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Shareholder wealth effects of management regulatory compliance

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ABSTRACT

This paper addresses whether and how the Sarbanes-Oxley Act of 2002(SOX) affects shareholder wealth (firm value) by focusing on the trade-off between improved corporate governance leading to a lower cost of capital and increased managerial compliance costs of regulations. We use an analytical model of solving the management utility maximization function and the change in stock prices in response to SOX regulations. We tested our analytical model by empirically investigating financial restatements in the pre and post-SOX.

We conclude that all public companies can benefit from regulatory reforms, but the net effects vary across firms depending on investors' perception about a firm's governance quality before regulatory reforms and the required managerial compliance costs. Our analytical model also generates new predictions about management compliance behavior, which we test empirically by investigating restatements of financial statements.

The model has policy implications by addressing cost-benefit of initiatives taken to improve US capital markets' global competitiveness and they impacts on managerial compliance behavior. Our results may be relevant to regulators and public companies in Iran as the government has promoted a series of deregulation and privatization initiatives.Our model attempts to reconcile mixed empirical results of related studies pertaining to the effects of SOX on stock prices.

Keywords:

Investor confidence, Capital markets, regulations, Sarbanes-Oxley Act 2002 Shareholder value, managerial compliance policies.

1. Introduction

The wave of financial scandals at the turn of the 21st century, related economic downturn and perceived inadequacy of market correction mechanisms, significantly eroded investor confidence in the United States. The Sarbanes-Oxley Act of 2002 (hereafter, SOX) was enacted in efforts to rebuild investor confidence, and to improve corporate governance and managerial compliance, along with the safety, integrity, and efficiency of the capital markets. After more than ten years since the passage of SOX its efficacy and sustainability have been challenged. The effects of SOX on shareholder wealth, firm value, management compensation and compliance behavior and U.S. capital markets' global competitiveness have received considerable attention from policymakers, regulators, the international business community (Committee on Capital Markets Regulation, 2006), and researchers (Jain and Rezaee, 2006; Li, et al.,, 2008; Zhang, 2007; Chhaochharia and Grinstein, 2007). Prior research addresses shareholder wealth effects of SOX in terms of its imposed compliance costs and induced benefits. The main purpose of this study is to develop a basis for cost-benefit analysis of SOX regulation and to enable a deeper empirical investigation into managerial compliance with regulations in protecting investors.

Two conflicting theories are being used to address regulatory reforms (SOX) efficacy and their impacts on shareholder wealth (Doidge, et al., 2009). First, the "loss competitiveness theory" suggests that regulatory compliance is costly in the sense that U.S capital markets are falling behind their abroad counterparts as public firms go private or de-list from U.S markets. Second, the "bonding theory" advocates that compliance with regulatory reforms improve corporate governance and thus provide a better protection for investors worldwide. Although efficacy of regulatory reforms has been theoretically and empirically addressed and its broad effects are being discussed with conflicting claims, no analytical study has been done to investigate the trade-off between improved corporate governance leading to a lower cost of capital and increased compliance costs of regulatory reforms. We seek to fill this void in the governance literature by developing an analytical model to examine whether and how regulatory reforms affect shareholder value. Our analytical investigation captures two possible contentious effects of regulatory reforms: (1) an overall-effect to demonstrate whether regulatory reforms generated a net benefit (positive externalities) for all public companies as reflected in increase in shareholder wealth and thus firm value and (2) a compliance-effect that examines the impact of compliance level with provisions of regulatory reforms prior to their passage for two groups of firms, namely less-compliant (LC) and more-compliant (MC) firms based on their organizational complexity, size, and earnings as well as managerial compliance.

We conclude that all public companies can benefit from regulations that enhance transparency and governance, but regulatory compliance is costly. The net benefits or costs vary across firms, dependent upon investor's perception about a firm's governance quality before regulatory reforms and the imposed compliance costs. Specifically, the model explains the trade-off effects of regulatory reforms in terms of its induced benefits (lower cost of capital, improved market liquidity, and investor confidence), imposed costs (compliance costs, management's governance cost, and efforts), and penalizing consequences of noncompliance. This paper contributes to academic research on the economic consequences of regulatory regimes and mandatory governance and financial disclosures that affect all public companies and their managerial strategies, decisions and actions. Our model has policy implications by demonstrating that companies of all sizes, complexities, and business structures can benefit from compliance with efficient regulatory reforms intended to improve their managerial actions, corporate governance effectiveness and financial reporting and audit quality.

The remainder of this paper describes institutional background and theoretical justification for our analytical model. We then analyze the model to determine the net effect of regulatory reforms on shareholder value, as well as their effects on more compliant (MC) and less compliant (LC) firms. We finally present some empirical evidence in support of our model and discuss the implications of our results for policymakers, regulators, standard setters, the international business and academic communities, limitations, and possible future avenues of inquiry.

2. Literature Review

2.1. Institutional Background

Investor confidence in capital markets worldwide is the key driver of economic growth, prosperity, and financial stability. This confidence is earned over time and "the ability of the US capital markets to attract capital over time depends on investors having confidence in the integrity and transparency of the markets" (Turner, 2006). The rash of financial scandals at the turn of the 21st century in the United States, among other things, resulted in the erosion of investor confidence. As a result, Congress responded by passing SOX in 2002. Since its inception, SOX has been praised and criticized—praised as a sweeping measure in restoring investor confidence in corporate America and its financial reporting, but criticized as imposing unintended high compliance costs and being detrimental to the global competitiveness of the US capital markets. Subsequently the debate over financial regulations has assumed heightened importance in light of the 2007-2009 global financial crises.

Empirical results of SOX-related academic studies are mixed and inconsistent. Jain and Rezaee (2006) and Li et al (2008) document, on average, a positive effect of SOX on firm value, whereas Zhang (2007) and Li (2006) find a total negative impact of SOX on firm value. Furthermore, Jain and Rezaee (2006) report that more compliant firms earn more net benefits (benefits minus costs) from SOX than less compliant firms, while Chhaochharia and Grinstein (2007) document the opposite (i.e., less compliant firms earn more positive abnormal returns compared to more compliant firms). Opponents claim that SOX is a costly legislation that imposes unnecessary regulatory compliance burdens on public companies, which has in turn caused US public companies to go private and discouraged non-US companies from raising capital and listing in US capital markets. Proponents of SOX argue that despite the fact, it is hard to quantify many benefits of SOX, it has substantially improved investor confidence in corporate America, its capital markets and financial reports, and significantly decreases corporate malfeasance. Doidge, Karolyi and Stulz (2009) find evidence in support of an adversarial effect of SOX on the U.S capital markets competitiveness. Other studies examine effects of SOX on quality of financial reports and corporate governance. Burks (2010) documents that boards have taken more disciplinary actions against top management and imposed bonus penalties on executives after SOX despite the decline in financial restatement severity. Ugrin and Odom (2010) find that SOX's imposed criminal and civil penalties (jail time) have minimal effects on deterring financial statement fraud beyond other mechanisms that were in place in the pre-SOX period. Kim and Park (2009) report that abnormal stock returns of firms that disclosed internal deficiencies were negatively associated with changes in market uncertainty in the post-SOX period. Victoravich (2010) finds that executive certification requirements financial statements and internal control over financial reporting of SOX have indirect impact on guilt assessments through jurors' perceptions of the executive responsibilities for fraudulent financial statements.

Our analytical model provides an alternative explanation and contributes to the literature (e.g., Chhaochharia & Grinstein, 2007; Jain & Rezaee, 2006; Bushee & Leuz, 2005) that suggests mandatory disclosures provide externalities in terms of positive effects on stock prices for firms that were already in compliance or closer to compliance with such disclosures. The results contribute to our understanding of possible effects of regulations on the global competitiveness of US capital markets and cost-effectiveness and efficiency of regulations and their impacts on corporate culture of integrity and competency. We explicitly model the changes in stock prices pre- and post-regulatory reforms (SOX) for firms that were more compliant with provisions of SOX prior to its passage and those that were less compliant. We show that both the actual pre-SOX compliance structure of the firm and investors' perception about the degree of pre-SOX compliance affects the stock price reaction and shareholder wealth effects of SOX. Thus, our study also contributes to the growing literature regarding the link between corporate governance and firm value (e.g., Gompers et al., 2003; Agrawal and Chadra, 2005), which suggests that effective corporate governance is associated with better performance and higher firm value. Our results contribute to better understanding of the possible effects of regulations on managerial compliance strategies, policies and actions.

2.2. Conceptual Debate

The passage of regulatory reforms (SOX) provides a compelling setting for assessing the shareholder wealth effects of mandatory disclosures and corporate governance regulations for at least three reasons. First, SOX equally apply to and is intended to benefit investors and consumers of all public companies and financial institutions.[1] Some of the provisions of SOX that were not previously practiced by public companies and that are intended to benefit all companies are: (1) creating the Public Company Accounting Oversight Board (PCAOB) to oversee the audit of public companies and to improve the perceived ineffective self-regulatory environment of the auditing profession; (2) improving corporate governance through more independent and vigilant boards of directors and responsible executives; (3) enhancing the quality, reliability, transparency, and timeliness of financial disclosures through executive certifications of both financial statements and internal controls; (4) prohibiting nine types of non-audit services; (5) regulating the conduct of auditors, legal counsel, and analysts and their potential conflicts of interest; and (6) increasing civil and criminal penalties for violations of security laws. These provisions require the SEC to adopt long-term implementation rules regarding managerial compensation practices and disclosures and brokers' discretionary voting and advance voting instructions. If regulatory reforms improve corporate governance, financial reporting, and audit functions, executive compensation and increases criminal penalties for willful misrepresentation of financial information (which was previously unachievable through market mechanisms), then it should improve investor confidence, decrease the cost of capital, increase firm value, and enhance benefits to all public companies, the investing public, and the capital markets (Jain and Rezaee, 2006).[2]

Second, the mandatory level of compliance with provisions of SOX regarding corporate governance and accounting and auditing practices is much higher than that of the pre-SOX era. The achievement of this mandatory level of governance is ensured by SEC-related implementation rules. Investor protection laws, including SOX, have provided corporations in the United States with the lowest cost of equity capital in the world (Neimeier, 2006). Christopher Cox, the chairman of the SEC, states that, "we have come a long way since 2002. Investor confidence has recovered. There is greater corporate accountability. Financial reporting is more reliable and transparent. Auditor oversight is significantly improved" (Cox, 2006).

Finally, SOX impose significant new compliance costs on public companies. We conjecture that the compliance costs vary depending on the firm's level of compliance with SOX provisions prior to its passage. The pre-SOX financial environment is characterized as an era of ample incentives and opportunities for engaging in conflicts of interest that caused financial manipulation. Zhang (2007) estimates that the cost of compliance with Section 404 of SOX ranges from 0.12 percent to 0.62 percent of the company's reported revenues, and the average is a lower percentage for larger companies. Nonetheless, the compliance cost of SOX should be weighed against its possible benefits of positive impacts on investor confidence, improved reliability of financial reports, and improved effectiveness of internal controls in preventing, detecting, and correcting financial statement fraud. Smaller public companies are disproportionately burdened by SOX's compliance costs: public companies with market capitalization of below $75 million paid $1.14 in audit fees for every $100 of their revenue whereas larger companies paid 13 cents (GAO, 2006). Compliance costs of SOX dropped twenty-three percent in 2006 for the second consecutive year from $4.51 million per company in 2004 to an average of $2.9 million in 2006 (FEI, 2007). The post-SOX era

[1] Multinational and private companies and even not-for-profit organizations have also benefited from some best practices of SOX in areas such as the majority of independent directors, mandatory audit committee, internal control reporting, whistleblowing programs, code of business conduct, and ethics. Some of the best practices of SOX including mandatory audit committees, internal control reporting, management certifications of and audit opinion on financial statements and internal controls have global reach and are implemented in other countries and regions including Canada, South America, Europe, Asia, China and Iran.

[2] The 2006 survey of Financial Executives International (FEI) reports the following benefits of compliance with SOX, particular Section 404: more investor confidence in public financial information and more accurate and reliable financial reports (FEI, 2007).

can be characterized by less opportunity for earnings manipulation, more effective internal controls, costly higher audit quality, stiffer and more enforceable penalties for aggressive accounting practices, and more timely disclosure of executive compensation.

The debate over the possible impacts of new corporate governance reforms and their compliance costs on US capital market global competitiveness centers around two key issues. The first issue is that SOX and its implementation costs have: (1) increased compliance costs of regulation and the potential for liability; (2) contributed significantly to the loss of US capital markets global competitiveness as the majority of initial public offerings (IPOs) have recently been listed on capital markets abroad; (3) encouraged US companies to go private in order to reduce their regulatory compliance costs; and (4) reduced the corporate risk-taking that produces economic growth. This view is supported by those who believe some provisions of SOX should be revised and their implementation rules should be relaxed, particularly for smaller companies (The Committee on Capital Markets Regulation, 2006). The other view is that SOX and its implementation rules have significantly improved the accountability of corporate America, the quality and reliability of its financial reporting, and the integrity and efficiency of its capital markets, and some of its best practices have reached global adoption. This view is supported by those who believe that SOX rebuilt investor confidence in US capital markets, and investors are willing to pay a premium for more protection provided by tougher regulations (Norris, 2006). Indeed, Doidge, Karolyi & Stulz (2009) find no evidence of deficit in cross-listing counts on US exchanges that can be attributed to SOX, and foreign investors still pay a premium for companies listed in US capital markets which are governed by tougher investor protection. In summary, these two views are described by Doidge at el. (2009) as the "loss of competitiveness theory" and the "bonding theory" in addressing the costs and benefits of SOX.

It is expected that companies that were actually closer to compliance with SOX provisions with good compliance infrastructures experience higher net benefits than companies that were further away from compliance due to the substantial costs in bringing their governance practices and financial reporting process to the level required by SOX. If SOX has aided in improving investor confidence in cost-effective compliance, then we expect SOX to have positive effects on shareholder wealth. The extent of positive effects depends on the induced net benefit, which is the difference between the realized benefit of providing investor protection and the imposed compliance costs. If the net benefit is positive and meaningful, we expect to observe positive and significant impacts of SOX on shareholder value. Anecdotal evidence and empirical research provide inconclusive results regarding the cost-benefit analysis of SOX with conflicting claims. In this paper we examine how actual levels of both imposed costs and induced benefits of SOX interplay with investor perceptions of costs and benefits of SOX compliance.

The foregoing discussion on improved corporate governance, perceived degree of compliance, and actual compliance infrastructure and costs leads to the following propositions:

Proposition 1: There can be positive externalities of SOX for all public companies in the form

of lower equity risk premiums and higher price multiples caused by improved investor perception about corporate governance and financial reporting. However, firms that already enjoyed positive investor perception pre-SOX benefit less than firms that had negative investor perception because the latter firms have a much greater scope of improvement in their governance and financial reporting that may result in higher compliance costs.

Proposition 2: More compliant companies with better actual compliance infrastructures in place prior to SOX incur less incremental cost than less compliant companies that had poor pre-SOX compliance infrastructures.

3. Methodology

The shareholder wealth effects of SOX have been extensively and inconclusively debated in the literature and by Congress, regulators, and both the business and academic communities.[3] We consider a corporate setting in which executives have some

[3] For example, William A. Donaldson (2005), then the chairman of the SEC, states, "The Sarbanes-Oxley reforms should yield extraordinary long-term benefits in the form of improved financial reporting, better management control, and more ethical behavior by companies and gatekeepers."

discretion in strengthening their corporate governance and the extent of compliance with regulatory reforms including SOX. We define $\psi \in [0,1]$ a firm's decision pertaining to the degree of compliance and good governance in the form of trade-offs between costs and benefits of regulatory compliance. Management can incur significant costs, *V*, on elevating corporate governance and compliance with regulations and mandatory disclosures. Although these efforts are costly, they reduce financial and reporting risks perceived by the investors and enhance stock valuations. Doing so increases the stock-based portion of their compensation, which we define as fraction, *f*, of stock price, *S*, which in turn is a function of reported earnings, *e*, shareholder-borne compliance costs, $a \in [0,0.21]$, modeled as a fraction of earnings, and the discount factor, *R*. An important feature of our model is that both *V* and *R* are also functions of ψ because greater compliance comes at a greater cost, but reduces the risk perception of investors who then accept a lower discount rate. Furthermore, *R* is also a function of the regulatory environment.[4]

Management can be lax in governance and compliance efforts, and thus, avoid the managerial costs, *V*, incurred directly by them. However, this strategy carries the risk of getting caught and facing monetary fines, jail terms, and other civil and criminal liabilities, *L*, which is a function of the regulatory environment such as pre-SOX or post-SOX. The lower the degree of good governance and compliance, the higher the probability, *p*, of getting caught breaking a law is. Thus, *p* is also a function of ψ. Finally, the regulatory environment also affects governance and compliance costs, *a*, mentioned above. Compliance costs reduce stockholders' wealth because the net earnings are equal to gross earnings minus compliance and governance infrastructure costs. Note that *V*, managerial costs, and *a*, compliance costs, are not the same. *V* measures the managerial costs (e.g., opportunity costs of diverting management time and efforts from operating efficiency to SOX compliance) that can be incurred by executives and as such affect shareholder value indirectly and only to the extent that the diverted executives' time and managerial resources negatively impacts reasonable risk taking and growth opportunities. The possible adversarial effects of SOX on the firm's risk-taking that produces economic growth are discussed by Bargero,L., Lehn, K.M., and Zutter C.J., (2010). In contrast, *a* is a shareholder-borne direct compliance cost driven by: (1) internal and external people hours paid to internal employees and mostly external consultants and independent auditors to comply with SOX, particularly Section 404, which is about $4 million according to the FEI survey (FEI, 2007) and (2) diversion of company resources from profitable projects to compliance, including audit functions. This compliance cost directly and immediately reduces reported earnings of public companies and affects stock prices.

Keeping the trade-off between costs and benefits of compliance and good governance in mind, management may choose the degree of compliance and good governance, ψ, while solving the following utility function (*U*):

$$\max_{\psi} U = f * S\{e,\ R(\psi,\mathrm{SOX}),\ a(\mathrm{SOX})\} - V(\psi^2) - p(\psi) * L(\mathrm{SOX})$$

where the first term before the minus sign represents the stock-based compensation of corporate executives, the second term between the two minus signs represents compliance and governance costs and efforts incurred by the executives, and the third term represents the likelihood and consequences (liability, loss of reputation, etc.) of getting caught for wrongdoing.

The various functions in the general equation above can be made more specific to understand the trade-off. For example, we define the discount rate, net earnings factor (*n*), stock price, compliance cost, and liability probability functions as follows:

$$R = r_{\mathrm{SOX}}\psi^{-1}; \quad n = 1 - a_{\mathrm{SOX}};$$
$$S = \frac{ne}{r_{\mathrm{SOX}}\psi^{-1}}; \quad V = v\psi^2;$$
$$\text{and} \quad p = 1 - \psi$$

Where $v > 0$ is a positive constant, and $r_{\mathrm{SOX}} > 0$ is constant within a regulatory regime but switches from one regime to another, the risk-adjusted discount rate

[4] Note that La-Porta, Lopez-de-Silanes, Shleifer and Vishny (1997) show that risk premium is high where regulatory environment is lax.

$r_{SOX}\psi^{-1}$ is decreasing in compliance, assuming that analysts' perception about reliability of reported earnings improves as more money and effort is spent on compliance. Thus, increased compliance results in improved price-earnings multiples. However, SOX compliance comes at a cost, explicitly defined above as $v\psi^2$, consisting of both indirect compliance costs and divergence of managerial resources. The dual impact of compliance can justify its squared term. Furthermore, we define the probability of being caught and punished $p(\psi) \equiv 1 - \psi$. This is easily justifiable because with full compliance, there is no punishment, and with gross negligence, punishment is almost certain (Norris, 2007).[5]

With these specific functional forms, the objective function of a utility-maximizing corporate executive becomes:

$$\max_{\psi} U = f * \frac{e(1-a_{SOX})}{r_{SOX}\psi^{-1}} - v\psi^2 - (1-\psi)L_{SOX}.$$

The first-order condition for obtaining the optimal compliance level, ψ_{opt}, is:

$$\partial U/\partial\psi = 0$$
$$\Rightarrow \frac{\partial}{\partial\psi}\left\{ f * \frac{e(1-a_{SOX})}{r_{SOX}\psi^{-1}} - v\psi^2 - (1-\psi)L_{SOX} \right\} = 0$$
$$\Rightarrow \psi_{opt} = \frac{f * e(1-a_{SOX})}{2vr_{SOX}} + \frac{L_{SOX}}{2v}.$$

The second-order condition, $\partial^2 U/\partial\psi = -2v < 0$, is satisfied because v is defined as a positive constant in our model specification.

The effect of regulatory environment and managerial ownership structure on corporate governance and compliance can be analyzed easily by examining the first-order partial derivatives of the optimal compliance function. In regards to managerial ownership of stock, we have $\partial\psi_{opt}/\partial f = e(1 - a_{SOX})/2vr_{SOX} > 0$ because e, v, and r are positive constants by definition, and $(1 - a_{SOX})$ is positive because $a \in [0,0.21]$ by definition. With respect to earnings, we have $\partial\psi_{opt}/\partial e = f(1 - a_{SOX})/2vr_{SOX} > 0$ by the same token, since f is also a positive constant by definition. Similarly, in terms of managerial liability upon being caught for wrongdoing, $\partial\psi_{opt}/\partial L = 1/2v > 0$. Both the indirect compliance costs borne by management and the direct compliance costs borne by shareholders have negative first-order partial derivatives. For managerial costs, we have $\partial\psi_{opt}/\partial v = -2fe(1 - a_{SOX})r_{SOX}/4v^2r^2_{SOX} - 2L_{SOX}/4v^2 < 0$ because each of the two terms has a negative sign, both terms have squared terms in the denominator that are always positive, and numerator terms, excluding the minus sign, were shown to be positive in the discussion above. For shareholder-borne costs, $\partial\psi_{opt}/\partial a = -fe/2vr_{SOX} < 0$, because all individual terms are positive by definition and the minus sign in front of the expression makes it negative. Finally, the effect of equity risk premium on compliance can be seen from $\partial\psi_{opt}/\partial r = -2fe(1\text{-}a_{SOX})v/4v^2r^2_{SOX} < 0$ because the denominator has squared terms which are always positive and numerator terms, excluding the minus sign, were shown to be positive in the discussion above. Thus, ψ_{opt} is increasing in f, e, and L_{SOX}. In contrast, ψ_{opt} is decreasing in v, a_{SOX}, and r_{SOX}.

Hence, the model predicts that more profitable firms will release greater earnings and practice good governance. Furthermore, executives can be motivated to spend time, effort, and money on compliance if their fraction of stock-based compensation is increased. Then, they share the benefits of the compliance efforts that come in the form of higher valuation multiples. The most important implication is that compliance will be greater if the regulatory regime is stricter. If the punishment L_{SOX} is high, then compliance will be high. SOX increases the personal liabilities and penalties for accounting misdeeds through executive certifications of both financial statements and internal controls, and thus it should result in more truthful reporting and disclosure of financial situations by corporate executives. In the context of our model, $L_{post\text{-}SOX} > L_{pre\text{-}SOX}$. Similarly, SOX had a positive impact in restoring investor confidence in financial markets and corporate America. Thus, for any fixed level of compliance, we have $r_{post\text{-}SOX} > r_{pre\text{-}SOX}$, $\forall\ \psi$. SOX was enacted in response to financial scandals

[5] For example, Tyco will pay about $3 billion to settle shareholder suits resulting from the financial fraud caused by the use of aggressive accounting by its executives. In addition, Tyco's chief executive officer (CEO), L. Dennis Kozlowski, and the chief financial officer (CFO), Mark Swartz, are in prison and its independent auditor, Richard P. Scalzo of PwC, has been banned by the SEC from auditing public companies (Norris, 2007).

and investor protection needed to complement the perceived failure of market-based correction mechanisms. SOX generates sustainable benefits if it creates a finely tuned balance between the induced benefits of reducing the likelihood of reoccurrence of financial scandals and the imposed enforcement and compliance costs.[6] The intuition behind the inverse relation between ψ_{opt} and v is fairly straightforward: the less money and effort it costs, the easier it is to comply with more stringent regulatory reforms and practice good governance.

4. Result

We can analyze the stock market reactions to regulatory reforms and changes in governance and compliance levels by substituting the optimal compliance level back into the stock price function as follows:

$$S = \frac{ne}{r_{SOX}\psi_{opt}^{-1}} = \frac{e}{2vr_{SOX}}(1-a_{SOX})\left\{ f\frac{e}{r_{SOX}}(1-a_{SOX}) + L_{SOX} \right\}.$$

The change in stock prices, ΔS, in response to any regulatory changes is given by

$$\Delta S = \frac{ne}{\Delta r_{SOX}\Delta\psi_{opt}^{-1}} = \frac{e(1-\Delta a_{SOX})}{2v\Delta r_{SOX}}\left\{ f\frac{e(1-\Delta a_{SOX})}{\Delta r_{SOX}} + \Delta L_{SOX} \right\}$$

The expression in curly brackets suggests the cost-benefit effects of regulatory reforms. The positive sign in front of ΔL indicates that increased liability and accountability of corporate executives help the stock price increase regardless of managerial efforts. By imposing higher standards on executives, SOX helped increase investor confidence and reduce their risk perceptions. This investor protection effect is value increasing. Second, the negative sign in front of Δa is the straightforward reduction in shareholder wealth due to increased costs. For example, Section 404 compliance costs are perhaps the most contentious wealth-reducing effects of SOX. The net market reaction depends on which of these two effects dominates.

Net effects of regulation	*Corporate governance (L) improves significantly*	*Corporate governance (L) improves marginally*
Compliance cost (a) increases heavily	Ambiguous reaction	Stock prices decrease
Compliance cost (a) increases marginally	Stock prices increase most	Stock price may not change significantly

The equation for ΔS gives us the following break-even point at which the stock market reaction is zero:

$$\Delta L\Delta r = fe(1 - \Delta a_{SOX}).$$

If corporate governance improvements $\Delta L\Delta r > fe(1 - \Delta a_{SOX})$, then stock market reaction is positive. Conversely if $\Delta L\Delta r < fe(1 - \Delta a_{SOX})$, then stock market reaction is negative. The greater the difference $\Delta L\Delta r - fe(1 - \Delta a_{SOX})$, the higher the stock price reaction will be.

At this point, one could examine the difference in returns for a *high compliance* firm relative to a *low compliance* firm. The literature contains conflicting results about the type of firm that should observe a more positive price reaction than the other. For example, Jain & Rezaee (2006) suggest that all firms benefit but more-compliant (MC) firms benefit more, whereas Chhaochharia & Grinstein (2007) find the opposite, i.e., less-compliant (LC) firms earn a positive abnormal return compared to firms that are more compliant. We conjecture that there are two dimensions to this puzzle. One dimension is that a firm can be MC in terms of perceived corporate governance measures. If the MC status is in terms of better corporate governance, then the benefits on that count are only marginal, but compliance cost increases may be significant, i.e., $\Delta r\Delta L_{SOX}^{MC} < \Delta r\Delta L_{SOX}^{LC}$ but $\Delta a_{SOX}^{MC} \approx \Delta a_{SOX}^{LC}$. In this sense MC firms observe a lower valuation benefit from SOX because:

$$\Delta r\Delta L_{SOX}^{MC} - fe(1-\Delta a_{SOX}^{MC}) < \Delta r\Delta L_{SOX}^{LC} - fe(1-\Delta a_{SOX}^{LC})$$

Alternatively, one can define MC status in terms of sound Section 404 compliance practices on internal controls when a firm is already spending more than

[6] Anecdotal evidence (CRA, 2005; Turner, 2006; FEI, 2007) suggests that SOX has induced substantial benefits to investors despite the significant compliance cost of more than 0.10% of the total revenue of public companies.

others on its compliance procedures. In that case, the incremental compliance costs may be marginal for MC firms but substantial for LC firms, whereas the gains may be similar for both firm types as long as there is some pure externality effect among the investors who raise their perception of corporate governance for all firms. With this alternative but plausible definition of MC firms where $\Delta r \Delta L_{\text{SOX}}^{\text{MC}} \approx \Delta r \Delta L_{\text{SOX}}^{\text{LC}}$, but $\Delta a_{\text{SOX}}^{\text{MC}} < \Delta a_{\text{SOX}}^{\text{LC}}$, the relative stock market reaction is now reversed with MC firms experiencing a more positive stock market reaction because:

$$\Delta r \Delta L_{\text{SOX}}^{\text{MC}} - fe(1-\Delta a_{\text{SOX}}^{\text{MC}}) > \Delta r \Delta L_{\text{SOX}}^{\text{LC}} - fe(1-\Delta a_{\text{SOX}}^{\text{LC}})$$

Figure 1 provides a graphical representation of the optimal compliance and executive's utility before and after the passage of SOX. We calibrate the following hypothetical values for the parameters.[7] Fraction of stock-based compensation ≡ f = 0.1; gross earnings per share ≡ e = 10; compliance costs as a fraction of earnings pre-SOX ≡ $a_{\text{pre-SOX}}$ = 0.05 and post-SOX ≡ $a_{\text{post-SOX}}$ = 0.1; cost of equity used for discounting earnings pre-SOX = $r_{\text{pre-SOX}}$ = 10% and post-SOX ≡ $r_{\text{post-SOX}}$ = 8%; executive's managerial cost and effort required for compliance ≡ v =10; probability of getting caught for noncompliance ≡ p = 1 – ψ; and liability and punishment for illegal behavior (violations of securities laws) pre-SOX ≡ $L_{\text{pre-SOX}}$ = 2 and post-SOX ≡ $L_{\text{post-SOX}}$ = 3.

[INSERT FIGURE 1 HERE]

With total noncompliance and poorest governance of ψ = 0 that can result from gross negligence or intentional recurrent fraud, executive's utility is U = −2 before SOX. An effect of SOX is that it increased the penalty for noncompliance and therefore poor governance and noncompliance of ψ = 0 result in lower utility U = −3. On the other extreme is full compliance and best governance practice of ψ = 1, where top executives are spending more time with regulators, accountants, attorney generals, fund managers, union bosses, proxy-advisory services, trial lawyers, and nonprofit activists instead of focusing on financial profits. Such comprehensive compliance behavior would result in a negative utility of –0.5 in the pre-SOX world, but is encouraged in the post-SOX world where the executive utility is +1.25 with full compliance.

Stock price is highest with full compliance with regulatory reforms. If investors are not satisfied with the company's compliance, they can sell their shares, and when many investors follow suit, the stock price drops and forces management to change course.[8] However, neither zero compliance nor full compliance is optimal either before or after SOX from the corporate executive's perspective. The degree of optimal compliance is higher in the post-SOX era because of the stiffer penalties for noncompliance, which eventually affects management reputation and tenure in the labor market. With our parameter values, pre-SOX optimal compliance is ψ_{opt} = 0.575, which gives a utility of U = 1.31 and stock price of $54.63. In the post-SOX era, the optimal compliance level increases to ψ_{opt} = 0.7125, which gives U = 2.08 and a stock price of $80.15.

We present the trade-off between the two opposing effects of SOX in Figure 2. On one hand, we expect reduced equity risk premium for many firms due to improved corporate governance. On the other hand, many firms will see a stronger effect from increased compliance costs post-SOX. If the governance change is negligible but the compliance cost increase is strong, then we see a very negative stock market reaction. Such firms are highly compliant in terms of perceived governance, but less compliant in terms of actual internal controls, audit activities, and financial reporting practices. On the other extreme are firms with a negligible change in compliance costs and significant reductions in perceived risks. This profile generates the maximum positive stock market reaction. Here, although the

[7] One may argue that these hypothetical values cannot be used to claim generality of our analytical model. However, these numerical values are selected based on the extensive review of the related literature and consultation with several experts in corporate governance. For example, Rezaee (2007) reports cost of compliance with SOX in the range of five to ten percent of reported earnings of many companies while their executive compensation is about ten percent of reported earnings.

[8] Note that even though a significant portion of pension fund assets is usually passively managed through indexed funds and cannot sell poorly governed companies, recently mutual and pension funds have been influencing the governance of public companies through direct involvement or their investment advisory firms.

firm was highly compliant in terms of its actual governance, financial reporting, and audit activities before SOX, the market perception of governance risk and financial reporting is improved after SOX.

[INSERT FIGURE 2 HERE]

EMPIRICAL ANALYSIS

The predictions from our model show that firm specific characteristics, compliance levels, and costs can determine the eventual stock market valuation effects of SOX. We also supplement our analytical analysis with some new empirical evidence on management's behavioral response to SOX regulations. SOX was passed in response to the rash of financial scandals which undermined the integrity of public financial information and the capital markets. SOX was enacted with the intent to improve reliability of public information, reduce financial scandals, corporate malfeasance, and accounting fraud and hold management more accountable for the quality of financial information. We focus on the trend and determinants of financial restatements in the pre- and post-SOX as indirect evidence of SOX efficacy. On the one hand, restatements can be viewed as an act of truthfulness and owning up responsibility for past errors. Restated earnings and balance sheets are supposed to reflect the financial health and condition of the company more accurately. When a company discovers that previously issued financial statements are false or misleading, or they become inaccurate, it is obligated to restate those financial statements. On the other hand, the Government Accountability Office (GAO) report finds that restatements not only negatively impact stock prices, but also negatively affect investor confidence (GAO, 2002) in the company's management and processes.

The need for a restatement can be identified by the company's management or external agencies such as its independent auditor or regulatory authorities, and monitoring by investors (Palmrose et al., 2004). SOX is intended to improve reliability of published financial statements by requiring : (1) executive certifications of both financial statements and internal controls; (2) the audit committee oversight of both financial reporting and internal controls; (3) independent auditor opinions on both financial statements and internal control over financial reporting; (4) more severe civil and criminal liabilities for producing misleading and false audited financial statements; (5) improving standard-setting process of both the FASB in establishing accounting standards and the PCAOB in setting auditing standards; and (6) strengthening the review and enforcement activities of the SEC relevant to financial reporting. We posit that effective implementation of these provisions of SOX, while increasing compliance cost, improves reliability of financial reports. The improved reliability of financial reports is reflected in the likelihood that the firm itself, its independent auditor, regulators (SEC), and investors identify the previously misstated financial statements and make the firm to restate its financial statements and include earnings numbers.

We examine restatements from 1999 to 2006 in the pre-SOX period (from 1999-2001) and the post-SOX period (from 2002-2006)[9]. We obtain the list of firms that restated their financial statements from the GAO 2002 report and the Audit Analytic database. Figure 3 shows the actual number of restatements with brown squares in each year. There is an increasing trend in the number of companies that restated their financial statements from 1999-2006 with a spike after SOX. Indeed, 2,931 US companies filed at least one restatement in the post-SOX period. The increase in restatements comes despite a decrease in overall earnings management trends as measured inversely by median absolute total accruals (e.g., Dechow and Dichev, 2002). Following Hribar and Collins (2002) and Jo and Kim (2006), we calculate accruals directly from the cash flows statement as follows:

$$TACC_{it} = [EBXI_{it} - CFO_{it}]/(TA_{it-1}) \quad (2)$$

Where:

$TACC_{it}$ = normalized accrual adjustment provided on the cash flows statement for firm *i* for year *t*;

$EBXI_{it}$ = earnings before extraordinary items and discontinued operations (Compustat #123);

CFO_{it} = operating cash flows (from continuing operations) taken directly from the statement of cash flows (Compustat #308 – Compustat #124); and

TA = total assets (Compustat #6).

[9] We did not analyze financial restatements beyond 2006 in order to avoid confounding and conflicting events associated with the 2007 global financial crisis.

The median absolute level of normalized accrual is plotted for each year in Figure 3 and the values are shown along right hand side of the vertical axis. Median absolute TACC jumped from 4.85% in 1999 to 6.05% in 2001. SOX set a declining trend in absolute TACC and by 2006 their level has dropped to 3.86%. The need for restatements arises mainly from the miss-estimation of accruals and rarely from incorrect representation of cash positions. Thus, we expect the number of restatements to be positively associated with the level of TACC in the economy.

One way of addressing the impact of earnings management on number of restatements (#R) is to adjust the actual number of restatements in year *t* by incorporating the TACC rate as follows:

Adjusted $\#R_t$ = Actual $\#R_t$ / Median $TACC_t$ * Median *TACC* in Base Year (3)

As shown by the pink bars in Figure 3, the adjusted number of restatements is fairly stable between 175 and 185 in the years before SOX. After the passage of SOX, adjusted restatements jumped above the 300 level and stayed in that proximity or higher for all subsequent years. The adjustment for 2002 is annualized to account for the fact that SOX was passed in the middle of the year.

[INSERT FIGURE 3 HERE]

There are several plausible explanations for the increasing trend in adjusted number of restatements. Consistent with our theoretical prediction, the implementation of corporate governance reforms including SOX created an environment of extensive scrutiny resulting in greater compliance which brought restatements to light. Since SOX is a continuous process, its full impacts in preventing financial problems can take several years. Many of the SEC implementation rules for SOX were designed to be effective after 90 or 180 days after the passage of the Act and the prosecutions, enforcements, and court decisions would clarify the toughness of the new regulatory environment with the passage of time. For many large public companies, 2004 was the first year of compliance with Section 404 of SOX on internal controls and as their internal controls will improve, the number of restatements would decrease. Indeed, the Glass Lewis report shows that the number of restatements for public companies that started complying with Section 404 has been on a steady decreasing trend from 2005 to 2006 (Glass Lewis, 2008) and again a 31 percent drop in the number of restatements in 2007 (Audit Analytics, 2008 report). In 2007, there was also decline in the severity of restatements measured in terms of their negative impact on net income (Audit Analytics). For example, the average negative impact of a typical restatement on income was 21.33 million in 2006 compared with 3.64 million in 2007 (Audit Analytics, 2008). Prior studies (Agrawal and Chadha, 2005, Srinivasan, 2005) report that effective internal corporate governance mechanisms (vigilant board) prevent or at least discourage financial restatements. The restatements may cause short-term negative market reactions, but in the long term, their effects on shareholder wealth may be positive, as investors may consider changes made in improving the reliability of financial reports through restatements, providing them with a better picture of the company's future finances and expected cash flows (Rezaee, 2007).

Studies conducted in the post-SOX period show that the overall negative impacts of restatements on stock prices have significantly lessened. Hranaiova and Byers (2007), in a PCAOB sponsored study, find overall negative capital market reactions to restatement announcements in both the pre- and post-SOX period, while the extent of reactions (either positive or negative) has reduced in the post-SOX period also with lower average volatility. They interpreted their findings, as if investors, in the post-SOX era consider restatements conveying timelier and higher quality information. The Department of Treasury commissioned a study of 6,633 public company restatements from 1997 to 2006 that indicate: (1) there is an increasing trend in restatements during the past decade; (2) restatement frequencies have accelerated since 2001; (3) the average market reactions to restatements are negative while the magnitude of reaction has declined in the post -SOX period; and (4) restatements related to fraud and revenue recognition have more negative market reactions.. While fraud-prone restatements may have short-term negative impacts on stock prices, overall restatements are expected to have positive long-term effects for two reasons. First, restatements correct erroneous past earnings, and that improves reliability and predictability of future earnings and cash flow. Second, restatements can be

perceived by investors as a positive signal that SOX compliance (and Sections 302, 404, 906, 301) is having positive effects in discovering previously undiscovered financial problems.

5. Conclusions

Public companies worldwide are operating to primarily enhance shareholder value by adopting the most effective and efficient regulatory reforms and corporate governance mechanisms to maximize their value. Financial scandals prove that market-correction mechanisms alone cannot prevent aggressive corporate reporting practices and regulations such as SOX are needed to protect investors from receiving misleading financial information. SOX is considered a process whose impact on improving the effectiveness of corporate governance will continue in the future. In its infancy, SOX was viewed as a compliance document that often caused complications and substantial compliance costs for many companies regardless of the effectiveness of their corporate governance and internal controls and despite its perceived benefits of improving investor confidence in corporate America and its capital markets. Regulations should be proactive, cost effective, efficient, and scalable to generate sustainable shareholder wealth effects. Our study concludes that public companies—regardless of size, earnings, types, organizational structure or geographical locations—can benefit from SOX.

There are positive externalities of SOX for all public companies in the form of lower equity risk premiums and higher price multiples based on improved investor perception about corporate governance and financial reporting. However, firms that enjoyed positive investor perception about governance before SOX benefit less than firms with negative investor perception because the latter firms have a greater scope of improvement. In contrast, MC companies with better compliance infrastructures pre-SOX incur less incremental costs, and thus, earn more net benefits from SOX than LC companies with poor actual compliance infrastructures. Our theory and model provide an alternative explanation for the empirical studies (e.g., Buskee & Leuz, 2005; Jain & Rezaee, 2006; Chhaochharia and Grinstein, 2007; Doidge et al., 2009) that suggest that mandatory disclosures produce positive externalities (positive stock returns, improvements in liquidity) for firms that were already in compliance or closer to compliance with such regulations.

We provide new empirical evidence on management's behavioral response to SOX regulations. We show an increase in the number of restatements despite the negative return association with such events. During the same period, earnings management trends, as measured inversely by median absolute total accruals, are on a decline. Thus, adjusting for the earnings management environment, the increase in restatement is especially notable because the inherent for restatements is positively associated with overall earnings management trends. These results suggest that cost-effective, efficient and scalable regulations such as SOX can create a sound and safe environment for public companies to achieve their sustainable performance, reduce earnings management opportunities, improve accuracy and reliability of financial reports and restore investor confidence. Our results have policy, practical and educational implications by suggesting that: (1) regulatory reforms that are proactive, cost-effective, efficient and scalable can improve corporate governance effectiveness, promote sound managerial decisions and actions, and strengthen the quality of financial and audit reports and thus reduce financial scandals and fraud; (2) market correction mechanisms of rewarding sustainable public companies and penalizing underperformed companies can be effective in a long-term and supplement regulatory measures; and (3) the development of the corporate culture of integrity and competency in promoting sustainable financial and non-financial performance is the key to sustainability and log-term success of public companies.

In conclusion, SOX appears to be a step in the right direction of protecting investors and rebuilding their confidence in corporate America, its capital markets, and its public financial information, and its best practices may also have global reach. Future research can extend this analysis to an agent-based analysis by considering agency issues and also address some of the limitations of our study. For example, we have analyzed the situation where managerial costs of SOX compliance are a quadratic function of the degree of good governance and compliance. Other functional forms of costs and benefits are worth examining as well. Second, our study is merely a starting point for calibrating the

model parameters to the values noted in popular press and early related literature on SOX. Future empirical studies can analyze the issues in a much more comprehensive manner. Third, we have considered managers and shareholders as the key stakeholders. Future research can include additional stakeholders and the agency relationships among them to enrich the model. Finally, we have used a fairly simple management compensation plan and future research can extend the framework by considering more sophisticated managerial retention and incentive plans that can have a bearing on the optimal level of SOX compliance and the resultant valuation effects.

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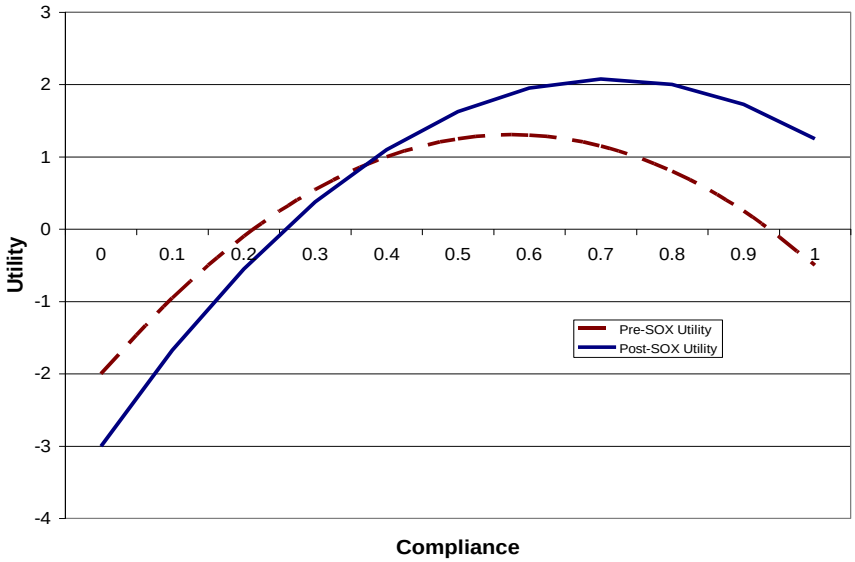
Figure 1
Ethical Compliance and Executive's Combined Utility
Before and After SOX



We calibrate the corporate executive's utility outcome, U, based on varying degrees of compliance, $\psi \in [0,1]$, with ethics and fair accounting. The utility function has the following specification:

$$U = f * \frac{e(1-a_{SOX})}{r_{SOX}\psi^{-1}} - v\psi^2 - (1-\psi)L_{SOX}$$

where the first term represents stock-based compensation, the second term represents compliance costs and efforts, and the third term represents the liability and punishment if noncompliance is discovered. We set the following values for the parameters: fraction of stock-based compensation ≡ f = 0.1; gross earnings per share ≡ e =10; internal and external audit and compliance costs as a fraction of earnings pre-SOX ≡ $a_{pre\text{-}SOX}$ = 0.05 and post-SOX ≡ $a_{post\text{-}SOX}$ = 0.1; cost of equity used for discounting earnings pre-SOX $r_{pre\text{-}SOX}$ = 10% and post-SOX ≡ $r_{post\text{-}SOX}$ = 8%; executive's managerial cost and effort required for compliance ≡ v =10; probability of getting caught for noncompliance ≡ p = 1 – ψ; and liability and punishment for unethical behavior before SOX ≡ $L_{pre\text{-}SOX}$ = 2 and after passage of SOX ≡ $L_{pre\text{-}SOX}$ = 3.

This figure presents the trade-off between two opposite effects of SOX regulation. On one hand it results in better governance and on the other hand it increases audit costs. The stock price reaction, plotted on the vertical y-axis, depends on the strength of each effect for any individual firm. Price reaction is the percentage return calculated as $\Delta S_{SOX}/S_{pre\text{-}SOX} - 1$, where

$$\Delta S = \frac{ne}{\Delta r_{SOX}\Delta\psi_{opt}^{-1}} = \frac{e(1-\Delta a_{SOX})}{2v\Delta r_{SOX}}\left\{ f\frac{e(1-\Delta a_{SOX})}{\Delta r_{SOX}} + \Delta L_{SOX}\right\}$$

We set the following values for the parameters: fraction of stock-based compensation ≡ f = 0.1; gross earnings per share ≡ e =10; internal and external audit and compliance costs as a fraction of earnings pre-SOX ≡ $a_{pre\text{-}SOX}$ = 0.05 and post-SOX ≡ $a_{post\text{-}SOX} \in$ [0,0.21] varies for individual firms on the z-axis; cost of equity used for discounting earnings pre-SOX $r_{pre\text{-}SOX}$ = 10% and post-SOX ≡ $r_{post\text{-}SOX} \in$ [8%,10%] varies for individual firms on the z-axis; executive's managerial cost and effort required for compliance ≡ v = 10; probability of getting caught for noncompliance ≡ p = 1 – ψ; and liability and punishment for unethical behavior before SOX ≡ $L_{pre\text{-}SOX}$ = 2 and after passage of SOX ≡ $L_{pre\text{-}SOX}$ = 3.

Figure 2
Price Reaction on Passage of Sarbanes-Oxley Act (Better Governance versus Higher Audit Costs)

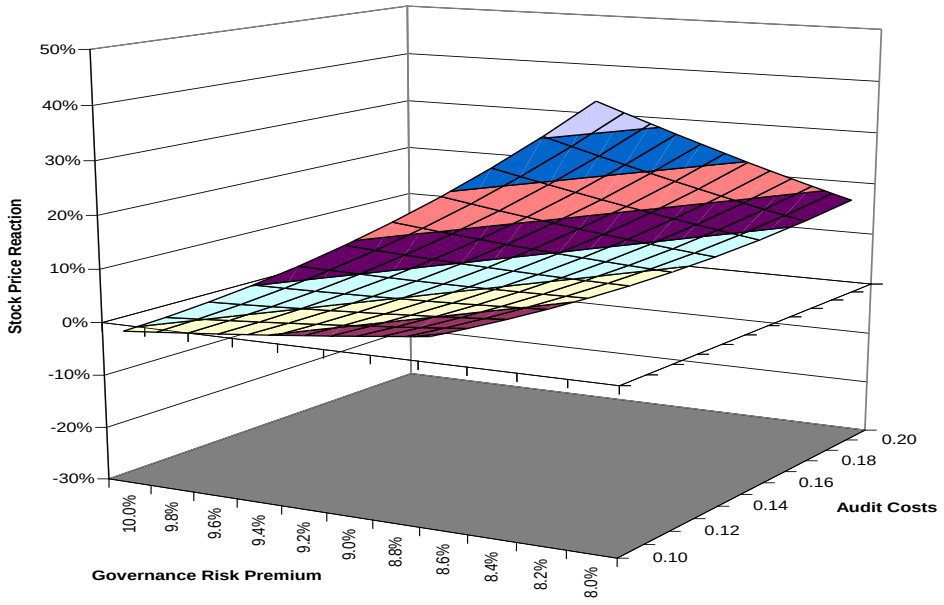


Figure 3: Earnings Management (Absolute Accruals) and Earnings Restatements