekeepers; it shows how distortions propagate throughout the hierarchy, how earnings manipulation obstructs value creation by undermining internal incentives, and the importance of organisational policies for the feasibility of earnings manipulation.

In our theory, top management has short-term incentives to manipulate earnings because of overconfident investors. We here follow other authors (Harrison and Kreps, 1978, Scheinkman and Xiong, 2003, Bolton et al, 2003), and we believe that the assumption makes sense, but the presence of overconfident shareholders is not a necessary ingredient for our model. There are other reasons why top management may have incentives to manipulate short-term earnings. In Bebchuk and Bar-Gill (2003), the management of a corporation that wants to take over another firm manipulates earnings because this allows them to raise equity at favorable terms. Other sources for managerial short-termism are
the costs of long-term arbitrage (Shleifer and Vishny, 1990), and managerial risk aversion and demand for liquidity (Holmstrom and Tirole 1998, Aghion et al, 2004, Axelson and Baliga, 2004). These sources would produce similar results in our theory.

To the extent that we look at rent-seeking and incentives in firms, our model has some similarity to the model in Scharfstein and Stein (2000). However, in our model, the potential of rents for division managers is created by CEO’s earnings manipulation. Moreover, we allow for cash compensation inside the firm; our main interest is information diffusion to the outside world rather than allocation of capital between divisions. Also related is the paper by Faure-Grimaud and Gromb (2004) who study the role of a different type of insider in providing information about a firm, namely, that of large shareholders.

Earnings misreporting may also be carried out for tax optimization purposes (Misai, 2003). In this case, managers tend to underreport rather to overreport the earnings. Desai and Dharmapala (2004) build a model of interaction between managers, owners and government. The effect of high-powered incentives on tax avoidance is ambiguous; tax sheltering is complementary to diversion of profits from shareholders, on the other hand, by paying less taxes manager may increase shareholder value. Hence, the effect of incentives on reported earnings depends on corporate governance, namely to what extent management is controlled by shareholders. Desai and Dharmapala do not model corporate hierarchy, but our analysis suggests that tax avoidance should not distort internal incentives. Indeed, as management tends to underreport earnings, keeping two sets of books is costly but incentive compatible. The potential whistle-blowers are the divisions that succeed; these divisions get a bonus on top of their official compensations.

Our paper also contributes to literature on whistle-blowing (Miceli and Near, 1992) that discusses costs and benefits of blowing the whistle. This literature has been largely descriptive except for Leppamaki (1998) who studies whistle-blowing in a rather specific context of bilateral monitoring and for Friebel and Raith (2004) who look at whistle-blowing and conflicts between different layers in the hierarchy. Our paper complements this literature by modelling the effect of potential whistle-blowing on corporate governance.

3 The model

We consider a publicly traded firm which is held by initial shareholders (“S”). The firm is run by a CEO (“M”) who reports to S, and there are two division managers, A and B, who report to M. There are also potential new investors (“I”). In the Appendix, we provide a graphical sketch of our model.
Agents $M$, $A$ and $B$ are risk-neutral, but have limited liability; their reservation payoffs are normalized to zero. Both initial investors $S$ and overconfident potential investors $I$ are financially unconstrained and, in dealing with $M$, risk-neutral.

### 3.1 Production and information

The division managers exert effort $e_i$, $i = A, B$, which increases the expected value of the firm. Output of each division $y_i$ can take two values: 1 (with probability $e_i$) and 0 (with probability $1 - e_i$). The aggregate output of the divisions is

$$y = y_A + y_B.$$  

Effort is private information of the respective division manager. The cost of effort is $c(e_i)$, which is an increasing, convex function. For simplicity, we assume that $c(e) \sim e^{1+\sigma}$, so that the elasticity of the marginal cost of effort $\sigma = e c''(e)/c'(e)$ is positive and independent of the level of effort.

Division manager $i$ observes her own output, but not that of the other division manager. In what follows, we assume that division managers cannot engage in any side-contracting and, in particular, that they cannot share information.\footnote{We discuss this issue in subsection 5.1.}

The CEO observes both divisions’ outputs, while the outside world – $S$ and new investors $I$, who may buy stocks from $S$ – cannot observe the true value of the firm. Rather, they have to rely on $M$’s report, which may or may not be truthful. This setting captures the idea that certain information is only available within the boundaries of a firm. The role of auditors, who at some cost can generate additional information about the true value of the firm, is discussed in Section 6.

Besides gathering and reporting information, $M$ also exerts effort $E = \{0, 1\}$ which is complementary to that of division managers. For simplicity we make an extreme assumption of perfect complementarity: the firm’s gross output is $Ey$. If $M$ chooses high level of effort $E = 1$, the output of divisions adds value $y$. If the top manager shirks, the firm’s value is nil. The top manager’s cost of exerting $E = 1$ is $c_M$. We shall assume throughout the paper that this cost of effort is sufficiently low and that shareholders will provide the top manager with incentives (short-term, long-term, or both) such that $M$ never shirks. Thus we will solve the model for the case $E = 1$, and then check for $M$’s incentive not to deviate to $E = 0$. 
3.2 Timing

There are three dates: \( t = 0 \) (contracting stage), \( t = 1 \) (short run), and \( t = 2 \) (long run).

At \( t = 0 \), \( S \) hold 100\% shares. They keep at least \( \alpha_{S2} \geq 0 \) shares in the long run (e.g. for risk management purposes, or for preserving non-pecuniary benefits of control). In our model, \( \alpha_{S2} \) is an exogenous parameter. The initial shareholders offer \( M \) a contract; then \( M \) offers a contract to \( A \) and \( B \). The compensation package of \( M \) includes a fixed salary and bonuses that are contingent on earnings reported at \( t = 1 \) and \( t = 2 \). These bonuses can be interpreted as stock grants or stock options to be exercised at \( t = 1 \) (short term) and \( t = 2 \) (long term). For simplicity, we assume that the manager receives \( \alpha_{M1} \) shares that can be sold in the short term (to new investors \( I \)), and \( \alpha_{M2} \) shares that must be kept until the end; \( \beta \) is the present value of all fixed salaries \( M \) receives.

The division managers’ contracts are contingent on their individual output \( y_{A,B} \).

Date \( t = 1 \) has several stages:

1. The CEO chooses \( E \).

2. Division managers \( A \) and \( B \) choose their effort levels \( e_A, e_B \) and division outputs realize.

3. The CEO observes \( y_A \) and \( y_B \), and prepares a report about aggregate earnings. The reported earnings \( x \) may or may not be manipulated by \( M \). Given \( W \), the sum of all wage payments to \( M, A \) and \( B \), the reported short-term value of the firm is

\[
V_1 = x - W.
\]

Here \( x = y \) if there is no overreporting, and \( x > y \) otherwise. Obviously, \( W \) depends on whether or not there is earnings manipulation. We assume that inflating short-term earnings by \( x - y \) units has costs \( C_{x-y} \) with \( C_2 > C_1 > 0 = C_0 \). These costs reduce the firm’s long-run \( V_2 \), but do not affect short-run value \( V_1 \).\(^5\)

4. The division managers learn about the report before it is sent to potential investors.\(^6\)

Subsequently, if they believe that there is some overreporting, they can bargain individually with \( M \) for a wage raise. The bargaining power of either division

\(^5\)Two comments: First, this may be considered as a reduced form of the net present value of stochastic costs of earnings manipulation. Second, the costs may be incurred by the firm, for instance, as consulting fees to auditors or misallocation of resources, or by the manager, for instance, as an effort cost or the expected costs of potential imprisonment. We take the former route, as it is more in line with the literature, e.g. Stein (1989).

\(^6\)We could also allow for \( A \) and \( B \) to receive noisy signals about the report.
manager (vis-a-vis the CEO) is \( \gamma \in [0, 1] \). If \( M \) and one or several of the division managers disagree, they can make verifiable information about their division output available to the public. This whistle-blowing drives down the stock price that the potential investors are willing to pay. We further specify the whistle-blowing game in Section 4.

5. The CEO can sell up to \( \alpha M_1 \) shares to the new investors at a price based on reported output \( x \). Initial shareholders can sell a total of \( 1 - \alpha S_2 - (\alpha M_1 + \alpha M_2) \) to new investors. Potential new investors are overconfident, so that they value the firm based on the reported earnings. This allows an alternative interpretation for the parameter \( \alpha S_2 \) as a measure of market sophistication. If some of the new investors are overconfident while others figure out the true value of the firm, an increase in the proportion of smart investors is equivalent to higher \( \alpha S_2 \) in our model.

6. Finally, \( A, B \) and \( M \) receive their first-period wages according to the initial contract and whatever additional revenues accrue through exercise of short-term options or through bargaining.

At \( t = 2 \) (long run) the true value becomes public information. The market value at this point is based on \( y \). There is no additional production. The firm is liquidated and all remaining shareholders (including managers and original shareholders if holding long-term stock) receive their part of the true value, \( V_2 = y - W - C x - y \).

### 3.3 Contracts and payoffs

Contracts between \( M \) and \( A, B \) are simple. There is a wage in case of success, \( w_1 \), and a wage in case of failure, \( w_0 \).\(^8\) Owing to limited liability, \( w_{0,1} \geq 0 \).

The contract of \( M \) can be written as \( \langle \beta, \alpha M_1, \alpha M_2 \rangle \), so the payoff is

\[
U^M = \beta + \alpha M_1 V_1 + \alpha M_2 V_2 - c_M * E. \tag{1}
\]

Here \( E \) is either 1 or nil. Limited liability implies \( \beta = 0 \).

The contract between shareholders and \( M \) must deal with a two-dimensional moral hazard problem: \( M \) chooses effort \( E \) and decides what to report. Incentives for high effort are provided by a sufficiently high total of short-term and long-term stakes. Incentives

\(^7\)We assume that new investors observe wages, but cannot infer from wages on whether or not earnings manipulation has occurred. This is not an important assumption; we discuss it in Section 5.

\(^8\)The sufficient statistic theorem (Holmstrom, 1979) suggests that division manager \( i \)'s contract will be contingent only on \( y_i \).
for earnings manipulation depend on the contract’s structure, that is, the ratio of short versus long-term incentives.\footnote{In our model, there is no reason for short-term compensation other than S’s interest in selling to outside investors at inflated prices. There can certainly be other reasons, e.g. risk-aversion and liquidity considerations (e.g. Axelson and Baliga, 2004), which generates similar insights concerning our main interest, the internal functioning of the firm.} The more short-termist the contract, the more likely $M$ is to inflate earnings. If the contract only includes long-term compensation, $M$ will file truthful reports. Notice that new investors, who buy shares at $t = 1$, do not renegotiate $M$’s long-term contract, because all choices and decisions have already been made at that point.

4 Equilibrium earnings manipulation and internal incentives

We here establish the main result of the paper: earnings manipulation may reduce incentives within the firm. We solve the model backwards.

4.1 Market valuation

At $t = 2$, the price of the firm’s equity is $V_2 = y - \beta - W - C_{y-x}$, where $y = y_A + y_B$ is total output by two divisions, $W$ is the total wage paid to divisions, and $C_{y-x}$ is the cost related to earnings manipulation.

At $t = 1$, the price of the firm’s equity is $V_1 = x - \beta - W$ where $x$ is the total reported output.

4.2 Threat of whistle-blowing and bargaining

We assume a symmetric choice of effort by divisions $e_A = e_B = e$ and use the limited liability constraint ($w_0 = \beta = 0$). We also assume that $C_2$ is very high so that the manager never manipulates earnings by two units.\footnote{In Section 5.3 we investigate the situation where this is not the case.}

Suppose that the manager has chosen to report $x = y + 1$ whenever $y \leq 1$. This costs him $\alpha M_2 C_1$ in the long-run, and provides him with short-run benefits according to the table below.
Under the assumption that division managers cannot side-contract, the threat of
whistle-blowing is only relevant when $x = 2$ and $y = 1$. Only then, one division – the
one that produced nil – has evidence of manipulation. This division threatens $M$
with reporting the evidence to the market. The wage $\bar{w}_0$ is the result of bargaining between
$M$ and this division manager, as explained below. In Section 5.1, we discuss the effect of
relaxed assumptions concerning output.

Consider the second row in the table. Here, $B$ has evidence about earnings manipu-
alation. We assume the division manager to receive a part $\gamma \in (0, 1)$ of the joint surplus
due to not blowing the whistle. If at the time of bargaining, $C_{y-x}$ has been realized\(^{11}\) and $B$
reports its true performance, the market value will be based on $y = 1$, so the sum of
utilities of $M$ and $B$ is

$$
(\alpha_{M1} + \alpha_{M2}) (1 - w_1) - \alpha_{M2}C_1.
$$

If $B$ does not blow the whistle, the market value will be based on $y = 2$, so the sum of
utilities is

$$
\alpha_{M1} (2 - 1) + (\alpha_{M1} + \alpha_{M2}) (1 - w_1 - \bar{w}_0) - \alpha_{M2}C_1 + \bar{w}_0.
$$

The CEO and the division manager share the surplus, that is the difference between the
latter and the former expression. As $B$ receives a share of $\gamma$, we find

$$
\bar{w}_0 = \frac{\gamma \alpha_{M1}}{1 - \gamma (1 - \alpha_{M1} - \alpha_{M2})}
$$

As expected, this wage increases in $\gamma$ and $\alpha_{M1}$ and decreases in $\alpha_{M2}$. If the threat of
whistle-blowing were not important ($\gamma = 0$), then $\bar{w}_0$ would be nil.

As we have pointed to in the Introduction, top managers can choose to avoid bargaining
at the interim stage, simply by aligning the incentives of division managers with their own.
Top management can ex ante choose a renegotiation-proof contract that is equivalent to the
outcome of the interim bargaining game. This contract would give employees short-
term incentives contingent on reported earnings. It can be implemented via contracts or
short-term stock grants or options. The division’s ex ante contract would be as follow: “If

\(^{11}\)Considering that $C_{y-x}$ is not sunk at the bargaining stage would not make any qualitative difference.
the division’s output is high \((y_i = 1)\), the division manager receives a performance bonus \(w_1 - \tilde{w}_0\); if the short-term price is high (based on \(x = 2\)), the division manager receives \(\tilde{w}_0\); if both are high, the division manager receives \(w_1\).” It is worth noting that these short-term incentives emerge endogenously: \(M\) makes division managers accomplices by aligning their incentives not to tell the truth to the public in a way similar as the initial shareholders do with \(M\). Put differently, the potentially harmful short-term incentives propagate through the hierarchy.

### 4.3 Earnings manipulation

When \(M\) observes \(y_A = y_B = 0\), he chooses to report \(x = 1\), since this involves no cost – neither division can whistle-blow if side-contracting is not possible.

When \(M\) observes \(y_A + y_B = 1\), then he compares the benefit of misreporting \(\alpha M_1 - (\alpha M_1 + \alpha M_2) \tilde{w}_0\) to the cost of misreporting \(\alpha M_2 C_1\). Using (3), we find that CEO chooses to misreport whenever

\[ \alpha M_2 C_1 < \frac{(1 - \gamma) \alpha M_1}{1 - \gamma (1 - \alpha M_1 - \alpha M_2)} \]

i.e., whenever cost of manipulation \(C_1\), bargaining power \(\gamma\), and long-term incentives \(\alpha M_2\) are sufficiently low and short-term incentives \(\alpha M_1\) are sufficiently high.

### 4.4 Choice of effort by division

Suppose that condition (4) holds. Then \(A\) expects that to receive \(\tilde{w}_0\) if she produces nil and the other division produces 1. If a division succeeds it always gets \(w_1\). If both divisions fail, each receives nil. Given the effort \(e_B\) by \(B\), manager \(A\) chooses her effort level \(e_A\) to solve:

\[
\max_{e_A} [e_A w_1 + \tilde{w}_0 (1 - e_A e_B - c(e_A))].
\]

Hence,

\[ c'(e_A) = w_1 - e_B \tilde{w}_0. \]

As in equilibrium \(e_A = e_B = e\), we obtain the incentive compatibility constraint

\[ c'(e) + e \tilde{w}_0 = w_1. \]

The equation above shows what bonus \(w_1\) should be paid to a successful division if \(M\) wants to implement a given effort level \(e\).

If (4) does not hold, the division is only paid \(w_1\) if she is successful and \(w_0 = 0\) otherwise. Thus, the effort solves

\[ c'(e) = w_1. \]
4.5 Optimal contract for division managers

When $M$ designs contracts for the division managers, he takes into account whether or not he will manipulate the earnings later, see (4).

**Truthful reporting:** If (4) does not hold, $M$ expects that he will have incentives to report truthfully $x = y$. He chooses a contract $w_1$ that maximizes

$$(\alpha_{M1} + \alpha_{M2}) \left[ (2 - 2w_1) e^2 + 2e(1 - e)(1 - w_1) \right]$$

subject to the incentive compatibility constraint (8). The f.o.c. is $c'(e^*) = 1/(1 + \sigma)$. In this case

$$w_1^* = c'(e^*) = \frac{1}{1 + \sigma};$$

$$V_1^* = V_2^* = 2e^*(1 - c'(e^*)) = \frac{2e^*\sigma}{1 + \sigma}. \quad (9)$$

The effort $e^*$ is below the first-best level that would solve $c'(e) = 1$. However, $e^*$ is the optimal effort chosen in the conventional principal agent model with limited liability. Even if the divisions' contract were set up by shareholders $S$ directly, (9) would still be the case.

**Earnings manipulation:** If (4) holds, $M$ expects to manipulate earnings, so he maximizes his expected payoff according to (2):

$$(\alpha_{M1} - \alpha_{M2}C_1) (1 - e^2) + (\alpha_{M1} + \alpha_{M2}) \left[ (2 - 2w_1) e^2 + 2e(1 - e)(1 - \tilde{w}_0 - w_1) \right]$$

subject to the incentive compatibility constraint (7). Substituting $w_1$ from (7), we obtain the first order condition:\footnote{We use the standard first-order approach to solving principal agent problem. The principal knows the agent’s IC constraint, and therefore can calculate how much it costs to implement a given level of effort $e$. Then the principal’s problem is to choose the effort level that involves maximum payoff. Notice that (4) implies $\frac{\alpha_{M1} - \alpha_{M2}C_1}{\alpha_{M1} + \alpha_{M2}} > 0$.}

$$\frac{\alpha_{M1} - \alpha_{M2}C_1}{\alpha_{M1} + \alpha_{M2}} e = 1 - \tilde{w}_0 - c'(e) - ec''(e).$$

The equilibrium effort is $e = \tilde{e}$ where $\tilde{e}$ solves

$$\frac{\alpha_{M1} - \alpha_{M2}C_1}{\alpha_{M1} + \alpha_{M2}} \tilde{e} + c'(\tilde{e})(1 + \sigma) = 1 - \tilde{w}_0. \quad (10)$$

The left-hand side is increasing in $\tilde{e}$ hence there is a unique solution.
Our main result follows from eq. (10): the equilibrium level of effort $\tilde{e}$ is decreasing in $\tilde{w}_0$, and in $\alpha_{M1}$ (keeping $\alpha_{M1} + \alpha_{M2}$ constant). This shows that $M$’s short-termism - induced by the initial shareholders who want to benefit from inflated share prices - undermines incentives within the hierarchy and involves less effort and less value creation. Eq. (10) also describes how short-term incentives propagate through the hierarchy. Even if whistle-blowing were not important (e.g. if divisions had no bargaining power $\gamma = 0$, and $\tilde{w}_0 = 0$), the effort level would still be distorted, $\tilde{e} < e^*$. The distortion is driven by the first term in (10) which is large whenever manager’s incentives are predominantly short-term. In this case, $M$ is not willing to pay much for higher effort, because he is going to overreport the earnings anyhow.13 Since rewarding high effort is costly for $M$, he will prefer to provide weaker incentives.

We can now compute the market value in case of earnings manipulation:

\[
\tilde{V}_2 = 2\tilde{e} - 2\tilde{e}w_1 - 2\tilde{e}(1 - \tilde{e})\tilde{w}_0 - C_1; \\
\tilde{V}_1 = 2\tilde{e} - 2\tilde{e}w_1 - 2\tilde{e}(1 - \tilde{e})\tilde{w}_0 + (1 - \tilde{e}^2).
\]

(11)

4.6 Optimal contract for the CEO

The shareholders $S$ choose $\alpha_{M1}$ and $\alpha_{M2}$ in order to maximize their payoff

\[
U^S = [\alpha_{S2}V_2 + (1 - \alpha_{M1} - \alpha_{M2} - \alpha_{S2})V_1] E.
\]

subject to CEO’s optimal response to $\alpha_{M1}$ and $\alpha_{M2}$. The shareholders want to (i) provide incentives for manager’s effort $E = 1$; (ii) make sure that the CEO reports or misreports earnings in the interests of the shareholders. To solve (i), $S$ have to increase both $\alpha_{M1}$ and $\alpha_{M2}$ so that $M$’s overall contingent compensation exceeds his cost of effort $c_M$. As under limited liability the fixed salary is nil, this requires that $M$’s equilibrium wage is at least $c_M$.

In order to solve the other moral hazard problem (ii) the shareholders should increase $\alpha_{M1}/\alpha_{M2}$ if they prefer overreporting or decrease $\alpha_{M1}/\alpha_{M2}$ otherwise. In particular, the shareholders can choose to discourage earnings manipulation by setting $\alpha_{M1} = 0$. In this case (4) does not hold, so $M$ reports truthfully. Shareholders set $\alpha_{M2} = c_M/V_1^*$ and receive the following payoff:

\[
\alpha_{S2}V_2^* + (1 - \alpha_{M1} - \alpha_{M2} - \alpha_{S2})V_1^* = V_1^* - c_M.
\]

13It is crucial that M cannot boost earnings in the high states by as much as in the low states. Investors are overconfident but not stupid. They know that $y > 2$ can never occur. This is certainly an implication of the specific setup. We discuss this further in Section 5.
Shareholders benefit from misreporting if $\tilde{V}_1 - V_1^*$ is sufficiently large, and $\alpha_{S2}$ is small. That is, even though manipulation reduces the long-term value ($\tilde{V}_2 < V_2^*$), shareholders may be mostly interested in selling to the overconfident investors in the short-term at a higher price $\tilde{V}_1$. Using (9) and (11) we can check when this is possible:

$$\tilde{V}_1 - V_1^* = (1 - \tilde{e}^2) + 2\tilde{e} \frac{\alpha_{M1} - \alpha_{M2}C_1}{\alpha_{M1} + \alpha_{M2}} + 2\sigma [\tilde{e}c'(\tilde{e}) - e^*c'(e^*)]$$

The first two terms are benefits of manipulation while the last term is the loss due to lower incentives ($\tilde{e} < e^*$). For some parameter values $\tilde{V}_1 - V_1^*$ is positive so earnings manipulation occurs in equilibrium if market is sufficiently overconfident.

**Proposition 1** There exists $\pi$ such that for all $\alpha_{S2} \leq \pi$ the equilibrium involves earnings manipulation. The threshold level $\pi$ (weakly) decreases in $\gamma$ and $C_1$.

As we already mentioned, higher $\alpha_{S2}$ is tantamount to longer-term orientation of initial shareholders, and to the lower share of uninformed outside investors. Proposition 1 implies that earnings manipulation is more likely to occur if initial shareholders are more short-term-oriented, if there are many overconfident investors around, and if the costs of earnings manipulation are not too high. It is also worth noting that earning manipulation occurs when the bargaining power of division managers, $\gamma$, is low. In particular, if there is no internal incentive cost due to earnings manipulation ($\gamma = 0$), earnings manipulation is more likely to improve $S$’s welfare, especially if the shareholders want to sell all the shares as soon as possible (low $\alpha_{S2}$) and/or negative long-term consequences $C_1$ of earnings manipulations are low.

It is interesting that even if the direct cost of manipulation $C_1$ is small or nil, the implicit cost of distorted incentives may be sufficiently large to make shareholders prefer no earnings manipulation. Consider the following numerical example.

**Example 1** Suppose $c(e) = e^2/2$, $\gamma = 1/2$, $C_1 = 0.3$, $c_M = 0.1$. Shareholders $S$ can choose whether:

**to discourage earnings manipulation:**

provide $M$ with long-term incentives only $\alpha_{M1} = 0, \alpha_{M2} = 0.2$. Then, each division manager’s effort is $e_1^* = 1/2$ and the market value is $V_1^* = V_2^* = 1/2$; the CEO receives a payoff of 0.1, and $S$ receives 0.4.

**to provide $M$ with short-term incentives:**

the optimal contract is independent of $\alpha_{S2}$ and is $\alpha_{M1} = 0.078, \alpha_{M2} = 0$. Then effort is lower $\tilde{e} = 0.31$, while the market value is different in short- and long-term:
\[ \tilde{V}_1 = 1.287, \tilde{V}_2 = 0.083. \text{ Shareholders receive } \tilde{V}_1 (1 - \alpha_{M1} - \alpha_{M2}) - \left(\tilde{V}_1 - \tilde{V}_2\right) \alpha_{S2} = 1.187 - 1.204 \alpha_{S2}. \]

Comparing S’s payoffs with and without earnings manipulation we find that the shareholders will prefer earnings manipulation whenever \( \alpha_{S2} < \overline{\alpha} = 0.65 \). If \( C_1 = 0 \), then \( \overline{\alpha} \) increases to 0.87. Even though the direct cost of manipulation is trivial, the implicit cost of distorted incentives makes shareholders prefer long-term incentives whenever \( \alpha_{S2} \in (0.87, 1) \).

5 Robustness and extensions

5.1 Observation of wages by shareholders

We have assumed that outside investors observe wages but cannot infer whether or not earnings have been manipulated. This may appear an extreme assumption, but it is not crucial for our results. Consider that outside investors would indeed infer from observing certain wages that earning manipulation has occurred and that division managers have been bribed. Then top management could decide to pay only two wages: nil in case there is low output and no credible threat to blow the whistle, and some other wage if either the division has performed well or when it has a whistle-blowing threat. Notice that this would not destroy incentives entirely, because the division managers still do better ex post with a high rather than with a low output (as they receive a wage of nil in case they have both produced an output of nil).

5.2 Costs of manipulation

We have solved the model taking \( C_2 \) to be prohibitively high. This ruled out a situation where the manager reports \( x = 2 \) even though the true state is \( y = 0 \). In this case, the cost of earnings manipulation is even higher. First, the firm bears a long-term cost \( C_2 \). Second, the manager has to negotiate with both divisions since either of them can whistle-blow. Therefore the CEO gets to keep a smaller share of the surplus. Indeed, as there is no side-contracting, each division bargains with \( M \) separately. The share of \( A, \xi^A \), is \( \gamma \) per cent of the joint surplus of coalition \( M, A \): \( \xi^A = \gamma(1 - \xi^B) \). Similarly, \( \xi^B = \gamma(1 - \xi^A) \), hence \( \xi^A = \xi^B = \gamma/(1 + \gamma) \), so \( M \) only keeps \( 1 - 2\gamma/(1 + \gamma) = (1 - \gamma)/(1 + \gamma) \) per cent of the surplus which is below \( 1 - \gamma \).
5.3 Structure of hierarchy

Our analysis can also contribute to the literature on the relative advantages of steep vs flat hierarchical structures. The early research on this topic studied the optimal information processing (e.g. Radner, 1993), the more recent work has emphasized the trade-off between incentives and loss of control.\textsuperscript{14} Our model can be readily extended to show that management’s incentives to manipulate earnings are larger in a flat hierarchy.

Consider the version of the model sketched in 5.1. Assume that the firm consists of four production units. If the hierarchy is flat and each unit reports directly to $M$, the returns to earnings manipulation for $M$ are quite high, as the threat of whistle-blowing is less likely. Even if all units fail, top management can report high earnings: each unit knows that it observes only 1/4 of aggregate output, so there may be not enough ground to undertake the cost of learning other divisions’ performance. In a nutshell, in this flat hierarchy, there is a coordination failure that allows the management to appropriate all the surplus without sharing with the subordinates. This is a similar effect to Rajan and Zingales (2001) where flat hierarchies allow the management to ‘divide and conquer’ in order to establish control and appropriate a larger share of (quasi-)rents.

Consider now a steeper hierarchy, in which two intermediate supervisors are each in charge of 2 lower-level units. Here, each of the supervisors observe 1/2 of the firm’s business. Therefore if the supervisor knows that his divisions failed, it is more likely to pay off to learn about the other divisions’ output and hold up the management. Hence, $M$’s costs of earnings manipulation are higher. Effectively, the intermediate supervisors aggregate information and overcome the coordination failure among subordinates. Here, the supervisors provide checks and balances on $M$’s urge to inflate earnings - they play the role of gatekeepers as pointed out by Jensen (2004).

Notice also that the other effect – propagation of weak incentives through the hierarchy – makes earnings manipulation more expensive in steeper hierarchies. Indeed, the more layers of potential agency costs, the greater the ultimate incentive distortion at the level of production units.

Our analysis is consistent with Enron’s strategy to foster the new corporate culture of ‘entrepreneurial’ corporation. Enron’s CEO Jeff Skilling wanted to empower human capital via flatter hierarchies and was “openly scornful of stead, asset-based businesses”\textsuperscript{15}

\textsuperscript{14}Qian (1994) builds a model where this trade-off determines the optimal structure of the hierarchy. Aghion and Tirole (1997) show how the formal structure of the hierarchy (span of control) affects real authority. Rajan and Zingales (2001) show that the choice of structure may be driven by appropriability considerations. Flat hierarchies should be expected to perform better in human capital intensive industries, while firms in industries with more physical assets should be organized as steeper hierarchies.
(Maclean and Elkind, 2003). As Rajan and Wulf (2003) show, Enron was certainly not the only firm that made its hierarchy flatter. However, for many human resource management gurus, Enron was a role model (Michaels et al., 2001). While it is hard to deny multiple benefits of flatter structure, our model suggests that this flattening has created more scope for earnings manipulation.

5.4 Technology

We here discuss the robustness of our results to changes in information and production technology. Unlike the model above where divisions automatically obtain hard information on earnings manipulation, we consider a model of costly state verification. The division have to incur a cost to learn the aggregate output. We show that their incentives to do so are inversely related to their individual performance. Also, we replace the 2x2 model with the one of $N$ divisions with continous output. For the brevity’s sake, we focus on the interim stage, after the efforts $e_i$ and $E$ are exerted.

5.4.1 Setup

Suppose that the firm consists of $N$ divisions: $i = 1, ..., N$. Each division produces $y_i$ which is a function of effort and noise. The individual noises are independently and identically distributed on a finite support (if there divisions’ outputs were correlated the results would be even stronger ). At this stage, efforts are fixed (and everyone can infer their equilibrium levels). Thus individual outputs are distributed on a support $[y/N, \overline{y}/N]$ with a c.d.f. $F(\cdot)$; the distribution function is common knowledge. Division $i$ observes its own output $y_i$, but can also pay a fixed cost $\phi$ to learn true value of aggregate output $y$. CEO observes both individual outputs of divisions and the aggregate output is $y = \sum_i y_i$. CEO then reports aggregate earnings $x$. Overconfident investors are happy to accept it. So CEO gets $\alphaM_1(x - y)$ in the short-term, but also bears a cost $\alphaM_2C_{x-y}$ in the long-term. We assume that $C_{x-y}$ is increasing and convex, so earnings manipulation is finite in equilibrium as long as $\alphaM_2 > 0$. As in the model above, the cost is sunk at the time of the report. The divisions that have paid the cost of state verification, can threaten the CEO with blowing the whistle. If the earnings manipulation has occurred and $n$ divisions know

\footnote{Our assumption of finite support for $y_i$ and therefore for the aggregate output $y$ rules out the situation where the CEO will report indefinitely high earnings and the market would still believe it. The assumption is a shortcut for introducing limits on overconfidence of investors: even very overconfident investors know that returns of 1000% a year cannot be the case. Alternatively, we can assume that there are either prohibitively high costs of egregious overreporting either for the company (e.g. $C_{x-y}$ is very high whenever $x - y$ is high) or for the manager himself (liability or even imprisonment).}
the truth, the bargaining game results in sharing the benefits of manipulation between CEO and the informed divisions in the following proportions. Each division obtains \( \Gamma(n) \) per cent of the pie, while the CEO gets \( 1 - n\Gamma(n) \). We assume that both \( \Gamma(n) \) and \( 1 - n\Gamma(n) \) decrease in \( n \).

### 5.4.2 Equilibrium

We solve the model by backward induction. When the CEO chooses what earnings to report, he observes all divisions’ outputs and can infer how many of them have learned the true state. The long-term cost of manipulation is already sunk, so the CEO chooses \( x \in [y, \overline{y}] \) to maximize

\[
\alpha_{M1}(x - \sum y_i)[1 - n\Gamma(n)] - \alpha_{M2}C_{x-y} \tag{12}
\]

The solution depends on the number of informed divisions: \( x^*(n) = \min\{\overline{y}, y + \Delta(n)\} \), where \( \Delta(n) \) is a decreasing function that solves the first order condition \( dC_{\Delta}/d\Delta = \alpha_{M1}[1 - n\Gamma(n)]/\alpha_{M2} \). The strategy of each individual division is the decision to inquire as a function of her individual output \( y_i \). Each division makes her decision given the strategies of other divisions. An individual division’s expected net return to inquiring is as follows:

\[
R(y_i) = -\phi + \alpha_{M1}E_{y_{-i}}[\Gamma(n)\min\{\Delta(n), \overline{y} - y_i - y_{-i}\}]
\]

As the incentives to inquire \( R(y_i) \) decrease in the division’s own output \( y_i \), we obtain the following result.

**Claim 2** In the game above, there exists a unique subgame perfect equilibrium. The equilibrium is as follows: there exists \( y^* \in [y, \overline{y}] \) such that division \( i \) prefers to inquire whenever \( y_i < y^* \) and not to inquire if \( y_i > y^* \). The threshold \( y^* \) decreases in \( \phi \).

Similarly to the main model, the divisions with lower performance threaten the CEO with whistleblowing and receive a compensation for silence.

### 5.4.3 Comparative statics with regard to \( N \)

The incentives to manipulate earnings also depend on the structure of hierarchy. Is CEO more likely or less like to overreport if the hierarchy becomes flatter? In this section we study comparative statics with regards to the number of divisions \( N \). To keep our analysis consistent we need to redefine distribution functions and cost of effort functions in an obvious way as the size of each division decreases. We also need to redefine the split of surplus at the bargaining table. The natural assumption is that the CEO’s share should
depend on the relative size of the informed divisions; strictly speaking the manager’s share of the pie is a function of $n/N$ rather than $n$ alone: each informed division gets $\frac{1}{N}\Gamma(n/N)$, while the manager gets $1 - \frac{n}{N}\Gamma(n/N)$. There are several channels through which the number of immediate subordinates $N$ may affect the above analysis. All the effects suggest that it is easier to manipulate earnings in flatter hierarchies.

1. Costs of finding out the aggregate performance $\phi$. The greater $N$, the smaller is each division. Hence it should be costlier for an individual division manager to learn the aggregate performance in flatter hierarchy; $\phi$ should increase in $N$.

2. Costs of coordination at the bargaining table. As the number of divisions increase, it is harder for them to coordinate holding up the CEO. Compare two situations (a) there are 4 divisions and 2 of them are informed, and (b) there are 2 divisions and only 1 is informed. CEO should obtain higher share of surplus in (a).

3. Coordination failure in costly state verification. Even if the inquiring and bargaining and bargaining costs do not change, the incentives to inquire are weaker in flatter hierarchies. Each division’s output is on average only $1/N$ of the total output. Other divisions are simply producing a greater share of output more and it is more likely that the higher $x$ is true. Indeed, $Ey_{-i}$ is simply higher as it is distributed on $[y_{N-1}^{-\frac{N-1}{N}}, \bar{y}_{N-1}^{-\frac{N-1}{N}}]$. Consider a simple example: there are 4 divisions, and the output of each is either 1 (with probability $e$) or 0 (with probability $1 - e$). Suppose that the actual performance is 2 failures and 2 successes. If $\phi$ is sufficiently high, there the CEO reports $x = 4$ and even failing divisions do not have incentives to inquire: the expected amount of overreporting is below 3. Now suppose that there are two divisions, each controls two units above. If a division manager observes both of his units failing, he knows that earnings have been overreported with probability 1. If $e$ is sufficiently high, then the average amount of overreporting is close to 4; the division manager has stronger incentives to inquire and share the benefit of earnings manipulation. Thus for some range of parameters, flatterening of hierarchy increases the earnings manipulation.

For simplicity, we rule out (1) and (2) and concentrate on (3).

**Claim 3** Assume that the cost of checking the aggregate performance does not depend on the size of the division $\phi = \text{const}$ and the bargaining power depends only on the relative size of informed divisions: $\Gamma(n, N) = \frac{1}{N}\Gamma(n/N)$. Then an increase in $N$ results in more earnings manipulation in equilibrium ($x$ is higher).
5.5 Dynamic extensions

In a dynamic setting, manager’s incentives to manipulate earnings depend on his previous choices. Jensen (2004) suggests that overvalued equity can result in “managerial heroin”. A manager who inflated earnings today may have to overreport even more tomorrow to cover up today’s manipulation. Essentially, managers can embark on the gambling-for-resurrection strategy, increasing overreporting over time and hoping for a miracle (a “Big Enchilada”, in Enron’s internal jargon) to rescue the company. Our model helps to understand the internal life of an “addicted” company. As top management engages in more and more manipulation, they have to compensate subordinates for not blowing the whistle. The amount of compensation grows over time (as potential disclosure becomes costlier for the manager). Since this compensation suppresses incentives to exert effort and therefore destroys value, the manager’s need for manipulation grows even faster. In other words, once the internal hierarchy is explicitly modeled, the addiction to “managerial heroin” is even more irreversible than it would seem.

Another dynamic extension refers to the reputational concerns of division managers. These are very important for our story whenever the manager has full bargaining power with regard to his subordinates. Indeed, if $\gamma = 0$ then the wage $w_0 = 0$ does not get renegotiated upwards. And if there is at least a very small cost of whistle-blowing then the threat to blow the whistle is not credible. However, if the firm’s employees care about their reputation, earnings manipulation is costly for them, hence they must be compensated for not blowing the whistle.

Suppose that division managers are heterogenous with regard to their cost of unethical behavior. The prior distribution of types is public information, but only division manager herself and the CEO know the realization of type. The outside labor market values honesty. Like in Tirole (1996), a person with honest reputation will be able to find a job where trust is an important component. Since such individuals are in limited supply, these jobs pay well.

In case of earnings manipulation, the market learns in the long term that the wrongdoing has occurred; moreover the market knows that some employee has observed the wrongdoing but has not blown the whistle. Hence the market believes that all the firm’s employees are on average dishonest. Honest agents prefer to blow the whistle in order to establish their own reputation rather than be mixed up with other, less honest colleagues. Therefore the CEO will have to pay the division manager a non-trivial amount to compensate honest division managers both for their moral costs and for their future losses due to negative collective reputation.
6 Sarbanes-Oxley and earnings manipulation

The Sarbanes-Oxley Act of 2002 has introduced a number of new regulations concerning the corporate governance of publicly listed companies. The ultimate goals of the Act are to restore investor confidence by increasing corporate transparency. The Act regulates the compensation of top management in order to avoid short-termism; it requires higher monitoring standards; and it increases the responsibilities of managers and auditors for corporate transparency. It also imposes stricter penalties in the case of misconduct of managers and auditors.

As there are many good discussions of the Sarbanes-Oxley Act (e.g. Holmstrom and Kaplan, 2003), we here only discuss a small number of implications that are directly related to our theoretical analysis. They concern whistle-blowing and the effects of better auditing on earnings management and incentives in firms.

6.1 Whistle-blowing

The Sarbanes-Oxley Act entails a number of prescriptions that are supposed to make whistle-blowing easier and less risky for the whistle-blower.16 In particular, Sec. 806 increases protection for employees who provide evidence about violations of regulations of the Securities and Exchange Commission or other regulations relating to fraud against shareholders.

We can readily extend the setting of the model to investigate the potential effects of decreasing costs and better protection for whistle-blowers. In principle, whistle-blowing may both have costs \textit{ex ante} (preparing the evidence) and \textit{ex post}. We believe the \textit{ex ante} costs to be small: the evidence needed to blow the whistle may accumulate more or less as a side product of day-to-day work. whistle-blowers may, however, fear the \textit{ex post} costs of lost reputation if they erroneously blow the whistle, or the costs associated with retaliation by top management.

Sarbanes-Oxley makes the threatpoint of potential whistle-blowers who bargain with top management more attractive. Hence, top management appropriates a smaller share of the surplus. The mere risk of whistle-blowing reduces top management’s incentives to manipulate earnings.

\textsuperscript{16}See Block and Hoff (2003) for a summary.
6.2 Auditing

Auditors play an important role whenever there is a separation of ownership and control. They constitute an important interface between what happens within the firm and outside investors. If auditors do their job well, investors are subject to less risks of earnings manipulation. Global corporate scandals like Enron, Parmalat, Tyco, WorldCom have shed doubt on the degree to which auditors’ reputational concerns are sufficiently strong to create adequate incentives for performing these duties. The Sarbanes-Oxley Act strengthens auditor independence and makes it harder to strike side deals (Section 201); auditors are not allowed to provide—and get paid for—consulting services to their clients. It requires higher quality standards of auditing, and imposes new and more effective sanctions against auditors that fail to supervise their clients, both “intentionally or in repeated instances of negligent conduct, resulting in a violation of the applicable statutory, regulatory, or professional standard” (Sec. 105.)

These changes may indeed increase the effort of auditors and, in turn, improve incentives within the firm. This becomes clear from the following modified framework of our model. Prior to the bargaining stage between CEO and division managers, an auditor receives the report that CEO plans to send to investors. The auditor either rubberstamps it or checks whether division outputs are in line with the report. Presume that the auditor learns the true division output with some probability and that this probability is concave in the auditor’s effort, which is unobservable. Hence the auditor may shirk, and just cash in the auditing fee without doing their job.

At the end of the second period, the true value of the firm is revealed. This allows imperfect inference on whether there has been earnings manipulation in the first period; even an auditor who exerts high effort, may be unlucky and learn nothing. Clearly, when penalties are more severe, auditors have better incentives to monitor. Furthermore, when the effort of auditors increases, the odds to penalize an innocent auditor decrease. Hence, higher quality standards and harsher penalties reinforce each other. This also implies that, ceteris paribus, the costs of auditing increase, a point that has been made before, for instance, by Holmstrom and Kaplan (2003) and by practitioners.17

17According to a study reported in Taub (2004), “compliance costs of going public for smaller firms with annual revenue under $1 billion climbed from $1.24 million before the passage of Sarbanes-Oxley to $2.13 million in 2002 and $2.86 million in 2003.” It is beyond the scope of our paper to evaluate whether or not the improvements in transparency and corporate governance are worth this price. A complete welfare analysis should include among others the implication for the market for human capital. As firms that manipulate earnings offer higher compensation, they are able to attract better talent (‘guys with spikes’, as Enron’s CEO used to put it). As the talent is not used efficiently, this reduces aggregate labor productivity in the economy.
Higher auditor effort can increase the incentives in the firm. If the auditor excerts high effort and learns the true output, he joins the bargaining table between top management and the division manager. But, as we discussed above (see 5.2), it becomes more likely that bargaining collapses when there is an additional party that needs to be pacified. In that case, the auditor will always be interested in reporting earnings manipulation to the outside world in order to avoid being penalized. Beyond the simple fact that an informed auditor adds an additional person to the bargaining problem, auditors will demand a higher bribe than division managers because of the very fact that they can be penalized by law (while this may be harder to do in the case for division managers) and because the side payments to auditors are now costlier.

Thus, we can expect that Sarbanes-Oxley increases auditor effort both through its higher quality standards and harsher penalties that reinforce each other, and by inducing collapse of bargaining between informed insider parties, which in turn leads to better information for outside parties. However, we should expect costs to rise.

7 Concluding remarks

Earnings manipulation does not only redistribute value and raises the cost of capital; it also results in the destruction of value. Whenever a CEO has short-term incentives and inflates earnings, there is a risk of whistle-blowing. Hence, top management may have to share with subordinates to reduce the risk of information leakage to the outside world. This may take other forms than explicit bargaining over a bribe, in particular, a propagation of short-term incentives inside the firm.

The framework of our model allows to show that earnings manipulation is easier to undertake in flat hierarchies. If top management supervises many units, each unit has too little information to threaten blowing the whistle. If there is a steeper hierarchy with fewer middle level managers, they aggregate information across their subordinates and can serve as internal gatekeepers of fraudulent management. In equilibrium, top management may then decide not to manipulate earnings, as the returns of this behavior are too low when the surplus must be shared with other insiders. Hence, while flatter hierarchies may have many benefits that are outside of the scope of our theory, we show that they come at the cost of making it harder for insiders to blow the whistle on corporate fraud.
References


