ELSEVIER

The Quarterly Review of Economics and Finance
47 (2007) 651–666

The QUARTERLY REVIEW of ECONOMICS and FINANCE

www.elsevier.com/locate/qref

Corporate governance, Sarbanes-Oxley, and small-cap firm performance

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Received 16 July 2007; accepted 9 August 2007
Available online 29 September 2007

Abstract

The recent debate on the onerous costs of compliance with the Sarbanes-Oxley Act has primarily focused on small firms. I study the effects of SOX compliance on such firms by comparing the performance of Canadian small-cap firms that are subject to SOX provisions with those that are not, while: (a) taking into account firms' internal and external governance mechanisms, including the market for corporate control, and (b) accounting for the simultaneous interactions between alternative governance mechanisms and firm performance. Firms subject to Sarbanes-Oxley experienced an incremental increase in market valuation ranging between 15.7% and 34% depending on the measure of board independence used in the estimation. Some sub-optimal deployment of the endogenous governance mechanisms is observed, while the market for corporate control serves as a positive disciplining factor.

JEL classification: G32; G34

Keywords: Sarbanes-Oxley; Corporate governance; Small-cap firm performance

1. Introduction

In the aftermath of the post-boom financial scandals in the U.S., Congress revised significantly federal securities laws and ratified the Sarbanes-Oxley Act in 2002 (SOX). As noted by Coffee (2006, p. 16), the intent of the new legislation was to "protect the integrity of financial reporting by redesigning the network of institutions and intermediaries who served investors in order that the capital markets would not be systematically deceived again." SOX imposes several changes

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1062-9769/$ – see front matter
doi:10.1016/j.qref.2007.08.001

to the governance and regulatory environment in the U.S. including, (1) heightened disclosure, (2) separation of analysts from underwriters, (3) requiring attorneys to report crimes or fraud without delay, and (4) requiring senior management to personally certify their corporations' quarterly financial results. In addition, audit committees were given enhanced powers, with a new quasi-public self-regulatory system put in place.

Some observers have concluded that the overall impact of SOX is beneficial as a consequence of improved transparency and disclosure, with heightened monitoring providing better control of agency costs. Indeed, a governance metrics international survey (GMI) claims that U.S. companies have risen to the top of a global comparison of corporate governance standards, overtaking the U.K and Canada. The report suggests that SOX and similar reforms succeeded in improving the relative performance of large U.S. companies by over 10%.[1]

However, opponents of SOX have argued that the costs of compliance are excessive. For example, a survey of corporate board members by Korn/Ferry International estimates that the costs of compliance average $5.1 million, while Parsons Consulting estimates that costs average $12.28 million for 70 British headquartered businesses.[2] The annual survey of Foley & Lardner LLP suggests that the costs associated with SOX are particularly onerous for small and medium-sized companies, with smaller firms lacking the requisite compliance infrastructure. Adherence to Sarbanes-Oxley Section 404 (Management Assessment of Internal Controls) is deemed in their survey to be the most problematic, with estimated compliance costs ranging from $350,000 to $1 million to assess and document the scope, adequacy, and overall effectiveness of the internal control structure and procedures. According to the most recent Foley & Lardner survey, since the enactment of SOX the average cost of compliance for companies with under $1 billion in annual revenue has increased more than $1.8 million to approximately $2.9 million, representing a 174% overall increase.[3] The U.S. Government Accountability Office also has suggested that small businesses' costs for implementing the disclosure requirements of SOX rules are disproportionately higher than large firms.[4] Recently, the high costs of compliance have been alleged to the impetus for several international companies to delist from U.S. exchanges.

The purpose of this study is to look at the net costs versus benefits of SOX for small-cap firms in a comprehensive way, taking into account a wide range of interacting governance mechanisms that may affect firm performance. Previous estimates, such as those of GMI and Foley & Lardner have been based on surveys that are problematic from a number of perspectives. First, they can be sensitive to short-run fluctuations in market conditions. In addition, they may suffer from selectivity bias in that there is no guarantee that they capture the actual conditions from the most informed agents within the firm.

The approach taken here is to examine the effects of a set of interacting governance mechanisms which jointly affect the performance of a sample of firms, extending the approach of Agrawal and Knoeber (1996). A natural test of the hypothesis that the mandatory disclosure costs of SOX are detrimental to small firms that I propose in this paper is to examine the behavior of the governance

[1] See D. Roberts, "U.S. rises to top of corporate governance table," *Financial Times*, 6 September 2004, p. 23.

[2] See B. Carney, "Foreign Outfits Rue Sarbanes-Oxley," *Business Week Online*, 15 December 2004. A survey by Financial Executives International says companies are reporting costs of compliance with certain parts of the Sarbanes-Oxley Act have increased by over 60%. See D. Roberts, "Average US group faces $5 m Sarbanes-Oxley compliance bill,"*Financial Times*, 12 November 2004, p. 33.

[3] According to the Foley & Lardner survey for 2005, the cost of an outside audit to verify management's report of effective internal controls, as required by SOX 404, has increased auditing fees by 60–100%. ee T. E. Hartman, "The Cost of Being Public in the Era of Sarbanes-Oxley," Foley & Lardner LLP Report, 15 June 2006.

[4] See R. Schroeder, "SEC Admits Sarbanes-Oxley Rules May Need Changes," *Wall Street Journal*, 8 May 2006, p. C3.

system for Canadian firms that are cross-listed on U.S. exchanges prior to and subsequent to the introduction of SOX with their counterparts that are exclusively listed on a Canadian exchange while: (a) taking into account firms' internal and external governance mechanisms, including the market for corporate control, and (b) accounting for the simultaneous interactions between alternative governance mechanisms and firm performance.

My focus on Canadian small-cap firms should be of interest for several reasons. First, the Canadian environment has some similarities with that of the U.S. For example, Canada ranks highly in the La Porta, Lopez-de-Silanes, Shleifer, and Vishny (LLSV, 1998) metric for investor protection (anti-director rights). Second, Canadian firms, like U.S. firms, are fairly widely held, well above the median for countries in the high investor protection grouping of La Porta, Lopez-de-Silanes, and Shleifer (LLS, 1999).[5]

However, there are meaningful differences between countries. First, unlike in the U.S., many Canadian companies have dual- or multiple-class share structures, with significant deviations from the one-share one-vote rule (La Porta et al., 1998, Table 2). Deviations from one-share one-vote are typically viewed as harmful to shareholder rights, although the empirical evidence on this is mixed.[6] Secondly, the regulatory environment for exclusively Canadian-listed small-cap firms is less stringent in that such firms are not subject to the rules-based approach used by the SEC or to the mandatory requirements of SOX or to the governance requirements of the NYSE and NASDAQ. Instead, their governance mechanisms are "guidelines" based.[7] Since 1995, the Toronto Stock Exchange (TSE) has maintained a code of 14 "Best Practices" that firms can voluntarily choose to adhere to that include recommendations for a majority of independent board members, for separation of the roles of chairman and CEO, and for reduction of board sizes as a means to facilitate more efficient decision-making.[8]

The Canadian equity market has followed the trend identified by Fama and French (2004) in the U.S. in that since 1986 (i.e., post the Chirinko and Schaller (2004) sample) there has been a proliferation of new listings on the Toronto Stock Exchange, with a large contingent of small-cap companies represented in the market.[9] Indeed, the largest number of companies in the

[5] As they demonstrate, these observations hold for both large-capitalization and medium capitalization Canadian companies in their sample. In terms of the S&P/TSX, their $500 million threshold for a medium size company would actually put such companies in the S&P TSX small-cap category.

[6] Doidge (2004) provides evidence that the voting premium for dually listed stocks is lower, arguing that this reflects a decrease in the private benefits of control for cross-listed shares.

[7] Doidge et al. (2004) suggest that there is a valuation premium associated with cross-listing that may be explained by bonding and monitoring benefits, although they note that there are other mechanisms that need to be explored that could lead to lower consumption of private benefits of control.

[8] Following the publication of the U.K.'s Cadbury Committee report, the Toronto Stock Exchange officially formed the Committee on Corporate Governance in Canada (the Dey Committee). After a year of deliberations, in 1994 this committee presented these guidelines for corporate boards. Nevertheless companies listed on the TSX are required to report annually whether they are adhering to them, and if not, why not. Recently, however, the Ontario Securities Commission (OSC) has proposed mandatory governance rules. To date, the rules adopted refer to the roles of the CEO and CFO in ensuring true reporting of information, the formation of independent audit committees, and the role of external auditors. So far there are no requirements for boards of directors due in large part to the Canadian market being heavily populated by small-cap firms that are unable to recruit directors who would meet strict rules.

[9] The number of stocks listed on the TSX (from the TSX-CFMRC database), when taking into account only the most actively traded stocks when a company has multiple-share classes, has increased by about 20% over the period 1985–2004. I used the S&P/TSX relative capitalization thresholds to backdate an index of qualifying small-caps stocks for Canada to 1986 since the TSE Small-cap Index only extends to 1999, and find that the number of small caps has increased by 43% between 1985 and 2004.

Canadian benchmark index, the S&P/TSX composite index consists of small-cap companies.[10] Hence, examining the governance characteristics for this group of publicly listed companies is also worthy in its own right.

Testing for the impact of SOX on small-cap firms that face mandatory compliance constraints is a direct way to test and extend the La Porta, Lopez-de-Silanes, Shleifer, and Vishny (LLSV, 2000, 2002) hypothesis that governance and performance are linked to the legal and institutional environment in which the firm operates. My paper provides additional evidence on this hypothesis, as I test for performance and managerial labor market differentials between Quebec-based companies and companies headquartered in other provinces. I will also shed some new light on the implications of deviations from one-share one-vote by looking at the relative impact of dual- or multiple-class share structures for firms. Finally, I will assess the impact of the external market for control as a governance mechanism that may affect the valuation of firms.

The results confirm simultaneity between several governance mechanisms and Canadian small-cap firm performance. Governance mechanisms appear to be substitutes, and some evidence of non-optimality of deployment is observed. However, unlike Agrawal & Knoeber, 1996, who studied large-capitalization U.S. firms, I do not find that independent boards of directors harm small-cap firm performance. Debt is shown to be a costly control mechanism for small-cap firms, although the market for corporate control serves as a positive disciplining factor. When non-financial firms are considered, increased CEO ownership is shown to reduce agency costs. A prominent cross-listing premium in the period since the ratification of the SOX in 2002 suggests that the costs of enhanced disclosure and compliance are exceeded by their benefits, which would include increased accountability of managers to shareholders.

The remainder of the paper is organized as follows: Section 2 provides a brief review of the literature on the governance–performance interactions. The specification of the model and data are provided in Section 3. Empirical results follow in Section 4. The paper concludes in Section 5 with a summary of the findings.

2. Literature review

Most of the empirical research to date on corporate governance focuses on U.S.-based large-capitalization firms.[11] Although the returns of small-cap companies have been studied extensively since Banz (1981) and Reinganum (1981) documented the "small-cap anomaly",[12] little attention has been devoted to the governance of such firms. As small-cap stocks are more closely held, one might expect to find that they are less prone to agency problems. The few studies that do examine small firms show that this is not necessarily the case. For example, Eisenberg, Sundgren, and Wells (1998) show that board size of small firms is negatively related to firm performance, which they argue shows that "problems in communication and coordination can extend to smaller boards and firms" (1998, p. 53). They do not, however, look at the composition of boards, e.g., the extent of board independence. In addition, most of their firms are not publicly traded.

[10] The Toronto Stock Exchange's Small-Cap Index is a subset of the S&P/TSX Composite Index, and consists of 101 companies as of September 2005. The S&P/TSX Composite Index also includes the 60 stocks of its Large-Cap Index and 52 companies of its Mid-Cap Index. My sample is drawn from the Small-Cap Index.

[11] Denis and McConnell (2003) provide a comprehensive survey of the international evidence.

[12] The differential performance of small-caps continues to generate significant interest (see e.g. Dimson and Marsh (1999) and Switzer and Fan (2007)).

The Canadian environment is unique in that there is no uniform legal regime across regions. Companies based in the province of Quebec follow Civil Law under a codified system similar to that in France, while the rest of Canada uses Common Law similar to the U.K.[13] Toronto Stock Exchange (TSE) listed Quebec-based firms, which account for about a third of all listings, are subject to the Common Law regime and must incur costs of compliance with both Civil and Common Law regimes.[14] Furthermore, Quebec-based firms, unlike other TSE-listed companies, are subject to further legal restrictions. Specifically, under Bill 101 (The Charter of the French language) and its successor Bill 22 (The Official Languages Act), companies in Quebec must comply with certain language requirements whereby French is the sole official language of commerce in the province (for fiscal reporting and taxation) and that written communications for all corporations in Quebec must be in French. These restrictions necessitate translation costs that are not incurred by firms headquartered in other provinces. On the other hand, Quebec-based firms that are listed on the TSE must comply with both the Ontario Securities Commission's (OSC) regulations, as well as those of Quebec's Autorité des Marchés Financiers (AMF). The additional monitoring of firms from regulators in Quebec may serve to limit discretionary managerial behavior. The net effect of the trade-off between benefits of additional monitoring versus incremental legal and reporting costs is an empirical matter that I address.

Cross-listed firms are subject to the compliance provisions of SOX. Coffee (1999) argues that cross-listing in the U.S. enhances investor protection via stricter governance rules and increased monitoring by the media and investment community. Canadian firms form the largest group of foreign firms cross-listed on U.S. stock exchanges, and there has been some work on the benefits of cross-listing (e.g., Switzer (1986), Doidge, Karolyi, and Stulz (2004)). How cross-listing affects smaller companies, which can be expected to incur proportionally higher costs, to my knowledge has not yet been examined.

3. Empirical approach—model specification and data

The approach is to consider the performance–governance mechanism interaction for small-cap firms in a simultaneous equation perspective, extending the framework of Agrawal and Knoeber (1996). As per the latter, the firm's control mechanisms are deemed to be potential substitutes and are jointly determined with the firm's performance.

3.1. Variable selection and data sources

The model consists of five endogenous variables that consist of four governance mechanisms and a firm performance measure. The endogenous governance mechanisms are both internal and external to the firm and include: the Degree of Board Independence (BIND), CEO Ownership (OWN), the extent of CEO Pay-Performance Sensitivity (PAY), and Leverage (DBVAL). The firm performance measure used is Tobin's Q (TOBINQ).

[13] LLSV (2000) emphasize the importance of the legal and institutional environment. However, they treat Canada as a uniform common law country.

[14] The direct relation between investor protection and firm performance has been demonstrated by La Porta et al. (2002) who show that firms in common law countries, where investor protection is stronger, have higher Tobin Q ratios. Moreover, Gul and Qiu (2002) find that lower levels of information asymmetry, or agency problems, as measured by investors' emphasis placed on current versus future earnings, are associated with stronger legal protection.

To identify the system, I first conduct pre-tests of each equation using Hausman (1978) tests to select the endogenous regressors. Exogenous variables are drawn from control mechanisms that are predetermined (e.g., whether or not the company is listed in the U.S.) or outside of the control of managers (e.g., the degree of takeover intensity in the firm's industry). It is possible that there may be differences in the effectiveness of governance mechanisms in different industry groups (see, e.g., Murphy, 1999). The resource sector represents a large component of the sample (31% of firms) and is subject to significant uncertainty corresponding to volatility shocks of the underlying commodity markets.[15] As Brick, Palia, and Wang (2005). note, the risk of the firm, which helps determine the firm's financing policy and governance structure, is largely affected by the product market in which the firm operates. To distinguish between industry effects and the effects of the explanatory variables, I include a dummy variable for the resource sector (mining and oil–gas firms).

To quantify the impact of SOX on all firms, including those who voluntarily comply with its provisions, I include a dummy variable for the post-2002 "enactment" period. To isolate the separate impact of SOX on firms for which compliance is compulsory, I also introduce an interactive term representing the product of the SOX dummy variable and the cross-listing dummy variable.

The data in this study were compiled in a unique database for the companies in the TSX/S&P Small-Cap Index over the years 1997–2004. This database includes financial, governance, and compensation data that were collected from a wide range of sources. Financial data were obtained from the Reuters, Datastream, and Financial Post-databases, while the information about CEO compensation and governance variables were collected from individual firm proxy statements. A description of the data sources for the variables is provided in Table 1. Eliminating any observations that were incomplete left an unbalanced sample of 94 companies with a total of 470 observations.

3.2. Model description

The basic five-equation model used to capture the impact of SOX on firm performance is:

$$\begin{aligned}\text{BIND} = {} & \text{B1} + \text{B2} * \text{OWN} + \text{B3} * \text{BSIZE} + \text{B4} * \text{DUAL} + \text{B5} * \text{ASSET} + \text{B6} * \text{SHRRTS} \\ & + \text{B7} * \text{RISK} + \text{B8} * \text{RES} + \text{B9} * \text{PACQ} + \text{B10} * \text{SOXLEY} \\ & + \text{B11} * \text{USSOXLEY} + \varepsilon_1\end{aligned}$$

$$\begin{aligned}\text{DBVAL} = {} & \text{C1} + \text{C2} * \text{BIND} + \text{C3} * \text{PAY} + \text{C4} * \text{TOBINLAG} + \text{C5} * \text{LISTING} \\ & + \text{C6} * \text{SHRRTS} + \text{C7} * \text{ASSET} + \text{C8} * \text{RISK} + \text{C9} * \text{RES} + \text{C10} * \text{PACQ} \\ & + \text{C11} * \text{SOXLEY} + \text{C12} * \text{USSOXLEY} + \varepsilon_2\end{aligned}$$

$$\begin{aligned}\text{OWN} = {} & \text{D1} + \text{D2} * \text{BIND} + \text{D3} * \text{DUAL} + \text{D4} * \text{LISTING} + \text{D5} * \text{SHRRTS} \\ & + \text{D6} * \text{ASSET} + \text{D7} * \text{RISK} + \text{D8} * \text{RES} + \text{D9} * \text{SOXLEY} \\ & + \text{D10} * \text{USSOXLEY} + \text{D11} * \text{PACQ} + \varepsilon_3\end{aligned}$$

[15] See, e.g., Switzer and El-Khoury (2007).

Table 1

Variable	Definition	Data source
BINDA	Relative tenure of directors to the CEO: the percentage of the rest of the board elected before the CEO	Proxy statements (Sedar)
BINDB	Proportion of outsiders on the board: the percentage of the board (excluding the CEO) not employed by the firm	Proxy statements (Sedar)
DBVAL	Total long-term debt/total assets	Reuters
PAY	Jensen–Murphy pay-performance sensitivity	Compensation data: proxy statements (Sedar) Variables for calculating option values: datastream, and Bank of Canada
PACQ	5-year corporate control activity	Bloomberg / SDC
TOBINQ	Tobin's Q	Reuters, Bloomberg
OWN	Percentage of the firm's outstanding shares owned by the CEO at the fiscal year end	Proxy statements (Sedar) & Financial Post
BSIZE	Total number of board members	Proxy statements (Sedar)
DUAL	CEO duality: dummy variable equal to 1 if the CEO is also the Chairperson, and 0 otherwise	Proxy statements (Sedar)
SHRRTS	Shareholder rights: dummy variable equal to 1 if the firm has a single class share structure, and 0 otherwise	Proxy statements (Sedar)
LISTING	Cross-listing: dummy variable equal to 1 if the firm is also listed on a U.S. stock exchange, and 0 otherwise	TSX review
QUEBEC	Quebec headquartered firms: dummy variable equal to 1 if the firm is headquartered in Quebec, and 0 otherwise	Proxy statements (Sedar)
ASSET	Firm size: total assets in $MM	Reuters
RISK	Monthly stock price volatility	Datastream
RES	Industry: dummy variable equal to 1 for resource corporations (mining and oil–gas), and 0 otherwise	Financial post
YEAR	Fiscal year for all variables reported	Proxy statements (Sedar)
SOXLEY	Dummy variable for post-SOX time period, equal to 1 for post-2002 observations, and 0 otherwise	-
USSOXLEY	Interactive variable, equal to SOXLEY*LISTING	-
MARKETCAP	Market capitalization of the firm's stock at year-end, in $MM	Bloomberg

$$\begin{aligned}\mathrm{PAY} = {} & \mathrm{E1} + \mathrm{E2} * \mathrm{BIND} + \mathrm{E3} * \mathrm{DBVAL} + \mathrm{E4} * \mathrm{QUEBEC} + \mathrm{E5} * \mathrm{SHRRTS} \\ & + \mathrm{E6} * \mathrm{ASSET} + \mathrm{E7} * \mathrm{RISK} + \mathrm{E8} * \mathrm{RES} + \mathrm{E9} * \mathrm{SOXLEY} \\ & + \mathrm{E10} * \mathrm{USSOXLEY} + \mathrm{E11} * \mathrm{PACQ} + \varepsilon_4\end{aligned}$$

$$\begin{aligned}\mathrm{TOBINQ} = {} & \mathrm{F1} + \mathrm{F2} * \mathrm{BIND} + \mathrm{F3} * \mathrm{DBVAL} + \mathrm{F4} * \mathrm{OWN} + \mathrm{F5} * \mathrm{PAY} + \mathrm{F6} * \mathrm{BSIZE} \\ & + \mathrm{F7} * \mathrm{DUAL} + \mathrm{F8} * \mathrm{QUEBEC} + \mathrm{F9} * \mathrm{LISTING} + \mathrm{F10} * \mathrm{SHRRTS} \\ & + \mathrm{F11} * \mathrm{SOXLEY} + \mathrm{F12} * \mathrm{USSOXLEY} + \mathrm{F13} * \mathrm{PACQ} + \varepsilon_5.\end{aligned}$$

I estimate two versions of the system using both measures of board independence (BIND): BINDA and BINDB, which are reported in alternate columns. BINDA is the tenure of directors relative to the CEO, estimated as the percentage of directors elected to the board before the CEO. BINDB is the proportion of outsiders on the board of directors, excluding the CEO. DBVAL, the leverage ratio, is equal to total long-term debt divided by total assets. PAY is Jensen and Murphy (1990) pay sensitivities is denoted as b, where b is calculated from the regression: Δ (total CEO

compensation) = $a + b\Delta$ (annual stock return) + e. I tested the model using as a proxies for CEO compensation: (a) salary plus bonuses and (b) total compensation defined as salary plus bonuses and the value of option grants determined by using Black and Scholes (1973). The estimates were almost identical. The results reported here use total compensation. CEO ownership, OWN, is calculated as the number of shares owned by the CEO divided the total number of shares outstanding at the fiscal year-end. BSIZE is the number of board members. DUAL is a dummy variable equal to 1 if the CEO is also the board chair, and 0 otherwise. The performance variable, TOBINQ is estimated as (market value of common stock + book value of preferred stock + book value of long-term debt)/(book value of total assets).[16] TOBINLAG is the 1-year lagged value of Tobin's Q.

QUEBEC equals 1 when the firm is Quebec-headquartered and 0 otherwise. LISTING is a dummy variable equal to 1 if the firm is also listed on a U.S. stock exchange and 0 otherwise. ASSET is total assets in $M. SHRRTS equals 0 when the firm has dual- or multiple-class shares outstanding and 1 otherwise. RISK is the firm's 1-month stock price volatility. RES is a dummy variable equal to 1 for resource corporations (i.e. mining and oil–gas), and 0 otherwise. PACQ, which measures corporate takeover activity, is calculated as the total number of takeover bids in a 5-year period, up to and including the current year, divided by the total number of firms in the 2-digit SIC industry in a 5-year period, up to and including the current year. SOXLEY is a dummy variable equal to 1 for the period after the ratification of the SOX while USSOXLEY is the cross product interactive term of SOXLEY*LISTING.

Descriptive statistics for the sample are shown in Table 2. Excluding the CEO, firms make extensive use of outsiders on their boards of directors, with over 90% of non-CEO board members being outsiders. Hence it is clear that these sample firms do qualify as TSE Best Practices firms insofar as their utilization of outsiders on the boards. The median board size for the firms is eight,[17] although there is a large range in the sample (from 3 to 20 members). In 35% of the firms, the CEO is also the Chairperson of the Board. Quebec-based firms account for about 19% of the sample and about 35% are also listed on U.S. stock exchanges. Firms in the sample encompass a very wide range of asset sizes, ranging from about $2 million (First Calgary Petroleum) to $18.6 Billion (Laurentian Bank of Canada). These firms are still considered small-caps, however, as when examining market capitalizations I find that the market cap of the Laurentian Bank of Canada (the company with the largest assets in the sample), for example, represents only about 4% of its total assets. Shareholders equity will typically represent a smaller proportion of banking firms' total assets.[18] Approximately 37% of the firms in the sample have dual or multiple-class voting right structures. About 31% of firms are in the resource sector (mining and oil–gas).

Table 3 provides the simple correlation matrix of the variables of the model. One observation is that the two measures of board independence that have been widely used in the literature (BINDA, the tenure of the directors relative to the CEO versus BINDB, the proportion of outsiders on the boards (excluding the CEO)) is quite low. This may reflect the high representation of outsiders on the boards in the sample overall and the relatively small variation of this variable. I also note that there is a strong negative correlation between firm size and stock return volatility (−.2833).

Another observation is that there is a high positive correlation between mining and oil–gas firms (RES) and stock market volatility (.3486). This provides some support for the use of industry

[16] Chung and Pruitt (1994) find high correlations between alternative proxies of Tobin's Q, including the variant that I use.

[17] According to Lipton and Lorsch (1992), eight is the upper bound for an "optimal" board.

[18] As a robustness check, I later eliminate these financial firms. Secular effects were also estimated with a linear time trend in each equation, but this variable was not found to be significant in any of the specifications.

Table 2
Sample Statistics

	Mean	Median	Maximum	Minimum	Standard deviation
BINDA	23.22	0	100	0	32.81
BINDB	91.11	100	100	0	14.08
DBVAL	0.183	0.156	0.849	0	0.183
PAY	0.0021	0.0001	0.1111	−0.0381	0.0160
OWN	8.74	1.02	70.20	0	17.46
BSIZE	8.74	8	20	3	2.64
DUAL	0.351	0	1	0	0.478
TOBINQ	1.66	1.07	10.04	0.02	1.55
QUEBEC	0.191	0	1	0	0.394
LISTING	0.353	0	1	0	0.478
ASSET	979.86	456.70	18595.62	2.20	2015.03
SHRRTS	0.626	1	1	0	0.485
RISK	15.09	12.60	59.37	2.60	9.42
RES	0.313	0	1	0	0.464
MARKETCAP	559	396	3400	3.50	578
Total observations	470				

In Table 2 descriptive statistics are reported for the sample. The variables are defined in Table 1. PAY is calculated as the Jensen–Murphy pay sensitivity. It is the estimated coefficient b, in the regression: Δ(annual total CEO compensation) $= a + b\Delta$(annual stock return). PACQ, which measures corporate takeover activity, is calculated as the total number of takeover bids in a 5-year period, up to and including the current year, divided by the total number of firms in the 2-digit SIC industry in a 5-year period, up to and including the current year. The performance variable, TOBINQ, the performance measure, is estimated as (market value of common stock + book value of preferred stock + book value of long-term debt)/(book value of total assets). TOBINLAG is the 1-year lagged Tobin's Q.

dummy variables in the governance mechanism equations as a means of distinguishing the effects of the other explanatory variables. The high negative correlation between board size and Tobin's Q (−2829) might suggest that smaller boards are more conducive to performance than larger boards, consistent with Eisenberg et al. (1998). I also observe a high positive correlation between Tobin's Q and cross-listing (.2452). In addition, firms with higher debt ratios tend to operate in industries with higher takeover intensities (.2328).

With the exception of debt with CEO ownership and board independence, all of the pair-wise correlations between the endogenous control mechanisms are negative, suggesting that they are substitutes, as expected. Since these are bivariate correlations and do not take into account the interactions between all of the endogenous variables of the model, these interpretations need to be viewed with caution, however.

4. Results

If simultaneous equation biases are present, the coefficients from OLS estimation of the agency relationships set forth in the model are inconsistent. To identify possible simultaneity bias in the OLS regression results, I perform Hausman (1978) tests. Most of the control mechanisms were found to be jointly and endogenously determined. In 2SLS estimation, significant residual cross-correlations are found.[19] Hence, the efficient estimation procedure that

[19] When no simultaneous equation bias was found in the Hausman (1978) test for a presumed endogenous variable in an equation and the variable was neither significant in the OLS or 2SLS estimation, it was excluded from the 3SLS estimation

makes use of the cross-correlation of the disturbances is 3SLS. I report the 3SLS results in Table 4 .

At the outset, it is evident that the overall results are largely as predicted in accordance with the "substitutability" hypothesis for governance mechanisms. Significant interactions between the mechanisms are generally observed, with greater usage of one mechanism countered by a reduction in another. Columns (1) and (2) show that greater CEO ownership (OWN) and greater shareholder (SHRRTS) rights are associated with less independent boards. Similarly, columns (3) and (4) show that pay-performance sensitivity (PAY) is inversely related to leverage (DBVAL), consistent with John and John (1993).

The "shareholder-voting" hypothesis appears dubious, given the significantly positive coefficient of DUAL in the BINDB equation in column (2) and the insignificance of Board Independence (BINDA or BINDB) in the pay-performance sensitivity equation (PAY) in columns (7) and (8). Thus, CEOs who control the boards of small-cap firms are not averse to outsider director representation; however, independent boards are not more likely to enact pay for performance compensation schemes. Mining and oil–gas firms (RES) are more likely to have less independent boards (columns (1) and (2), lower levels of CEO ownership (columns (5) and (6)), and greater pay-performance sensitivity (columns (7) and (8)). This result is consistent with distinct product market uncertainty effects. High uncertainty owing to volatility shocks in resource markets, apart from the volatility of their companys' shares *per se*, would act as a deterrent to risk-averse CEOs of resource firms from investing in their company shares. Hence, to strengthen their accountability to shareholders, firms rely more on performance based remuneration contracts. Furthermore, the boards of these companies may be less independent, perhaps owing to the special expertise required to competently serve on such boards, or perhaps because these firms may have less need to appeal to political interest groups (Agrawal and Knoeber (1996)).

The impact of stock return volatility (RISK) on pay-performance sensitivity in columns (7) and (8) is insignificant. As indicated earlier, this does not violate the basic principal-agent model of executive compensation (Aggarwal and Chamwick (1999)), given the higher volatility base for small-cap stocks relative to large-cap stocks.

Estimates of the performance equation regression (TOBINQ) suggest some sub-optimality in the deployment of governance mechanisms. Most striking is the significantly negative effect of leverage (DBVAL) on performance that is robust to the measure of board independence that is employed as shown in columns (9) and (10). This result may be due to a number of factors. One possibility is that the monitoring provided by debtholders may force smaller firms to adopt overly conservative investment strategies. In addition, smaller firms with limited access to capital markets may face a higher cost of debt. They also may be subject to higher default risk. Unlike the U.S. results reported by Agrawal and Knoeber (1996) for large firms, board independence for small firms (BIND) does not seem to detract from firm performance as shown in columns (9) and (10). Also, in contrast with Eisenberg et al. (1998), I do not find an inverse relationship between board size and performance. My results suggest that for publicly traded small firms, the problems of coordination and communication may not be as important as they would be for small firms that are privately held.

No significant incremental effects for Quebec-based firms (QUEBEC) on pay-performance sensitivity or on firm performance are observed in columns (7)–(9). In addition, unlike Agrawal

that I report herein. The results do not change significantly when such variables are included as exogenous variables in the 3SLS model.

Table 3
Correlation matrix

BINDA	1.000														
BINDB	0.197	1.000													
DBVAL	0.020	0.092	1.000												
PAY	−0.072	−0.027	−0.119	1.0000											
OWN	−0.334	−0.060	0.089	−0.0992	1.0000										
BSIZE	0.112	0.187	0.517	−0.1200	0.0376	1.0000									
DUAL	−0.400	−0.130	−0.071	0.0546	0.4184	−0.1699	1.0000								
TOBINQ	−0.063	−0.109	−0.365	0.0313	−0.1098	−0.2829	0.0134	1.0000							
QUEBEC	−0.225	−0.102	0.233	−0.0662	0.2029	0.2416	0.1745	−0.1137	1.0000						
LISTING	−0.042	−0.095	−0.198	0.1263	−0.0955	−0.2604	0.1653	0.2452	−0.0315	1.0000					
ASSET	0.086	0.126	0.562	−0.0508	−0.0034	0.5126	−0.1033	−0.2177	0.2333	−0.2273	1.0000				
SHRRTS	−0.066	0.105	−0.083	−0.0072	−0.1233	−0.1642	−0.0204	0.0642	−0.0145	−0.2285	−0.1802	1.0000			
RISK	0.052	−0.075	−0.297	0.0662	−0.1514	−0.3253	0.0738	0.2795	−0.1704	0.4718	−0.2833	−0.0295	1.0000		
RES	0.006	−0.169	−0.303	0.1567	−0.1850	−0.4008	−0.0251	0.1369	−0.2350	0.3560	−0.2586	−0.0090	0.3486	1.0000	
PACQ	−0.028	0.039	0.233	−0.1002	0.1354	0.1733	−0.0401	−0.1101	0.0771	−0.3108	0.1886	0.0779	−0.2597	−0.4158	1.0000
	BINDA	BINDB	DBVAL	PAY	OWN	BSIZE	DUAL	TOBINQ	QUEBEC	LISTING	ASSET	SHRRTS	RISK	RES	PACQ

Table 3 provides the Pearson correlation matrix between the main variables of the model. The variables are described in Tables 1 and 2. Absolute Pearson correlations are significant for critical values in excess of .091 (.076) at the 5% (10%) level of significance.

Table 4
Three-stage least squares results

Independent variables	Dependent variables									
	Board independence		Debt/value		CEO Ownership		Pay		Performance	
	BINDA (1)	BINDB (2)	BINDA (3)	BINDB (4)	BINDA (5)	BINDB (6)	BINDA (7)	BINDB (8)	BINDA (9)	BINDB (10)
Constant	47.041	100.325	0.311	0.224	24.380	63.538	0.007	0.008	1.621	−4.535
	0.000***	0.000***	0.000***	0.447	0.000***	0.001***	0.063*	0.168	0.129	0.258
BIND			−0.002	0.000	−0.439	−0.601	0.000	0.000	0.000	0.079
			0.014**	0.932	0.000***	0.002***	0.120	0.961	0.986	0.101
DBVAL							−0.023	−0.033	−7.291	−8.951
							0.019**	0.002***	0.000***	0.000***
PAY			−41.453	−20.908					−5.480	−6.349
			0.000***	0.001*					0.372	0.276
OWN	−1.649	−1.385							−0.003	−0.005
	0.001***	0.000***							0.770	0.410
BSIZE	0.186	0.243							0.085	0.015
	0.703	0.319							0.054*	0.797
DUAL	−2.446	18.176				13.385			−0.162	−0.002
	0.77	0.000***			0.264	0.000***			0.759	0.994
TOBINLAG			−0.026	−0.027						
			0.000***	0.000***						
QUEBEC							0.001	0.000	0.264	0.692
							0.3	0.877	0.553	0.068*
LISTING			0.084	0.059	−1.989	0.509			0.346	0.055
			0.045*	0.055*	0.246	0.711			0.082*	0.813
ASSET	0.037	0.436	0.036	0.035	−0.205	0.092	0.001	0.001		
	0.967	0.357	0.000***	0.000***	0.603	0.829	0.134	0.024**		
SHRRTS	−11.836	−2.784	0.01	0.013	−7.102	−2.652	0.000	0.000	0.108	−0.311
	0.003***	0.167	0.791	0.633	0.000***	0.126	0.863	0.937	0.623	0.286

RISK	−0.092	−0.267	−0.003	−0.003	−0.088	−0.232	0.000	0.000		
	0.663	0.008***	0.14	0.018***	0.363	0.010***	0.680	0.412		
RES	−9.306	−9.687	0.142	0.036	−4.917	−6.837	0.004	0.003		
	0.021**	0.000***	0.015**	0.270	0.006***	0.001***	0.041**	0.110		
PACQ	0.064	0.081	−0.001	0.000	0.053	0.067	0.000	0.000	0.011	0.013
	0.572	0.171	0.557	0.963	0.298	0.208	0.596	0.671	0.042**	0.036**
SOXLEY	−2.841	1.060	−0.018	−0.022	−1.135	1.078	−0.001	−0.001	0.060	0.016
	0.506	0.646	0.729	0.483	0.605	0.625	0.668	0.540	0.818	0.951
USSOXLEY	−0.717	−3.934	−0.037	−0.021	0.482	−3.271	0	0.000	0.860	1.168
	0.913	0.267	0.651	0.689	0.89	0.350	0.937	0.902	0.023**	0.011***
Wald test χ^2	s	13872.200	196.339	443.002	330.481	287.176	35.734	31.250	653.066	422.838
P-value	0.000***	0.000***	0.000***	0.000***	0.000***	0.000***	0.000***	0.001***	0.000***	0.000***

Table 4 provides three-stage least squares estimates of the governance mechanisms and performance equations of the following models.

$\text{BIND} = \text{B1} + \text{B2} * \text{OWN} + \text{B3} * \text{BSIZE} + \text{B4} * \text{DUAL} + \text{B5} * \text{ASSET} + \text{B6} * \text{SHRRTS} + \text{B7} * \text{RISK} + \text{B8} * \text{RES} + \text{B9} * \text{PACQ} + \text{B10} * \text{SOXLEY} + \text{B11} * \text{USSOXLEY} + \varepsilon_1$

$\text{DBVAL} = \text{C1} + \text{C2} * \text{BIND} + \text{C3} * \text{PAY} + \text{C4} * \text{TOBINLAG} + \text{C5} * \text{LISTING} + \text{C6} * \text{SHRRTS} + \text{C7} * \text{ASSET} + \text{C8} * \text{RISK} + \text{C9} * \text{RES} + \text{C10} * \text{PACQ} + \text{C11} * \text{SOXLEY} + \text{C12} * \text{USSOXLEY} + \varepsilon_2$

$\text{OWN} = \text{D1} + \text{D2} * \text{BIND} + \text{D3} * \text{DUAL} + \text{D4} * \text{LISTING} + \text{D5} * \text{SHRRTS} + \text{D6} * \text{ASSET} + \text{D7} * \text{RISK} + \text{D8} * \text{RES} + \text{D9} * \text{SOXLEY} + \text{D10} * \text{USSOXLEY} + \text{D11} * \text{PACQ} + \varepsilon_3$

$\text{PAY} = \text{E1} + \text{E2} * \text{BIND} + \text{E3} * \text{DBVAL} + \text{E4} * \text{QUEBEC} + \text{E5} * \text{SHRRTS} + \text{E6} * \text{ASSET} + \text{E7} * \text{RISK} + \text{E8} * \text{RES} + \text{E9} * \text{SOXLEY} + \text{E10} * \text{USSOXLEY} + \text{E11} * \text{PACQ} + \varepsilon_4$

$\text{TOBINQ} = \text{F1} + \text{F2} * \text{BIND} + \text{F3} * \text{DBVAL} + \text{F4} * \text{OWN} + \text{F5} * \text{PAY} + \text{F6} * \text{BSIZE} + \text{F7} * \text{DUAL} + \text{F8} * \text{QUEBEC} + \text{F9} * \text{LISTING} + \text{F10} * \text{SHRRTS} + \text{F11} * \text{SOXLEY} + \text{F12} * \text{USSOXLEY} + \text{F13} * \text{PACQ} + \varepsilon_5.$

The variables are described in Tables 1 and 2.

and Knoeber (1996), the probability that a firm will be acquired (PACQ) has a valuation premium as shown in columns (9) and (10), suggesting that the external capital market for corporate control serves as an effective disciplinary device for small-cap firms. Cross-listing (LISTING) *per se* has only a positive effect on performance that is only weakly significant only when the relative tenure of directors to the CEO is used as the measure of board independence as in column (9). However, the SOX-cross listing interactive term is positive and significant in columns (9) and (10), which demonstrates that mandatory compliance with SOX for small firms has net benefits that exceed the costs. These estimates imply an incremental market valuation gain from SOX ranging between 15.7% and 34% for affected firms, based on market-capitalization weighted Tobin Q's and depending on the measure of board independence used in the estimation.[20]

4.1. Robustness tests

As a first robustness check, following McConnell and Servaes (1990) and Agrawal and Knoeber (1996), estimation excluding financial firms from the sample was also performed.[21] The results are broadly similar to those of the original sample, with some notable exceptions. First, a positive and significant effect between firm size (assets) and board independence is observed, consistent with the notion that as firms increase in size, their enhanced visibility induces them to allocate board positions to public figures representing special interest groups (Agrawal and Knoeber (1996)). Second, when the system is re-estimated using the relative tenure of directors to the CEO as the measure of board independence, board size is found to be highly significant and positively related to performance. This suggests that board sizes are below their optimum, which is consistent with thinness in the market for directors (Golden and Zajac (2001) and Bonn, Phan, and Yoshikawa (2004)) for these firms. Again, this contrasts with Eisenberg et al. (1998) results for small- and medium-size (largely) private companies in Finland. Another result is that when financial firms are removed, the inverse relationship between pay-performance sensitivity and leverage (John and John (1993)) is strengthened, and is robust to both measures of board independence used in the estimation. A significantly positive relationship between performance and CEO ownership is observed, which is consistent with the results of Ang, Cole, and Lin (2000) for non-publicly traded small firms. This result does not support entrenchment of CEOs. On the contrary, CEO ownership appears below the optimum for these firms. Finally, the positive effect of SOX on these firms is maintained.

As a second robustness test, I also re-estimated the using the Heckman (1979) two-step correction for self-selection bias for the U.S. listing variable, LISTING (see, e.g., Doidge et al. (2004)). In the specification employed, LISTING is first estimated in a probit model as a function of BIND, OWN, DUAL, SHRRTS, SIZE, RISK, and PACQ. The expanded model uses the calculated LAMBDA (determined from the inverse Mills Ratio) as an additional regressor in the Tobin's Q equation. While the estimated LAMBDA coefficient is found to be significant in this alternative specification, the results for the SOX variable as well as the other variables of the model remain virtually unchanged with this expanded representation.

[20] These estimates represent the incremental increase in firm's market value attributed to Sarbanes-Oxley for firms directly affected by its provisions. They are calculated as the product of the difference between the joint Sarbanes-Oxley-listing cross term effect and the Listing premium effect ((.860–.346) using BINDA or (1.168–.055) using BINDB) and the market-weighted Tobin Q of the firms subject to Sarbanes-Oxley (3.270).

[21] As noted by Agrawal and Knoeber (1996, p. 389) the "definition of assets for financial firms causes their [Tobin's] Q to be systematically different from that for other firms."

5. Conclusions

One of the criticisms of SOX is that it overly burdens small-cap firms. The main result of this paper is that based on a model that reflects the endogeneity of performance and a fairly extensive set of governance mechanisms, the net benefits of SOX in the form of increased accountability of managers to act in shareholders' interest outweigh the costs of increased disclosure and compliance.

The findings show some similarities but also some striking differences with the results on the interactions between control mechanisms and performance found for large-cap firms, particularly U.S. based firms. On the whole, the results support the substitutability of governance mechanisms for small-cap firms. Some sub-optimal deployment of the endogenous governance mechanisms is observed. Firm leverage is inversely related to performance. This may be due to a number of non-mutually exclusive factors that are worthy of future investigation including: (a) the monitoring by debtholders may force smaller firms to adopt overly conservative investment strategies; (b) limited access of small firms to capital markets may result in excessively high costs of debt for these firms; and (c) the default risk for small firms may be high.

The market for corporate control also is found to exert a positive influence on firm performance. In addition, when financial firms are excluded, a significantly positive relationship between CEO ownership and performance is observed. This result is consistent with the hypothesis that managerial ownership reduces agency costs not only for small private firms (Ang et al. (2000)), but also for small-cap publicly traded firms.

Acknowledgements

Finance Department, Concordia University. I would like to thank the anonymous refree, the Editor (Gordon J. Alexander) and participants at the MFA 2007 Meetings in Minneapolis for their helpful comments. Financial support from the SSHRC and the Autorité des Marches Financiers is gratefully acknowledged.

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