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Executive compensation and managerial incentives: A comparison between Canada and the United States ¹

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Abstract

This paper compares executive pay–performance sensitivities between Canadian firms and US firms. Examining the data for 365 Canadian firms and 675 US firms over the years 1991–1994, we find that the pay–performance sensitivity associated with direct pay and stock ownership is smaller in Canadian firms than in US firms but that the difference diminishes as firm size increases. We also find that during this period Canadian firms underperformed US firms and Canadian CEOs were paid substantially lower than were their US counterparts. Our findings are consistent with the argument that the pay–performance relationship, depending on the intensity of economic regulation, affects corporate performance. © 1999 Elsevier Science B.V. All rights reserved.

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1. Introduction

Studies of executive compensation and managerial incentives have had a long history in the United States where corporate executive compensation has been publicly disclosed for decades. Research on the linkage between pay and perfor-

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mance has established that pay is tied to performance (e.g., Coughlan and Schmidt, 1985; Murphy, 1985; Jensen and Murphy, 1990; Joskow and Rose, 1994). In Canada, it only became possible to conduct such studies after 1993 when all publicly traded companies in the province of Ontario were required to disclose top executives' compensation under new Ontario Securities Regulations. Using the newly available public data on executive compensation of Canadian firms, Zhou (1997) identified a positive relationship between CEO pay and firm performance for Canadian firms.

This paper examines whether or not the pay–performance relationship differs across Canadian and US firms. While the vast majority of previous studies have focused on US pay–performance relationships, a few have examined international firms (e.g., Cosh, 1975; Kato and Rockel, 1992; Kaplan, 1994). In particular, Kaplan and Kato and Rockel have compared executive compensation between US firms and Japanese firms. Such comparisons are important to understanding differences in managerial pay schemes between countries that have quite different cultures and are with different organizational and institutional structures. A comparison between Canada and the United States is interesting not only because it has not been examined in the literature, but because it provides a natural experiment that may reveal the effects of factors other than cultural and institutional differences on managerial pay schemes.

It is unlikely to have such an experiment with other international comparisons. The extensive cultural, economic and institutional linkages between Canada and the United States define a unique close relationship between the two countries; they share similarities in a wide range of areas. Besides, the executive compensation data of Canadian and US firms are the most comparable samples one could ever find. On the other hand, notable differences exist between the two countries in areas such as regulation intensity, labor legislation, and taxation. So, the executive pay schemes and thus pay–performance relations are expected to be different between Canada and the United States. Understanding this difference may provide further insights to these factors which influence a firm's compensation system and internal managerial incentives.

This paper examines a sample of 365 large Canadian firms and 675 large US firms, during the period of 1991–1994, to compare the intensity of the pay–performance relationship, i.e., incentive strength of CEO compensation, between the two countries. Although there is no consensus in the literature concerning the measurement of incentive strength, it is usually taken to be the sensitivity of managerial pay to the firm's stock performance or to shareholder wealth. This paper examines both the arithmetic sensitivity of CEO pay to firm performance (the ratio of changes in CEO pay over changes in shareholder wealth), and the elasticity of CEO pay with respect to shareholder wealth. Similarities in data between the two countries allow the comparison to be made based on joint-sample regressions for Canadian and US firms. After firm-size heterogeneity between the Canadian sample and the US sample is adequately controlled, we find that the

incentive strength associated with direct pay and stock ownership in Canadian firms is weaker than in US firms but that the difference diminishes as firm size increases. This result is obtained both with the arithmetic sensitivity estimator and with the elasticity estimator.

Given that the Canadian market is more intensively regulated than the US market, our findings are consistent with some early studies that identify a weaker pay–performance relationship for regulated firms or more intensively regulated firms (e.g., Smith and Watts, 1992; Joskow et al., 1993; Hubbard and Palia, 1995). Our findings also seem to support the populist view that shareholders' scrutiny under compensation disclosure strengthens the linkage between pay and performance. This comes with the fact that while publicly-held companies in the US have disclosed executive compensation information for decades, Canadian firms did not do so until the end of 1993. Although this study does not aim at the effect of compensation disclosure, the salient difference in managerial pay schemes between Canada and the US sheds light on the issue concerning disclosure rules which is extremely interesting and merits further investigation.

To evaluate the effect of managerial incentives, this paper also undertakes a Canada–US comparison of corporate performances. Analysing the average return to the firm's common stock and Tobin's Q , we find that during the years 1991 to 1994, US firms outperformed Canadian firms. This observation coincides with the fact that in this period US CEOs were paid substantially higher than were the Canadian counterparts. The relatively poorer corporate performance and lower CEO pay, together with a weaker pay–performance relationship, at Canadian firms are consistent with the argument that managerial incentives affect corporate performance.

The rest of the paper is organized as follows. Section 2 introduces the basic issues concerning the pay–performance relationship; it briefly discusses previous empirical studies and then describes the methodology and the data used in this paper. In Section 3, a comparison of incentive strength with CEO direct pay and stock ownership is made between Canadian firms and US firms. Section 4 evaluates the impact of the Canada–US difference in managerial incentive schemes on corporate performance. Section 5 discusses potential factors behind the differences between the two countries. Section 6 concludes the paper.

2. The methodology and data

2.1. Previous studies

An incentive problem arises when the owner of a firm, the principal, delegates decision-making or production tasks to another individual, the agent (manager), and where the principal does not observe the agent's effort in production. Standard agency theory predicts that to induce the agent to promote the interests of the

principal, the optimal reward scheme must have the agent's pay vary with his output.² In other words, to align the interests of the agent with those of the principal, the agent's pay must be performance-based. This is the starting point of various empirical studies which, from different perspectives, investigate the relationship between managerial pay and firm performance.

In empirical studies of managerial incentives, shareholders of corporations are taken to be the principal and chief executive officers are taken to be the corresponding agents. Focusing on cross-sectional analyses, earlier studies tried to identify a positive relationship between managerial pay and firm performance, and the results were mixed (see, e.g., Lewellen and Huntsman, 1970; Masson, 1971; Ciscel and Carroll, 1980).³ Since the late 1980s, most studies have used longitudinal data and overwhelmingly confirmed a positive relationship between pay and performance, even though the estimated performance-related coefficient depends critically on the model specification and choice of performance measure (e.g., Coughlan and Schmidt, 1985; Murphy, 1985; Jensen and Murphy, 1990; Jaskow and Rose, 1994; Kaplan, 1994).

Given that managerial pay increases with firm performance, more recent studies seek to estimate the intensity of the pay–performance relationship or incentive strength. Using the Forbes sample of US CEOs' compensation during the years 1974–1986 and taking into account cash payments, options, stock ownership and dismissal-related factors, Jensen and Murphy (1990) find a pay–performance sensitivity of 0.00325. This means that CEO compensation in the largest US firms increases \$3.25 for each \$1000 increase in shareholder value. While different arguments have been put forth to explain the seemingly small magnitude of the pay–performance sensitivities,⁴ there is no consensus concerning whether or not the compensation of CEOs in the largest US firms provides the appropriate incentives to maximize shareholder wealth. Since the general agency model fails

² Since Ross (1973) first posed the principal–agent problem, many studies have been done to examine the optimal compensation scheme of the agency model, among which notably are Mirrlees (1976), Holmstrom (1979), Grossman and Hart (1983), and Hart and Holmstrom (1987).

³ As Murphy (1985) points out, the reason why earlier studies fail to identify an unambiguous relationship between pay and performance partly resides in the cross-sectional feature of these studies. In addition, the sales–profits debate in the earlier studies complicates the issue because of the multicollinearity between size variables and performance variables (see Ciscel and Carroll, 1980; Rosen, 1992).

⁴ Jensen and Murphy (1990) conjecture that under disclosure of executive compensation, public and private political forces impose constraints on the type of contracts that are written between shareholders and management, and thus reduce sensitivity. The explanation of Jaskow et al. (1993) for regulatory constraints on CEO compensation also belongs to the political pressure argument. Haubrich (1994) and Garen (1994) tend to explain the small sensitivity in terms of agency costs. Given the risk-averse behavior of managers, the compensation scheme must be structured to trade off incentives with insurance. Under this argument, the small pay–performance sensitivity is a response of the pay scheme to large output variation in the largest US firms, reflecting the shift of the balance between incentives and insurance.

to identify a quantitative benchmark, it is difficult to draw a conclusion concerning the incentive implications of a small pay–performance sensitivity.

Setting the absolute magnitude of the pay–performance sensitivity aside, one can still profitably pursue a comparative analysis. In recent years, comparisons of managerial incentives have been made between small firms and large firms (Jensen and Murphy, 1990; Garen, 1994); regulated firms and unregulated firms (Joskow et al., 1993; Hubbard and Palia, 1995; Joskow et al., 1996); and Japanese firms and US firms (Kato and Rockel, 1992; Kaplan, 1994). In this paper, we undertake a comparison of Canadian firms and US firms.

2.2. Model specification

There are a variety of different model specifications in the empirical literature on managerial incentives. As a matter of interpretative convenience, the model proposed by Jensen and Murphy has been increasingly used in the literature. This model links changes in managerial pay to changes in shareholder wealth. Denoting CEO pay as W_t and firm output as Y_t , where subscript t denotes fiscal year, a linear compensation contract pays $W_t = a + bY_t$. Jensen and Murphy estimate the model in its differential form:

$$\Delta W_t = \alpha + \beta \Delta Y_t. \quad (1)$$

The regressor, ΔY_t , is defined as the change in shareholder wealth calculated as $r_t V_{t-1}$, where r_t is the rate of return on common stock realized in fiscal year t and V_{t-1} is the firm value at the end of the previous fiscal year. As a linear approximation to marginal reward for performance, the arithmetic sensitivity of CEO pay to shareholder wealth, β , measures the strength of the pay–performance relationship.

As observed in several previous studies, the sensitivity estimated under Eq. (1) changes notably with firm size.⁵ This feature of the model imposes a potential problem for our comparison because of a substantial difference in firm size between Canadian firms and US firms. For this reason, we also employ the elasticity specification used by Gibbons and Murphy (1992) that converts the regression variables to logarithmic changes as follows:

$$\Delta \log(W_t) = \phi + \eta \Delta \log(Y_t), \quad (2)$$

where $\Delta \log(Y_t)$ is approximated by $\log(1 + r_t)$. Under Eq. (2), the effect of firm size on the estimate of the elasticity of CEO pay with respect to shareholder wealth, η , is substantially reduced.

In Section 2.3, the two specifications, Eqs. (1) and (2), are both used for the comparison of incentive strength between Canadian firms and US firms. Recogniz-

⁵ With US CEO compensation data, Jensen and Murphy (1990), Garen (1994) and Schaefer (1995) all find an inverse relationship between the sensitivity and firm size.

ing that past performance may also have an influence on current compensation,⁶ a term of lagged performance is added in each specification.

2.3. The data

2.3.1. The Canadian data

The compensation data of Canadian CEOs is compiled from the corporate proxy statements that are filed with the Ontario Security Commission and which are also mailed to shareholders. Under the new Ontario Regulation (1993), publicly traded companies in Ontario are required to disclose all payments to their CEOs and their four other most highly paid executive officers. Though the sample is based on the firms subject to the new Ontario regulation, most large Canadian firms are listed on the Toronto Stock Exchange (TSE); the resulting sample is certainly representative of large Canadian firms.⁷ The compensation data is drawn from all corporate proxy statements filed between October 1993 and July 1995, which report executive compensation for fiscal years 1991 through 1994.

Executive remuneration has several components. Current cash payments (salary, annual bonus, and various benefits) are reported, along with stock options, grants of restricted stock units, and long-term incentive plan payouts. In a broad sense, these components can be classified into four categories: salary, annual bonus, long-term incentive payments, and other payments. Indirect-pay-related benefits reported in proxy statements include stock gains from exercising previously rewarded stock options and stock holdings of directors.⁸ Because the disclosure rules require firms to provide only the current fiscal year information on executive stock gains and directors' stock ownership, the data of these two items are only available for fiscal years ending 1993 and 1994.

Financial data on Canadian firms are obtained from the *Financial Post* data file. Because the change in CEO payment will be used as the dependent variable in regressions below, those firms that have only 1-year data are ignored. Excluding partial compensation due to turnover, firm reorganization, fiscal year change and part-time service, and eliminating the observations with missing data after matching CEO compensation with firm financial data, the Canadian sample contains 365 firms for a total of 1183 observations.

⁶ Both Jensen and Murphy (1990) and Joskow and Rose (1994) confirm a significant influence of the previous performance on current compensation. Such a phenomenon partly results from the ambiguity of the timing of performance payments in both the decision and the firm's report (see Jensen and Murphy). In addition, various long-term incentive payments that usually depend on performance over several years directly link current compensation with previous performance.

⁷ For example, by either total assets or sales levels in fiscal year 1993, more than 90% of the 300 largest Canadian firms are traded on the TSE. The compensation data includes 98% of TSE100 firms and 92% of TSE300 firms.

⁸ In most cases, a CEO is also a director.

2.3.2. The US data

The CEO compensation data of US firms are obtained from the *Forbes'* annual report of executive compensation for fiscal years 1991 to 1994. The report includes three compensation categories: total salary plus bonus, stock gains, and other. Total salary plus bonus is the same as the sum of salary and annual bonus in the Canadian data.⁹ Stock gains are the net value realized from exercising options previously awarded. The category of other pay includes long-term incentive payments (which are reported separately in Canadian firms' proxy statements) and various benefits. CEO stock ownership is also reported in terms of the value of each executive's stock holdings as a percentage of the firm's total market value. The financial data for US firms are obtained from the Standard and Poor's *Compustat*. The US sample contains 675 firms with a total of 2159 observations.

2.3.3. Selected statistics

This paper focuses on CEOs' direct payments and stock ownership. The *Forbes'* survey on US CEO compensation does not report stock holdings under options, and so it is difficult to make a direct comparison of the pay–performance linkage associated with stock options. The effect of option-related incentives will be discussed in Section 3.3. The pay variables in the Canadian sample include salary, bonus, long-term incentive payments, and various benefits. These four components are combined to form two major pay variables, salary plus bonus and total direct pay excluding stock options (or total pay thereafter), which can be measured for each firm in both the Canadian sample and the US sample. Discussions below will focus on these two pay variables. Table 1 summarizes selected statistics of CEO pay as well as some firm variables. The value of Canadian variables is converted into US dollars based on annual average exchange rates.¹⁰ All variables are in 1991 constant dollars.

There exists a substantial difference in firm size between the Canadian sample and the US sample. Based on median assets and sales, the average size of US firms is about 12 to 15 times as large as that of Canadian firms. The median total pay to US CEOs is about four times as high as that of Canadian CEOs. Supposing that there is a common managerial labor market for Canada and the US, these observations are consistent with the allocation theory of control: in a market equilibrium, the most talented executives occupy positions in the largest firms and thus receive the highest pay (Rosen, 1992). They are also consistent with the fact that the firm-size elasticity of executive compensation is smaller than one.

⁹ The Ontario disclosure rules closely follow the US disclosure rules that require firms to disclose executive compensation in standardized tables. Before 1993, CEO salary and bonus are reported as a total in the *Forbes* reports.

¹⁰ To avoid introducing noises into the data, all Canadian variables remain unconverted in regressions, which affects the constant term in the joint-sample estimation but has little impact on the performance-related coefficients.

Table 1
Selected statistics^a

	Canadian firms			US firms		
	Median	Mean	Observation	Median	Mean	Observation
<i>Pay variables (\$ in thousands)</i>						
Salary + bonus	274	365	1183	917	1137	2159
Total pay	290	404	1183	1115	1572	2159
(Salary + bonus)/Total (%)	100.0	94.0	1183	90.1	82.4	2159
<i>Firm variables (\$ in millions)</i>						
Assets	284	2461	1180	4291	12,308	2150
Sales	211	1180	1180	2540	5216	2145
Market value	242	795	1180	1946	4135	2154
Shareholder return (%)	9.92	25.4	1183	11.7	23.5	2145

^aThe data is from the 1991–1994 sample. Total pay includes all components of direct compensation except stock options. All variables are annual and in 1991 US dollars.

Salary and bonus are the most important compensation components in both Canadian and US firms, constituting an average of 94% of total pay for Canadian CEOs and 82.4% of total pay for US CEOs.¹¹ It is interesting to observe that the median and mean values suggest a left-skewed distribution for this percentage. Noticing that the distribution of firm size is right-skewed, this seems to suggest that larger firms tend to use more long-term incentive payments and other benefits, or emphasize a variety of incentive pay.

3. Incentive strength

3.1. Incentives from direct pay

The comparison with CEO direct compensation focuses on salary plus bonus and total pay, using both the arithmetic and the elasticity specifications. In the first stage of the analysis, the Canadian and US samples are combined and regressions are performed for the total sample using the two specifications by introducing a dummy variable, *CND*, for Canadian firms.

Table 2 presents the results.¹² The first two columns present the results from the arithmetic estimation. The sum of the coefficients on changes in shareholder

¹¹ When stock gains from exercising previously awarded options are included in total pay, the percentage of salary and bonus in total pay for US CEOs drops to 72. This is consistent with the finding of Joskow and Rose (1994) that salary and bonus averaged 82% of total compensation during 1972 to 1990, and the percentage declined by an average of 1.1% points per year (p. 13).

¹² As the constant terms are not of our interest, they are not reported in the tables.

Table 2
 Estimation of pay–performance sensitivity (total sample)^a

Independent variables	Dependent variables			
	Arithmetic estimation		Elasticity estimation	
	$\Delta(\text{Salary} + \text{bonus})$	$\Delta(\text{Total pay})$	$\Delta\log(\text{Salary} + \text{bonus})$	$\Delta\log(\text{Total pay})$
$\Delta(\text{Shareholder wealth})$	0.000073 (6.6)	0.000149 (6.5)	–	–
$\Delta(\text{Shareholder wealth})_{-1}$	0.000007 (0.6)	0.000034 (1.5)	–	–
$\text{CND} \times \Delta(\text{Shareholder wealth})$	–0.000011 (–0.2)	–0.000023 (–0.2)	–	–
$\text{CND} \times \Delta(\text{Shareholder wealth})_{-1}$	0.000035 (0.8)	0.000010 (0.1)	–	–
$\Delta\log(\text{Shareholder wealth})$	–	–	0.245 (9.1)	0.335 (9.2)
$\Delta\log(\text{Shareholder wealth})_{-1}$	–	–	0.033 (1.3)	0.063 (1.8)
$\text{CND} \times \Delta\log(\text{Shareholder wealth})$	–	–	–0.135 (–4.3)	–0.224 (–5.3)
$\text{CND} \times \Delta\log(\text{Shareholder wealth})_{-1}$	–	–	–0.012 (–0.4)	–0.044 (–1.1)
R^2	0.023	0.024	0.051	0.045
Observations	2245	2245	2549	2549

^a t -Statistics are in parentheses. CND is a dummy variable for Canadian firms.

wealth estimates the pay–performance sensitivity for US firms. The coefficients on the corresponding terms with dummy variable CND estimate the Canada–US difference in the sensitivity. Including the coefficients on the previous year’s performance, the sensitivity for US firms is eight cents change in salary and bonus for every \$1000 change in shareholder value. Of the change in total pay, the sensitivity increases to 18 cents for every \$1000 change in shareholder wealth. These estimates are consistent with, though higher than, those of previous studies.¹³ The focus here is the coefficients on the dummy variable for Canadian firms. The estimates of these coefficients can be summarized as the following: the sign is mixed, the magnitude of the coefficients is relatively small, and none is significant. This result suggests no significant difference in the pay–performance sensitivity between Canadian firms and US firms.

The regressions for the elasticity specification, however, are quite different, as shown in the third and fourth columns of Table 2. All the coefficients on dummy variable CND are negative and are statistically significant at the 1% level for the current year’s change in shareholder wealth. Including both the current and previous years’ performance variables, the elasticity of salary plus bonus with respect to shareholder value is 0.278 for US firms and 0.131 for Canadian firms. For every 1% increase in shareholder wealth, US CEOs’ salary and bonus increases by about 0.28% while the Canadian counterpart increases by 0.13%. The difference is even larger with the elasticity of total pay. The large magnitude and high significance level of the difference in the elasticity implies that CEO payments are much less sensitive to firm performance in Canadian firms than in US firms.

This result, apparently, contradicts that from the arithmetic estimation. A possible reason for this inconsistency is sample heterogeneity which poses a problem when it has an asymmetric effect on the two specifications. As observed by earlier studies, while the elasticity estimator seems quite robust to firm size, the arithmetic sensitivity estimator declines notably as firms size increases. This suggests the possibility that the Canada–US difference may not be revealed using the arithmetic estimation because of the large difference in firm size between the two samples. To clarify this issue, we now examine firm-size heterogeneity.

Firm size is usually proxied by total assets or sales. Noticing that the distribution of sales is less skewed than that of total assets, we use average sales during the years 1991 to 1994 as a proxy for firm size throughout the discussion. Fig. 1

¹³ Using the *Forbes* sample during 1974–1986, Jensen and Murphy (1990) report a sensitivity of 0.000022 and 0.000033 with respect to salary plus bonus and total pay, respectively. With a similar sample for the period between 1986 and 1990, Schaefer (1995) identifies a sensitivity of about three times as large as that of Jensen and Murphy. These results are consistent with the observation of Joskow and Rose (1994) that CEO compensation in the US firms surveyed by *Forbes* became significantly more sensitive to firm performance during the 1980s compared to the 1970s.

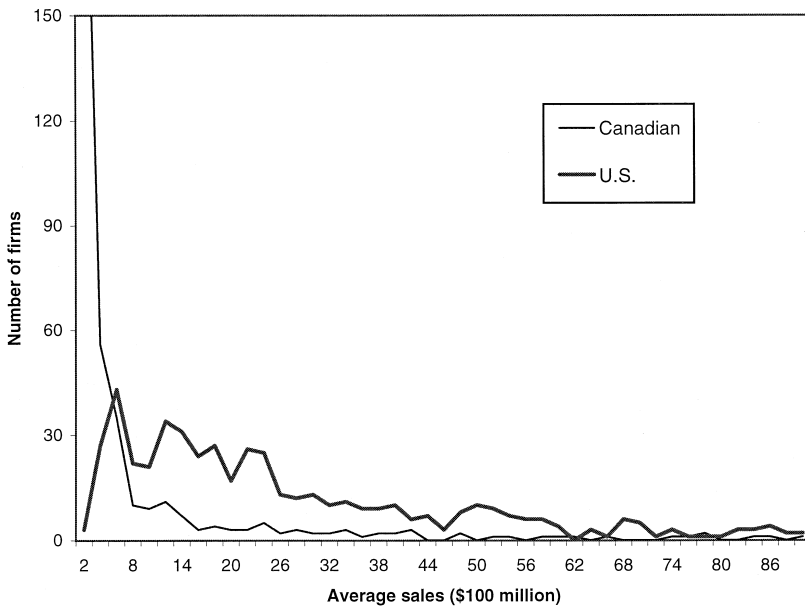


Fig. 1. Distribution of firms.

illustrates the firm size distribution for the two samples. While about 80% of Canadian firms in our sample have average sales below 500 million, only about 9% of the US firms have average sales below this level. Given such a striking difference in firm-size distribution between the two samples, a distortion unavoidably occurs in the arithmetic estimation. In this paper, we adopt an approach that minimizes size heterogeneity by directly controlling for the sample that is used. Taking into account the number of firms and the firm-size distributions, we choose to include those firms with average sales between \$400 million and \$8 billion; this subsample contains 36% of the total Canadian sample and 78% of the total US sample. These firms are further divided into two subsamples for both Canadian firms and US firms. Subsample 1 includes firms with average sales between \$400 million and \$1 billion, and subsample 2 includes those that have average sales between \$1 billion and \$8 billion. As shown in Table 3, with the two subsamples, the Canadian and US firms have similar median and mean values of average sales.

After controlling for size heterogeneity, the regressions in Table 2 were rerun for the subsamples. We first examined the total subsample (subsample 1 plus 2) which includes 130 Canadian firms and 528 US firms. The results are presented in Table 4. The two specifications now provide consistent estimates of the Canada–US difference, and both confirm a weaker pay–performance linkage for Canadian firms. The coefficients of the current year performance interacted with the dummy

Table 3
Differences in firm size^a

	Canadian firms			US firms		
	Median size	Mean size	Number of firms	Median size	Mean size	Number of firms
Total sample	222	840	365	2395	5226	675
Subsample 1	546	617	65	645	666	95
Subsample 2	2394	2949	65	2549	3090	433

^a Firm size is measured as average sales in \$1 million. Subsample 1 includes firms with average sales between \$400 million and \$1 billion, and subsample 2 includes firms with average sales between \$1 billion and \$8 billion.

variable *CND* are all significantly negative.¹⁴ Including the effect of the previous year's performance, the arithmetic sensitivity of CEO total pay to shareholder wealth for Canadian firms is only about 22% of the corresponding US value. Similarly, the shareholder-value elasticity of total pay in Canadian firms is about 27% of the US number. These results establish that the incentive strength of CEO direct pay is weaker for the Canadian firms in the total subsamples 1 and 2.

Table 5 presents the regressions for subsamples 1 and 2 separately. The results for subsample 1 are qualitatively similar to those for the total subsample, but the estimate of the Canada–US difference becomes larger. This suggests a larger Canada–US difference in pay–performance relations for the subsample of smaller firms. This observation is strengthened by the regressions for subsample 2, in which although most coefficients of firm performance interacted with *CND* are negative, none is significant. Compared with the results from subsample 1, the magnitude of the coefficients for the Canada–US difference are substantially reduced with subsample 2. On one hand, the overwhelmingly negative sign of these coefficients still suggests a weaker pay–performance linkage in Canadian firms. On the other hand, the low significance level and smaller magnitude of the coefficients imply that there is no real economic difference in incentive strength for the subsample of larger firms.

All of the subsample regressions indicate a weaker pay–performance relationship in Canadian firms, and the regressions for the two separate subsamples suggest an inverse relationship between the Canada–US difference and firm size. Using an alternative approach, we will provide further evidence for these results and then extend them to the total sample.

¹⁴ The two coefficients in the arithmetic estimation are statistically significant at the 10% level and the two in the elasticity estimation are statistically significant at the 5% level. The relatively low significance level in the arithmetic estimation may reflect the effect of the remaining size difference between Canadian firms and US firms in the total subsamples 1 and 2, where the average US firms are about twice as large as the average Canadian firms.

Table 4

Estimation of pay–performance sensitivity (subsample 1 plus 2)^a

Independent variables	Dependent variables			
	Arithmetic estimation		Elasticity estimation	
	$\Delta(\text{Salary} + \text{bonus})$	$\Delta(\text{Total pay})$	$\Delta\log(\text{Salary} + \text{bonus})$	$\Delta\log(\text{Total pay})$
$\Delta(\text{Shareholder wealth})$	0.000154 (5.8)	0.000340 (6.3)	–	–
$\Delta(\text{Shareholder wealth})_{-1}$	0.000000 (0.0)	–0.000010 (–0.2)	–	–
$\text{CND} \times \Delta(\text{Shareholder wealth})$	–0.000148 (–1.9)	–0.000294 (–1.9)	–	–
$\text{CND} \times \Delta(\text{Shareholder wealth})_{-1}$	0.000025 (0.4)	0.000037 (0.3)	–	–
$\Delta\log(\text{Shareholder wealth})$	–	–	0.228 (7.7)	0.314 (8.1)
$\Delta\log(\text{Shareholder wealth})_{-1}$	–	–	0.028 (1.0)	0.052 (1.4)
$\text{CND} \times \Delta\log(\text{Shareholder wealth})$	–	–	–0.143 (–2.4)	–0.179 (–2.3)
$\text{CND} \times \Delta\log(\text{Shareholder wealth})_{-1}$	–	–	–0.046 (–1.0)	–0.088 (–1.5)
R^2	0.025	0.029	0.046	0.051
Observations	1396	1396	1408	1408

^a t -Statistics are in parentheses. CND is a dummy variable for Canadian firms. The sample includes firms with average sales between \$400 million and \$8 billion.

Table 5

Estimation of pay—performance sensitivity (subsamples)^a

Independent variables

Dependent variables

Subsample 1

Subsample 2

	$\Delta(\text{Salary} + \text{bonus})$	$\Delta(\text{Total pay})$	$\Delta \log(\text{Salary} + \text{bonus})$	$\Delta \log(\text{Total pay})$	$\Delta(\text{Salary} + \text{bonus})$	$\Delta(\text{Total pay})$	$\Delta \log(\text{Salary} + \text{bonus})$	$\Delta \log(\text{Total pay})$
$\Delta(\text{Shareholder wealth})$	0.000110 (2.6)	0.000216 (2.0)	—	—	0.000155 (5.1)	0.000346 (5.7)	—	—
$\Delta(\text{Shareholder wealth})_{-1}$	—0.000031 (—0.6)	0.000295 (2.4)	—	—	0.000000 (0.0)	—0.000021 (—0.4)	—	—
$\text{CND} \times \Delta$ (Shareholder wealth)	—0.000162 (—3.1)	—0.000264 (—2.0)	—	—	—0.000090 (—0.7)	—0.000199 (—0.8)	—	—
$\text{CND} \times \Delta$	0.000115 (2.1)	—0.000209 (—1.5)	—	—	—0.000021 (—0.2)	0.000001 (0.0)	—	—
$\Delta \log$ (Shareholder wealth)	—	—	0.247 (3.5)	0.239 (2.8)	—	—	0.232 (7.1)	0.333 (7.5)
$\Delta \log$ (Shareholder wealth) ₋₁	—	—	—0.086 (—1.4)	—0.003 (0.0)	—	—	0.070 (2.1)	0.080 (1.8)
$\text{CND} \times \Delta \log$ (Shareholder wealth)	—	—	—0.216 (—2.2)	—0.155 (—1.3)	—	—	—0.097 (—1.3)	—0.150 (—1.4)
$\text{CND} \times \Delta \log$ (Shareholder wealth) ₋₁	—	—	0.030 (0.4)	—0.077 (—0.9)	—	—	—0.025 (—0.4)	—0.046 (—0.5)
R^2	0.072 314	0.035 314	0.046 321	0.037 321	0.024 1081	0.030 1081	0.055 1086	0.057 1086

^a t-Statistics are in parentheses. CND is a dummy variable for Canadian firms. Subsample 1 includes firms with average sales between \$400 million and \$1 billion, and subsample 2 includes firms with average sales between \$1 billion and \$8 billion.

As pointed out by Gibbons and Murphy (1992), and confirmed by the above regressions, the elasticity estimator changes little with firm size among large US firms. Thus, to proceed, we assume that the elasticity of CEO pay with respect to firm performance is roughly constant within the US sample. Under this assumption, and introducing the variable SIZE to measure firm size and the dummy variable CND to denote Canadian firms, specification (2) is revised as follows:

$$\Delta \log(W_t) = [\phi_0 + (\phi_1 + \phi_2 \text{SIZE})\text{CND}] + [\eta_0 + (\eta_1 + \eta_2 \text{SIZE})\text{CND}] \Delta \log(Y_t), \quad (3)$$

where SIZE is equal to the firm's average sales during 1991–1994. The sum $\eta_1 + \eta_2 \text{SIZE}$, as a linear approximation, characterizes the relationship between firm size and the Canada–US difference in pay–performance elasticity. A negative value of the sum means a weaker incentive strength with Canadian firms. To check whether the Canada–US difference declines as firm size increases, we simply check whether η_2 is significantly positive.

Estimates of Eq. (3) for the total sample are reported in Table 6. Columns 1 and 3 present coefficient estimates when only the current year's performance variables are regressors. In both regressions, the coefficient on the term $\text{CND} \times \Delta \log(\text{Shareholder wealth})$, or η_1 , is significantly negative. The coefficient on the term $\text{CND} \times \text{SIZE} \times \Delta \log(\text{Shareholder wealth})$, or η_2 , is positive in both regressions and significant at the 5% level with total pay. When $\text{SIZE} < \$3$ billion,

Table 6
The Canada–US differential and firm size (total sample)^a

Independent variables	Dependent variables			
	$\Delta \log(\text{Salary} + \text{bonus})$		$\Delta \log(\text{Total pay})$	
	(1)	(2)	(3)	(4)
$\Delta \log$ (Shareholder wealth)	0.258 (9.6)	0.245 (9.1)	0.344 (9.6)	0.335 (9.2)
$\text{CND} \times \Delta \log$ (Shareholder wealth)	−0.161 (−5.1)	−0.143 (−4.4)	−0.257 (−6.0)	−0.242 (−5.6)
$\text{CND} \times \text{SIZE} \times \Delta \log$ (Shareholder wealth)	0.00004 (1.5)	0.00004 (1.3)	0.00009 (2.4)	0.00008 (2.0)
$\Delta \log$ (Shareholder wealth) _{−1}	—	0.033 (1.3)	—	0.063 (1.8)
$\text{CND} \times \Delta \log$ (Shareholder wealth) _{−1}	—	−0.003 (−0.1)	—	−0.028 (−0.7)
$\text{CND} \times \text{SIZE} \times \Delta \log$ (Shareholder wealth) _{−1}	—	−0.00002 (−0.9)	—	−0.00005 (−1.5)
R^2	0.053	0.054	0.046	0.048
Observations	2605	2549	2605	2549

^a t-Statistics are in parentheses. CND is a dummy variable for Canadian firms. SIZE is measured as the firm's average sales in \$1 million.

which is the case for about 93% of all Canadian firms in the sample, the point estimate of $\eta_1 + \eta_2 \text{SIZE}$ is negative. These results verify the above observation that the pay–performance linkage is weaker in Canadian firms than in US firms, and that the difference declines as firms expand. For example, for a Canadian firm with average sales of \$100 million, the elasticity is 0.101 for salary and bonus and 0.097 for total pay, which is about 39 and 28%, respectively, of the US counterparts. As average sales increase to \$1 billion, these elasticities for Canadian firms rise to 0.140 and 0.175, respectively, and become 54 and 51% of the US estimates. When the performance variables of the previous year are included, the qualitative results remain the same, as shown in columns 2 and 4.

3.2. Incentives from stock ownership

Stock ownership provides another important contribution to managerial incentives. Compared with direct compensation, the incentive effects of stock ownership are arguably greater. According to Jensen and Murphy (1990), the incentive intensity of CEO stock ownership in terms of the arithmetic pay–performance sensitivity is about eight times as high as that of total direct pay. Hence, it is necessary to examine the incentives from CEO stock ownership before a reasonable conclusion can be drawn on the relative intensity of managerial incentives between the Canadian and US firms.

The data of Canadian CEOs' stock ownership are obtained from the firm's proxy statements for the fiscal years ending 1993 and 1994. The stock holdings of US CEOs for the same fiscal years as the percentage of the firm's total market value are obtained from the *Forbes'* annual report. The data includes the shares held by family members but excludes the shares acquirable through options.

Wealth changes in CEOs' stock ownership are directly linked with changes in shareholder wealth. The percentage of a CEO's stock shares in her firm's total shares outstanding has the same incentive interpretation as the arithmetic pay–performance sensitivity. Table 7 summarizes the percentages of CEO stock holdings in the firm's total shares outstanding. For the total samples, Canadian CEOs own an average of 2.811% and a median of 0.161% of their firms' stocks, while US CEOs own an average of 1.823% and a median of 0.17%.¹⁵ The close medians but higher mean percentage for Canadian CEOs seem to suggest a higher stock holdings, and thus a stronger incentive strength associated with CEO stock ownership, in the Canadian sample.

As before, firm-size heterogeneity affects the Canada–US comparison of CEO stock ownership. For this reason, the percentage owned is also calculated for the

¹⁵ The mean and median levels of US CEOs' stock ownership are similar to, but smaller than, that reported by Jensen and Murphy (2.42 and 0.25%, respectively). One possible reason for the difference is that before 1991 the *Forbes'* report on stock ownership includes options that can be exercised within 60 days.

Table 7

CEO stock ownership as the percentage of total shares outstanding^a

	Canadian CEOs		US CEOs	
	Median (%)	Mean (%)	Median (%)	Mean (%)
Total sample	0.161	2.811	0.170	1.823
Subsample 1	0.056	1.124	0.360	2.271
Subsample 2	0.026	0.833	0.170	2.052

^aThe data is from the 1993–1994 sample.

two subsamples. Table 7 shows that Canadian CEOs in subsample 1 own a median of 0.056% (a mean of 1.124%) of their firm's stock, compared with a median of 0.36% (a mean of 2.271%) owned by US CEOs. In subsample 2, the median percentage becomes 0.026 (mean percentage 0.833) for Canadian CEOs and 0.170 (mean percentage 2.052) for US CEOs. With firm size being controlled, the results indicate that Canadian CEOs hold a much smaller percentage of their firms' stock than their US counterparts do. In other words, the incentives provided by stock ownership are smaller in Canadian firms than in US firms. This observation is consistent with the earlier results from direct compensation.

Table 8 summarizes the pay–performance sensitivities for the two subsamples. The difference between the Canadian firms and the US firms is striking: For every \$1000 increase in shareholder wealth, while US CEOs' wealth including direct pay and stock holdings (based on the median holdings) increases \$4.11 and \$2.03, respectively, with subsamples 1 and 2, the Canadian counterpart increases only 60 cents and 39 cents, respectively.

3.3. The effect of stock options

It is widely recognized that stock options have become an increasingly important component of executive compensation. We thus need to determine whether or not ignoring options undermines the comparisons made above.

Table 8

Summary of pay–performance sensitivities: changes in CEO wealth for a \$1000 change in shareholder wealth^a

	Canadian firms		US firms	
	Subsample 1 (\$)	Subsample 2 (\$)	Subsample 1 (\$)	Subsample 2 (\$)
Salary and bonus	0.032	0.044	0.079	0.155
Total pay	0.038	0.127	0.511	0.325
Median stock holdings	0.560	0.260	3.600	1.700
Total sensitivity	0.598	0.387	4.111	2.025

^aThe data for salary plus bonus and total pay is from Table 5, and the data for stock holdings is from Table 7.

Table 9

Ratio of stock gains (from exercising previously granted options) over total pay^a

	Canadian CEOs		US CEOs	
	Median	Mean	Median	Mean
Total sample	0.000	0.498	0.080	0.634
Subsample 1	0.000	0.232	0.126	0.786
Subsample 2	0.000	0.067	0.063	0.634

^aThe data is from the 1993–1994 sample. Total pay includes all direct payments excluding the stock gains from exercising options.

Jensen and Murphy (1990) obtain an estimate of 0.00015 for the pay–performance sensitivity of CEO options for 73 *Fortune 500* manufacturing firms during the period of 1969 to 1983; they include currently granted options and stock gains from exercising previously awarded options. This sensitivity is about seven times as large as the sensitivity they estimate for salary and bonus. Examining 147 banks over the decade of the 1980s, Hubbard and Palia (1995) find a sensitivity for options that is about six times as large as that for salary plus bonus. Given that the sensitivity of total pay is roughly twice as large as that of salary plus bonus,¹⁶ both of these studies suggest that for large US firms, the incentive strength associated with stock options is three to four times as large as that associated with total cash compensation.

Supposing that stock options play a similar role in CEO compensation across Canada and the United States including options in the comparison made earlier should not change the qualitative results concerning the Canada–US difference in managerial incentives. On the other hand, because the incentive strength from CEO stock ownership is about six times as large as that from total pay in US firms, and since Canadian CEOs hold percentages of their firms' stocks that based on median holdings are less than one quarter of that of US CEOs, even a modest difference in option-related incentives between Canadian firms and US firms is unlikely to change our earlier conclusions.

To pursue this matter, we also compare, between the two countries and for different samples, the ratio of the gains from exercising prior options to CEO total pay (excluding the stock gains). There are two reasons for undertaking this comparison. First, because executive options are nontransferable, the ratio of the stock gains to total pay gives an estimate of the relative importance of options as a pay component, which in turn reflects the relative importance of option-related managerial incentives. Second, the option data is available for both Canadian firms

¹⁶ See Jensen and Murphy (1990) and the estimates of this paper.

and US firms for the fiscal years ending 1993 and 1994. As shown in Table 9, the ratio is smaller in Canadian firms than in US firms for both the total sample and each subsample. On average, the stock gains constitute 23.2 and 6.7%, for subsamples 1 and 2, respectively, of total direct compensation for Canadian CEOs, which are less than 30% of those for US CEOs. This difference suggests a notably smaller role for stock options in Canadian firms than in US firms. Thus, had we been able to include options in the econometric comparison, the Canada–US difference in managerial incentive strengths would likely have been even larger.

4. Incentives and performance

Managerial incentive schemes are important because of their impact on corporate performance. That is, because managerial effort increases with incentive strength, a stronger pay–performance linkage is expected to lead systematically better firm performance. Abowd (1990) obtains evidence supporting this argument. Examining managerial compensation for 250 large corporations during 1981–1986, Abowd finds that increases in the sensitivity of compensation to shareholder return enhanced corporate performance. Given the Canada–US difference in management incentives discussed above, we now examine whether or not US firms have in fact outperformed Canadian firms.

A CEO pay scheme is expected to affect a firm's fundamentals. We first examined the average rates of return to the firm's common stock during the related period. Because of a potential positive correlation between the mean and variance of return, average returns alone may not tell the whole story. For this reason, the performance measure of the average return to the return standard deviation, a Sharpe measure for portfolio performance,¹⁷ is examined as well.

The upper panel of Table 10 compares the monthly return over the years 1991 to 1994. The Canadian monthly data is obtained from the University of Western Ontario's TSE monthly return file. The US data is retrieved from the CRSP stock return file. To be consistent with the discussion of Section 3, we focus on the results for two subsamples. As shown in the table, the average return to common stock is smaller for Canadian firms than for US firms though the standard deviation is quite close between the two countries. Consequently, the ratio of average return to return standard deviation is notably smaller for the Canadian subsamples. With mean values,¹⁸ this ratio for Canadian firms is 0.140 and 0.107 for subsamples 1 and 2, respectively, which are 75 and 72% of the corresponding

¹⁷ See, e.g., Jobson and Korkie (1981).

¹⁸ Because the distribution of the ratio does not seem skewed, the mean values are more suggestive than the median values as the number of observations is relatively small.

Table 10

Comparison of firm performance: Market return^a

	Average return (%)		Standard deviation		Average return/ standard deviation	
	Median	Mean	Median	Mean	Median	Mean
<i>Monthly return (1991–1994)</i>						
Canadian firms						
Total sample	1.32	1.82	0.096	0.115	0.166	0.165
Subsample 1	0.96	0.97	0.088	0.094	0.142	0.140
Subsample 2	0.63	0.51	0.066	0.078	0.096	0.107
US firms						
Total sample	1.08	1.22	0.074	0.080	0.156	0.155
Subsample 1	1.29	1.70	0.080	0.088	0.191	0.186
Subsample 2	1.01	1.16	0.074	0.081	0.154	0.148
<i>Annual return (1984–1994)</i>						
Canadian firms						
Total sample	9.83	19.41	0.331	0.573	0.321	0.295
Subsample 1	9.47	10.61	0.332	0.362	0.313	0.305
Subsample 2	7.41	8.43	0.265	0.325	0.321	0.308
US firms						
Total sample	12.98	16.31	0.254	0.356	0.505	0.517
Subsample 1	15.41	19.54	0.274	0.379	0.548	0.566
Subsample 2	12.13	16.33	0.250	0.373	0.493	0.504

^aUS monthly return is retrieved from the CRSP stock return file. Canadian monthly return is obtained from the return file of the University of Western Ontario's TSE database. Annual returns are calculated from the Standard and Poor's *Compustat* for both US and Canadian firms.

US numbers. These results indicate a better performance of US firms, and, together with the Canada–US difference in pay–performance linkage, are consistent with the notion that managerial incentives affect firm performance.

We also examined the firm's annual stock return during the period of 1984–1994 with the *Compustat* data for both Canadian firms and US firms. The results are presented in the lower panel of Table 10. The differences in the average returns and the ratios of average return to return standard deviation are similar to these resulting monthly data, again indicating poorer performance of Canadian firms. The standard deviation of annual return is also very close between the Canadian firms and US firms. The higher ratio of average return to return standard deviation for US firms comes mainly from much higher average returns.

To eliminate the effect of differences in risk free returns, the above comparison is also made after the return data are adjusted to determine the return premium $r - r_f$, where r denotes the return to the firm's common stock and r_f denotes risk free rates. Yields on three month Treasury Bills are used as r_f . Using $r - r_f$, the Canada–US difference becomes even larger while the qualitative results remain the same.

Table 11
Comparison of firm performance: Tobin's Q^a

	Canadian firms		US firms	
	Median (%)	Mean (%)	Median (%)	Mean (%)
Total sample	0.973	1.192	0.931	1.206
Subsample 1	0.927	0.988	0.901	1.347
Subsample 2	0.820	0.764	0.960	1.224

^aThe values are calculated from the Standard and Poor's *Compustat* data files for the period of 1991–1994.

Another measure of corporate performance commonly used in the finance and accounting literature is Tobin's Q , the ratio of the market value of a firm over the replacement value of assets of the firm. A comparison of Tobin's Q is presented in Table 11. Though the median Q values do not seem different between the Canadian firms and the US firms, the mean values show a notable difference between the two countries consistent with the above results from stock returns. On average, Tobin's Q for Canadian firms is 0.988 and 0.764 for subsamples 1 and 2, respectively, which are 73 and 62% of the corresponding numbers for US firms.

With a close linkage in managerial labor market between Canada and the United States, the superior performance of US firms is expected to be reflected in a higher level of pay to their CEOs. This finds support in the difference in pay levels between Canadian CEOs and their US counterparts. As shown in Table 12, during 1991–1994 an average Canadian CEO in subsample 2 earned a total direct compensation that was about 48% of that of an average US CEO. The percentage decreases to 41 for subsample 1. The difference in the level of CEO pay between the two countries is surprisingly large. There are, certainly, indirect pay-related factors that have not been taken into account. For instance, nonmonetary benefits and job security may be emphasized more in Canadian firms. However, given the importance of various components of direct pay, the difference is unlikely to disappear even if these indirect pay-related factors are included.

Table 12
Comparison of levels of CEO total pay^a

	Canadian CEOs		US CEOs	
	Median	Mean	Median	Mean
Total sample	297	407	1154	1568
Subsample 1	387	414	797	1006
Subsample 2	539	755	1179	1573

^aThe data is from the 1991–1994 sample. All variables are annual and in 1991 (\$ in thousands).

5. Discussion

Given the extensive cultural and institutional linkages between Canada and the US, the salient difference in managerial pay schemes between the two countries is surprising. A natural question is, why haven't Canadian firms adopted managerial pay schemes more similar to their US counterparts. While many factors may play a role and it is difficult to give an exclusive answer, some observations are expected to have a direct relevance to this question. First, the Canadian market is more intensively regulated than is the US market. Several recent studies confirm that pay–performance relations are weaker when firms are regulated or more intensively regulated (e.g., Smith and Watts, 1992; Joskow et al., 1993; Hubbard and Palia, 1995). A direct effect of economic regulation is that it reduces the competitiveness of the market and directs firms to also pursue objectives other than economic profits. Consequently, firms are induced to tie managerial pay less closely to corporate financial performance than they would in an unregulated market.

There is also an indirect effect of economic regulation. Smith and Watts find that “firms with greater investment opportunities employ more skilled executives who have to be given both a higher level of pay and a more pronounced pay–performance relationship.”¹⁹ In other words, more skilled managers need to be compensated with a scheme of a stronger pay–performance relationship.²⁰ Because “regulation may reduce the ability of even exceptional managers to substantively affect firm performance” and “reduces the returns to superior management and greater managerial effort, limiting potential CEO productivity” (Joskow et al., 1993, p. 3), the Canadian market may discourage the best managers. Besides, the higher income taxation in Canada directly reduces a manager's after-tax wealth.²¹ As a result, a less productive environment and higher income taxation may result in generally less-talented management of Canadian firms (as implied by the observation that Canadian CEOs were paid much lower than their US counterparts). This, in turn, requires the managerial pay system to be less sensitive to corporate performance.

In Section 4, we tend to explain the relatively poorer performance of Canadian firms in terms of weaker managerial incentives. According to the managerial quality argument, the difference in corporate performance between the Canadian firms and US firms may also partly result from an inherent difference in managerial skills between the two countries. While a less performance-sensitive

¹⁹ Hubbard and Palia (1995, p. 107).

²⁰ This is consistent with standard agency theory in that the pay–performance sensitivity changes inversely with the cost coefficient of effort.

²¹ There is another effect of income taxation: it may change the structure of pay and thus the riskiness of pay package. While there seems to have little theoretical guidance to this taxation effect on the optimal incentive contract, no empirical work has been reported to identify this effect.

pay scheme may come with less skilled management, it further adversely affects the performance of the management. The information here is that the situation of a less productive environment is deteriorated even more due to the presence of the moral hazard problem, because it is more difficult to provide incentives for less talented managers.

The public disclosure of executive compensation may be another potential factor behind the Canada–US difference in managerial pay schemes. Some recent studies suggest that because of the visibility of executive pay under disclosure, there exist political forces, due to the public disapproval of very high compensation to corporate executives, that implicitly regulate executive compensation and consequently suppress the pay–performance sensitivity (see, e.g., Jensen and Murphy, 1990; Joskow et al., 1993). While no direct evidence has been reported supporting this argument, the public and regulators hold a different view. They believe that under disclosure, the substantially increased shareholders' scrutiny of the firm's compensation policies provides a monitoring scheme that disciplines the behavior of the firm's board compensation committee. As the directors of the committee become more concerned about the relationship between executive compensation and corporate performance, the pay–performance linkage is intensified.²² While executive compensation has been public information for decades in the United States, Canadian firms did not disclose executive pay until late 1993. Hence, with the populist view, a weaker pay–performance relationship of Canadian firms may be partly explained by the lack of public scrutiny in a long period of time of the managerial pay system in Canada. Although this study does not yield the results allowing one to draw a conclusion on the impact of executive compensation disclosure, it is worth noting the important and complex role disclosure regulations may play. Further study is needed to identify this role.

6. Conclusion

This paper compares managerial incentives from CEO direct compensation and stock ownership between large Canadian firms and US firms during the period of 1991–1994. Much attention is paid to the effect of firm-size heterogeneity between the Canadian sample and the US sample, as this proves crucial for the

²² For instance, commenting on the new Ontario disclosure rules, Dimma (1994) predicts that they will result in more emphasis on both short-term cash bonuses and long-term stock options or stock appreciation rights, with less emphasis on salaries. Dimma explains this impact as the following: “With increased disclosure, shareholders activism — primarily but not entirely that of institutional investors — will increase. As always, knowledge is power. Furthermore, compensation committee members will be increasingly sensitive to charges of being captive to management or of looking soft or granting increases out of line with what their peers, sitting on compensation committees of companies in the same industry or in broadly similar industries, are approving” (p. 45).

comparison of incentive strengths. In the presence of firm-size heterogeneity, intersample comparisons may be misleading and dependent on the choice of model specification. This phenomenon occurs because of different effects of firm size on different specifications. When sample heterogeneity is adequately controlled, consistent results are obtained with both the arithmetic sensitivity estimator and the elasticity estimator.

This paper shows that the incentive strength of CEO compensation is weaker in Canadian firms than in US firms but that the difference declines as firm size increases. For firms with average sales between \$400 million and \$8 billion (which is the case with 130 Canadian firms and 528 US firms in our sample), the sensitivity of CEO direct pay to shareholder wealth for Canadian firms is about a quarter of that for the US counterparts. Canadian CEOs hold a percentage of their firm's stock which is less than half of the fraction held by US CEOs.

Examining the return to firms' common stocks and Tobin's *Q*, it is found that US firms outperformed Canadian firms over the years 1991 to 1994. This finding coincides with the fact that during these years, an average Canadian CEO earned a total pay that was about 50% of that of an average US CEO. The observation of a less performance-sensitive managerial pay system, relatively poorer corporate performance and lower CEO pay with Canadian firms is consistent with the argument that the pay–performance relationship, depending on the intensity of economic regulation, affects corporate performance.

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References

- Abowd, J.M., 1990. Does performance based managerial compensation affect corporate performance? *Industrial and Labor Relations Review* 43, 52–73.
- Ciscel, D.H., Carroll, T.M., 1980. The determinants of executive salaries: An econometric survey, *Review of Economic and Statistics*, 7–13.
- Cosh, A., 1975. The remuneration of chief executives in the United Kingdom. *Economic Journal* 85, 75–94.
- Coughlan, A.T., Schmidt, R.M., 1985. Executive compensation, managerial turnover, and firm performance. *Journal of Accounting and Economics* 7, 67–84.
- Dimma, W., 1994. A peek into the boss's pocket book, *Business Quarterly*, Autumn, 41–45.

- Garen, J.E., 1994. Executive compensation and principal–agent theory. *Journal of Political Economy* 102, 1175–1199.
- Gibbons, R., Murphy, K., 1992. Optimal incentive contracts in the presence of career concerns: Theory and evidence. *Journal of Political Economy* 100, 468–505.
- Grossman, S.J., Hart, O.D., 1983. An analysis of the principal–agent problem. *Econometrica* 51, 7–46.
- Hart, O., Holmstrom, B., 1987. The theory of contracts. In: Bewley, T.F. (Ed.), *Advances in Economic Theory Fifth World Congress*. Cambridge University Press, Cambridge.
- Haubrich, J.G., 1994. Risk aversion, performance pay, and the principal–agent problem. *Journal of Political Economy* 102, 258–276.
- Holmstrom, B., 1979. Moral hazard and observability. *Bell Journal of Economics* 10, 74–91.
- Hubbard, R.G., Palia, D., 1995. Executive pay and performance evidence from the US Banking Industry. *Journal of Financial Economics* 39, 105–130.
- Jensen, M.C., Murphy, K.J., 1990. Performance pay and top-management incentives. *Journal of Political Economy* 98, 225–264.
- Jobson, J.D., Korkie, B.M., 1981. Performance hypothesis testing with the sharpe and treynor measures. *Journal of Finance* XXXVI (4), 889–908.
- Joskow, P., Rose, N., 1994. CEO pay and firm performance: Dynamics, asymmetries, and alternative measures of performance. Working paper no. 4976. NBER, Cambridge, MA.
- Joskow, P., Rose, N., Shepard, A., 1993. Regulatory constraints on CEO compensation, Brookings Papers on Economic Activity, Microeconomics, pp. 1–72, with comments and discussions.
- Joskow, P., Rose, N., Wolfram, C., 1996. Political constraints on executive compensation: Evidence from the electric utility industry. *Rand Journal of Economics* 27 (1), 165–182.
- Kaplan, S.N., 1994. Top executive rewards and firm performance: A comparison of Japan and the United States. *Journal of Political Economy* 102, 510–546.
- Kato, T., Rockel, M., 1992. Experiences, credentials, and compensation in the Japanese and U.S. managerial labor markets: Evidence from new micro data. *Journal of the Japanese and International Economics* 6, 30–51.
- Lewellen, W.G., Huntsman, B., 1970. Managerial pay and corporate performance. *American Economic Review* 60, 710–720.
- Masson, R., 1971. Executive motivations, earnings, and consequent equity performance. *Journal of Political Economy* 79, 1278–1292.
- Mirrlees, J.A., 1976. The optimal structure of incentives and authority within an organization. *Bell Journal of Economics* 7, 105–131.
- Murphy, K.J., 1985. Corporate performance and managerial remuneration, an empirical analysis. *Journal of Accounting and Economics* 7, 11–42.
- Rosen, S., 1992. Contracts and the market for executives. In: Werin, L., Wijkander, H. (Eds.), *Contract Economics*. Basil Blackwell, Massachusetts, with comments by Bengt Holmstrom.
- Ross, S.A., 1973. The economic theory of agency: The principal's problem. *American Economic Review (Papers and Proceedings)* 63, 135–139.
- Schaefer, S., 1995. The dependence of CEO pay–performance sensitivity on the value of the firm, Manuscript, Kellogg Graduate School of Management, Northwestern University, Evanston, IL.
- Smith, C.W., Watts, R.L., 1992. The investment opportunity set and corporate financing, dividend and compensation policies. *Journal of Financial Economics* 32, 263–292.
- Zhou, X., 1997. Essays on executive compensation and managerial incentives, PhD dissertation, University of Toronto, Toronto.