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Nanyang Business School

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The Role of Severance Pay in CEO Turnover

Abstract

We examine the effect of CEO severance pay on the likelihood of CEO turnover. We find that severance pay reduces both the frequency and performance sensitivity of turnover. Moreover, we find that these reductions are especially pronounced when, conditional on poor past performance, there remain considerable uncertainties about CEOs' competence. Our findings suggest that severance pay protects CEOs against the risk of dismissal when performance is poor but may only be temporarily so. In addition, we show that variations in the quality of corporate governance do not significantly alter the relation between severance pay and turnover rate, suggesting that the protection effect of severance pay is orthogonal to the effects of corporate governance on CEO turnover.

Keywords: Severance pay, CEO turnover, Performance uncertainty, Corporate governance

JEL classification: G30, G34, J33

1. Introduction

Understanding the determinants of CEO turnover is an important issue that has received considerable research interests. Much of the existing literature focuses on the effects of firm performance, quality of corporate governance, and supply of CEO talents, on turnover.¹ On the other hand, a key element in the turnover process that has been the topic of spirited debate among practitioners, regulators, and scholars, relates to CEO severance pay – the contractually promised pay that the CEO would receive upon dismissal (e.g. Bebchuck and Fried, 2003). While much of this debate revolves around whether severance payments to departed CEOs might have been excessive, there is little empirical evidence on how such pay may affect firms' turnover decisions in the first place. Insights on this issue not only help broaden the understanding of the determinants of CEO turnover, but also shed light on the ongoing debate about the appropriateness of severance pay amounts: if severance pay significantly influences turnover decisions, conclusions based only on the observed pay amounts to dismissed CEOs are subject to a selection bias.

This paper examines the relation between severance pay and CEO turnover. In doing so, our main interest is in identifying the possible *independent* effect of severance pay on turnover, given firm performance, quality of corporate governance, and supply of CEO talent. We seek to address three questions. First, how does severance pay influence the likelihood and performance sensitivity of CEO turnover? Second, what are the circumstances under which such an influence tends to be most pronounced? And third, given the existing literature's central focus on the effects of

¹ For the effect of firm performance on turnover, see, for example, Coughlan and Schmidt (1987), Warner, Watts, and Wruck (1988). Jenter and Kanaan (2010), Kaplan and Minton (2011). For the effect of corporate governance on turnover, see, for example, Weisbach (1988), Denis, Denis, and Sarin (1997), Huson, Parrino, and Starks (1997), Jenter and Lewellen (2010). For the effect of the supply of managerial talent on turnover, see, for example, Parrino (1997).

corporate governance on turnover decision, how might variations in the quality of corporate governance modify the relation between severance pay and CEO turnover?

Severance pay presents both a potential benefit to the CEO and a cost to the firm. Contrasting emphases on the relative importance of these two, albeit related, perspectives lead to opposing views on the effect of severance pay on CEO turnover. First, emphasizing the potential benefit to the CEO, Laux (2008), and Inderst and Mueller (2010), argue that severance pay encourages information revelation by the CEO that improves turnover decision. Specifically, a CEO may, over time, realize that he does not possess sufficient competence to successfully manage the company, but the board still lacks the information to reach a precise estimate of the CEO's competence.² If the severance pay is small relative to the on-the-job compensation, the CEO has an incentive to conceal the negative information from the board so as to retain his position. High severance pay, on the other hand, can induce the CEO to reveal the information, even if such revelation may prompt his dismissal. Further, since lack of CEO competence is likely to be more acute when performance is poorer, the inducement effect of severance pay tends to be more pronounced as firm performance declines. We refer to the view that large severance pay relative to on-the-job compensation induces a poorly performing CEO to disclose unfavorable private information when the observable performance remains inconclusive about his competence as the "*inducement hypothesis*".

The second view on severance pay emphasizes the cost of such pay to the firm. According to this view, large severance pay relative to on-the-job compensation reduces a firm's expected reward from replacing a poorly performing CEO, especially

² CEO competence includes individual talent, the depth of knowledge and understanding about the firm's business, creative ideas about how to grow the firm, the abilities to work with the firm's other senior executives and provide leadership, personal charisma, etc. As such, CEO competence should be viewed broadly as referring to the "fit" or "match" between the CEO's skill set and the challenges that the firm faces.

if the poor performance is insufficiently conclusive about the CEO's competence. As such, large severance pay helps deter the board from replacing the CEO when the firm experiences subpar performance that may be temporary. Using severance pay to make replacement costly, however, may in the end benefit the firm by motivating the CEO to invest in firm-specific human capital or take on risky investments that improve firm value (Berkovich, Israel, and Spiegel, 2000; Ju, Leland, and Senbet, 2003; Almazan and Suarez, 2003). We refer to the view that large severance pay relative to on-the-job compensation protects a CEO against the risk of replacement due to temporary bad performance as the “*protection hypothesis*”.

The arguments for the two hypotheses focus on the turnover decision *given* the severance agreement in place. There are good reasons to suspect that high severance pay may be the result of CEO entrenchment/weak board (Bebchuck and Fried, 2004), which also tends to reduce the likelihood of CEO turnover. To mitigate this endogeneity problem, our analysis uses the ratio between severance pay and on-the-job compensation (henceforth referred to as severance pay) as the key explanatory variable. The idea is that an entrenched CEO who can get the weak board to agree to a large severance pay should also be able to persuade the board into granting significant on-the-job compensation (Wiesbach, 1987; Core, Holthausen, and Larcker, 1999; Adams, Almeida, and Ferreira, 2005; Morse, Nanda, and Seru, 2011). The severance pay also captures the main spirit behind our hypotheses that turnover decisions critically depend on firms' relative benefits from retaining and from dismissing the incumbent CEOs. Nevertheless, we subject our findings to a battery of additional tests so as to ensure that our results capture the *ceteris paribus* effect of severance pay on turnover.

To empirically evaluate the relative merits of the inducement and protection

hypotheses, we take advantage of the recent changes in the regulations on executive compensation disclosure. In 2006, the Securities Exchange Commission (SEC) issued new rules that substantially expanded the scope of compensation disclosures. With respect to severance pay, the new rules mandate that firms tabulate and itemize promised payments under severance agreements in the annual filings. Thus, information furnished by firms after 2006 enables precise estimates of the monetary values of severance pay. For our analysis, we hand collect a large data set of CEO severance pay over the years 2006-2009.

The severance pay obtained from a firm's proxy filing is the *ex ante* contractually specified payment that the CEO would receive upon dismissal. In practice, during the turnover process it is typically the case that a firm enters into a separation agreement with the departing CEO that spells out the details of the "final settlement". The agreement may provide an *actual* payment that is in excess to the *ex ante* pay (Yermack, 2006; Goldman and Huang, 2011). Our analysis focuses on the *ex ante* severance pay because this is the inducement to the CEO or cost to the firm that factors into the CEO's or the firm's calculation before the inception of the turnover process. Consequently, the decision to initiate the turnover process is likely to be largely influenced by the *ex ante* instead of the actual severance pay that the firm and the departing CEO agree upon towards the end of the turnover process.^{3,4}

Our analysis of the data yields three sets of important findings. First, we find that higher severance pay significantly lowers both the level and performance sensitivity

³ To illustrate, on Nov. 8, 2006, H.B. Fuller Company (NYSE:FUL) announced that Al Stroucken, chairman, president and chief executive officer, has decided to resign, effective Dec. 1 2006. Later, the company announced that on Nov. 20, 2006, it signed with Al Stroucken a separation agreement, which modified the terms of Stroucken's existing employment agreement.

⁴ Of course, both the departing CEO and the board may have some expectations about the eventual pay that will result from the negotiations during the turnover process. Nevertheless, since *ex ante* severance pay represents the CEO's reservation level in the negotiation process, it should be positively correlated with the expected actual pay.

of turnover. This finding is inconsistent with the inducement hypothesis but supports the protection hypothesis. Specifically, according to the inducement hypothesis, higher severance pay motivates CEOs to be more forthcoming with unfavorable information, and this inducement effect is especially evident when performance is poor so that potential lack of CEO competence is acute. Thus, larger severance pay increases the likelihood of turnover and strengthens the turnover-performance sensitivity. The protection hypothesis, on the other hand, suggests that higher severance pay alleviates the risk of dismissal to CEOs at times of poor performance, thereby lowering the likelihood of turnover and weakening the turnover-performance sensitivity.

Second, we find that the weakening effect of the severance pay on the turnover-performance sensitivity is especially pronounced when, conditional on poor past firm performance, there remain significant uncertainties about the CEO's competence. This finding provides further evidence in favor of the protection hypothesis. Specifically, when past performance is less revealing of the CEO's competence, self-revelation by the CEO becomes more critical in enabling sound turnover decision by the board. Thus, according to the inducement hypothesis, the strengthening effect of severance pay on turnover-performance sensitivity intensifies when performance is more uncertain. On the other hand, when performance is not particularly telling about the CEO's competence, chances are good that any poor performance may be temporary. Thus, according to the protection hypothesis, the weakening effect of severance pay on turnover-performance sensitivity becomes stronger when performance is more uncertain.

Finally, we show that the protection effect associated with severance pay is not a mere reflection of the potential effects of corporate governance on turnover. In

particular, when we look across subsamples with varying strength of corporate governance, we find that the reductions in the turnover rate and turnover-performance sensitivity due to severance pay are generally of similar statistical and economic significance. This finding suggests, therefore, that the protection effect of severance pay we document tends to be orthogonal to the effects of corporate governance on CEO turnover documented in the previous studies.

There might be two concerns with our findings. First, it is plausible that severance pay may simply proxy for some unobservable CEO or firm characteristics which also influences boards' turnover decisions. For example, it might be that firms tend to provide large severance pay to CEOs that they perceive as highly talented, and are often reluctant to replace such CEOs even in face of poor performance. Thus, the negative effect of severance pay on turnover arises because severance pay is a proxy for CEO talent. Alternatively, as alluded to earlier, it might be that firms with relatively weak boards tend to promise large severance pay to CEOs, and are also slow in replacing those with poor performance. To address this endogeneity problem, we control for an extensive list of variables relating to corporate governance and CEO characteristics in our regressions. We also conduct additional robustness tests, including firm fixed-effect and two-stage treatment regressions. We find that our key results generally survive these additional tests.

Second, we take the view that *ex ante* severance pay is an important element shaping firms' turnover decisions. However, it is plausible that firms strategically set severance pay in accordance to predetermined CEO replacement/retention decisions. For example, firms may increase severance pay and refer to the high cost of dismissal as the reason to avoid replacing poorly performing CEOs. Alternatively, to reduce the costs of dismissing CEOs, firms may lower the promised severance pay in

anticipation of replacing the CEOs. Such strategic behavior would create a seemingly negative effect of severance pay on turnover. We provide evidence indicating that the protection effect of severance pay we found is unlikely to be due to firms strategically setting severance pay ahead of turnover/retention decisions.

Overall, our results reveal that severance pay is an important determinant of CEO turnover, and its effect is consistent with the predictions of the protection hypothesis. Moreover, our results suggest caution in drawing conclusions about the appropriateness of severance pay amounts based on those to dismissed CEOs: since high severance pay protects CEOs against the risk of dismissal when performance is poor but remains inconclusive about CEO competence, a large severance payout is observed precisely when performance becomes highly indicative of low competence, i.e. when performance is sufficiently and consistently bad.

In addition to addressing the literature on CEO turnover, this paper is also closely related to the growing empirical literature on CEO severance pay. One strand of this literature focuses on the determinants of *ex ante* severance pay (Rusticus, 2006; Rao and Xu, 2010; Cadman, Campbell, and Klasa, 2011).⁵ We draw hints from this strand of the literature in our two-stage treatment regression that accounts for the endogeneity of severance pay. This paper, however, also contributes to this strand of the literature. In particular, studies examining the determinants of severance pay typically presume either that severance pay elevates CEO departure rate through encouraging self-revelation (i.e., inducement hypothesis) or that it protects CEO from

⁵ In addition to the determinants of severance pay, Rusticus (2006) also conducts some analysis of the effect of severance pay on turnover, and provides mixed results. There are several key differences between this paper and Rusticus (2006). First, Rusticus (2006) uses a data set of severance pay that ends in 1999, while our much larger data set comes from the post-2006 period where changes in the disclosure regulations enable accurate estimates of severance pay amounts. Second, Rusticus (2006) does not examine how severance pay interacts with firm performance and performance uncertainty to influence the likelihood of turnover. Finally, Rusticus (2006) does not examine the potential effect of corporate governance on the relation between severance pay and the probability of turnover.

being replaced when performance is temporarily poor (i.e., protection hypothesis). Our results provide evidence on the actual mechanism through which *ex ante* severance pay affects CEO turnover.

The second strand of this literature examines the *ex post* CEO severance pay in the separation agreement (Yermack, 2006; Bebchuk and Fried, 2004; Goldman and Huang, 2011). Yermack (2006), and Goldman and Huang (2011), find that the actual pay to a dismissed CEO may substantially exceed the *ex ante* severance pay. As was pointed out previously, our analysis focuses on *ex ante* severance pay, because this is the pay that is likely to have significant bearings on firms' turnover decisions.

The rest of the paper is organized as follows. In Section 2, we describe our data and provide sample statistics. In Section 3, we present our main analysis and the findings. Section 4 contains the results of robustness tests. The paper concludes in Section 5.

2. Data and summary statistics

We draw our initial sample by merging Riskmetrics and ExecuComp over the years 2006-2009. We obtain information on the boards of sample firms from Riskmetrics and that on the components and total sum of annual CEO on-the-job compensation from ExecuComp. We require sample firms have financial and stock price information in Compustat and CRSP over the sample period. This requirement excludes CEO turnovers that are associated with control changes or delisting from the major stock exchanges. The final sample contains 4318 firm-year observations.

We collect data on CEO severance pay in the years 2006-2009 from the sample firms' annual proxy filings (Form DEF 14, DEF 14A, 10-k or 8-k). In July 2006, the SEC issued new rules (Release No. 33-8732a) that significantly expanded the scope of

compensation disclosure requirements. The new rules, which went into effect on December 15th 2006, provide specific guidelines on disclosure of severance pay. In particular, firms are required to tabulate and quantify in annual filings all payments under severance agreements that would become due to the named executives upon dismissals.⁶ Prior to the rule changes, firms disclose whether a severance agreement exists and, should it exist, provide narrative descriptions of the potential payments under the agreement. However, often times the narrative descriptions lack sufficient details to enable precise estimates of the monetary values of the payments. As a result, before 2006 severance pay inferred from a company's filings often significantly underestimates the actual amount of the pay (Cadman et al, 2011).

CEO severance compensation is reported in a firm's filing as the pay to the CEO in the event of "involuntary termination without cause" or "voluntary termination with good reason". Termination with cause is typically narrowly specified as applying if a CEO is found to have engaged in gross misconduct or malfeasance. Thus, circumstances covered by without-cause termination are very broad, and, in particular, include those relating to CEO incompetence or unsatisfactory performance. Voluntary termination with good reason, on the other hand, applies when the CEO resigns after significant reductions in the job scope and/or compensation.

In most instances, the reported payments upon involuntary termination without cause and upon voluntary termination with good reason are the same. When the two amounts differ, we take the larger one as the severance pay. Furthermore, in identifying the pay amount, we follow Cadman et al (2011) to carefully remove from the reported amount the portion which is already "vested", that is, the amount the CEO will receive irrespective of whether he is dismissed or stays on in his position

⁶ In addition to cash payments, severance pay can include benefits of immediate vesting of restricted stocks and options, health care and life insurance benefits, additional pension benefit, compensation for future tax payment and legal expenses incurred by the departing CEO, etc.

(see Appendix C for illustrative examples). Thus, the severance pay we use represents the payment that only becomes due to the CEO upon dismissal.⁷

The total amount of on-the-job compensation is the annual CEO pay (ExecuComp item TDC1), which includes annual stock option grants, salary and bonus, annual restricted stock grants, other annual compensation, long-term incentive payouts, and all other total compensation. On Dec. 12, 2004, Financial Accounting Standards Board (FASB) issued rule FAS 123R which changes the way in which firms report equity-based compensation. We follow Coles et al. (2010) to adjust item TDC1 so that it is comparable across the sample years.

We use the definition of the delta of CEO's wealth in Hayes et al (2012), which is the change in the value of a CEO's wealth for a 1% change in the company's stock price. To compute the delta of the stock-option component of CEO wealth, we employ the procedure in Guay (1999) and Core and Guay (2002).

We identify a CEO turnover in a given year if ExecuComp reveals a change in the name of the CEO. We then obtain information about the turnover by searching for news articles archived in *Factiva*. Based on the news articles, we classify each turnover as either forced or voluntary using the algorithm in Parrino (1997). Specifically, if the news article explicitly mentions that the CEO is fired, ousted, forced from the position, or departs due to unspecified policy differences, the turnover is classified as forced. Among the remaining cases, if the departing CEO is under age 60 the event is also classified as a forced turnover if the announcement article either (1) does not report the reason for the departure as involving death, poor health, or the acceptance of another important position, elsewhere or within the firm, or (2) reports

⁷ The ExecuComp database also reports severance pay. However, there are many errors in the reported numbers, some of which seem to be due to inappropriate reporting format in firms' annual disclosures. Chief among the errors are: 1) it reports missing severance pay, but the number is actually available in the firm's filing; 2) it reports zero severance pay, but the pay is actually positive according to the firm's filing; and 3) it simply reports a wrong number.

that the CEO is retiring, but does not announce the retirement at least 6 months before the succession. In all the other cases, the turnover is classified as voluntary.

Table 1 describes the sample summary statistics. All continuous variables are winsorized at the 1% and 99% percentile (see the Appendix for the definitions of the variables). Panel A of Table 1 provides the summary statistics of the full sample. Of particular interest are compensation, governance, and performance related variables. In our sample, 71.35% of the firm-years severance agreements in place, suggesting that severance pay is widely used by the sample firms. The mean (median) severance pay is \$6.19 million (\$2.19 million), and the mean (median) on-the-job compensation is \$5.44 million (\$3.46 million). The sample mean (median) of severance pay is 1.25 (0.72), and this number increases from zero at the 25th percentile to 1.72 at the 75th percentile, suggesting that there are large variations in the severance pay across the firm-years. Finally, the average CEO delta is around \$699,000, suggesting that on average a 1% increase in stock price increases a CEO's wealth by \$699,000.

Based on the previous studies, we measure the quality of corporate governance using board size (Yermack, 1997), board independence (Weisbach, 1988), CEO-chairman duality (Goyal and Park, 2002), independent director's percentage ownership, and block institutional ownership (Cremer and Nair, 2005). In the full sample, the mean (median) board size is 9.37 (9), and the mean (median) board independence -- the proportion of independent directors -- is 0.75 (0.78). The mean (median) percentage ownership by independent directors is 1.25% (0.35%), while the mean and median block institutional holdings are fairly close at 0.21 and 0.20, respectively.

For much of our analysis, we measure firm performance based on past stock return. We calculate the return-based performance based on two considerations. First,

economic theories suggest that optimal assessment of a CEO's competence should be based on the firm's performance relative to that of the peer firms when all performance is influenced by common factors that are beyond the CEO's control (Holmstrom, 1979, 1982; Diamond and Verrechia, 1982). Consistent with these theories, previous studies find that industry-adjusted stock return significantly influences the likelihood of CEO turnover (Morck, Shleifer, and Vishny, 1989; Barro and Barro, 1990; and Gibbons and Murphy, 1990). Thus, we rely on the firm's industry-adjusted (at 2-digit SIC code) stock return to measure past performance.

Second, previous studies show that the likelihood of CEO turnover is closely related to a firm's past stock return over multiple years (Parrino, 1997; Jenter and Lewellen, 2010). We consider the firm's industry-adjusted stock return over the previous three years. On the other hand, because it is unclear at what frequency the CEO is periodically assessed, we compute the firm's past performance as the average monthly industry-adjusted stock return over the three-year period (henceforth referred to as 3-year average return).⁸

In addition to the stock-return based measure, we also consider accounting-based performance, namely, 3-year average return-on-asset (ROA), which is computed as the average annually industry-adjusted ROA over the previous three years.

Panel A shows that the mean and median of 3-year average return for sample firm-years are the same at 0.28%, suggesting that the returns are evenly distributed around the mean. Further, there is considerable dispersion in the distribution of 3-year average return: it increases from -0.46% at the 25th percentile to 1.03% at the 75th percentile, implying a 1.49% spread on a monthly basis. For the accounting-based performance, the 3-year average ROA has a mean of 0.07 and a median of 0.04.

⁸ The key findings of our analysis generally remain valid if we use the average of quarterly or annual returns.

Panel B of Table 1 compares the subsamples of firm-years that do not experience turnovers, those experience forced turnovers, and those experience voluntary turnovers. The total number of turnover events in our sample is 360, representing a turnover rate of about 8.3%, a figure that is consistent with the turnover rates in Huson et al. (2001), and Parrino et al. (2003). Among the turnovers, 26% (94 events) are forced. This proportion of forced turnovers is similar to those in the previous studies (Parrino, 1997; Huson et al., 2001; Yermack, 2006)

Panel B shows that the means (medians) of on-the-job compensation in the non-turnover, forced turnover, and voluntary turnover subsamples are comparable with one another. However, the mean (median) of severance pay in the non-turnover subsample is significantly higher than those in the forced and voluntary turnover subsamples. Not surprisingly, the severance pay is much higher in the non-turnover subsample than in the other two subsamples. These comparisons are suggestive that lower severance pay is associated with a higher likelihood of turnover.

Comparisons of governance variables show that there are only small differences in board size, board independence, independent directors' ownership, and block institutional ownership across the three subsamples.

There are, however, large differences in the stock return performance across the three subsamples. In terms of both the mean and median numbers, the forced-turnover subsample has the worst 3-year average return, followed by the voluntary-turnover subsample. On the other hand, the 3-year average ROA appears to be quite similar across the three subsamples.

3. Main analysis and findings

3.1 *The basic results*

We use binary probit regression to analyze the likelihood of CEO turnover in a given year. Recent studies suggest that separating between forced and voluntary turnovers can be challenging, and the widely used classification schemes, including that in Parrino (1997), may be imperfect. In particular, some of the turnovers that are deemed as voluntary according to these schemes may in fact be forced (Mikkelsen and Partch, 1997; and Denis, Denis, and Sarin, 1997, Jenter and Lewellen, 2010; Kaplan and Minton, 2010). In the analysis below, we initially aggregate all CEO turnovers and analyze the probability of total turnover; later, we also conduct multinomial probit regressions to estimate the probabilities of both forced and voluntary turnovers.

3.1.1 *Total turnovers*

The key explanatory variables are the severance pay and the 3-year average return.⁹ Both of the variables are measured as of the most recent fiscal year end prior to the year over which the firm's turnover decision is observed.

To mitigate the omitted variable problem, in all the regression models we include an extensive list of control variables relating to firm corporate governance and CEO characteristics. In addition, we control for year fixed effects and, except for the firm fixed-effect regression, industry fixed effects. We follow Peterson (2009) to compute

⁹ Recent studies show, however, that the filtering of common factors from CEO performance may be incomplete, so that in addition to industry-adjusted stock return, the likelihood of CEO turnover may also depend on the overall performance of the industry and even the performance of the overall market (Jenter and Lewellen, 2010; Kaplan and Minton, 2010). In unreported tests, we also include industry-level stock return and market return as explanatory variables in our regression models, and find that our key results remain essentially unchanged. Furthermore, we repeated all the main tests by using past 1 year stock returns instead and our results seem to be robust.

robust errors that correct for heteroscedasticity and serial correlation by clustering at the firm level. Note that in the regressions, the number of observations used is generally lower than that in the full sample. This is because with fixed effects at industry (firm) level, observations in the industries (of firms) that do not experience turnovers over the sample period are dropped from the regressions.

Table 2 presents the results of the probit regressions. Ai and Norton (2003), and Norton, Wang, and Ai (2004), show that for nonlinear models, such as the probit model, care must be exercised in interpreting the regression results: the coefficient on an interaction term does not correspond to the true effect of the term on the estimated probability. In Table 2 and hereafter, we report the marginal effect of each interaction term when all the explanatory variables are held at their respective mean values. To keep consistency, for the non-interaction terms, we also report the marginal effects when all the explanatory variables assume their mean values.

Column (1) in Table 2 shows that consistent with previous studies, the marginal effect of 3-year average return is negative and highly significant, suggesting that poorer stock performance heightens the likelihood of CEO turnover (e.g., Coughlan and Schmidt, 1985; Warner, Watts, and Wruck, 1988).

More importantly, Column (1) shows that the marginal effect of severance pay is negative and highly significant at 1% level. Thus, larger severance pay relative to on-the-job compensation significantly reduces the likelihood of CEO turnover. In terms of the economic significance, the marginal effect implies that increasing severance pay by one more year of on-the-job compensation reduces the likelihood of CEO turnover by about 1.12%. Given that in our sample the realized turnover rate is 8.33%, the effect of severance pay is also economically significant.

This finding contradicts the inducement hypothesis, which suggests that higher

severance pay entices a CEO to be more forthcoming with unfavorable information, and thus tends to increase the likelihood of turnover. However, this finding is not inconsistent with the protection hypothesis, which suggests that higher severance pay better protects a CEO against the risk of dismissal, and thus tends to reduce the likelihood of turnover.

For the control variables, consistent with previous studies the marginal effect of CEO ownership is significantly negative, indicating that higher CEO ownership reduces the likelihood of CEO turnover (e.g., Denis, Denis, and Sarin, 1997). On the other hand, greater return volatility tends to increase the likelihood of CEO turnover. The marginal effect of indicator for CEO age above 60 is significantly positive, implying a higher incidence of turnover when a CEO gets close to the retirement age. Among the governance variables, consistent with previous studies larger board size and higher board independence increase turnover rate (Weisbach (1988) and Linck et al, (2010)); however, independent director ownership and block institutional ownership do not significant influence turnover rate. The marginal effect of CEO-chairman duality is positive and significant at 10% level. In Hazarika, Karpoff and Nahata (2012), a significantly positive relation between CEO duality and voluntary turnover is also observed and they argue that CEOs who have substantial influence with their boards are easier to facilitate the transfer of control through voluntary resignations. Finally, the marginal effect of industry homogeneity is positive but is not statistically significant.

A sharper contrast between the inducement and protection hypotheses arises as firm performance declines. Specifically, since poorer performance suggests that lack of CEO competence is likely to be more acute, the potential inducement effect of severance pay is expected to be more pronounced. Thus, according to the inducement

hypothesis, larger severance pay more positively influence the turnover rate when performance declines, thereby strengthening the (negative) turnover-performance sensitivity. On the other hand, according to the protection hypothesis, larger severance pay mitigates the risk of dismissal to underperforming CEOs, thereby weakening the (negative) turnover-performance sensitivity.

To examine the above contrasting implications of the two hypotheses, in the second regression we interact severance pay with 3-year average return. By controlling for this interaction explicitly, individual marginal effects on severance pay and past stock return shall also become more informative. Column (2) shows that the marginal effect of the interaction term is positive and significant at 5% level, suggesting that the reduction effect of severance pay on turnover becomes especially pronounced when performance is poor. Thus, consistent with the protection hypothesis, higher severance pay significantly reduces the turnover-performance sensitivity.

To verify the robustness of the findings from the first two regressions, we run firm fixed-effect regression. Controlling for firm fixed effects removes the potential bias in the estimates of marginal effects due to omitted variables that are associated with time invariant CEO and firm-specific characteristics. Column (3) shows that the marginal effect of the interaction between severance pay and 3-year average return remains positive and significant, confirming the finding of the dampening effect of severance pay on the turnover-performance sensitivity in the second regression. The marginal effect of severance pay remains negative but loses significance.

Taken together, the results from the first three regressions reveal that severance pay lowers likelihood and performance-sensitivity of CEO turnover. These findings contradict the inducement hypothesis but support the protection hypothesis.

In the last regression in Table 2, we consider accounting-based performance measure, namely, 3-years average ROA. The result in column (4) shows that the marginal effects of both the 3-year average ROA and its interaction with severance pay are rather insignificant statistically. It should be noted that the previous studies on CEO turnover also find that ROA is generally insignificant or marginally significant in explaining turnover rate.¹⁰

3.1.2 Forced and voluntary turnovers

We perform multinomial probit regressions of the probabilities of both forced and voluntary turnovers. The results are provided in Table 3. From columns (1) and (2), the marginal effect of severance pay is negative and significant in both columns. Thus, consistent with the protection hypothesis, higher severance pay lowers both the likelihood of forced turnover and that of voluntary turnover. However, in terms of the economic magnitude, the marginal effect of severance pay is larger for voluntary turnovers than for forced turnovers.

Further, the marginal effect of 3-year average return is negative and significant in both columns 1 and column 2. However, in terms of both economic magnitude and statistical significance, the marginal effect of 3-year average return appears to be stronger for forced turnovers.

In columns (3) and (4), we include the interaction between severance pay and 3-year average return. In column (3), both the economic magnitude and statistical significance of the marginal effect of 3-year average return are similar to those in column (1). In contrast, as column (4) shows, both the economic magnitude and statistical significance of the marginal effect of 3-year average return are much stronger,

¹⁰ In an unreported test, we also follow Parrino (1997) to use ROA in the previous year, and the changes in ROA from year -2 to year -1 and from year -3 to year -2, in place of average 3-year ROA. We find that the effects of these variables are statistically insignificant.

and become comparable to those in column (3). It appears, therefore, that the relatively low performance sensitivity of voluntary turnover, as shown in column (2), is attributable in part to the ameliorating effect of severance pay on the turnover-performance sensitivity.

Furthermore, columns (3) and (4) show that the marginal effect of the interaction between severance pay and 3-year average return is positive and highly significant in the case of voluntary turnover, and is negative but insignificant in the case of forced turnover. These results indicate, therefore, that the protection effect of severance pay is more evident for voluntary turnovers.

The results of the fixed-effect regression in columns (5) and (6) are similar to those in columns (3) and (4). In particular, the marginal effect of the interaction between severance pay and 3-year average return is only significant in determining the likelihood of voluntary turnover. Further, the marginal effect of severance pay in both columns (5) and (6) remains negative but becomes marginally insignificant.

Why might the protection effect of severance pay be more subdued for forced than for voluntary turnovers? One possible explanation is that the performance of firms experiencing forced turnovers tends to have been consistently poor and is thus more indicative of low CEO competence. Consequently, the protection effect of is more abated when it comes to forced turnovers. We explore this explanation later in Section 3.2.2.

3.2 Performance uncertainty and the effect of severance pay on turnover

Both the inducement and protection hypotheses suggest a more pronounced effect of severance pay on turnover-performance sensitivity, when performance is more uncertain and less informative of the CEO's competence. Specifically, when

performance is less revealing of the CEO's competence, self-revelation by the CEO becomes more critical in facilitating appropriate turnover decision by the board. Thus, according to the inducement hypothesis, the strengthening effect of severance pay on turnover-performance sensitivity should be more evident when performance is more uncertain. In contrast, when performance is less telling about the CEO's competence, poor performance is more likely to be temporary, and the protection effect of severance pay tends to grow stronger. Consequently, according to the protection hypothesis, the weakening effect of severance pay on turnover-performance sensitivity should be more pronounced when performance is more uncertain.

To test the above contrasting predictions from the inducement and protection hypotheses, we examine subsamples of firms with differing performance uncertainties. In the following, we separately consider performance uncertainty arising from firm characteristics and from performance history.

3.2.1 Performance uncertainty based on firm characteristics

We form subsamples based on the sample median level of stock return volatility, Tobin's Q, or firm assets. The logic behind the sample divisions is as follows. Firms with volatile stock returns tend to operate businesses with highly uncertain and time-varying prospects, so the stock returns of such firms are likely to be significantly influenced by factors that are beyond the CEOs' control. Thus, as volatility increases, past stock performance becomes less revealing of CEO competence. Similarly, firms with high Tobin's Q tend to actively engage in growth-oriented investments, which are generally hard to value, and may entail early losses before eventually returning significant profits (Manso, 2011). Thus, stock return performance by firms with higher Tobin's Q is likely to be a noisier indicator of CEO competence. Finally, the informational environments of large firms tend to afford more transparency and more

informative stock prices than small firms. For example, the greater number of analyst followings, higher presence of institutional investors, and more disclosures, in the case of large firms tends to cause the stock prices of such firms more informative than those of small firms. Consequently, the stock return performance of small firms is likely to be less indicative of CEO competence than that of large firms.

Table 4 provides the estimation results of the probability of CEO turnover in the various subsamples. Columns (1) and (2) show that the marginal effect of the interaction term between severance pay and 3-year average return is significantly positive in the subsample with above median stock return volatility, but is insignificant in the subsample with below median stock return volatility. Similarly, columns (3) and (4) show that the marginal effect of the interaction term is significantly positive in the subsample with above median Tobin's Q, but is insignificant in the subsample with below median Tobin's Q. Finally, as columns (5) and (6) show, the marginal effect of the interaction term is significantly positive in the subsample with below median asset value but is insignificant in the subsample with above median asset value.¹¹

In unreported tests, we also experiment the protection effect by cutting the sample based on idiosyncratic volatility and accounting return volatility as performance measures. Not surprising, we find that the CEO turnover-performance sensitivity is significant in above median idiosyncratic volatility subsample and in above median ROA volatility subsample. Those results are also consistent with our protection hypothesis.

¹¹ We have also experimented with dividing the sample based on the sample median leverage ratio. Prior studies suggest that severance pay encourages CEOs to take on more risks, including choosing a higher leverage ratio (Ju, Leland, Senbet, 2003). Thus, one expects that the protection effect of severance pay to be more evident for firms with more leverage. However, we do not find a larger marginal effect of the interaction between severance pay and 3-year average return in the subsample with above median leverage than that in the subsample with below median leverage. It appears, therefore, that the protection effect of severance pay has less to do with risk *per se* but more to do with the difficulties in obtaining an accurate assessment of CEO competence.

Taken together, the results in Table 4 provide further evidence in favor of the protection hypothesis. Moreover, these results confirm that the protection effect of severance pay for poorly performing CEOs is most pronounced when the boards perceive a good chance that poor past performance may be temporary.

3.2.2 Performance uncertainty based on performance history

Performance uncertainty may also depend on performance history. To illustrate, consider a firm that has been performing reasonably well in the past, but experiences a sharp decline in performance in the recent year, so that the 3-year average return turns out to be poor. Compare this firm with another firm that has been performing consistently poorly but provides the same 3-year average return. The difference in the variability of the return series suggests that the 3-year average return of the first firm provides less conclusive information about CEO incompetence than does the 3-year average return of the second firm.

To capture the differences in the performance uncertainty due to varying performance histories, we split the 3-year average return into the average industry-adjusted monthly return over the past year (henceforth referred to as the past-year average return), and the average industry-adjusted monthly return over the early two years (henceforth referred to as the early 2-year average return). Using the two returns also enables us to investigate if the effect of severance pay applies differently with respect to recent performance and to that in the more distant past.

Table 5 presents the regression results. Column (1) shows that the marginal effect of the interaction between severance pay and past-year average return is positive and highly significant. On the other hand, the marginal effect of the interaction between severance pay and early 2-year average return is positive, but is marginally insignificant. Thus, the effect of severance pay in reducing turnover rate of

underperforming CEOs is stronger with respect to recent poor performance. Previous studies find that in making CEO replacement decisions, boards appear to place more weights on CEOs' recent performance than that in the more distant past (e.g., Parrino, 1996; Jenter and Lewellen, 2010). In light of this finding, our result reinforces the idea that severance pay affects the likelihood of turnover through its influence on boards' turnover decisions.

Returning to the question as to how performance uncertainty influences the effect of severance pay on turnover, we divide the sample based on the early 2-year average return into those that are among the bottom ten percent and those that are above the tenth percentile. The former type of firms had been performing poorly prior to the past year. Thus, if they continue to perform poorly in the past year, they are consistent poor performers. In contrast, the latter type of firms was not among the bottom performers prior to the past year. Consequently, if they end up performing poorly in the past year, there is likely to be quite a bit of uncertainties regarding whether the recent poor performance is temporary.

We estimate the likelihood of turnover separately in the two subsamples. The results are reported in columns (2) and (3) of Table 5. It is worth noting that in the regressions, we control for firm characteristics, including stock return volatility, Tobin's Q, and firm size, which also influence performance uncertainty. From column (2), the marginal effect of the interaction between severance pay and past -year average return is positive but insignificant in the subsample of firms whose early 2-year average returns are in the bottom ten percent. In contrast, from column (3) the marginal effect of the interaction term is positive and highly significant in the subsample of firms whose early 2-year average returns are above the tenth percentile.

In columns (4) and (5), we divide the sample firms based on the early 2-year average returns into those that are among the bottom twenty percent and those that are above the twentieth percentile. Dividing the sample at the twentieth percentile increases the number of turnovers among the bottom performers to 102, which is a little over 28% of all the turnovers. As column (4) shows, the marginal effect of the interaction term between severance pay and past-year average return remains insignificant though the p-value is slightly lower than that in column (2). For the subsample with early 2-year average returns above the twentieth percentile, column (5) shows that the marginal effect of the interaction term is positive with similar statistical and economical significance as that in column (3).

In unreported tests, we also experiment with dividing the sample based on a number of other thresholds for the early 2-year average return. Not surprisingly, as the threshold moves up, the number of turnover events in the subsample of bottom performers increases, and the marginal effect of the interaction between severance pay and past-year average return becomes statistically significant at some point. For example, when we set the threshold at the thirtieth percentile, the number of turnovers among the bottom performers increases to 144, which is close to 40% of all the turnovers. Moreover, the turnover regression in the subsample of bottom performers shows that the marginal effect of the interaction between severance pay and past-year average return is 0.0036 (p-value=0.031). By comparison, the corresponding numbers in the subsample above the thirtieth percentile 0.0037 (p-value=0.007). Thus, even in this case, the statistical significance of the marginal effect is still lower in the subsample of bottom performers.

Taken together, our results suggest that the effect of severance pay in reducing the likelihood of turnover for an underperforming CEO is more pronounced when the

series of past returns are more varied and less revealing of the CEO's competence. In contrast, severance pay does little to prevent the replacement of a CEO who puts out a slew of poor performance.

Before proceeding, we return to the earlier question on the difference in the protection effect between forced and voluntary turnovers (see Table 3). In Panel B of Table 5 we compare the distributions of the earlier 2-year returns and past-year returns of firms experiencing forced and voluntary turnovers.

As Panel B shows, out of the 99 (261) firms that experience forced (voluntary) turnovers, 17 (39) were among the bottom 10% performers in terms of the early 2-year average return. Conditional on being among the bottom 10% performers in the early two years, 76.47% (23.08%), or 13 (9), of these 17 (39) firms were among the bottom 30% performers in the past year. Similarly, 70.59% (17.95%), or 12 (7), of the 17 (39) firms that experience forced (voluntary) turnovers and were among the bottom 10% performers in the early 2 years fall into the bottom 20% performers in the past year; and, 35.29% (17.95%), or 6 (7), of these 17 (39) firms were among the bottom 10% performers in the past year. Thus, the chances that the firms continue to perform poorly in the past year are much higher for those who end up experiencing forced turnovers than voluntary turnovers. We observe a similar pattern of return distributions when we consider firms that experience turnovers and whose early 2-year average turns were among the bottom 20% or 30%.

Taken together, the results in Panel B reveal that firms experiencing forced turnovers are much more likely to have performed consistently poorly over time than firms experiencing voluntary turnovers. Consequently, the protection effect of severance pay tends to be especially pronounced for voluntary turnovers.

3.3 The effect of corporate governance on the relation between severance pay and CEO turnover

Previous studies show that the quality of corporate governance can have significant effects on CEO turnover. To investigate if such effects interact with the protection effect of severance pay, we compare both the magnitude and statistical significance of the latter effect across subsamples that differ in the respective qualities of corporate governance.

First, we divide the sample based on the sample median board size (i.e., the number of directors). Jensen (1993) and Yermack (1996) argue that by affording more efficient communication among directors, smaller boards tend to be more effective in monitoring and disciplining CEOs, thereby improving the quality of corporate governance.¹² Columns (1) and (2) of Table 6 show that the marginal effects of the severance pay and the interaction between this ratio and 3-year average return are significant in both the subsamples. Moreover, when considering both the economic and statistical significance, these marginal effects are comparable between the two subsamples.

Second, we divide the sample based on the sample median level of board independence (proportional of independent directors). Directors who are executives of a firm typically have their careers tied to the CEO and are under the direct authority of the CEO, who also controls these directors' compensation, continued employment,

¹² Shivdasani and Yermack (1999), however, argue that CEOs of small firms may be more involved with board selection even if they do not sit on the nominating committee. Consequently, these CEOs may wield significant influence over the boards. Since our results show that the effect of severance pay is of similar magnitude and significance in both the large-board and small-board subsamples, the implication of the results remain the same, irrespective of which of the arguments prevails.

and career path (Weisbach 1988; Bebchuk and Fried, 2003). In contrast, due to the reputational concerns, independent directors tend to be more motivated to monitor and discipline the CEO (Fama and Jensen, 1983). Thus, CEO influence over board is likely to be lower when board independence is higher. Consistent with this idea, previous studies find that firms with higher board independence are more likely to dismiss their CEOs when performance is poor (Weisbach (1988); Denis, Denis, and Sarin (1997); Mikkelsen and Partch (1997); Perry (2000); and Huson, Parrino, and Starks, 2001).

Columns (3) and (4) contain the results of turnover regression in the subsamples. The marginal effects of severance pay and the interaction between this ratio and 3-year average return are of similar statistical significance in the two subsamples. The economic significance of these marginal effects appears to be slightly larger in the subsample with above median board independence.

Third, we divide the sample based on sample median ownership by independent directors. Larger ownership better align independent directors' interests with those of shareholders', thereby enhancing these directors' incentive to monitor and discipline poorly performing CEOs. Consequently, boards with higher ownerships by independent directors are likely to provide better corporate governance. Previous studies show that higher ownerships by independent directors increases CEO turnover-performance sensitivity (Weisbach, 1988; Perry, 2000; Huson et al., 2001).

As Columns (5) and (6) indicate, the marginal effects of severance pay and the interaction between this ratio and 3-year average return are of similar economic and

statistical significance in the above and below median independent director ownership subsamples.

Finally, we divide the sample based on the median institutional blockholding. Higher institutional blockholding tends to induce more intense monitoring by institutional investors, thereby strengthening external corporate governance (Huson, Parrino, and Starks, 2001; Cremer and Nair, 2005). As columns (7) and (8) indicate, the marginal effects of both the severance pay and the interaction term are of similar magnitudes and statistical significance in the above and below median blockholding subsamples.

In additional analyses, we also divide the sample based on CEO-chairman duality dummy. In untabulated results, we find that the marginal effect of the interaction between severance pay and 3-year average return is 0.006 (p-value 0.001) positive and significant only in the subsample with duality dummy equal to zero, and is 0.0046 (p-value 0.199) in the subsample with duality dummy equal to one. This result suggests that the protection effect of severance pay is especially strong in the subsample where CEO duality dummy is zero.

Collectively, with the exception of CEO-chairman duality, our results show that there are no discernable differences in the strength of the protection effect of severance pay across subsamples with varying qualities of corporate governance. In other words, the protection effect is orthogonal to the effects of corporate governance on turnover documented in the existing literature. Further, these results suggest that the protection effect of severance pay is not a direct consequence of weak governance.

4. Additional tests

4.1 *Endogeneity of severance pay*

To further address the possible endogeneity problems with our results, we perform a two-stage analysis, where in the first stage we estimate severance pay, and in the second stage we conduct a probit regression to estimate the turnover probability. Since severance pay is a non-negative continuous variable, in principle we need run a tobit regression censored at zero in the first stage. To simplify our analysis, we discretize severance pay by a dummy variable, high (severance pay/compensation), which takes a value of one if the continuous severance pay assumes a value above its sample median value and zero otherwise. In the first stage, therefore, we estimate a probit model of the probability of high (severance pay/compensation).

Following the discretization of severance pay in the first stage, in the second stage we also replace this ratio by the dummy variable high (severance pay/compensation). Here, we encounter an additional technical problem relating to the interaction term between high (severance pay/compensation) and 3-year average return. Directly substituting the estimation result from the first stage into the interaction term leads to the forbidden regression problem (Wooldridge, 2002, section 9.5, esp. pp. 236-7). To simplify our analysis, we first divide the sample firms into those with 3-year average return above the sample median and those below the sample median; we then separately perform the two-stage analysis in each of the subsamples without including the interaction term in the second stage. The effect of the original

interaction term is then inferred by comparing the marginal effects of the dummy variable high (severance pay/compensation) in the two subsamples.

The instrument variable we use in the first-stage probit regression is the industry percentage value of firms with high (severance pay/compensation). Since firms in the same industry face similar input and output markets, production technology, and share the same managerial labor market, the structure of CEO compensation of firms in the same industry tends to be similar. Thus, the instrument is likely to satisfy the relevance criteria. On the other hand, there is no clear reason linking the instrument variable to unobservable firm-specific variables, including those relating to CEO competence or corporate governance, which may significantly influence a firm's turnover decision. Thus, the instrument is also likely to satisfy the exogeneity condition.

Panel A of Table 7 shows the results of the two-stage regression relating to our basic findings in Table 2. Columns (1) and (2) respectively contain the results of the first- and second-stage regressions in the subsample with below median 3-year average return, while columns (3) and (4) respectively provide the first- and second-stage results in the subsample with above 3-year average return. Since in the first-stage regression the dependent dummy variable – high severance pay - is measured at the year end proceeding the year over which turnover decisions are observed, the explanatory variables in the first-stage regression are of two years prior to the year of turnover observations. In Panel A, we use subscript “t-2” to indicate explanatory variables in the first stage, and subscript “t-1” to indicate those in the

second stage. An explanatory variable that appears in both the first- and second-stage regressions carry both subscripts.

Columns (1) and (3) show the results of the first-stage probit regression in the two subsamples with above and below median 3-year average return. The instrument variable is highly significant in both columns, affirming its relevance. Further, consistent with Cadman (2011), the marginal effects of CEO ownership and Tobin's Q are significantly negative in both columns (1) and (3), but the marginal effects of outside CEO dummy and non-compete dummy are both significant positive in columns (1) and (3).

Columns (2) and (4) contain the results of the second-stage probit regression in the two subsamples. A comparison between the two columns shows that the marginal effect of high (severance pay/compensation) dummy is negative in both columns, but it is only significant in column (2). Thus, confirming our earlier findings, large (severance pay/compensation) reduces the probability of turnover, especially for poorly performing CEOs.

Panel B of Table 7 presents the regression results relating to the effects of performance uncertainty and corporate governance. For brevity, we do not report the results of the first-stage regressions. To verify the results on the effect of performance uncertainty in Table 4, we first divide the sample based on the median of 3-year average return and on the median of return volatility, and then perform the two-stage analysis in each of the four subsamples.

Columns (1) and (2) of Table 7 provide the results of the second-stage regression

in the subsamples with below median 3-year average return. From columns (1) and (2), the marginal effect of high (severance pay/compensation) dummy is significant only when the return volatility is above sample median. In unreported tests, we find that in the subsamples with above median 3-year average return, the marginal effect of high (severance pay/compensation) dummy is insignificant, irrespective of if return volatility is above or below sample median. These results suggest that the protection effect for poorly performing CEOs is most pronounced when return volatility is large, confirming the findings in Table 4.

In unreported tests, we repeat the two-stage regressions but divide the samples based on 3-year average return and the other uncertainty measure, namely, Tobin's Q or firm asset value. We find a similar pattern of results as in columns (1) and (2). In particular, among the subsamples with below median 3-year average return the marginal effect of high (severance pay/compensation) dummy is only significant in the subsample with above sample median Tobin's Q or with below sample median asset value. Moreover, we find that in the subsamples with above median 3-year average return, this marginal effect is insignificant, irrespective of if Tobin's Q or firm asset value is above or below sample median value. These results again confirm the findings in Table 4.

Next, we consider performance uncertainty based on performance history. We divide the sample based on if a firm's early 2-year average return is above the twentieth percentile and if its past-year average return is above the sample median. Columns (3) and (4) show the results of the second-stage regression in the subsamples

with below median past-year average return. The results indicate that the high (severance pay/compensation) dummy is significant only in the subsample where the early 2-year average return is above the twentieth percentile. In the unreported tests, we find that in the subsamples with above median past-year average return, the high (severance pay/compensation) dummy is insignificant irrespective of if the early 2-year average return is above or below the twentieth percentile. These results confirm the findings in Table 5.

Finally, we verify the results relating to the quality of corporate governance in Table 6. To this end, we divide the sample based on the median 3-year average return and the median board size. Columns (5) and (6) provide the results of the second-stage regression in the subsamples with below median 3-year average return. The marginal effect of high (severance pay/compensation) dummy is negative and significant both when board size is above sample median and when it is below sample median. In the reported tests, we find that the marginal effect of high severance pay in the subsamples with above median 3-year average return is insignificant irrespective of if board size is above or below median value. These results confirm that the protection effect of severance pay for poorly performing CEOs applies whether board size is above or below the sample median. In the unreported tests, we repeat the two-stage analysis with the other governance measures in Table 6, and find a same pattern of results.

Taken together, the results from the two-stage analysis suggest that our main findings are unlikely to be caused by the endogeneity of severance pay.

4.2 Do firms strategically set severance pay?

In our main analysis, we take the view that severance pay significantly influences turnover decision. It is conceivable, however, that a board may first reach a replacement/retention decision and then strategically set the severance pay to facilitate the decision. For example, in the case of a poorly performing CEO, the board may nevertheless decide to retain the CEO. To justify the decision, the board may increase the severance pay and refer to the high cost of dismissal as the reason to not replace the CEO. Alternatively, the board may decide to dismiss the underperforming CEO, and to reduce the cost of dismissal the board may lower the promised severance pay. In both instances, strategic setting of severance pay creates a seemingly negative effect of severance pay on turnover.

To investigate possible strategic setting of severance pay, we perform several tests. First, in the subsample of firms experiencing turnovers, we compute the mean and median of the change in severance pay over the past year and find that they are respectively -0.082 and 0.000, and are both statistically insignificant. Moreover, looking at the change of severance pay itself, we find the mean change over the past year is negative but insignificant, while the median change is zero and insignificant. Thus, neither the severance pay nor the severance pay itself appears to be subject to significant reductions ahead of CEO dismissals. We only use 1 year horizon in the test rather than using a longer horizon because if a board wants to protect a CEO from being fired because of recent poor performance by increasing severance payment, it should be accepted by the CEO easily. Therefore, the board should have no incentive

to do it many years in advance. Nevertheless, in unreported tests, we also try to use 2-year change of severance pay for the strategically setting tests and we find that our results are robust.

Next, in the non-turnover subsample, we select those whose 3-year average returns are among the bottom 20%. These are the firms that are likely to face pressure to replace the incumbent CEOs but do not end up undertaking dismissal decisions. If firms strategically set severance pay to facilitate retention decision, in these cases we would see significant increases in the severance pay. We find that the mean and median changes in the severance pay over the past year are respectively -0.001 and 0.000, and are both insignificant. Thus, the boards do not seem to significantly increase the ratio ahead of the decisions to retain underperforming CEOs. In addition, looking at the change of the severance pay itself, we find that the mean and median changes over the past year are negative and significant at 1% level, suggesting that on average there is actually a decline in the severance pay amount.

Third, to more formally test for possible strategic setting of severance pay, we run the baseline turnover regressions (models (1) and (2) in Table 2) by including the change in the severance pay over the prior year as an additional independent variable. If strategic behavior by the boards were the key reason behind our earlier findings, we would expect the effect of the severance pay to diminish, but that of the change in the ratio to be significant.

Columns (1) and (2) of Table 8 show the regression results. From column (1), the marginal effect of the change in severance pay is positive and insignificant, but the

marginal effect of the ratio remains negative and highly significant. In column (2), we further include the interaction between the ratio and 3-year average return as well as that between the change in the ratio and the 3-year average return. From column (2), the marginal effect of the latter interaction term, though positive, is highly insignificant, but that of the former interaction term remains positive and highly significant. These results again speak against possible strategic setting of severance pay.

Finally, we note that it might be difficult for boards to reduce the promised severance pay ahead of dismissal decisions, but may have much more latitude to increase severance pay so as to justify the decisions to retain poorly performing CEOs. Since the latter behavior is likely to arise mostly in firms with entrenched CEOs/weak governance, we might be able to see a significant effect of the change in severance pay on turnover rate in the subsamples of firms with a low quality of governance, even if such an effect is absent in the full sample. To investigate this possibility, we run turnover regressions in the subsamples with differing quality of governance. Columns (3) and (4) show results in the subsamples with above and below median-size boards. The marginal effects of the change in severance pay and its interaction with 3-year average return are insignificant in both subsamples. In unreported tests, we find a similar pattern of results when we use the other governance measures, including board independence, ownership by independent directors, and block institutional ownerships.

Taken together, the above results indicate that the effects of severance pay on

turnover rate and turnover-performance sensitivity is unlikely to be due to boards' strategically setting severance pay, thereby confirming our main findings.

4.3 Sub-period analysis

During our sample period, the stock market experienced a significant decline due to the onset of the financial crisis. It is conceivable that CEO turnover during the crisis period may systematically differ from those in other times. In our main analysis, we control for year fixed effects in order to capture differences in the level of turnover across years. Here, we additionally verify that the found effect of severance pay on turnover is not an artifact of the crisis period.

To this end, we divide our sample into two sub-periods, the pre-crisis period in years 2006-2007 and the crisis period in years 2008-2009. We then rerun all the regression models in Tables 2-6 in each sub-period. We find that our results generally remain qualitatively unchanged. The only exception is with respect to the fixed-effect regression in Table 2. In each of the 2006-2007 and 2008-2009 periods, the coefficient on the interaction between severance pay and 3-year average stock return remains positive but becomes insignificant. However, this is not surprising: In the fixed-effect regression firms that do not experience any turnover over the sub-periods are dropped from the regression, so the sample sizes in the sub-periods are quite small, weakening the power to the tests.

4.4 Powerful CEOs

We understand that powerful or entrenched CEOs may pressure the board to provide them higher severance pays. If the firm performed poorly, those powerful CEOs are more likely to keep their jobs because of their high severance pays, in addition to their own influence on the board. If this argument is true, we should observe that a long tenured CEO's turnover-performance sensitivity shall be weakened by the severance pay. Similarly, the turnover-performance sensitivity of a CEO with chairman duality shall also be weakened by the severance pay. In table 9, we conduct subsample analyses based on the tenure and CEO-chairman duality to test this powerful CEO hypothesis.

From the regression results in table 9, we find that the marginal effect on the interaction term between severance pay and firm's past performance is significantly negative in below tenure median subsample but insignificant in above tenure median subsample. We further find that the marginal effect is significantly negative in No CEO duality subsample but insignificant in CEO Duality subsample. These findings contradict with the powerful CEO hypothesis but consistent with our protection hypothesis, which argues that high severances pay should protect those CEOs with unclear ability to the board.

5. Conclusion

This paper examines the role of severance pay in CEO turnover. We find that severance pay is an important determinant of CEO turnover rate. Our evidence is generally consistent with the protection hypothesis, and suggests that severance pay

mitigates the risk of dismissal to a CEO. Furthermore, our results show that the protection effect of severance pay is most pronounced when, conditional on poor past performance, there remain significant uncertainties about the CEO's competence. Finally, we find that the protection effect of severance pay is generally orthogonal to the effects of corporate governance on turnover.

Our findings suggest caution in drawing conclusions about the appropriateness of severance pay amounts based on those to dismissed CEOs. The board of directors is often criticized by the media and the public for paying a large amount of severance pay to a dismissed CEO. The public believes that paying a large amount of severance pay is always inappropriate and it harms the shareholders benefits. Furthermore, the public believes that a large amount of severance pay reflects that the board does not fulfill the duties in the termination process. However, our findings suggest that the popular conceptions may not be entirely correct, and caution needs to be exercised in jumping to the conclusion that making a large severance pay is necessarily the consequence of failed due diligence by the board. In particular, severance pay mitigates the risk of dismissal to CEOs when performance is poor but may only be temporarily so. Thus, large payouts are observed precisely when performance is highly indicative of low CEO competence, that is, when performance is consistently and sufficiently poor.

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Appendix A: Variables definitions and data sources

Variable	Definition	Source
<i><u>Severance and Compensation Variables</u></i>		
Severance Pay	Total ex-ante contracted severance payment to CEO upon involuntary termination without cause or voluntary termination with good reasons. In the main text and tables, severance pay means the Severance Pay/Compensation ratio.	Hand collected from SEC filings (DEF 14/14A, 10-k or 8-k)
CEO On-the-Job Compensation	CEO's total compensation	Adjusted tdc1 in Execucomp following Coles, Daniel and Naveen (2010)
Severance Pay/Compensation (s2c)	Scale severance pay by compensation at the same fiscal year end	
Delta of CEO Wealth	Expected dollar change in CEO wealth for a 1% change in stock price (using entire portfolio of stocks and options)	Computed following Core and Guay (2002)
<i><u>CEO characteristics Variables</u></i>		
CEO Tenure	Time between fiscal year end (data date) and the day executive becomes CEO	Execucomp
CEO Ownership	Shares held by CEO divided by firm's total shares outstanding	Execucomp
Age above 60	=1 if CEO is above 60 years old; =0 otherwise	Execucomp
Non-compete Agreement	=1 if there is a non-compete agreement included in CEO's employment contract	Hand collected from proxy statement
Outside CEO	=1 if the CEO is hired from outside of the company	Boardex and hand collection from Factiva
<i><u>Corporate Governance Variables</u></i>		
Board Size	Total number of directors on the board	Riskmetrics
Board Independence	Number of independent directors on the board divided by board size	Riskmetrics
Independent Director's Ownership	Cumulative shares held by independent directors divided by firm's total shares outstanding	Riskmetrics
CEO-chairman Duality	=1 if the CEO is also the chairman of the board	Riskmetrics
Block Institutional Ownership	Cumulative shares held by block institutions divided by firm's total shares outstanding. A block institution is the one that holds more than 5% of firm's total shares outstanding	Thomson Financial
<i><u>Firm Characteristics Variables</u></i>		
Total Asset	Firm's total asset	Compustat
Leverage	Firm's leverage ratio. Measured as firm's total debt divided by total asset. Total debt is calculated as DLC+DLTT	Compustat
Tobin's Q	Measured as $(AT-CEQ+PRCC_F \cdot CSHO)/AT$	Compustat
3-year average ROA	The average industry-adjusted ROA over past 3 years. ROA is measured as firm's operating income before depreciation (OIBDP) divided by total asset.	Compustat
1-year average return (ret1)	The average monthly industry-adjusted stock returns over past 1 year.	CRSP
2-year average return 1 year before (ret13)	The average monthly industry-adjusted stock returns from past 3 year to past 1 year.	CRSP
3-year average return (ret3)	The average monthly industry-adjusted stock returns over past 3 years.	CRSP
3-year average return volatility	The average monthly industry-adjusted return volatility over past 3 years.	CRSP
Industry Homogeneity	=1 if the firm is in a more homogenous industry	Calculated following Parrino (1997)

Appendix B: Severance Pay under Different Trigger Events

CEO employment contracts generally provide different severance pay packages applicable when the departure is due to involuntary termination without cause or voluntary termination for good reasons and when the departure is due to a change in control. The following examples illustrate the possible difference.

In 2009, Mr. Fernando Aguirre was the CEO of Chiquita Brands International, Inc. His potential severance packages upon Involuntary Termination Not for Cause or for Good Reasons and Termination due to Change in Control events are listed below:

Potential Payments Upon Termination or Change in Control

	Involuntary Not For Cause Termination or For Good Reason Termination	Termination due to Change in Control
Cash Severance	\$4,370,000	\$6,555,000
Non-Equity Incentive Awards	\$859,096	\$2,970,041
Unvested and Accelerated RSUs	\$1,029,915	\$3,706,484
Health and Welfare Benefits	\$56,692	\$56,692
Potential Excise Tax Gross Up	0	\$4,836,083
Total	\$6,315,703	\$18,124,300

*Severance package information can be found in company's 10-k filing or proxy statements.

Similarly, in 2009, Ms. Carol Bartz was appointed as the CEO of Yahoo, Inc. Her severance packages are listed below:

	Involuntary Not For Cause Termination or For Good Reason Termination	Termination due to Change in Control
Cash Severance	\$4,500,000	\$7,500,000
Acceleration of Equity	\$2,804,763	\$9,688,845
Continuing Health Benefits	N/A	0
Outplacement Benefits	N/A	0
Total	\$7,304,763	\$17,188,845

The current paper focuses on the first type of severance pay. While severance pay in the event of a change of control is an important issue, it is beyond the scope of the current paper.

Appendix C: Adjustments of Severance Pay

To obtain severance pay, we make adjustments, wherever necessary, to compensation upon involuntary termination without cause or voluntary termination with good reasons as reported in SEC filings. Specifically, we remove from the reported compensation: 1) the amount of restricted stocks or options portion that has already been vested; and 2) the portion of severance pay due to the CEO upon both involuntary termination without cause and involuntary termination with cause, or upon both voluntary termination for good reason and voluntary termination not for good reason.

The reason for us to make such adjustment is straightforward. Acceleration of restricted stocks and options is an important element in severance package. However, vested restricted stocks and options are allowed to be sold or exercised regardless of CEO's current situation. Therefore, they can neither affect the probability of CEO turnover, nor the CEO turnover-performance sensitivity. On the other hand, as involuntary termination with cause or voluntary termination not for good reason are mainly because of CEO's personal misconducts, such as inside trading, sexual harassment and etc. Therefore, severance upon those circumstances is not related to CEO's turnover-performance sensitivity.

We include two examples to illustrate how we adjust the total severance.

C.1 Vested Restricted Stocks and Options

Mr. David Dingus, the CEO of Azz Inc. (ticker: AZZ) in fiscal year 2007, had a contracted ex-ante total severance of \$7.93 million upon involuntary termination without cause, the details are shown in the table below.

	Involuntary termination without cause
Cash severance	\$ 1,264,500
Short-term cash incentive	\$ 385,926
Stock options	\$ 2,515,882 ⁽³⁾
Stock Appreciation rights	\$ 3,760,763
Total	\$ 7,927,071

However, in the footnote (3) below the table, it mentions that “This amount is the total value of vested options held by the named executive officer”. Then we know that they are already vested stock options, and then we will remove them from the total amount of severance. After adjusting, the total amount of severance should be $7,927,071 - 2,515,882 = \$5,411,189$

C.2 Amount of severance that subjects to both involuntary termination without cause and involuntary termination with cause

Mr. Daniel DiMicco, the CEO of Nucor Corp. (NYSE ticker: NUE) in fiscal year 2008, had a contracted ex-ante total severance of \$7,119,014 upon involuntary termination without cause. However, he can still get \$5,376,000 for non-compete if he is terminated with cause. Therefore, this amount will be removed and after adjusting, the total amount of severance should be $7,119,014 - 5,376,000 = \$1,743,014$

	Involuntary termination without cause	Involuntary termination with cause
Non-compete – cash	\$ 5,376,000	\$ 5,376,000
Cash severance	\$ 1,743,014	0
Vesting of restricted stocks	0	0
Benefits and perquisites	0	0
Total	\$ 7,119,014	\$ 5,376,000

Table 1: Summary Statistics

The full sample consists of 4,318 firm-year observations from 2006 to 2009. Severance pay data hand-collected from firms' SEC filings. We obtain accounting data from Compustat and stock return data from CRSP. Information on board of directors and CEOs is from RiskMetrics and Execucomp, respectively. Panel A reports the summary statistics for the full sample. Panel B compares the non-turnover subsample, forced turnover subsample, and voluntary turnover subsample. The definitions of all the variables are provided in Appendix A. All continuous variables are winsorized at 1st and 99th percentiles.

Panel A: Full sample

Full Sample (N=4318)	Mean	SD	0.25	Median	0.75
Compensation Variables					
Percentage of positive severance pay (%)	71.35				
CEO severance pay (in thousand \$)	6193.03	11030.63	0.00	2192.70	6776.80
CEO on-the-job compensation (in thousand \$)	5442.98	5851.32	1691.07	3456.13	6719.41
Severance pay (s2c)	1.25	1.69	0.00	0.72	1.72
Delta of CEO wealth (in thousand \$)	699.76	1440.99	95.10	244.69	625.60
CEO Characteristics					
CEO tenure	7.84	6.59	3.00	6.00	10.00
CEO ownership (%)	1.56	3.91	0.11	0.31	0.96
CEO age above 60 (dummy)	0.26	0.44	0.00	0.00	1.00
Non-compete agreement (dummy)	0.57	0.50	0.00	1.00	1.00
Outside CEO (dummy)	0.21	0.36	0.00	0.00	1.00
Corporate Governance Variables					
Board size	9.37	2.31	8.00	9.00	11.00
Board independence	0.75	0.12	0.67	0.78	0.86
Ownership by Independent directors (%)	1.25	3.15	0.13	0.35	0.90
Block institutional ownership	0.21	0.14	0.11	0.20	0.31
CEO-chairman duality	0.27	0.44	0.00	0.00	1.00
Firm Characteristics					
Total asset (in thousand \$)	11977.84	32139.97	898.62	2574.15	8179.35
Leverage	0.22	0.18	0.07	0.20	0.33
Tobin's Q	1.69	0.90	1.10	1.39	1.96
Industry homogeneity	0.32	0.47	0.00	0.00	1.00
3-year average return (%)	0.28	1.33	-0.46	0.28	1.03
3-year average return volatility (%)	8.17	3.94	5.38	7.37	10.06
3-year average ROA	0.07	0.11	-0.01	0.04	0.10

Panel B: Subsample comparisons

	Non-turnover Submple (N=3958)		Forced Turnover Subsample (N=94)		Voluntary Turnover Subsample (N=266)	
	Mean	Median	Mean	Median	Mean	Median
Compensation Variables						
Percentage of positive severance pay (%)	72.08		65.96		62.41	
CEO severance pay (in thousand \$)	6735.04	2290.60	4346.48	1353.04	4137.25	1141.57
CEO on-the-job compensation (in thousnd \$)	5443.91	3481.69	5144.39	2966.30	5534.63	3313.14
Severance pay (s2c)	1.29	0.74	0.82	0.64	0.92	0.37
Delta of CEO wealth (in thousand \$)	698.43	247.03	489.45	122.74	793.88	268.20
CEO Characteristics						
CEO tenure	7.76	6.00	7.87	6.00	8.97	8.00
CEO ownership (%)	1.60	0.32	0.57	0.22	1.43	0.30
CEO age above 60 (dummy)	0.24	0.00	0.18	0.00	0.58	1
Non-compete agreement (dummy)	0.57	0.00	0.59	1.00	0.58	1.00
Outside CEO (dummy)	0.21	0.00	0.18	0.00	0.20	0.00
Corporate Governance Variables						
Board size	9.35	9.00	9.30	9.00	9.74	10.00
Board independence	0.75	0.77	0.75	0.76	0.76	0.78
Independent director ownership (%)	1.25	0.36	1.25	0.39	1.16	0.30
Block institutional ownership	0.21	0.20	0.25	0.24	0.20	0.19
CEO-chairman duality	0.27	0.00	0.24	0.00	0.30	0.00
Firm Characteristics						
Total asset (in thousand \$)	11652.18	2581.45	15459.20	1931.20	15593.38	2765.20
Leverage	0.22	0.20	0.22	0.20	0.23	0.22
Tobin's Q	1.69	1.40	1.45	1.10	1.76	1.39
Industry homegeneity (dummy)	0.32	0.00	0.30	0.00	0.30	0.00
3-year average return (%)	0.31	0.31	-0.95	-0.75	0.16	0.08
3-year average return volatility (%)	8.15	7.35	9.30	8.57	8.08	7.31
3-year average ROA	0.07	0.04	0.06	0.04	0.08	0.05

Table 2: CEO Turnover and Severance

This table presents the probit estimates of the relationship between the probability of CEO turnover and CEO's contracted ex-ante severance measured by *s2c*. The dependent variable is defined as 1 if there is a turnover in year *t* and 0 otherwise. All the other variables are defined in Appendix A. The coefficients reported are estimates of the marginal effect on the probability when all of the independent variables are at their mean values. The *p*-values in parentheses are based on standard errors adjusted for heteroscedasticity and firm clustering. Industry fixed effects are based on the two-digit SIC code. All of the control variables are winsorized at 1th and 99th percentiles. Superscripts ^{***}, ^{**}, ^{*} denote statistical significance at the 1%, 5% and 10% levels, respectively.

	(1)	(2)	(3)	(4)
Severance pay _{t-1} (s2c _{t-1})	-0.0112*** (0.001)	-0.0134*** (0.000)	-0.0070* (0.088)	-0.0111*** (0.003)
Severance pay _{t-1} * ret3		0.0059*** (0.000)	0.0028* (0.093)	
Severance pay _{t-1} * roa3				-0.0283 (0.371)
3-year average return (ret3)	-0.0175*** (0.000)	-0.0239*** (0.000)	-0.0132** (0.017)	
3-year average roa (roa3)				0.0528 (0.466)
CEO tenure _{t-1}	0.0009 (0.230)	0.0010 (0.173)	0.0124*** (0.000)	0.0008 (0.272)
CEO ownership _{t-1}	-0.0062*** (0.000)	-0.0063*** (0.000)	-0.0100*** (0.000)	-0.0064*** (0.000)
Delta of CEO Wealth _{t-1}	0.0057 (0.125)	0.0052 (0.157)	0.0031 (0.438)	0.0069* (0.088)
CEO is above 60 _{t-1} (dummy)	0.0787*** (0.000)	0.0779*** (0.000)	0.0183** (0.014)	0.0787*** (0.000)
Board size _{t-1}	0.0053** (0.013)	0.0055*** (0.009)	0.0036 (0.130)	0.0053** (0.019)
Board Independence _{t-1}	0.0556* (0.086)	0.0603* (0.057)	0.0249 (0.425)	0.0677** (0.046)
CEO-chairman duality _{t-1}	0.0179* (0.066)	0.0175* (0.070)	0.0505 (0.156)	0.0160 (0.120)
Independent director ownership _{t-1}	-0.0009 (0.451)	-0.0011 (0.350)	-0.0005 (0.640)	-0.0009 (0.476)
Block institutional ownership _{t-1}	-0.0220 (0.494)	-0.0201 (0.529)	-0.0007 (0.979)	0.0018 (0.958)
Log(total assets) _{t-1}	-0.0055 (0.157)	-0.0059 (0.126)	0.0010 (0.942)	-0.0069* (0.100)
Leverage _{t-1}	0.0079 (0.752)	0.0083 (0.738)	0.0481 (0.226)	0.0230 (0.393)
Tobin's q _{t-1}	0.0072 (0.148)	0.0071 (0.145)	0.0035 (0.610)	-0.0055 (0.364)
3-year average return volatility	0.0041*** (0.001)	0.0039*** (0.001)	-0.0002 (0.832)	0.0036*** (0.004)
Industry homogeneity (dummy)	0.0289 (0.623)	0.0464 (0.444)		-0.0197 (0.743)
Year FE	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	No	Yes
Firm FE	No	No	Yes	No
Observations	4,205	4,205	1084	4,027
Number of turnover	360	360	360	348
Pseudo R2	0.0976	0.1024	0.3899	0.0840

Table 3: Forced Turnover, Voluntary Turnover and Severance:

Table 3 compares the relationship between the probability of *forced* CEO turnover and CEO's contracted ex-ante severance to the relationship between the probability of *voluntary* CEO turnover and CEO's contracted ex-ante severance by using multinomial probit estimates. The dependent variable is defined as 1 if there is a forced CEO turnover in year t , as 2 if there is a voluntary CEO turnover in year t and 0 otherwise. All the other variables are defined in Appendix A. The coefficients reported are estimates of the marginal effect on the probability when all of the independent variables are at their mean values. The p -values in parentheses are based on standard errors adjusted for heteroscedasticity and firm clustering. Industry fixed effects are based on the two-digit SIC code. All of the control variables are winsorized at 1th and 99th percentiles. Superscripts ^{***}, ^{**}, ^{*} denote statistical significance at the 1%, 5% and 10% levels, respectively.

	Forced (1)	Voluntary (2)	Forced (3)	Voluntary (4)	Forced (5)	Voluntary (6)
Severance pay _{$t-1$} (s2c _{$t-1$})	-0.0052 ^{***} (0.009)	-0.0088 ^{***} (0.002)	-0.0055 ^{**} (0.022)	-0.0119 ^{***} (0.000)	-0.0064 (0.142)	-0.0220 (0.186)
Severance pay _{$t-1$} * ret3			-0.0003 (0.767)	0.0052 ^{***} (0.002)	-0.0003 (0.876)	0.0083 [*] (0.062)
3-year average return (ret3)	-0.0112 ^{***} (0.000)	-0.0056 ^{**} (0.048)	-0.0109 ^{***} (0.000)	-0.0107 ^{***} (0.001)	-0.0182 [*] (0.079)	-0.0229 [*] (0.088)
CEO tenure _{$t-1$}	0.0009 ^{**} (0.023)	-0.0000 (0.996)	0.0009 ^{**} (0.022)	0.0001 (0.930)	0.0104 ^{**} (0.049)	0.0698 ^{**} (0.022)
CEO ownership _{$t-1$}	-0.0065 ^{**} (0.013)	-0.0028 [*] (0.051)	-0.0065 ^{**} (0.013)	-0.0028 ^{**} (0.050)	-0.0184 (0.126)	-0.0505 (0.156)
Delta of CEO Wealth _{$t-1$}	0.0027 (0.244)	0.0029 (0.372)	0.0027 (0.245)	0.0026 (0.421)	-0.0052 (0.835)	0.0342 (0.493)
CEO is above 60 _{$t-1$} (dummy)	-0.0095 (0.110)	0.0852 ^{***} (0.000)	-0.0095 (0.112)	0.0849 ^{***} (0.000)	-0.0232 (0.131)	0.0745 ^{***} (0.000)
Board size _{$t-1$}	0.0008 (0.526)	0.0055 ^{***} (0.005)	0.0007 (0.537)	0.0056 ^{***} (0.005)	0.0045 (0.802)	0.0248 ^{**} (0.047)
Board Independence _{$t-1$}	-0.0019 (0.919)	0.0504 (0.100)	-0.0021 (0.910)	0.0547 [*] (0.075)	-0.0523 (0.812)	0.2236 (0.526)
CEO-chairman duality _{$t-1$}	0.0026 (0.662)	0.0156 (0.101)	0.0026 (0.664)	0.0151 (0.110)	0.0102 (0.465)	0.0388 (0.287)
Independent director ownership _{$t-1$}	0.0001 (0.888)	-0.0009 (0.496)	0.0001 (0.878)	-0.0011 (0.399)	-0.0011 (0.833)	-0.0014 (0.856)
Block institutional ownership _{$t-1$}	0.0076 (0.637)	-0.0373 (0.205)	0.0075 (0.644)	-0.0367 (0.211)	0.0302 (0.855)	-0.2256 (0.482)
Log(total assets) _{$t-1$}	0.0004 (0.847)	-0.0055 (0.137)	0.0004 (0.844)	-0.0057 (0.120)	0.0082 (0.474)	-0.0528 (0.785)
Leverage _{$t-1$}	-0.0190 (0.149)	0.0317 (0.146)	-0.0189 (0.150)	0.0306 (0.160)	0.1077 (0.436)	0.1786 (0.596)
Tobin's q _{$t-1$}	-0.0007 (0.848)	0.0068 (0.147)	-0.0007 (0.837)	0.0068 (0.145)	-0.0008 (0.942)	0.0163 (0.755)
3-year average return volatility	0.0018 ^{***} (0.004)	0.0020 [*] (0.075)	0.0018 ^{***} (0.004)	0.0018 [*] (0.097)	-0.0021 (0.835)	0.0037 (0.705)
Industry homogeneity (dummy)	0.0020 (0.719)	-0.0149 [*] (0.084)	0.0020 (0.718)	-0.0148 [*] (0.087)		
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	No	No
Firm FE	No	No	No	No	Yes	Yes
Observations	4,310	4,310	4,310	4,310	276	817
Number of turnover	94	256	94	256	94	256
Pseudo R2	0.1036	0.1036	0.1072	0.1072	0.5163	0.3869

Table 4: Performance Uncertainty, Severance and CEO Turnover

This table presents the effect of severance on the probability of CEO turnover based on different levels of firm performance uncertainty. The dependent variable is defined as 1 if there is a turnover in year t and 0 otherwise. All the other variables are defined in Appendix A. The coefficients reported are estimates of the marginal effect on the probability when all of the independent variables are at their mean values. The subsamples are split based on the median of CEO tenure, tobin's q and past 3 years average return volatility, respectively. The p -values in parentheses are based on standard errors adjusted for heteroscedasticity and firm clustering. Industry fixed effects are based on the two-digit SIC code. All of the control variables are winsorized at 1th and 99th percentiles. Superscripts ^{***}, ^{**}, ^{*} denote statistical significance at the 1%, 5% and 10% levels, respectively.

	High Return Volatility Subsample (1)	Low Return Volatility Subsample (2)	High Tobin's Q Subsample (3)	Low Tobin's Q Subsample (4)	Large Firm Subsample (5)	Small Firm Subsample (6)
Severance pay _{t-1} (s2c _{t-1})	-0.0129*** (0.008)	-0.0142*** (0.002)	-0.0167*** (0.006)	-0.0146*** (0.006)	-0.0130*** (0.006)	-0.0135*** (0.005)
Severance pay _{t-1} * ret3	0.0057*** (0.003)	0.0060 (0.133)	0.0061*** (0.010)	0.0040 (0.138)	0.0036 (0.355)	0.0064*** (0.001)
3-year average return (ret3)	-0.0220*** (0.000)	-0.0255*** (0.001)	-0.0152*** (0.003)	-0.0264*** (0.000)	-0.0206*** (0.000)	-0.0226*** (0.000)
CEO tenure _{t-1}	-0.0007 (0.477)	0.0029*** (0.002)	0.0008 (0.359)	0.0011 (0.290)	0.0016 (0.109)	0.0004 (0.689)
CEO ownership _{t-1}	-0.0074** (0.016)	-0.0036** (0.045)	-0.0067*** (0.007)	-0.0062** (0.033)	-0.0027 (0.265)	-0.0059** (0.021)
Delta of CEO Wealth _{t-1}	0.0034 (0.526)	0.0031 (0.491)	0.0066* (0.070)	0.0048 (0.490)	-0.0004 (0.917)	0.0014 (0.875)
CEO is above 60 _{t-1} (dummy)	0.0840*** (0.000)	0.0511*** (0.000)	0.0581*** (0.000)	0.0804*** (0.000)	0.0731*** (0.000)	0.0716*** (0.000)
Board size _{t-1}	-0.0002 (0.945)	0.0095*** (0.000)	0.0036 (0.178)	0.0050 (0.102)	0.0060** (0.015)	0.0020 (0.585)
Board Independence _{t-1}	0.0365 (0.422)	0.1003** (0.011)	0.0540 (0.224)	0.0377 (0.388)	0.0562 (0.164)	0.0496 (0.300)
CEO-chairman duality _{t-1}	0.0287** (0.022)	-0.0014 (0.914)	0.0163 (0.228)	0.0146 (0.265)	0.0129 (0.285)	0.0168 (0.222)
Independent director ownership _{t-1}	-0.0010 (0.557)	-0.0025 (0.200)	-0.0008 (0.555)	-0.0019 (0.373)	-0.0026 (0.117)	-0.0002 (0.882)
Block institutional ownership _{t-1}	-0.0087 (0.840)	-0.0604 (0.140)	-0.0582 (0.212)	-0.0134 (0.754)	-0.0464 (0.278)	-0.0197 (0.649)
Log(total assets) _{t-1}	-0.0057 (0.288)	-0.0070 (0.165)	-0.0082 (0.137)	-0.0029 (0.580)		
Leverage _{t-1}	0.0424 (0.218)	-0.0060 (0.865)	0.0490 (0.128)	-0.0007 (0.985)	0.0116 (0.740)	0.0063 (0.854)
Tobin's q _{t-1}	0.0150** (0.030)	-0.0047 (0.502)			0.0216*** (0.005)	0.0007 (0.914)
3-year average return volatility			0.0061*** (0.002)	0.0012 (0.490)	0.0027 (0.101)	0.0046*** (0.003)
Industry homogeneity (dummy)	0.0221 (0.619)	-0.0138 (0.821)	-0.0675 (0.172)	0.1140* (0.060)	-0.0045 (0.950)	-0.0247 (0.481)
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1,984	2,013	1,911	2,112	2046	1957
Number of turnover	193	167	154	206	177	183
Pseudo R2	0.1266	0.1212	0.1032	0.1227	0.1246	0.1142

Table 5: Performance History, Severance and CEO Turnover

Panel A of table 5 presents the effect of severance on the probability of CEO turnover based on firm's performance history. The dependent variable is defined as 1 if there is a turnover in year t and 0 otherwise. All the other variables are defined in Appendix A. The coefficients reported are estimates of the marginal effect on the probability when all of the independent variables are at their mean values. The subsamples are split based on the 10% and 20% percentiles of the average 2 years returns from $t-3$ to $t-1$, respectively. The p -values in parentheses are based on standard errors adjusted for heteroscedasticity and firm clustering. Industry fixed effects are based on the two-digit SIC code. All of the control variables are winsorized at 1th and 99th percentiles. Superscripts ^{***}, ^{**}, ^{*} denote statistical significance at the 1%, 5% and 10% levels, respectively.

Panel A: Subsample Analyses

	Full Sample	Low Ret13 Subsample (bottom 10%)	High Ret13 Subsample (top 90%)	Low Ret13 Subsample (bottom 20%)	High Ret13 Subsample (top 80%)
	(1)	(2)	(3)	(4)	(5)
Severance pay _{t-1} (s2c _{t-1})	-0.0133*** (0.000)	-0.0227* (0.075)	-0.0115*** (0.000)	-0.0135 (0.170)	-0.0124*** (0.000)
Severance pay _{t-1} * ret1	0.0029*** (0.001)	0.0036 (0.176)	0.0030*** (0.001)	0.0027 (0.173)	0.0030*** (0.003)
Severance pay _{t-1} * ret13	0.0026 (0.124)				
1-year average return (ret1)	-0.0091*** (0.000)	-0.0100* (0.097)	-0.0090*** (0.000)	-0.0110** (0.019)	-0.0092*** (0.000)
2-year average return _{t-3 to t-1} (ret13)	-0.0135*** (0.000)				
CEO tenure _{t-1}	0.0009 (0.179)	0.0053** (0.030)	0.0008 (0.255)	0.0025 (0.216)	0.0007 (0.330)
CEO ownership _{t-1}	-0.0062*** (0.000)	-0.0427*** (0.003)	-0.0041** (0.015)	-0.0149*** (0.005)	-0.0045** (0.014)
Delta of CEO Wealth _{t-1}	0.0052 (0.154)	0.0331* (0.070)	0.0013 (0.744)	0.0316** (0.020)	0.0011 (0.777)
CEO is above 60 _{t-1} (dummy)	0.0780*** (0.000)	0.0705** (0.045)	0.0783*** (0.000)	0.0730*** (0.008)	0.0801*** (0.000)
Board size _{t-1}	0.0054** (0.010)	-0.0126 (0.200)	0.0067*** (0.002)	-0.0051 (0.471)	0.0071*** (0.001)
Board Independence _{t-1}	0.0624** (0.049)	0.0512 (0.721)	0.0530 (0.104)	-0.0057 (0.958)	0.0610* (0.072)
CEO-chairman duality _{t-1}	0.0176* (0.066)	0.0690 (0.123)	0.0152 (0.128)	0.0323 (0.334)	0.0175* (0.091)
Independent director ownership _{t-1}	-0.0011 (0.368)	-0.0029 (0.603)	-0.0014 (0.264)	0.0034 (0.354)	-0.0018 (0.168)
Block institutional ownership _{t-1}	-0.0191 (0.548)	-0.2572** (0.035)	0.0162 (0.610)	-0.1618* (0.069)	0.0197 (0.564)
Log(total assets) _{t-1}	-0.0057 (0.140)	-0.0217 (0.192)	-0.0029 (0.471)	-0.0121 (0.318)	-0.0025 (0.548)
Leverage _{t-1}	0.0075 (0.763)	0.1726 (0.122)	0.0091 (0.725)	0.1068 (0.159)	0.0023 (0.933)
Tobin's q _{t-1}	0.0069 (0.154)	0.0064 (0.797)	0.0036 (0.459)	-0.0037 (0.839)	0.0080 (0.101)
3-year average return volatility	0.0039*** (0.001)	-0.0022 (0.622)	0.0034** (0.010)	-0.0000 (0.995)	0.0038*** (0.007)
Industry homogeneity (dummy)	0.0453 (0.449)	0.0347 (0.800)	0.0072 (0.891)	-0.0939 (0.463)	-0.0037 (0.935)
Year FE	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes
Observations	4,205	334	3,756	717	3,241
Number of turnover	360	56	304	102	258
Pseudo R2	0.1012	0.2175	0.0960	0.1209	0.1119

Panel B: Return distribution of Forced and Voluntary Turnovers

	Turnovers with early 2-year average return in the bottom 10%		Turnovers with early 2-year average return in the bottom 20%		Turnovers with early 2-year average return in the bottom 30%	
	Forced [17]	Voluntary [39]	Forced [31]	Voluntary [71]	Forced [49]	Voluntary [95]
Past-year average return in the bottom 30%	13 (76.47%)	9 (23.08%)	20 (64.52)	20 (28.17%)	27 (55.10%)	25 (26.31%)
Past-year average return in the bottom 20%	12 (70.59%)	7 (17.95%)	18 (58.06%)	15 (21.13%)	23 (46.94)	17 (17.89)
Past-year average return in the bottom 10%	6 (35.29%)	7 (17.95%)	9 (29.03%)	8 (11.27%)	11 (22.45%)	10 (10.53%)

Table 6: Corporate Governance, Severance and CEO Turnover

This table presents the effect of severance on the probability of CEO turnover based on different levels of corporate governance. The dependent variable is defined as 1 if there is a turnover in year t and 0 otherwise. All the other variables are defined in Appendix A. The coefficients reported are estimates of the marginal effect on the probability when all of the independent variables are at their mean values. The subsamples are split based on the median of board size, independent director percent, independent directors' ownership and block institution holding, respectively. The p -values in parentheses are based on standard errors adjusted for heteroscedasticity and firm clustering. Industry fixed effects are based on the two-digit SIC code. All of the control variables are winsorized at 1th and 99th percentiels. Superscripts ^{***}, ^{**}, ^{*} denote statistical significance at the 1%, 5% and 10% levels, respectively.

	Large Board Size Subsample	Small Board Size Subsample	High Board Independence Subsample	Low Board Independence Subsample	High Independent Directors' Ownership Subsample	Low Independent Directors' Ownership Subsample	High Block Institution Ownership Subsample	Low Block Institution Ownership Subsample
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Severance pay _{t-1} (s2c _{t-1})	-0.0186 ^{***} (0.001)	-0.0139 ^{***} (0.000)	-0.0172 ^{***} (0.005)	-0.0128 ^{***} (0.000)	-0.0122 ^{***} (0.009)	-0.0124 ^{***} (0.006)	-0.0132 ^{***} (0.004)	-0.0144 ^{***} (0.003)
Severance pay _{t-1} [*] ret3	0.0093 ^{**} (0.011)	0.0059 ^{***} (0.001)	0.0084 ^{**} (0.014)	0.0043 ^{***} (0.009)	0.0052 ^{**} (0.013)	0.0055 ^{**} (0.025)	0.0035 ^{**} (0.030)	0.0073 ^{***} (0.002)
3-year average return (ret3)	-0.0235 ^{***} (0.001)	-0.0254 ^{***} (0.000)	-0.0236 ^{***} (0.000)	-0.0254 ^{***} (0.000)	-0.0174 ^{***} (0.000)	-0.0309 ^{***} (0.000)	-0.0170 ^{***} (0.001)	-0.0295 ^{***} (0.000)
CEO tenure _{t-1}	0.0021 (0.122)	0.0007 (0.368)	0.0041 ^{***} (0.003)	-0.0003 (0.743)	0.0008 (0.358)	0.0016 (0.153)	0.0009 (0.340)	0.0016 (0.114)
CEO ownership _{t-1}	-0.0076 ^{**} (0.034)	-0.0077 ^{***} (0.000)	-0.0145 ^{***} (0.003)	-0.0039 ^{**} (0.015)	-0.0134 ^{***} (0.000)	-0.0035 (0.148)	-0.0129 ^{***} (0.000)	-0.0046 ^{**} (0.018)
Delta of CEO Wealth _{t-1}	0.0003 (0.961)	0.0140 ^{**} (0.012)	0.0092 (0.141)	0.0030 (0.502)	0.0157 ^{***} (0.003)	-0.0003 (0.961)	0.0158 [*] (0.059)	0.0014 (0.739)
CEO is above 60 _{t-1} (dummy)	0.0933 ^{***} (0.000)	0.0734 ^{***} (0.000)	0.0877 ^{***} (0.000)	0.0713 ^{***} (0.000)	0.0672 ^{***} (0.000)	0.0926 ^{***} (0.000)	0.0768 ^{***} (0.000)	0.0812 ^{***} (0.000)
Board size _{t-1}			0.0030 (0.396)	0.0071 ^{**} (0.011)	0.0042 (0.133)	0.0090 ^{***} (0.004)	0.0046 (0.177)	0.0050 [*] (0.065)
Board Independence _{t-1}	0.0216 (0.678)	0.0709 [*] (0.087)			0.0874 [*] (0.060)	0.0739 (0.115)	0.0631 (0.171)	0.0599 (0.181)
CEO-chairman duality _{t-1}	0.0097	0.0210 [*]	0.0306 [*]	0.0172	0.0224 [*]	0.0134	0.0183	0.0251 [*]

	(0.553)	(0.086)	(0.050)	(0.198)	(0.072)	(0.348)	(0.210)	(0.053)
Independent director ownership _{t-1}	-0.0014	-0.0019	0.0001	-0.0033*			0.0009	-0.0038**
	(0.478)	(0.193)	(0.967)	(0.090)			(0.589)	(0.043)
Block institutional ownership _{t-1}	-0.0085	-0.0253	-0.0385	0.0087	-0.0635	-0.0095		
	(0.883)	(0.491)	(0.463)	(0.834)	(0.116)	(0.852)		
Log(total assets) _{t-1}	0.0051	-0.0160***	-0.0059	-0.0074	-0.0114*	-0.0101*	-0.0129*	-0.0028
	(0.376)	(0.004)	(0.358)	(0.164)	(0.056)	(0.093)	(0.056)	(0.548)
Leverage _{t-1}	0.0167	0.0343	0.0241	0.0179	-0.0225	0.0368	0.0319	-0.0153
	(0.708)	(0.266)	(0.577)	(0.571)	(0.542)	(0.324)	(0.377)	(0.686)
Tobin's q _{t-1}	0.0092	0.0057	-0.0047	0.0156**	0.0037	0.0100	0.0041	0.0072
	(0.378)	(0.333)	(0.599)	(0.013)	(0.556)	(0.237)	(0.561)	(0.335)
3-year average return volatility	0.0019	0.0051***	0.0046**	0.0031**	0.0032**	0.0044**	0.0044**	0.0032*
	(0.424)	(0.000)	(0.025)	(0.048)	(0.036)	(0.012)	(0.011)	(0.053)
Industry homogeneity (dummy)	0.0614	0.0504	-0.0938*	0.0582	-0.0117	0.0092	-0.0719*	-0.0065
	(0.423)	(0.180)	(0.053)	(0.123)	(0.719)	(0.814)	(0.084)	(0.914)
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1,799	2,182	1,743	2,204	1,975	2,014	1,926	2,085
Number of turnover	176	184	173	187	163	197	175	185
Pseudo R2	0.0994	0.1427	0.1312	0.1193	0.1289	0.1257	0.1105	0.1340

Table 7: Endogeneity of Severance Pay

This table presents the robustness tests for possible endogeneity problems related to severance pay in our main tests by using bivariate probit 2-stage method. Panel A provides the robustness testing results for Table 2, and Panel B provides the robustness testing results for Table 4, Table 5 and Table 6. Continuous Severance Pay/Compensation ratio is discretized into a dummy variable which is equal to 1 if the ratio for a particular firm is greater than the value of sample median and 0 otherwise. The instrument variable used in stage 1 is the industry percentage value of firms with high (Severance Pay/Compensation). The p -values in parentheses are based on standard errors adjusted for heteroscedasticity and firm clustering. Industry fixed effects are based on the two-digit SIC code. All of the control variables are winsorized at 1th and 99th percentiels. Superscripts ^{***}, ^{**}, ^{*} denote statistical significance at the 1%, 5% and 10% levels, respectively.

Panel A: Endogeneity Tests of Table 2

	Low Ret3 Subsample		High Ret3 Subsample	
	Stage 1 (1)	Stage 2 (2)	Stage 1 (3)	Stage 2 (4)
High Severance pay _{t-1} (dummy)		-0.0839*** (0.001)		-0.0042 (0.429)
3-year average return (ret3) _{t-1}		-0.0253*** (0.001)		-0.0022 (0.704)
CEO tenure _{t-2, t-1}	0.0005 (0.264)	0.0013 (0.284)	-0.0018*** (0.008)	0.0009 (0.301)
CEO ownership _{t-2, t-1}	-0.0007*** (0.004)	-0.0094*** (0.001)	-0.0004** (0.013)	-0.0048** (0.037)
Delta _{t-2, t-1}	-0.0214 (0.235)	0.0138** (0.031)	0.0446* (0.054)	0.0014 (0.777)
CEO is above 60 _{t-2, t-1} (dummy)	-0.0054** (0.018)	0.0967*** (0.000)	-0.0007 (0.424)	0.0670*** (0.000)
Board size _{t-1}		0.0026 (0.453)		0.0078*** (0.003)
Board Independence _{t-1}		0.0414 (0.434)		0.0757* (0.060)
CEO-Chairman Duality _{t-1}		0.0127 (0.458)		0.0204* (0.076)
Independent director ownership _{t-1}		-0.0031 (0.153)		-0.0000 (0.992)
Block institutional ownership _{t-1}		-0.0274 (0.587)		-0.0346 (0.452)
Log(total assets) _{t-2, t-1}	-0.0007 (0.156)	-0.0052 (0.412)	-0.0003 (0.289)	-0.0060 (0.223)
Leverage _{t-2, t-1}	0.0044 (0.353)	0.0224 (0.584)	0.0041* (0.088)	0.0128 (0.715)
Tobin's q _{t-2, t-1}	-0.0062*** (0.000)	-0.0106 (0.301)	-0.0021*** (0.000)	0.0135** (0.017)
3-year average return volatility _{t-2, t-1}	-0.0002 (0.623)	0.0028 (0.224)	0.0014 (0.738)	0.0036** (0.020)
Outside CEO (dummy) _{t-2}	0.0213** (0.046)		0.0049* (0.088)	
Non-compete Agreement (dummy) _{t-2}	0.0825*** (0.000)		0.0782*** (0.000)	
Industry homogeneity (dummy)		-0.0463 (0.621)		0.0702 (0.116)
Percent of high Severance Pay _{t-2} /Compensatoin _{t-2} (Instrument)	0.0925*** (0.000)		0.0483*** (0.000)	
Year FE	Yes	Yes	Yes	Yes
Industry FE	No	Yes	No	Yes
Observations	2,144	2,144	2,145	2,145
Number of turnover		232		128
Rho		0.2856		-0.0162
Chi-2 Statistic		3.825*		0.0059

Panel B: Endogeneity Tests of Table 4, Table 5 and Table 6

	Low Ret36 High Volatility Subsample	Low Ret36 Low Volatility Subsample	High Ret13 Low Ret1 Subsample	Low Ret13 Low Ret1 Subsample	Low Ret36 High Board Size Subsample	Low Ret36 Low Board Size Subsample
	Stage 2 (1)	Stage 2 (2)	Stage 2 (3)	Stage 2 (4)	Stage 2 (5)	Stage 2 (6)
High Severance pay _{t-1} (dummy)	-0.0201** (0.040)	-0.0014 (0.738)	-0.0196*** (0.000)	-0.0363 (0.252)	-0.0235** (0.043)	-0.0247** (0.056)
3-year average return (ret3) _{t-1}	-0.0250** (0.014)	-0.0349*** (0.009)			-0.0095 (0.484)	-0.0328*** (0.000)
1-year average return (ret1)			-0.0155*** (0.000)	-0.0208* (0.075)		
CEO tenure _{t-2, t-1}	0.0003 (0.879)	0.0028* (0.074)	0.0001 (0.959)	0.0070* (0.081)	0.0016 (0.465)	0.0020 (0.161)
CEO ownership _{t-2, t-1}	-0.0186*** (0.002)	-0.0034 (0.251)	-0.0050** (0.039)	-0.0134 (0.133)	-0.0117* (0.094)	-0.0132*** (0.000)
Delta _{t-2, t-1}	0.0111 (0.283)	0.0055 (0.521)	0.0054 (0.390)	0.0176 (0.389)	0.0046 (0.646)	0.0384*** (0.000)
CEO is above 60 _{t-2, t-1} (dummy)	0.1137*** (0.000)	0.0875*** (0.000)	0.0863*** (0.000)	0.0812 (0.115)	0.1244*** (0.000)	0.0894*** (0.000)
Board size _{t-1}	-0.0126** (0.044)	0.0152*** (0.000)	0.0079** (0.039)	-0.0179 (0.206)	-0.0050 (0.462)	-0.0048 (0.515)
Board Independence _{t-1}	-0.0137 (0.880)	0.1118* (0.094)	-0.0065 (0.902)	0.1247 (0.562)	0.0046 (0.956)	0.0758 (0.295)
CEO-Chairman Duality _{t-1}	0.0175 (0.513)	0.0123 (0.582)	0.0311* (0.056)	-0.0851 (0.229)	0.0132 (0.616)	0.0205 (0.373)
Independent director ownership _{t-1}	-0.0014 (0.657)	-0.0072* (0.073)	-0.0023 (0.305)	0.0033 (0.678)	-0.0043 (0.207)	-0.0056* (0.073)
Block institutional ownership _{t-1}	-0.0702 (0.363)	-0.0171 (0.790)	0.0069 (0.888)	-0.2002 (0.236)	0.0333 (0.681)	-0.0382 (0.524)
Log(total assets) _{t-2, t-1}	0.0028 (0.796)	-0.0096 (0.247)	-0.0038 (0.564)	0.0166 (0.449)	0.0049 (0.591)	-0.0227** (0.019)
Leverage _{t-2, t-1}	0.0157 (0.813)	0.0775 (0.140)	-0.0444 (0.290)	0.1599 (0.254)	0.0390 (0.619)	0.0679 (0.192)
Tobin's q _{t-2, t-1}	0.0028 (0.905)	-0.0008 (0.950)	-0.0048 (0.597)	0.0389 (0.349)	0.0016 (0.935)	-0.0214 (0.140)
3-year average return volatility _{t-2, t-1}	0.0008 (0.810)	-0.0061 (0.381)	-0.0005 (0.850)	0.0035 (0.675)	-0.0014 (0.743)	0.0055** (0.038)
Industry homogeneity (dummy)	-0.1441 (0.101)	-0.0190 (0.842)	-0.0784 (0.337)	-0.0855 (0.626)	-0.0603 (0.540)	0.0217 (0.714)
Observations	990	1,154	1,758	386	977	1,167
Number of turnovers	122	110	147	54	110	122
Rho	0.0326	-0.2536	0.3562	-1.3247	0.0486	0.4528
Chi-2 Statistics	0.0085	0.5622	0.4235	8.521	0.0041	2.6321

Table 8: Strategic Setting of Severance Pay

Table 8 presents robustness tests for possible reverse causality problems related to severance pay. The dependent variable is defined as 1 if there is a turnover in year t and 0 otherwise. All the other variables are defined in Appendix A. The coefficients reported are estimates of the marginal effect on the probability when all of the independent variables are at their mean values. For column (3) and (4), the subsamples are split based on the median of board size. The p -values in parentheses are based on standard errors adjusted for heteroscedasticity and firm clustering. Industry fixed effects are based on the two-digit SIC code. All of the control variables are winsorized at 1th and 99th percentiles. Superscripts ^{***}, ^{**}, ^{*} denote statistical significance at the 1%, 5% and 10% levels, respectively.

	Full Sample		Large Board Size Subsample	Small Board Size Subsample
	(1)	(2)	(3)	(4)
Severance pay _{t-1} (s2c _{t-1})	-0.0147*** (0.001)	-0.0156*** (0.000)	-0.0284*** (0.000)	-0.0141*** (0.001)
ΔSeverance pay _{t-1} (s2c _{t-1} - s2c _{t-2})	0.0026 (0.425)	0.0027 (0.428)	0.0039 (0.421)	0.0036 (0.386)
Severance pay _{t-1} * ret3		0.0058** (0.022)	0.0112* (0.074)	0.0059** (0.023)
ΔSeverance pay _{t-1} * ret3		0.0016 (0.372)	0.0023 (0.638)	0.0012 (0.825)
3-year average return (ret3)	-0.0186*** (0.000)	-0.0248*** (0.000)	-0.0223** (0.013)	-0.0267*** (0.000)
CEO tenure _{t-1}	0.0006 (0.487)	0.0007 (0.371)	0.0014 (0.328)	0.0012 (0.137)
CEO ownership _{t-1}	-0.0077*** (0.000)	-0.0077*** (0.000)	-0.0058 (0.105)	-0.0107*** (0.000)
Delta _{t-1}	0.0069 (0.165)	0.0062 (0.187)	0.0012 (0.874)	0.0064 (0.387)
CEO is above 60 _{t-1} (dummy)	0.0930*** (0.000)	0.0915*** (0.000)	0.1049*** (0.000)	0.0746*** (0.000)
Board size _{t-1}	0.0048* (0.056)	0.0048* (0.055)		
Board Independence _{t-1}	0.0299 (0.447)	0.0322 (0.404)	0.0724 (0.269)	-0.0215 (0.634)
CEO-chairman duality _{t-1}	0.0166 (0.123)	0.0162 (0.114)	0.0226 (0.478)	0.0852* (0.093)
Independent director ownership _{t-1}	0.0000 (0.986)	-0.0002 (0.843)	-0.0005 (0.807)	-0.0009 (0.548)
Block institutional ownership _{t-1}	0.0160 (0.666)	0.0171 (0.641)	-0.0020 (0.976)	0.0201 (0.616)
Log(total assets) _{t-1}	-0.0027 (0.558)	-0.0028 (0.542)	0.0115* (0.099)	-0.0139** (0.020)
Leverage _{t-1}	-0.0005 (0.987)	-0.0016 (0.957)	0.0154 (0.762)	0.0143 (0.673)
Tobin's q _{t-1}	0.0042 (0.533)	0.0035 (0.586)	-0.0087 (0.574)	0.0087 (0.184)
3-year average return volatility	0.0039*** (0.002)	0.0036*** (0.003)	0.0019 (0.432)	0.0042*** (0.002)
Industry homogeneity (dummy)	0.0256 (0.672)	0.0386 (0.421)	0.0603 (0.352)	0.0527 (0.166)
Year FE	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes
Observations	2,866	2,866	1,202	1,500
Number of turnover	251	251	131	120
Pseudo R2	0.1321	0.1392	0.1429	0.1984

Table 9: Test of Powerful CEOs

Table 9 presents robustness tests for effects of powerful CEOs to severance pay. The dependent variable is defined as 1 if there is a turnover in year t and 0 otherwise. All the other variables are defined in Appendix A. The coefficients reported are estimates of the marginal effect on the probability when all of the independent variables are at their mean values. For column (3) and (4), the subsamples are split based on the median of board size. The p -values in parentheses are based on standard errors adjusted for heteroscedasticity and firm clustering. Industry fixed effects are based on the two-digit SIC code. All of the control variables are winsorized at 1th and 99th percentiels. Superscripts ^{***}, ^{**}, ^{*} denote statistical significance at the 1%, 5% and 10% levels, respectively.

	Tenure Median		CEO Duality	
	Above	Below	No	Yes
Constant	-4.9241*** (0.000)	-4.4802*** (0.002)	-4.9219*** (0.000)	-4.2650** (0.018)
Severance Pay _{t-1}	-0.2593*** (0.000)	-0.2266** (0.016)	-0.2407*** (0.000)	-0.2122* (0.085)
Severance Pay _{t-1} *ret3	0.0731 (0.114)	0.0980*** (0.002)	0.0946*** (0.001)	0.0568 (0.295)
3-year average return (ret3)	-0.3494*** (0.000)	-0.4275*** (0.000)	-0.3988*** (0.000)	-0.2566** (0.024)
CEO tenure _{t-1}			0.0266** (0.031)	-0.0317* (0.087)
CEO ownership _{t-1}	-0.0690** (0.034)	0.0088 (0.719)	-0.0508* (0.070)	-0.0324 (0.446)
Delta _{t-1}	-0.0503 (0.471)	0.0505 (0.609)	0.0135 (0.826)	-0.0822 (0.525)
CEO is above 60 _{t-1} (dummy)	0.9995*** (0.000)	1.1536*** (0.000)	1.0167*** (0.000)	1.3657*** (0.000)
Board size _{t-1}	0.1052** (0.038)	0.0884* (0.089)	0.1206*** (0.002)	-0.0353 (0.604)
Board Independence _{t-1}	1.5415** (0.030)	-0.3026 (0.708)	0.9336 (0.116)	1.4357 (0.192)
CEO-Chairman Duality _{t-1}	0.2182 (0.294)	0.3238 (0.160)		
Total Asset	0.0196 (0.811)	-0.0397 (0.662)	-0.0354 (0.610)	0.0531 (0.633)
Leverage	0.6461 (0.231)	-0.4761 (0.457)	0.0008 (0.999)	0.5022 (0.535)
Tobin's Q	0.1976 (0.107)	0.0884 (0.468)	0.1078 (0.242)	0.2323 (0.137)
3-year average return volatility	0.0246 (0.377)	0.0897*** (0.003)	0.0670*** (0.007)	0.0437 (0.146)
Institutional Ownership	-0.1988 (0.735)	0.8367 (0.256)	0.0908 (0.867)	-0.1954 (0.825)
Year Fixed Effect	Yes	Yes	Yes	Yes
Industry Fixed Effect	Yes	Yes	Yes	Yes
Observations	1,891	2,147	3,050	968
Pseudo R2	0.1171	0.1280	0.1156	0.1333

Performance of Reverse Mergers with Shell and Non-Shell Targets: Evidence from U.S. Backdoor Listing Market

Abstract

In this exploratory study, we separate the reverse merger targets into public shell companies and public non-shell companies and confirm that the non-shell targets have distinct difference from shell targets in firms' characteristics. We further find that non-shell based RM companies outperform shell based RM companies in terms of short-run stock return, long-run stock return and long-run operating performance. We then provide evidence to show that timely PIPE financing after the reverse merger transaction is critical to RM companies' future performance. The outperformance of non-shell based RM companies can be explained by their better ability to secure PIPE investments within 6 months after the transaction. Last but not least, by matching the RM companies with a group of penny stock IPO companies, we find that reverse merger companies are not inherently worse than those IPO companies.

Keywords: Reverse Merger, Shell Company, Non-Shell Company, Stock Return, Long-run Performance, PIPE Financing, Initial Public Offering

JEL Classification: G12, G34

1. Introduction

Over the last few decades, more ways to go public than through the conventional Initial Public Offering (IPO) have been discovered. Back-door Listing, or Reverse Merger (RM) is one of the most important alternative routes for a private firm to acquire a public status. In a reverse merger transaction, a private firm is merged into a public firm through stock exchanging, but the shareholders of the private firm acquire major ownership in the surviving company after the transaction so that the private firm inherits the public identity¹³. Compared to the traditional front-door listing, the reverse merger enjoys some major advantages: lower cost, quicker process, no IPO window necessary, no risk of underwriter's withdrawal, less dilution of ownership, and etc. (Feldman 2009). Therefore, it provides invaluable opportunities to those privately held enterprises which are seeking access to the capital markets but not eligible or not willing to do IPO¹⁴.

Since the end of the 1990s, the reverse merger has become increasingly popular. However, although the IPOs and M&As are extensively studied by researchers, the reverse merger, a combination of both to some extent, has not been well understood. There is only a small bundle of literature on reverse mergers, and most of these works have only focused on the demand side, that is from the perspective of the acquirer (private firm). Their findings are concentrated in two aspects: the difference in

¹³ After a reverse merger transaction, public firm is the legal surviving company and private firm is the accounting surviving company. Therefore, the public firm is the legal acquirer but accounting target in a reverse merger, and the private firm is the legal target but accounting acquirer. In the following contents of this paper, both acquirer and target refer to their accounting definition. See section 2.1 for more details about a reverse merger transaction.

¹⁴ Many well-known large companies which are eligible to IPO also have gone public through reverse mergers, such as New York Stock Exchange, Taxes Instruments Inc, Berkshire Hathaway Inc, Jamba Juice Inc, Radio Shack Corp, Occidental Petroleum Corp and etc.

characteristics of private firms using reverse mergers between those using IPOs (Arellano-Ostoa and Brusco 2002, Brau, Francis and Kohers 2003, Gleason, Rosenthal and Wiggins 2005, Adjei, Cyree and Walker 2008, Brown, Ferguson and Lam 2010, Floros and Shastri 2012), and the comparison of the post-event performance of RM firms and IPO firms (Gleason, Jain and Rosenthal 2006, Asquith and Rock 2011)¹⁵.

Although the reverse merger is functionally similar to the IPO and aims to allow private firms to go public, it is actually a merger transaction between two companies in essence. However, existing academic works on the reverse merger have devoted rapt attention to its function but have ignored its nature. Numerous literatures in regular mergers and acquisitions find that the characteristics of the target firm could significantly affect the post-event stock returns and performance of the acquirer¹⁶, but the importance of the target (public) firm in the reverse merger has not been well studied.

There are several reasons why evaluating a reverse merger transaction from the target's perspective is of interest. First, although the private held acquirer is the leading actor in a reverse merger, it is very opaque to the public individual investors. Unlike the IPO process, the RM process neither requires an underwriter nor a road show so that it is almost not possible for outsiders to get first-hand information about the acquirer. Moreover, the reverse merger attracts less media coverage and also fewer

¹⁵ See section 2.2 for more detailed literature review.

¹⁶ For Example, Asquith, Bruner and Mullins (1983), Servaes (1991), Chang (1998), Faccio, McConnell and Stolin (2006), Bagerona et al (2008), Cooney, Moeller and Stegemoller (2009), McNichols and Stubben (2010), Jindra and Moeller (2012), and etc.

analysts because it is not as glamorous as an IPO. Therefore, it is quite difficult for outside investors to evaluate the quality of the RM only from the acquirer's side. But compared to the private held acquirer, the public target is more transparent to the investors so that they are likely to evaluate a reverse merger from the target's characteristics. Second, previous literature (Myers 1984, Myers and Majluf 1984) implies that internal financial constraint is one important reason for a private company going public. An IPO company can raise a significant amount of capital to finance its future projects by issuing new shares, but that is not applicable to the RM acquirer. In this case, the future success of the acquirer partially depends on whether the company can get sufficient external financing from PIPE investors after the reverse merger. PIPE investors might have different preference in the shell status of the target because a shell based reverse merger is likely to be a pure going public transaction but a non-shell based reverse merger might generate synergies from the combination of two companies. Hence, the characteristics of the target may affect the long-run performance of the RM surviving company. Third, we know that the reverse merger has IPO-merger duality, but whether investors perceive it more as an alternative IPO or more as a regular merger is ambiguous. Conducting an investigation from the target's perspective may give us some hints.

The only paper that has explored the RM target, to the best of our knowledge, is Floros and Sapp (2011). In their study, they identify that most of the targets in reverse mergers are public shell companies, and they argue that the purpose of most shell companies keeping their shares listed in the markets is just to find a potential suitor

for a reverse merger¹⁷. They further find that investors in shell companies enjoy an average 48.1% three-month abnormal return once the reverse mergers are consummated, perhaps reflecting the compensation to shell stock investors for the illiquidity and the uncertainty of finding a RM suitor .

Floros and Sapp (2011)'s work sheds a light on the supply side of the reverse merger, and also leave us some interesting questions unsolved. In spite of the fact that shell companies participate in a majority of reverse merger transactions as targets, non-shell companies also play an important role in this market¹⁸. Using a comprehensive dataset, we have identified 1479 reverse merger transactions in the United States from 1996 to 2011, and 418 (28.3%) of them are non-shell based, which is already a significant sample so that we cannot neglect its importance. Our comparison results further show that non-shell targets have a distinct difference in firm characteristics from shell targets so that they are not substitutable. Last but not least, Floros and Sapp (2011) find that only half of the available public shell companies in the market can find a suitor, which implies that shell companies are obviously oversupplied and the acquirer should have no constraint on seeking a suitable target among available shell companies¹⁹. Therefore, it is reasonable to argue that the choice between shell and non-shell targets is neither random nor subjecting to any external restriction, but with some undiscovered reasons.

¹⁷ The Securities Act Rule 405 and Exchange Act Rule 12b-2 define a shell company as "with no or nominal operations and either no or nominal assets, assets consisting solely of cash and cash equivalents, or assets consisting of any amount of cash and cash equivalents and nominal other assets."

¹⁸ For example, Archipelago Holdings, Inc, which is a public company acquired by NYSE in a reverse merger transaction, has significant operations and non-cash assets in place before the transaction. It is not a shell company.

¹⁹ Floros and Sapp (2008) identify a sample of 585 public shell companies over 2006-2008, and report that only 298 of them complete RM agreements.

Based on the argument that the private firm may choose shell or non-shell public targets strategically in a reverse merger transaction, we want to discover if reverse mergers with non-shell companies and shell companies are really distinguishable. Therefore, our analyses focus on following issues: First, whether investors react differently to the reverse mergers with shell and non-shell targets in a short-run after the close of transactions. Second, whether the long-run stock and operating performance of the shell and non-shell based reverse mergers are different. Third, what is the reason if shell and non-shell based RM companies have different performance? Last, what is the relative performance of shell and non-shell based RM companies to the performance of matched IPO companies? To address those issues, we carefully construct an initial sample of reverse mergers in the United States between 1996 and 2011 with a total of 5972 transactions and a regression sample with 1479 transactions. Our RM data comes from multiple sources so that it provides us an opportunity to get a meaningful number of transactions involving both shell and non-shell targets²⁰. Compared to those in the existing literature, our sample has longest period and largest size, which mitigates the concerns that our results are driven by particular events or by particular time periods.

First of all, by dividing the full sample into non-shell based RMs and shell-based RMs, we find that in the first 20 trading days, non-shell based companies enjoy a

²⁰ In previous literature, common used database for reverse mergers data are SDC Platinum and DealFlow Media. SDC only covers large transactions with a deal value more than 5 million US dollars, so the sample retrieved from SDC is normally very small; DealFlow Media provides comprehensive reverse merger reports, however, according to the statements in its website (http://www.dealflowmedia.com/conferences/rm_conference_11.cfm), we find that it only covers shell based RMs.

significantly higher buy-and-hold return than shell-based companies (the raw return difference is 12.48% and the market-adjusted return difference is 12.39%). This result suggests that investors indeed react differently to RMs with different types of targets in a short run. More specifically, they are more optimistic about the non-shell based transactions than the shell-based transactions.

In a long run, we find a significant return reversal for RM companies. The average 3-year (36-month) holding period return for all RM companies is negative 65.99% and deeply underperforms the market. This reversal may be because of the fact that the investors are over optimistic about the future potential of RM companies at the beginning. In case they find the actual performance is below their expectation, they may rush out and dump their stocks. Following Shiller (1990), Ritter (1991) defines this phenomenon as “fads explanation”. Previous literature also shows that the future perspective of RM Company is not as good as the public thought. Gleason, Rosenthal and Wiggins (2005) as well as Adjei, Cyree and Walker (2007) find that more than half of the RM companies are either delisted or dead after 3 years. To provide supplemental evidence, we use ROA to measure the long-run operating performance of RM companies and find that it is persistently negative in 3 years after the transaction.

In spite of the fact that the overall long-run performance of RM companies is poor, non-shell based companies perform relatively much better than shell-based companies. The 3-year average ROA and buy-and-hold return for non-shell based companies are 16.4% and 13.27% higher than those for shell-based companies,

respectively. The superior performance is robust even after correcting it for potential survivorship bias. This finding suggests that non-shell targets can enhance the operating performance of the acquirers to some extent, and in turn, the stock performance.

However, if we further separate the sample into domestic RM and foreign RM, we find that shell based RM companies significantly underperform non-shell based RM companies in domestic subsample in both long-run stock returns and operating performance. However, the underperformance of shell based RM companies seems to be disappeared in foreign reverse merger subsample. The underperformance of shell based RM companies we observed in the full sample actually is driven by the domestic RM companies.

We find that the external capital raising ability through PIPE investors might be able to explain the performance difference between non-shell and shell based RM companies. 43.67% of domestic non-shell RM companies are able to secure PIPE investments within 6 months after the reverse merger transactions, while only 19.09% of domestic shell RM companies can do so. However, foreign non-shell RM companies tend to have comparable ability to secure PIPE investments within 6 months to foreign shell RM companies. Ability to attract PIPE investors might be important to the firm's future performance because of two reasons. First, PIPE investors are normally very professional and sophisticated. They will conduct a due diligence process before they put the money in the company. Therefore, those RM companies which can attract PIPE investors in a short time after the transaction might

be just fundamentally better than other companies. Second, if a RM company can get external financing quickly after the reverse merger transaction, it might have more free cash to do the marketing and to develop new products. In return, its future performance tends to be better.

We provide evidence to support the above arguments. Specifically, we find that timely PIPE financing is associated with a better future performance for both non-shell and shell RM companies. More important, those shell RM companies with PIPE financing within 6 months after the transaction do not significantly underperform non-shell RM companies in both operating performance and stock performance. So the overall underperformance of shell RM companies actually is driven by those companies which are not able to secure PIPE investments in a short time after the RM transaction.

Last but not least, we compare the performance of reverse merger companies and their matched penny stock IPO companies. We compare RM companies with penny stock IPO companies rather than regular IPO companies because penny stock IPO companies have similar characteristics to the RM companies, especially their market liquidity. Arellano-Ostoa and Brusco (2002) argue that low quality companies tend to do reverse mergers and high quality companies tend to do IPOs. If investors agree with this argument, the post-event short-run stock return for IPO companies should be higher than RM companies. Moreover, on average the long-run operating performance of IPO companies should also be better. However, we find that the post-event short-run return for penny stock IPO companies is surprisingly much lower

than RM companies. In the long run, both non-shell and shell based RM companies tend to have comparable performance in stock return to their matched penny stock IPO companies. On the other hand, in spite of the fact that penny stock IPO companies perform relatively better than shell based RM companies in operating performance, there is no evidence that shows they have a better performance than non-shell based RM companies. Therefore, RM companies may not be inherently worse than comparable IPO companies.

The remainder of this paper is structured as follows. Section 2 introduces some most important characteristics of reverse mergers and summarizes the existing literature related to reverse merger. Section 3 describes our data and sample selection procedures. Section 4 presents our empirical results and main findings. Section 5 concludes this paper.

2. Characteristics of Reverse Merger and Literature Review

2.1 Characteristics of Reverse Merger

In a reverse merger transaction, a public company acquires a private operating company, which is usually seeking access to the capital markets by entering into a stock exchange agreement. Hence legally, the public company is the acquirer and the private company is the target. Although the public company survives and maintains its public identity after the merger, the shareholders of the private company gain a controlling interest in the surviving public company as they exchange their shares for a large majority of the shares of the public company. Therefore, the transaction seems to be reversed as the legal acquirer (public company) is the actual accounting target,

and the legal target (private firm) is the actual accounting acquirer. Furthermore, normally the business of the surviving public company after the merger is in line with the business of the former private company so that the private company is the accounting survivor. In this paper, when we use terms acquirer or target, we refer to their accounting definitions.

In most cases, the reverse merger is accompanied by the reverse stock split in the public company, which is essential to achieve the percentage ownership that the private company is looking for upon transaction closing. For example, if the private company has 9 million common shares and wants 90% ownership in the surviving company after the reverse merger, then the common stocks of the public firm have to be reversed down to 1 million shares. That means if the public firm has 20 million shares outstanding before the reverse merger, it has to conduct a reverse stock split at a ratio of 1 for 20 to ensure that there are only 1 million shares remaining. Also, typically, upon the closing of the reverse merger, the management of the former public company will resign and the former private company's management will take over the board. In the following few months, the new board normally will change the name and the stock symbol of the surviving public company.

Finally, we can conclude that in case a public company announces a merger and acquisition agreement with a private company, followed by a reverse stock split, resignation of incumbent board members and change of name and stock symbol, it is most probably a reverse merger transaction²¹.

²¹ However, compared to the reverse stock split and resignation of incumbent board members, change of company name and stock symbol is relatively less frequent. The owner of the private firm may stick

2.2 Literature Review

Brau, Francis and Kohers (2003) examine the choice between an IPO and a takeover by a publicly trade acquirer for private held firms. They identify several factors associated with this choice, such as industry concentration, current cost of debt, relative hotness of the IPO market and the insider ownership concentration. Although they just consider the general takeovers of private firms by public firms rather than focus on reverse merger, they shed a light on the research of alternative routes to go public than IPO. Arellano-Ostoa and Brusco (2002) construct a three-date model about the private firm's going public decision. Their model predicts that under suitable condition, a separating equilibrium exists in which a high quality firm will prefer IPO and a low quality firm will prefer reverse merger. This paper is the first theoretical paper that works on reverse merger. Several follow-up empirical works support their predictions. In an exploratory paper, Gleason, Rosenthal and Wiggins (2005) argue that although shareholders receive significant wealth gains upon the closing of RM transaction, the RM firms are considerable risky and often fail to generate long-term wealth for the shareholders of the post-event firm. Adjei, Cyree and Walker (2008) find that the private firms using RM rather than IPO are generally smaller, younger and have poorer ex-ante performance. By comparing the RM firms and the penny stock IPO firms, Floros and Shastri (2012) further show that the RM firms tend to be small, have low profitability, low liquidity and most of them are in the development stage with higher R&D expenditures. Focusing on Australian

to the existing name of the public company if that company has good reputation or has some other significant advantages.

markets, Brown, Ferguson and Lam (2010) find similar characteristics of the RM firms to those found in Floros and Shastri (2012), but they argue that the reverse mergers in Australia actually take longer time to finish than the IPOs, which implies going public through RM may not necessarily be easier and quicker than through conventional IPO.

Another two papers focus on the comparison of the post-event performance of RM firms and IPO firms. Gleason, Jain and Rosenthal (2006) find that the firms utilizing reverse mergers to go public outperform their matched IPO counterparties in a short run, but exhibit comparable performance in the three years following going public. Asquith and Rock (2011) test existing under-pricing theories of IPOs with reverse mergers, and find that most theories are not applicable. Specifically, they find that the announcement day price reaction to reverse mergers for the acquirer is comparable to the initial day price reaction to IPOs, but no theory in IPOs can be used to explain the phenomena observed in reverse mergers.

The recent rash of financial scandals of Chinese reverse merger companies has caught significant public attentions. Both the investors and regulators start to take reverse merger seriously so that it suddenly becomes one of the hottest topics in the media reports, which induces a group of research papers investigating Chinese reverse mergers. Ang, Zhang and Wu (2012) identify the characteristics of good Chinese RM companies and bad Chinese RM companies then suggest a way to predict potential financial frauds. Chen et al (2012) and Givoly, Hayn and Lourie (2012) argue that the Chinese RM companies have poorer corporate governance and financial report quality

than their U.S. RM counterparties. Jindra, Voetmann and Walkington (2012) further find that Chinese RM companies perform poorer than Chinese IPO companies. Chu, Gotti and Schumann (2012) and Siegel and Wang (2013) suggest that the presence of Big 4 auditors in RM transactions can improve the financial reports quality. Last but not least, Darough, Huang and Zhao (2012) and Lee, Li and Zhang (2013) argue that the Chinese RM companies are not inherently bad. Instead, they find that the Chinese RM companies are generally healthier and fare better than either their U.S. RM counterparties or a control group of companies. The negative publicity on the Chinese RM companies is more likely due to China-bashing rather than RM-bashing.

Our paper contributes to the literature in the following ways. First, we construct a much larger sample of reverse mergers which helps to overcome the sample selection bias problem in RM research to some extent. Second, we identify two distinct types of targets in reverse merger and shed a light on the importance of non-shell targets. Third, we systematically examine the short-run and long-run performance of the reverse mergers, and show that RMs with different types of targets have different short-run and long-run performance. Forth, we provide direct evidence that shows the reasons behind the performance difference between shell and non-shell RM companies. Last but not least, we find that the reverse mergers are not inherently worse than the comparable IPOs.

3. Sample Selection and Data Description

Our initial sample includes all possible closed reverse merger transactions (5972 transactions) in the United States that are available in the Capital IQ and SDC

Mergers and Acquisitions database over the period from January 1, 1996 to December 31, 2011²². It is surprising that there is only one previous paper trying to obtain RM data from Capital IQ²³. Compared to SDC, Capital IQ contains many more transactions because it covers those transactions with a deal value less than 5 million US dollars. Therefore, Capital IQ significantly increases our sample size. Furthermore, Capital IQ provides detailed background information for both acquirers and targets, which helps us to understand the transactions better.

The next step is to collect daily stock return and price information for the surviving company after the reverse merger from DataStream. The reason for us to use DataStream rather than CRSP is because DataStream covers companies traded on OTCBB or Pink sheet, which consist of a majority of our sample. For any transaction to be further included in the sample, the stock of the surviving company should trade on the market for at least 250 days after the close date of the reverse merger.

We further merge this sample with the accounting data obtained from the WorldScope. In order to identify non-shell and shell companies, we require the availability of total assets, cash and sales for target firms within 2 years before the announcement date of the transaction.

To ensure the remaining transactions are indeed reverse mergers, we verify each transaction by searching targets' 8-k or 10-k filings around the reported RM closed date in the SEC Edgar filing database. A transaction is confirmed as a reverse merger

²² SDC database identifies possible reverse merger transactions with a reverse takeover flag. Capital IQ identifies possible reverse merger transactions with a screening criterion "reverse merger-backdoor IPO".

²³ It is Siegel and Wang (2013).

if: (1) it is clearly defined as a reverse merger in the material definitive agreement or in any other paragraphs in the filing; or (2) it announces a reverse stock split plan; or (3) it announces a resignation of incumbent board members; or (4) it changes its name to the former private firm's name after the transaction. If the relevant filings are missing or none of the above 4 criteria can be satisfied, we continue to search the transaction in Factiva to find possible hints from relevant news. If we still cannot get any useful information, that transaction will be dropped from our sample. We do not perform this step before deleting those transactions with missing return or accounting data because it may take too long time to verify all transactions in the initial sample. Finally, 1479 transactions with available stock return and accounting data are confirmed to be reverse mergers.

Last but not least, we define a public target company as a shell if its most recent sales before RM is 0 or its assets consist solely of cash and cash equivalents; otherwise we define it as a non-shell company. To verify whether this is a correct way to define shell and non-shell companies, we pick up a sub-sample which consists of the RM transactions which are closed after Jan 1, 2006²⁴. In this sub-sample, we define 489 targets as shells and remaining 154 targets as non-shells. Afterwards, we compare our self-defined shell status of those targets with the actual status reported in company's most recent 10-Q or 10-K filings before RM. We find that only 4 out of 489 self-defined shell companies are actually non-shell companies, and 15 out of 154 self-defined non-shell companies are actually shell companies. This result shows that

²⁴ On June 29, 2005, SEC adopted a new rule that require all public companies to check a box on the cover of all annual and quarterly reports to indicate whether it is a shell company.

our shell sample size is downward biased and the non-shell sample is upward biased. However, we believe this small bias will not seriously affect our analyses.

Table 1 presents an overview of our sample across the years from 1996 to 2011. Panel A of Table 1 reports the distribution of reverse mergers across years in our initial sample. From the first two columns, we can see that the number of reverse merger transactions has increased significantly since 1998. It is a booming period for reverse mergers from 2003 to 2007, and the number of transactions reaches its peak in 2005. However, from 2008 to 2011, the number of reverse mergers slightly decreases compared to the number in previous 5 years. This observation somehow contradicts certain arguments which state that the reverse merger transactions should be procyclical to the hotness of the IPO market. Therefore, a reverse merger may not just be a supplementary event to the IPO, which will only be considered in a ‘cold’ IPO market. We further note that there were only 295 reverse merger transactions in 2011, which is lower than the average transactions per year (373 transactions) in our sample. It may be because of the new rule adopted by SEC in 2011, which tightened the standards that companies going public through a reverse merger must meet. Although this new rule became effective in November of 2011, it was initialized in the summer of 2010. Furthermore, SEC issued a bulletin in June of 2010 warning investors about the risk involved in reverse merger companies. All these actions may delay the RM process for some companies, or even force the companies to stop the transactions.

Among all 5972 transactions, I can successfully identify the shell status of the target company for 4776 transactions, including 1309 (27.41%) non-shell based

transactions and 3467 (72.59%) shell based transactions. Therefore, the sample size of non-shell based RMs is significant for a meaningful research. In column (4) and (6) of Panel A, we report the distribution of non-shell and shell based reverse merger transactions across the years. From column (5), we observe that the distributions of transactions with public non-shell companies are normally proportional to the distribution of the full sample, which means that if the percentage of RM transactions in a particular year is higher, the percentage of non-shell based transactions in that year will also be higher. Similarly, from column (7) we can also find the above mentioned distribution pattern for transactions with public shell companies.

In Panel B, we report the distribution of reverse merger companies across years in our regression sample. The size of the regression sample is much smaller than the size of the initial sample because of the financial and stock data availability in the database. All together, we can collect 1479 reverse merger transactions with financial and stock return data available, including 418 non-shell based transactions and 1061 shell based transactions. In column (3) and (5) of Panel B, we report the distribution of non-shell and shell public company based reverse merger transactions across years. We find that on average there are 418 out of 1479, or 28% reverse mergers are non-shell based transactions. This percentage is very close to the number we observed in the initial sample.

4. Main Results and Findings

4.1 Summary Statistics

Panel A of Table 2 presents the summary statistics of the acquirers and targets around the closed date of reverse mergers. For targets, we report the first fiscal year-end annual data prior to the RM. For acquirer, we report the first fiscal year-end annual data after the RM. The reason for us to use post-RM data for acquirer is just because it is hard to collect detailed financial data for private firms prior to the reverse merger. Anecdotal evidence suggests that firms using reverse merger to go public tend to be small and under poor operating performance. Our findings are consistent with previous literature. The means (medians) of total assets and sales of acquirers immediately after the reverse merger are only \$19.364 (\$2.714) million and \$12.28 (\$0.548) million, respectively, which shows that RM acquirers are small companies. The means (medians) of EBIT and net income are -\$2.378 (-\$1.184) million and -\$3.311 (-\$1.356) million, respectively, which shows that the operating performance of those acquirers are not good. However, we find that RM acquirers may have certain liquidity constraints. The mean (median) of cash and equivalents is \$3.162 (\$0.228) million, which is only comparable to the mean (median) of short-term debt. Furthermore, more than half of the acquirers do not have any long-term debt outstanding, somehow suggests that it is difficult for them to get sufficient external financing. So we argue that the liquidity problem of the acquirers may be the most important motivation for conducting reverse mergers.

On average, public targets are much smaller than the acquirers. The mean

(median) of total assets is only \$2.999 (\$0.018) million and the mean (median) of sales is only \$0.793 (\$0). This result is quite normal because we know that most targets are shell companies, and the definition of a shell company is that it does not have operation or its assets consist solely by cash and equivalents. Therefore, most targets should either have no sales or have very small total assets in place. As most targets are out of the business, it is not surprising that means and medians of all variables are very small.

In order to understand the difference in characteristics between non-shell based and shell-based reverse mergers better, we separate the full sample into non-shell based and shell-based subsamples, and compare them. In Panel B of table 2, we find that the acquirers choosing public non-shell targets are not different from the acquirers choosing public shell targets. First of all, their sizes are comparable. The mean total assets of non-shell based acquirers are about \$21.19 million while the mean total assets of shell-based acquirers are around \$18.65 million. The difference is not statistically significant ($t=0.84$). In term of sales, these two groups are still indifferent. Their difference in average sales is \$1.526 million but statistically insignificant ($t=0.76$). Similarly, the leverage positions for these two groups of acquirers are also indifferent. Both the differences in short-term and long-term debt are statistically insignificant. The only exception is the liquidity difference. Non-shell based acquirers tend to be more liquid than shell-based acquirers. The difference in cash and equivalents is marginal significant ($t=1.85$) with a value of \$0.978 million.

On the target side, we see a very significant difference in characteristics between

non-shell targets and shell targets. On average, non-shell targets are much larger than shell targets. The differences in total assets and in sales are \$3.806 million and \$2.805 million, respectively, and both of them are significant at 1% level ($t=5.83$ and 17 , respectively). However, compared to the shell targets, the non-shell targets have a more negative earning. The differences in EBIT and Net Income are both significant ($t=-11.45$ and -9.40) with values of $-\$0.91$ million and $-\$1.166$ million. For the shell targets, they normally do not have operations so that the negative earnings are more likely due to the cost related to maintain public status. But for non-shell targets, the poor operating performance may be the major cause of the negative earnings. Furthermore, non-shell targets have more total debts outstanding than shell targets. It suggests that shell target may be cleaner than non-shell targets to the acquirers.

Overall, the results in Panel B of table 2 show that non-shell targets have distinct difference in characteristics from shell targets so that non-shell targets are not substitutable by shell targets. However, non-shell based acquirers are not different from shell based acquirers in firm's characteristics. Therefore, it is reasonable to hypothesize that the shell status of the targets might be an important factor that can affect the post-RM performance of the surviving company.

4.2 Short-run Stock Performance of Reverse Merger Acquirer

In this section, we examine the short-run stock performance of surviving companies after the reverse mergers and compare the performance between non-shell based companies and shell-based companies. We present the short-run raw stock returns and abnormal returns of the surviving company after the reverse merger in

Table 3. We examine the buy-and-hold return for 10 trading days and 20 trading days after the reverse merger. The raw buy-and-hold return of the full sample in the first 10 trading days is 19.76% and then ramps up to 24.54% in another 10 days. In the non-shell and shell subsamples, we find that the 10-day raw buy-and-hold return of non-shell based companies is 27.79% while the return of shell based company is 16.82%. Their return difference is 10.97% and statistically significant. In the 20 trading days window, the raw buy-and-hold return of non-shell based company is 33.68%, which is also significantly larger than the return of shell based company with a premium of 12.48%. Again, similar results can be obtained if we use market-adjusted abnormal returns to do the comparison.

The full sample results show that on average, investors hold a positive view about the reverse mergers initially. However, the short-run return difference between a non-shell based company and a shell based company further suggests that investors actually treat reverse mergers with different types of targets differently. They are more optimistic about the future development of companies merged with a non-shell target.

4.3 Long-run Performance of the Reverse Merger Acquirer

In this section, we examine the long-run stock and operating performance of the RM company after the reverse merger. We further compare the performance of non-shell and shell based companies to see if the shell status of the target can affect the acquirer's long-run performance or not. Panel A of table 4 presents the average long-run raw stock returns and market adjusted returns for the surviving companies after reverse mergers. Overall, we observe a significant long-run return reversal. The

average 1-year raw return of the surviving companies since the first trading day is -14.91% and statistically significant. In the following one year, the return further declines sharply to a significant -52.15%. The 3-year average raw return is still very negative with a significant value of -65.99%. Then we adjust the raw return by subtracting the return of equal-weighted market index and find that RM companies seriously underperform the market. This long-run return reversal and underperformance phenomena might suggest that investors are over-optimistic about the future potential of RM companies, leading them to push the stock price up too much initially, especially in case most private acquirers in reverse mergers are very opaque to investors. However, after a period they find that the company's operating performance is under their expectation so they just rush out and dump their stocks. To support this argument, we also examine the RM company's long-run operating performance.

Regardless of the fact that the overall long-run stock performance of RM companies is poor, non-shell based companies perform relatively much better than shell-based companies. In the first year after the transaction, the total raw buy and hold return of non-shell based companies is insignificant -6.47% while the return of shell-based companies is significant -17.94%. Their return difference is 11.48% and statistically significant. This superior performance is persistent in the following two years. The 2-year return for a non-shell based company is -40.94% while for a shell-based company is -56.22%. The difference is 15.28% and significant. Moreover, the 3-year returns of non-shell and shell based companies are -56.39% and -69.44%,

respectively, and their return difference is significant 13.05%. In terms of the market adjusted return, both returns of non-shell and shell based companies are more negative and more significant. However, non-shell based companies still outperform shell based companies in all three years with remarkable premiums.

We compare the operating performance of non-shell and shell based companies in Panel B of table 4. On average, the long-run operating performance for RM companies is poor. The average ROA of the companies 1 year after the reverse merger is -61.74% and statistically significant. In the following two years, although the performance is improved a little bit, the 2-year and 3-year ROAs are still significant negative with values of -43.7% and -37.16%, respectively.

We also find that non-shell based companies have a much better average operating performance than shell-based companies. The 1-year ROA after the reverse merger is -52.61% for non-shell based companies while it is -65.43% for shell-based companies. Their difference is a significant 12.82%. Similarly, in the following 2 years, this superior performance is persistent. The 2-year and 3-year ROAs for non-shell based companies are -36.72% and -26%, respectively, while for shell based companies they are -46.65% and 42.40%, respectively. The difference is widened from 9.93% to 16.40%, and both are statistically significant.

The persistent superior performance of non-shell based companies to shell-based companies cannot be explained from the acquirer's perspective, because non-shell based companies on average have similar firm characteristics as shell-based companies after the reverse merger. In order to support this argument, we perform the

regression analyses on the long-run performance of the acquirer by controlling for major RM company's characteristics in table 5. Table 5 shows the effects of shell status of the target and other control variables on the RM company's long-run stock performance and operating performance. From column (1) to (3), we find that a shell target can significantly reduce the acquirer's long-run operating performance. In more details, the coefficient of shell dummy on 1-year ROA is -0.1166 with a t value of -1.99; the coefficient on 2-year average ROA is -0.0882 with a t value of -1.92; and the coefficient on 3-year average ROA is -0.1634 with a t value of -3.91. Moreover, we note that some control variables are also significant across 3 columns. Total assets is always significantly positive and the leverage is always significantly negative related to the future ROAs. It suggests that larger firm with lower leverage tends to have better future operating performance. One interesting finding is that R&D expenditures tend to reduce the future operating performance of the RM company. We know that most of the RM companies are small and in development stage. A high R&D expenditure suggests this company is very risky and has a large uncertainty in the future. A negative relation between R&D expenditure and future 3 years ROA suggests that RM companies which spend a lot of money on the development of new products are either failed or need even longer time to market the new products²⁵. Cash burn rate measures how fast a company spends its cash. Not surprising, although it is not significant, a negative relation is observed between the cash burn rate and future operating performance.

²⁵ For example, firms in pharmaceutical industries may have a very long products development and testing period before they can sell the new products.

Column (4) to (6) of table 5 examines the relation between shell status of target and the acquirer's long-run stock returns. Again, we observe a persistent significant negative relation between shell dummy and RM companies future stock returns after controlling for other accounting variables as well as year and industry fixed effects. In more details, the coefficient of shell dummy on 1-year buy-and-hold return is -0.1204 with a t value of -1.72; the coefficient on 2-year buy-and-hold return is -0.1271 with a t value of -2.50; and the coefficient on 3-year average ROA is -0.1177 with a t value of -2.79. Since most RM companies are small and their stocks are traded in OTCBB market, the liquidity of the stocks will be an important factor that affects the future returns. I follow Gleason, Jain and Rosenthal (2006) to use average stock turnover as a proxy for the liquidity, which equals average daily stock trading volume divided by the total shares outstanding. The coefficients on the stock turnover are always significantly negative related to the future stock returns. These results are consistent with previous literature which suggests that illiquid stocks tend to have higher return because of the liquidity risk premium.

In summary, we find that the shell based RM companies significantly underperform non-shell based RM companies in both operating performance and stock performance, even after controlling for the characteristics of the surviving company and liquidity.

4.4 Survivorship Bias Problem

Survivorship is an important problem in this kind of study as many RM companies will be delisted or out of the operation within three years after reverse

mergers. Although we have included both lived and delisted/Out of Operation RM companies in the regression analysis, our study may still be subject to survivorship bias because the survival rate in non-shell based RM subsample and shell based RM subsample might be very different. Therefore, our results may be due to the difference in survival rate between two samples, rather than the true performance.

We take two approaches to assess whether survivorship might be responsible for the outperformance of non-shell RM companies we have found in table 5. First, we analyze the actual survival rates of both non-shell and shell based RM companies in 3 years from the reverse merger transaction. Second, we adopt the Heckman 2-stage correction method to explicitly control for the survivorship bias in the regressions.

Panel A of Table 6 reports the actual survival rate of non-shell and shell based RM companies. We find that on average there are about half of the RM companies will be delisted or out of operation in 3 years after the transaction. This finding is consistent with the findings in previous literature. However, the total survival rate of non-shell based RM companies is only slightly (5.31%) higher than the survival rate of shell based RM companies. It is a small difference and unlikely to dominate the difference in the performance we have found.

To examine whether this 5.31% difference in survival rate between non-shell and shell based RM companies explains away the observed difference across non-shell and shell based RMs subsamples, we conduct a Heckman 2-stage test following the method introduced in Sun, Wang and Zheng (2012) in Panel B of Table 6. We first estimate probit models on RM companies' survival probability over next 2 years and

3 years after RM transactions, respectively (1 year test cannot be conducted because there is no financial and return data for the combined company before the RM transaction). Then we include the inverse mills ratio from the probit estimation into our performance regression analyses to check the potential survivorship problems.

From stage 1, we find that shell dummy has an insignificant but negative relation with both 2-year and 3-year survival rate of RM companies. It is consistent with our findings in table 4. Furthermore, we find that larger companies with better past operating performance, lower return volatility and less cash expenditure tend to have a higher probability of survival. All those findings are consistent with previous literature. According to the second stage regression presented above, we find that after controlling the inverse mills ratio generated from the 1st stage of Heckman correction into the performance regressions, the coefficient on Shell dummy is still significant negative in both return tests and ROA tests. This result further confirms that our findings of the outperformance of non-shell RM companies are not likely to be driven by survivorship bias.

4.5 Foreign vs Domestic Reverse Mergers

Previous literature argues that the firm characteristics and future performance of foreign reverse merger companies and U.S. domestic reverse merger companies is different (Chen, et al 2012, Hayn and Lourie 2012, Darough, Huang and Zhao 2012 and Lee, Li and Zhang 2013). It is interesting to examine whether the outperformance of non-shell based RM companies we found in table 5 is driven by foreign RM companies or domestic RM companies. Similar to the classifications in prior workings,

we classify a transaction as foreign reverse merger if the acquirer is a foreign company and the target is a U.S. domestic company. If both the acquirer and target are U.S. domestic companies, we classify the transaction as domestic reverse merger.

Panel A of Table 7 reports the subsample analyses of foreign vs domestic reverse mergers. We find that shell based RM companies significantly underperform non-shell based RM companies in domestic subsample in both long-run stock returns and operating performance. The coefficients on shell dummy in domestic subsample are always significantly negative across all regressions. However, the underperformance of shell based RM companies seems to be disappeared in foreign reverse merger subsample. Although the coefficients on shell dummy are still negative, but none of them is statistically significant. Therefore, we can argue that in a long-run, foreign shell based RM companies have comparable performance to the foreign non-shell based RM companies. The underperformance of shell based RM companies we observed in the full sample actually is driven by the domestic RM companies.

To further confirm our findings in Panel A, we conduct interaction analyses in Panel B of Table 7. We find that the coefficients on the interaction term between shell dummy and domestic dummy are always significantly negative across all regressions, which suggests that the domestic shell based RM companies significantly underperform foreign shell based RM companies in both long-run stock performance and operating performance. This result is consistent with previous findings in Lee, Li and Zhang (2013).

4.6 Effects of PIPE Financing

According to the findings in Table 5 and 7, we find that the underperformance of shell based RM companies is not a universal phenomenon. Domestic shell RM companies significantly underperform non-shell RM companies while foreign shell RM companies do not. Therefore, it is interesting and important to understand the reasons behind this finding. As we know, one important advantage for a private firm to do an IPO and go public is that a large amount of external financing can be raised from the stock market participants. The proceeds raised from the IPO would increase the liquidity of the firm and allows the firm to invest in more positive NPV projects, which tends to increase the firm's operating performance, thereby improving the stock performance in a long run. However, although private firms can also go public through reverse merger, they are not able to issue new shares to raise capital directly from the capital market initially. Instead, most RM companies shall access to the external financing through PIPE investors. Whether a RM company can find PIPE investors in a short time after the transaction might be important to its future development and performance. We have two reasons for this hypothesis. First, PIPE investors are normally very professional and sophisticated. They will conduct a due diligence process before they put the money in the company. Therefore, those RM companies which can attract PIPE investors in a short time after the transaction might be just fundamentally better than other companies. Second, if a RM company can get external financing quickly after the reverse merger transaction, it might have more free cash to do the marketing and to develop new products. In return, its future

performance tends to be better. Therefore, the external capital raising ability through PIPE investors might be able to explain the performance difference between non-shell and shell based RM companies.

If the external capital raising ability through PIPE is indeed the reason behind the performance difference we find in table 5 and 7, we shall be able to observe that on average, non-shell based RM companies should be easier to receive PIPE investments in a short time than shell based RM companies. Furthermore, domestic non-shell RM companies should be easier to raise PIPE financing than domestic shell RM companies, while foreign non-shell RM companies should have similar PIPE financing raising ability to foreign shell RM companies.

In order to directly test this hypothesis, we collect the PIPE financing information from Capital IQ and summarize the follow-up PIPE financing activities for RM companies after the transactions in Table 8. Panel A of Table 8 reports the distribution of PIPE financing across samples in our initial sample and Panel B reports the distribution of PIPE financing in our regression sample. According to the results, we have following findings. First, on average, non-shell based RM companies are more favored by the PIPE investors. Close to half of the non-shell based RM companies can secure a PIPE investment within 6 months after the reverse merger transactions in both initial sample and regression sample. However, the percentage of shell based RM companies can get PIPE investments within 6 months after the reverse merger transaction is much lower (21.99% lower in initial sample and 17.98% lower in regression sample). If we extend the time window to 3 years after the transaction, the

percentage of non-shell based RM companies which can get PIPE investments is still higher than the percentage of shell based RM companies (17.72% higher in initial sample and 14.75% higher in regression sample), although the difference becomes a little bit smaller.

Second, on average, foreign RM companies are easier to find PIPE investments than domestic RM companies. Within 6 months after the transaction, 39.68% (44.62%) of foreign RM companies can find PIPE investors but only 25.03% (30.23%) domestic RM companies can do that in the initial sample (regression sample). In three years window, percentage of foreign RM companies which can get PIPE investments is still higher than domestic RM companies in both initial and regression sample.

Third, the percentage of domestic non-shell based RM companies which can secure a PIPE investment within 6 months is much higher than the percentage of domestic shell-based RM companies (24.58% higher in initial sample and 21.59% higher in regression sample). This difference is still significant in three years from reverse merger transaction (18.40% higher in initial sample and 14.96% in regression sample). However, although the percentage of foreign non-shell based RM companies which can receive PIPE investments is also higher than the percentage of foreign shell-based RM companies within 6 months by a number equals to 5.25% in initial sample and 5.12% in regression sample, the difference is not that significant compared to the difference in the domestic group. Similarly, in 3 years window, the percentage difference between foreign non-shell and foreign shell based RM companies which can receive PIPE investments is 10.3% in initial sample and 8.08%

in regression sample, which are still much lower than the difference in domestic group.

Forth, Domestic non-shell based RM companies have similar ability to find PIPE investors compared to foreign non-shell based RM companies. In 6 months (3 years) after the transaction, the percentage of domestic non-shell based RM companies which can find PIPE investors is slightly higher (lower) than the percentage of foreign non-shell based RM companies by 1.06% (2.56%) in the initial sample, and this difference is 2.19% (4.86%) in the regression sample. However, on the other hand, domestic shell based RM companies have significantly lower ability to secure PIPE investments compared to foreign shell based RM companies. In 6 months (3 years) after the transaction, the percentage of domestic shell based RM companies which can find PIPE investors is much lower than the percentage of foreign shell based RM companies by 18.27% (10.66%) in the initial sample, and this difference is 14.28% (11.74%) in the regression sample.

All the above findings are consistent with our external financing ability hypothesis. RM companies with better performance are indeed easier to receive PIPE financing in a short time. Next, in order to examine whether a timely PIPE financing can directly affect the firm's performance, we conduct the regression analyses in Table 9. In the regressions, PIPE is a dummy equals to 1 if a RM company can receive PIPE investments within 6 months after the reverse merger transaction, otherwise it equals to 0.

In both Panel A and Panel B of Table 9, we clearly observe that the coefficients on

the PIPE dummy are significantly positive across the tests. According to the these results, we understand that those RM companies which get PIPE investments within the first 6 months after the reverse merger transactions perform better than other RM companies in a long-run for both stock returns and operating performance. It is a common phenomenon regardless of the shell status of the RM target because we observe similar regression results on PIPE dummy in non-shell subsample and shell subsample. These tests confirm the hypothesis which predicts that RM companies with timely external financing should perform better in a long-run.

In Panel C of Table 9, we find that after controlling for the PIPE dummy and the interaction term between shell dummy and PIPE dummy, the coefficients on shell dummy becomes insignificant for all post operating performance and for 1-year and 2-year post stock return. Although the coefficient on shell dummy for 3-year post stock return is still significantly negative, it becomes much weaker. More important, the coefficients on the interaction terms are always significantly positive across all regressions, which suggest that PIPE investments can greatly help shell based RM companies to increase their future performance. This finding suggests that a shell RM companies might not perform significantly worse than non-shell RM company if it receives timely PIPE financing.

Next, we provide direct evidence to show that the outperformance of non-shell RM companies can be explained by their better external fund raising ability by conducting several subsample analyses. More specifically, we conduct following three groups of tests.

In Panel A of Table 10, we compare the performance between non-shell RMs without PIPE financing and shell RMs with PIPE financing. We find that the coefficients on the shell dummy turn to significantly positive in 1 and 2-year ROA regressions and all three years return regressions. This finding suggests that PIPE financed shell based RM companies actually perform even better than non-shell based RM companies without PIPE financing. It provides direct evidence that shows the importance of PIPE financing to the future performance of reverse merger companies.

In Panel B of Table 10, we compare the performance between non-shell RMs with PIPE financing and shell RMs also with PIPE financing. We find that although PIPE financed shell RM companies still perform a little worse than PIPE financed non-shell RM companies, the performance difference is not really remarkable. PIPE financed non-shell RM companies only significantly outperform PIPE finance shell RM companies in 2-year ROA regression and 2 and 3-year return regressions but the significance are all stay at 10% level, which is much weaker than the significance in the full sample analyses. Furthermore, the magnitudes of the coefficients also decrease sharply.

In Panel C of Table 10, we compare the performance between non-shell RMs with PIPE financing and shell RMs without PIPE financing. We find that shell RM companies significantly underperform non-shell RM companies in all ROA and return regressions. The significance of the coefficients on the shell dummy become much stronger and the magnitudes of the coefficients also become larger.

Put all findings from table 10 together, we can conclude that the

underperformance of the shell based RM companies is actually driven by those companies which cannot secure PIPE investments timely after the finish of reverse merger transactions. Since majority of shell RM companies cannot secure PIPE financing within 6 months after the reverse merger transactions, we are able to attribute the underperformance of non-shell based RM companies to their better capability to get external financing.

4.7 Comparison of RM Companies and Penny Stock IPO Companies

Since reverse merger is an alternative way for a private firm to go public, whether companies using reverse mergers to go public are inherently worse than companies using IPOs to go public is under debate in financial press. Therefore, it is interesting to understand the difference in future performance of RM companies and IPO companies. Arellano-Ostoa and Brusco (2002) argue that low quality companies tend to do reverse mergers and high quality companies tend to do IPOs. If this argument is correct, IPO companies should receive a better market reaction than RM companies, meaning the post-event short-run stock return for IPO companies should be higher than RM companies. Moreover, on average the long-run performance of IPO companies should also be better. Gleason, Jain and Rosenthal (2006) find that firms utilizing reverse mergers to go public outperform their matched IPO counterparties in a short turn, but exhibit comparable performance in the three years following going public. However, it might not be accurate to compare RM companies with regular IPO companies in the first place. Regular IPO companies are normally listed in the main

board so that their liquidity is high. On the other hand, most reverse merger companies are listed in OTCBB or Pink Sheet so that they are normally less liquid. Therefore, it is not really fair to compare these two groups of companies. A better comparison can be made between RM companies and Penny Stock IPO companies. According to the Securities Exchange Act of 1994, a penny stock is any stock: (1) not traded on NYSE, AMEX and NASDAQ, (2) priced at less than \$5 dollar per share when offered for the first time to the market, (3) with an issuer of less than \$6 million average in previous 3 years, and (4) whose issuer has fewer than \$5 million in net tangible assets. Therefore, we can find that penny stock IPO companies actually are quite similar to RM companies as both of them are small companies. More important, majority of both penny stock IPO companies and RM companies have their stocks traded in OTC market so that their liquidities are presumable to be similar.

In this section, we matched non-shell and shell based RM companies with a group of penny stock IPO companies by their event dates and firm sizes. We successfully match 93 non-shell based RM companies with 150 penny stock IPO companies, and match 114 shell based RM companies with 218 penny stock IPO companies. Then we compare the post event performance of non-shell and shell based RM companies with their matched penny stock IPO counterparties, respectively.

Panel A of table 11 presents the comparison between non-shell or shell based RM companies and their matched penny stock IPO companies on their short-run post event stock returns. We find that no matter in the following 10 trading days or 20 trading days after the first trading day, RM companies' stock always performs much

better than the stock of matched penny stock IPO companies. The 10 days raw buy and hold return for non-shell based RM companies is 16.33% while for matched penny stock IPO companies it is 4.25%. Similarly, the 10 days raw buy and hold return for shell based RM companies is 16.17% while for matched IPO companies it is only 5.23%. The comparison of the short-run market adjusted returns gives us similar results.

If we extend the window to 20 days, RM companies still significantly outperform matched penny stock IPO companies. The 20-day buy and hold returns for non-shell and shell based RM companies are 18.19% and 13.72% higher than their matched penny stock IPO companies, respectively. Similar outperformance of RM companies can also be observed if we use market-adjusted return instead.

This finding shows that the market reaction for reverse mergers is actually better than the reaction for penny stock IPOs in a short run, which contradicts the implications from Arellano-Ostoa and Brusco (2002)'s argument.

For the long-run analyses, we pool RM companies and matched penny stock IPO companies together and perform the regression analyses. Panel B of table 11 shows the regression analyses on operating performance and stock performance. We find that both non-shell and shell based RM companies tend to perform insignificantly different from matched IPO companies in long-run stock return. The coefficients on RM dummy are always insignificantly positive except in 2-year stock return regressions in shell RM matched sample.

For the long-run operating performance, non-shell based RM companies still

have comparable performance to matched penny stock IPO companies. The coefficients on the RM dummy are insignificantly negative in 1 and 2-year ROA regressions but insignificantly positive in 3-year ROA regression. However, shell based RM companies tend to significantly underperform matched penny stock IPO companies. The coefficients on the RM dummy are significantly negative across all regressions.

Overall, we can conclude that both non-shell and shell based RM companies tend to have comparable performance in long-run stock return to their matched penny stock IPO companies. On the other hand, in spite of the fact that penny stock IPO companies perform relatively better than shell based RM companies in long run operating performance, there is no evidence that shows they have a better performance than non-shell based RM companies. If considering both the short-run and long-run performance together, we are not able to say that IPO companies have a better quality than RM companies. Therefore, choosing reverse mergers as a method of going public reflects more about the company's strategy rather than the company's inherent quality.

5. Conclusion

In this paper, we separate the reverse merger targets into public non-shell companies and public shell companies and find that they have distinct difference in firms' characteristics. We further examine how the targets' shell status could affect the acquirers' short-run and long-run performance after the transactions.

In the following 10 to 20 trading days after the reverse mergers, both non-shell

and shell based RM companies enjoy significant positive returns. However, non-shell based RM companies have a significantly higher return than shell based RM companies. This result suggests that investors indeed react differently to RMs with different types of targets in a short run. More specifically, they are more optimistic about the non-shell based transactions than shell-based transactions.

In a long run, we find a significant return reversal for RM companies. This reversal may be because of the fact that the investors are over-optimistic about the future potential of RM companies at the beginning. We further find that the operating performance of RM companies is persistent negative in 3 years after the reverse merger. However, in spite of the fact that the overall long-run performance of RM companies is poor, non-shell based companies perform relatively much better than shell-based companies. This superior performance is robust even after correcting for potential survivorship bias. This finding suggests that non-shell targets can enhance the operating performance of the acquirers to some extent, and in turn, enhance the stock performance.

We find that the external capital raising ability through PIPE investors is able to explain the performance difference between non-shell and shell based RM companies. Specifically, we find that timely PIPE financing is associated with a better future performance for both non-shell and shell RM companies. More important, those shell RM companies with PIPE financing within 6 months after the transaction do not significantly underperform non-shell RM companies in both operating performance and stock performance. So the overall underperformance of shell RM companies

actually is driven by those companies which are not able to secure PIPE investments in a short time after the RM transaction.

Last but not least, we compare the performance of reverse merger companies and their matched penny stock IPO companies. We find that the post-event short-run return for penny stock IPO companies is surprisingly much lower than RM companies. In the long run, both non-shell and shell based RM companies tend to have comparable performance in stock return to their matched penny stock IPO companies. On the other hand, in spite of the fact that penny stock IPO companies perform relatively better than shell based RM companies in operating performance, there is no evidence that shows they have a better performance than non-shell based RM companies. Therefore, RM companies may not be inherently worse than comparable IPO companies.

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Table 1: Distribution of Reverse Mergers by Year

This table presents an overview of total numbers of reverse mergers in each year from 1996 to 2011. Panel A presents the distributions in the initial sample and Panel B presents the distributions in the regression sample. A transaction with non-shell target means the target in a transaction is a public non-shell company. A transaction with a shell target means the target in a transaction is a public shell company.

Panel A: Distribution of Reverse Mergers in Initial Sample

Year	Total No. of Transactions in the Initial Sample	Total No. of Transactions with Identifiable Shell Status	No. of Transactions with Non-shell Targets	% of Non-shell Sample	No. of Transactions with Shell Targets	% of Shell Sample
	(1)	(2)	(4)	(5)	(6)	(7)
1996	208	110	28	2.14%	82	2.37%
1997	139	45	13	0.99%	32	0.92%
1998	205	117	39	2.98%	78	2.25%
1999	281	205	48	3.67%	157	4.53%
2000	325	256	45	3.44%	211	6.09%
2001	343	256	56	4.28%	200	5.77%
2002	325	254	69	5.27%	185	5.34%
2003	389	299	78	5.96%	221	6.37%
2004	538	450	129	9.85%	321	9.26%
2005	582	533	161	12.30%	372	10.73%
2006	577	532	153	11.69%	379	10.93%
2007	513	451	143	10.92%	308	8.88%
2008	462	407	136	10.39%	271	7.82%
2009	386	274	55	4.20%	219	6.32%
2010	404	341	99	7.56%	242	6.98%
2011	295	246	57	4.35%	189	5.45%
Total	5972	4776	1309	100%	3467	100%

Panel B: Distribution of Reverse Mergers in Regression Sample

Year	Total No. of Transactions	% of Regression Sample	No. of Transactions with Non-shell Targets	% of Non-shell Sample	No. of Transactions with Shell Targets	% of Shell Sample
	(1)	(2)	(3)	(4)	(5)	(6)
1996	20	1.35%	10	2.39%	10	0.94%
1997	6	0.41%	1	0.24%	5	0.47%
1998	27	1.83%	8	1.91%	19	1.79%
1999	86	5.81%	17	4.07%	69	6.50%
2000	71	4.80%	19	4.55%	52	4.90%
2001	50	3.38%	15	3.59%	35	3.30%
2002	96	6.49%	34	8.13%	62	5.84%
2003	119	8.05%	42	10.05%	77	7.26%
2004	184	12.44%	55	13.16%	129	12.16%
2005	177	11.97%	63	15.07%	114	10.74%
2006	168	11.36%	53	12.68%	115	10.84%
2007	169	11.43%	46	11.00%	123	11.59%
2008	97	6.56%	28	6.70%	69	6.50%
2009	81	5.48%	6	1.44%	75	7.07%
2010	94	6.36%	16	3.83%	78	7.35%
2011	34	2.30%	5	1.20%	29	2.73%
Total	1479	100%	418	100%	1061	100%

Table 2: Summary Statistics

The full sample consists of 1479 reverse mergers transactions with available stock return data in DataStream and financial data in WorldScope from 1996 to 2001. The variables for the acquirer represent the first post-RM fiscal year-end financial data in surviving company's annual report, and the variables for the target represent the first prior-RM fiscal year-end financial data in target company's annual report. Panel A reports the detailed summary statistics of for the full sample, and panel B reports the means, medians, difference in means and difference in medians for the non-shell and shell-based subsamples. Superscripts ^{***}, ^{**}, ^{*} denote statistical significance at the 1%, 5% and 10% levels, respectively.

Panel A: Summary Statistics of Full Sample

Variable (in million US\$)	Mean	Std Dev	25%	Median	75%
Acquirer (Surviving firms, N=1479)					
Total Assets	19.364	52.279	0.551	2.714	12.542
Total Equity	7.202	22.321	-0.643	0.336	5.036
Short-term Debt	2.233	6.307	0	0.267	1.568
Long-term Debt	2.275	9.439	0	0	0.432
Cash and Equivalents	3.162	9.159	0.022	0.228	1.708
Sales	12.280	34.673	0.000	0.548	6.166
EBIT	-2.378	8.468	-3.655	-1.184	-0.146
Net Income	-3.311	8.943	-4.323	-1.356	-0.205
R&D Expenses	0.309	1.001	0.000	0.000	0.025
Capital Expenditure	1.278	4.392	0.003	0.063	0.416
Target (Public firms, N=1479)					
Total Assets	2.999	11.423	0.000	0.018	0.389
Total Equity	1.410	6.805	-0.044	0.000	0.057
Total Debt	0.497	1.958	0.000	0.000	0.105
Cash and Equivalents	0.353	1.523	0.000	0.003	0.049
Sales	0.793	3.123	0.000	0.000	0.009
EBIT	-0.482	1.436	-0.254	-0.035	0.000
Net Income	-0.666	2.210	-0.340	-0.036	0.000
R&D Expenses	0.055	0.321	0.000	0.000	0.000
Capital Expenditure	0.076	0.339	0.000	0.000	0.002

Panel B: Comparison of Non-shell and Shell-based Subsamples

	Mean				Median			
	NonShell (N=418)	Shell (N=1061)	Difference	t	NonShell (N=418)	Shell (N=1061)	Difference	z
Acquirer (Surviving firms)								
Total Assets	21.188	18.646	2.542	(0.84)	4.464	2.387	2.077***	(3.60)
Total Equity	7.911	6.922	0.989	(0.77)	0.479	0.302	0.177	(0.19)
Short-term Debt	2.421	2.159	0.262	(0.34)	0.332	0.235	0.097	(0.17)
Long-term Debt	2.334	2.252	0.082	(0.16)	0.000	0.000	0.000	(0.22)
Cash and Equivalents	3.864	2.886	0.978*	(1.85)	0.306	0.212	0.094*	(1.81)
Sales	13.374	11.848	1.526	(0.76)	1.024	0.422	0.603***	(3.96)
EBIT	-2.357	-2.386	0.030	(0.06)	-1.508	-1.087	-0.421	(-1.13)
Net Income	-3.452	-3.256	-0.196	(-0.38)	-1.725	-1.222	-0.504*	(-1.76)
R&D Expenses	0.369	0.286	0.083	(1.44)	0.000	0.000	0.000	(-0.19)
Capital Expenditure	1.336	1.255	0.081	(0.32)	0.080	0.057	0.023	(1.03)
Target (Public firms)								
Total Assets	5.729	1.924	3.806***	(5.83)	0.449	0.002	0.447***	(17.84)
Total Equity	2.209	1.095	1.114***	(2.84)	0.019	0.000	0.019***	(3.65)
Total Debt	1.312	0.176	1.135***	(10.40)	0.124	0.000	0.124***	(14.76)
Cash and Equivalents	0.819	0.169	0.650***	(7.52)	0.030	0.000	0.030***	(13.45)
Sales	2.805	0.000	2.805***	(17.00)	0.297	0.000	0.297***	(37.40)
EBIT	-1.135	-0.225	-0.910***	(-11.45)	-0.239	-0.020	-0.219***	(-11.66)
Net Income	-1.503	-0.337	-1.166***	(-9.40)	-0.240	-0.020	-0.220***	(-10.04)
R&D Expenses	0.164	0.012	0.151***	(8.37)	0.000	0.000	0.000***	(9.95)
Capital Expenditure	0.206	0.024	0.181***	(9.55)	0.009	0.000	0.009***	(19.99)

Table 3: Acquirer's Short-Run Return after Reverse Merger

This Table presents the acquirer's short-run stock return after reverse merger. The return of window (1, 10) is the first 10 trading days buy-and-hold return of the surviving company after the close date of reverse merger transaction. The return of window (1, 20) is the first 20 trading days buy-and-hold return of the surviving company after the reverse merger transaction. Market adjusted return is the raw return minus the return of equal weighted market index. Superscripts ^{***}, ^{**}, ^{*} denote statistical significance at the 1%, 5% and 10% levels, respectively.

	Raw Return			
	Full (N=1479)	NonShell (N=418)	Shell (N=1061)	Difference
(1, 10)	0.1976 ^{***} (11.85)	0.2779 ^{***} (7.19)	0.1682 ^{***} (9.44)	0.1097 ^{***} (2.92)
(1, 20)	0.2454 ^{***} (11.48)	0.3368 ^{***} (6.87)	0.2120 ^{***} (9.23)	0.1248 ^{***} (2.59)
	Market Adjusted Return			
	Full (N=1479)	NonShell (N=418)	Shell (N=1061)	Difference
(1, 10)	0.1916 ^{***} (11.48)	0.2720 ^{***} (7.03)	0.1622 ^{***} (9.11)	0.1098 ^{***} (2.92)
(1, 20)	0.2327 ^{***} (10.91)	0.3234 ^{***} (6.60)	0.1995 ^{***} (8.71)	0.1239 ^{***} (2.58)

Table 4: Acquirer's Long-run Performance after Reverse Merger

Panel A of this table presents the acquirer's long-run stock return and Panel B presents acquirer's long-run operating performance after reverse merger. The 1-year, 2-year and 3-year holding period returns are the 252, 504 and 756 trading days buy-and-hold return of the surviving company after the close date of reverse merger transaction, respectively. If a company is delisted within the calculation period, the total return is calculated until the delisting date. Market adjusted return is the raw return minus the return of equal weighted market index. The long-run operating performance is measured by return on total asset (ROA). ROA_{t-year} stands for the firm's ROA t fiscal years after the reverse merger and it is calculated as $Net\ Income_t / [(total\ assets_{t-1} + total\ assets_t) / 2]$. Superscripts ^{***}, ^{**}, ^{*} denote statistical significance at the 1%, 5% and 10% levels, respectively.

Panel A: Long-run Stock Performance

	Raw Return			
	Full	NonShell	Shell	Difference
Return _{1-year}	-0.1491 ^{***} (-5.14)	-0.0647 (-1.05)	-0.1794 ^{***} (-5.50)	0.1148 [*] (1.75)
Return _{2-year}	-0.5218 ^{***} (-26.72)	-0.4094 ^{***} (-9.26)	-0.5622 ^{***} (-26.58)	0.1528 ^{***} (3.46)
Return _{3-year}	-0.6599 ^{***} (-41.01)	-0.5639 ^{***} (-16.39)	-0.6944 ^{***} (-38.69)	0.1305 ^{***} (3.59)
	Market Adjusted Return			
	Full	NonShell	Shell	Difference
Adj_Return _{1-year}	-0.3241 ^{***} (-11.23)	-0.2202 ^{***} (-3.59)	-0.3615 ^{***} (-11.16)	0.1413 ^{**} (2.16)
Adj_Return _{2-year}	-0.8671 ^{***} (-42.84)	-0.7461 ^{***} (-17.07)	-0.9107 ^{***} (-40.53)	0.1646 ^{***} (3.60)
Adj_Return _{3-year}	-1.1744 ^{***} (-63.15)	-1.0769 ^{***} (-29.71)	-1.2095 ^{***} (-56.03)	0.1327 ^{***} (3.16)

Panel B: Long-run Operating Performance

	ROA			
	Full	NonShell	Shell	Difference
ROA _{1-year}	-0.6174 ^{***} (-21.62)	-0.5261 ^{***} (-10.57)	-0.6543 ^{***} (-18.89)	0.1282 ^{**} (2.03)
ROA _{2-year}	-0.4370 ^{***} (-20.02)	-0.3672 ^{***} (-10.05)	-0.4665 ^{***} (-17.35)	0.0993 ^{**} (2.08)
ROA _{3-year}	-0.3716 ^{***} (-16.92)	-0.2600 ^{***} (-8.33)	-0.4240 ^{***} (-14.90)	0.1640 ^{***} (3.51)

Table 5: Long-run Performance: Regression Analyses

This table presents the regression analyses of acquirer's long-run stock performance and operating performance after the reverse merger. The dependent variables are firm's return on total asset (ROA) and holding period stock return, respectively. ROA_{t-year} stands for the firm's ROA t fiscal years after the reverse merger and it is calculated as $Net\ Income_t / [(total\ assets_{t-1} + total\ assets_t) / 2]$. The 1-year, 2-year and 3-year holding period returns are the 252, 504 and 756 trading days buy-and-hold returns of the surviving company after the close date of reverse merger transaction, respectively. If a company is delisted within the calculation period, the total return is calculated until the delisting date. Shell equals to 1 if the firm acquires a public shell company and equals to 0 if it acquires a public non-shell company. Assets is the firm's total asset. Debt is firm's long-term debt scaled by total assets. Cash Burn rate is the negative of the change in total cash and cashflows from investment, divided by total cash. R&D/Sales is firm's research and development expenditure scaled by total sales. Turnover is the average daily stock turnover in 1, 2 and 3 years, respectively. All control variables are winsorized at 1th and 99th percentile. Superscripts ^{***}, ^{**}, ^{*} denote statistical significance at the 1%, 5% and 10% levels, respectively.

	ROA _{1-year}	ROA _{2-year}	ROA _{3-year}	Return _{1-year}	Return _{2-year}	Return _{3-year}
	(1)	(2)	(3)	(4)	(5)	(6)
Shell	-0.1166** (-1.99)	-0.0882* (-1.92)	-0.1634*** (-3.91)	-0.1204* (-1.72)	-0.1271** (-2.50)	-0.1177*** (-2.79)
Assets	0.0032*** (9.28)	0.0024*** (8.64)	0.0020*** (7.56)	0.0007 (1.51)	0.0013*** (3.43)	0.0015*** (3.74)
Debt	-0.1230*** (-2.75)	-0.0741*** (-2.66)	-0.0715* (-1.89)	-0.0621** (-2.34)	-0.0523*** (-2.95)	-0.0265 (-1.15)
Cash Burn Rate	-0.0083 (-0.09)	-0.0654 (-0.92)	-0.0583 (-0.84)	-0.0258 (-0.24)	-0.1354* (-1.79)	-0.2141*** (-3.39)
R&D/Sales	-0.3499*** (-4.41)	-0.1986*** (-3.84)	-0.2060*** (-3.85)	-0.0598 (-0.77)	-0.0125 (-0.33)	-0.0044 (-0.11)
Turnover	-0.0135 (-1.40)	0.0116 (0.69)	-0.0167 (-1.25)	-0.0694* (-1.71)	-0.0087* (-1.82)	-0.0153* (1.69)
Constant	0.0414 (0.35)	-0.1312** (-1.97)	-0.0327 (-0.23)	-0.1445 (-0.47)	-0.3276* (-1.95)	0.3161 (1.38)
Year Dummies	Yes	Yes	Yes	Yes	Yes	Yes
Industry Dummies	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1,214	961	730	1,426	1,417	1,357
R-squared	0.116	0.091	0.111	0.058	0.081	0.076

Table 6: Survivorship Bias

This table presents the testing results of potential survivorship bias problem. Panel A reports the survival rate of non-shell and shell RM companies in 3 years from the reverse merger transactions and Panel B reports the Heckman 2-stage correction tests. In the first stage of Heckman correction, Survival Prob is a binary variable equals to 1 if a RM company can survive for 2/3 years after the reverse merger transaction. All independent variables are calculated based on the values at the end of first fiscal year after the RM transaction. In the second stage of Heckman correction, the dependent variables are firm's return on total asset (ROA) and holding period stock return, respectively. ROA_{t-year} stands for the firm's ROA t fiscal years after the reverse merger and it is calculated as $Net\ Income_t / [(total\ assets_{t-1} + total\ assets_t) / 2]$. The 2-year and 3-year holding period returns are the 504 and 756 trading days buy-and-hold returns of the surviving company after the close date of reverse merger transaction, respectively. If a company is delisted within the calculation period, the total return is calculated until the delisting date. Shell equals to 1 if the firm acquires a public shell company and equals to 0 if it acquires a public non-shell company. Assets is the firm's total asset. Debt is firm's long-term debt scaled by total assets. Cash Burn rate is the negative of the change in total cash and cashflows from investment, divided by total cash. R&D/Sales is firm's research and development expenditure scaled by total sales. All control variables are winsorized at 1th and 99th percentile. Superscripts ^{***}, ^{**}, ^{*} denote statistical significance at the 1%, 5% and 10% levels, respectively.

Panel A: Survival Rate of Non-shell and Shell Based RM Companies

	Number of years after RM	Percentage of firms delisted or out of operation
Non-Shell Based	1	14.59%
	2	16.75%
	3	13.88%
Total		45.22%
Shell Based	1	16.25%
	2	17.76%
	3	16.53%
Total		50.53%

Panel B: Test of Survivorship Bias - Heckman Correction

Stage 1: Estimation of Survival Probability – Probit Model

	Survival Prob after 2 Years	Survival Prob after 3 Years
	(1)	(2)
Shell	-0.2146 (-0.97)	-0.1550 (-1.18)
Assets	0.0763*** (3.03)	0.0319*** (3.61)
Cash Burn Rate	-0.6003** (-2.15)	-0.3065* (-1.78)
R&D/Sales	-0.0265* (-1.76)	-0.0137 (-1.12)
Average Monthly Stock Return	0.1380 (1.12)	0.0829 (0.95)
ROA	0.0483*** (3.16)	0.0226** (2.23)
Monthly Stock Return Volatility	-0.0623* (-1.83)	-0.0182 (-1.01)
Constant	-1.7010*** (-9.65)	-1.4414*** (-13.76)
Year FE	Yes	Yes
Industry FE	Yes	Yes
Observations	1,226	1,226
R-squared	0.100	0.010

Stage 2: Test of Survivorship Bias – Including Inverse Mills Ratio

	Return _{2-year}	Return _{3-year}	ROA _{2-year}	ROA _{3-year}
	(1)	(2)	(3)	(4)
Shell	-0.1265** (-2.03)	-0.1088** (-2.39)	-0.0766* (-1.69)	-0.1324*** (-3.32)
Assets	0.0011*** (2.96)	0.0014*** (2.88)	0.0029*** (3.19)	0.0022* (1.82)
Debt	-0.0335* (-1.85)	-0.0150 (-0.68)	-0.0636** (-2.23)	-0.0677* (-1.81)
Cash Burn Rate	-0.0429 (-1.03)	-0.0782*** (-2.86)	-0.1025*** (-2.95)	-0.0953 (-1.26)
R&D/Sales	0.0215 (0.58)	-0.0058 (-0.15)	-0.1924*** (-3.67)	-0.2016*** (-3.66)
Inverse Mills Ratio	-3.6183*** (-2.84)	-3.5215*** (-2.81)	-5.4950*** (-2.96)	-4.6906*** (-3.31)
Constant	0.0641 (0.66)	0.0601*** (2.80)	0.0841*** (2.99)	0.0992 (1.34)
Year FE	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes
Observations	1210	1132	965	732
R-squared	0.134	0.120	0.143	0.158

Table 7: Foreign vs Domestic Reverse Mergers

This table presents the performance difference of non-shell and shell RM companies between foreign and domestic reverse mergers. Panel A reports the subsample analysis and Panel B reports the full sample analysis by inserting an interaction term between shell dummy and domestic dummy. Domestic dummy equals to 1 if both the acquirer (private firm) and the target (public firm) are originated from United States; it equals to 0 if the acquirer is originated from foreign country and the target is originated from United States. The dependent variables are firm's return on total asset (ROA) and holding period stock return, respectively. ROA_{t-year} stands for the firm's ROA t fiscal years after the reverse merger and it is calculated as $Net\ Income_t / [(total\ assets_{t-1} + total\ assets_t) / 2]$. The 1-year, 2-year and 3-year holding period returns are the 252, 504 and 756 trading days buy-and-hold returns of the surviving company after the close date of reverse merger transaction, respectively. If a company is delisted within the calculation period, the total return is calculated until the delisting date. Shell equals to 1 if the firm acquires a public shell company and equals to 0 if it acquires a public non-shell company. All control variables are winsorized at 1th and 99th percentile. Superscripts ^{***}, ^{**}, ^{*} denote statistical significance at the 1%, 5% and 10% levels, respectively.

Panel A: Subsample Analysis

	Domestic Subsample			Foreign Subsample			Domestic Subsample			Foreign Subsample		
	ROA _{1-year}	ROA _{2-year}	ROA _{3-year}	ROA _{1-year}	ROA _{2-year}	ROA _{3-year}	Return _{1-year}	Return _{2-year}	Return _{3-year}	Return _{1-year}	Return _{2-year}	Return _{3-year}
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Shell	-0.1257*	-0.0739**	-0.1651***	-0.1014	-0.0621	-0.0776	-0.0834**	-0.1597***	-0.1232***	-0.126	-0.1114	-0.1062
	(-1.84)	(-2.39)	(-3.20)	(-0.80)	(-0.56)	(-0.78)	(-2.07)	(-2.79)	(-2.59)	(-1.61)	(-1.18)	(-1.24)
Assets	0.0029***	0.0020***	0.0019***	0.0032***	0.0033***	0.0023***	0.0004	0.0011***	0.0013***	0.0017	0.0019	0.0029**
	(7.57)	(7.07)	(5.77)	(4.46)	(3.03)	(2.80)	(0.71)	(2.72)	(3.67)	(1.45)	(1.56)	(2.09)
Debt	-0.0702	-0.0713*	-0.0718	-0.1770*	-0.05	-0.0265	-0.0296	-0.0404*	-0.0267	-0.1336*	-0.062	-0.004
	(-1.48)	(-1.91)	(-1.52)	(-1.87)	(-0.97)	(-0.36)	(-0.85)	(-1.91)	(-1.45)	(-1.81)	(-1.41)	(-0.07)
Cash Burn Rate	-0.0475	-0.0322	-0.0403	-0.1406	-0.0434	-0.2372	-0.1155	-0.0776	-0.2301***	-0.1608**	-0.0226	-0.0741
	(-0.37)	(-0.36)	(-0.47)	(-0.69)	(-0.23)	(-1.12)	(-0.94)	(-0.83)	(-2.96)	(-2.58)	(-0.18)	(-0.72)
R&D/Sales	-0.3273***	-0.1993***	-0.1973***	-0.3543**	-0.0653	-0.1328	-0.0782	-0.0258	-0.0094	-0.0638	-0.0716	-0.1030**
	(-3.43)	(-3.23)	(-3.34)	(-2.01)	(-0.60)	(-0.64)	(-0.86)	(-0.61)	(-0.20)	(-0.43)	(-1.15)	(-2.22)
Constant	0.2358	-0.0431	0.2627	0.0172	-0.8830***	-0.8359	-0.0875	-0.2622	0.0330	-0.3341	-0.5835***	-1.4395***
	(1.21)	(-0.29)	(1.39)	(0.06)	(-2.98)	(-1.48)	(-0.19)	(-0.77)	(0.06)	(-0.44)	(-2.66)	(-4.67)
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	903	723	552	323	242	180	1,085	1,074	1,012	368	367	354
R-squared	0.156	0.166	0.189	0.326	0.267	0.336	0.077	0.147	0.142	0.207	0.235	0.232

Panel B: Interaction Analysis

	ROA _{1-year}	ROA _{2-year}	ROA _{3-year}	Return _{1-year}	Return _{2-year}	Return _{3-year}
	(1)	(2)	(3)	(4)	(5)	(6)
Shell	-0.1120*	-0.0890*	-0.0787**	-0.0055*	-0.0892*	-0.1133**
	(-1.89)	(-1.87)	(-2.01)	(-1.85)	(-1.92)	(-2.28)
Shell*Domestic	-0.0064**	-0.0075***	-0.0089***	-0.0322***	-0.0569***	-0.1037***
	(-2.34)	(-2.67)	(-2.81)	(-2.57)	(-3.51)	(-4.04)
Domestic	-0.0515	-0.0384	-0.0302	-0.2592	-0.0849	-0.0012
	(-0.41)	(-0.39)	(-0.37)	(-1.57)	(-0.81)	(-0.61)
Assets	0.0031***	0.0023***	0.0018***	0.0008*	0.0013***	0.0016***
	(8.92)	(8.10)	(6.71)	(1.68)	(3.23)	(3.77)
Debt	-0.1073**	-0.0618**	-0.0636*	-0.0465	-0.0450**	-0.0160
	(-2.34)	(-2.15)	(-1.72)	(-1.49)	(-2.48)	(-0.72)
Cash Burn Rate	-0.0569	-0.0285	-0.0573	-0.0253	-0.0677	-0.0640*
	(-0.54)	(-0.36)	(-0.75)	(-0.24)	(-0.90)	(-1.76)
R&D/Sales	-0.3393***	-0.1922***	-0.1987***	-0.0361	-0.0046	-0.0078
	(-4.13)	(-3.70)	(-3.68)	(-0.45)	(-0.12)	(-0.20)
Constant	0.1091	0.4600***	0.4585***	0.0307	0.1674	-0.4146
	(0.36)	(2.98)	(2.68)	(0.10)	(0.40)	(-1.29)
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1,226	965	732	1,453	1,441	1,366
R-squared	0.151	0.137	0.160	0.071	0.123	0.115

Table 8: Distribution of Follow-up PIPE Financing after Reverse Merger.

This table presents distribution of follow-up PIPE financing activities after reverse merger transactions in each subsample. Panel A reports the distribution of PIPE financing in initial reverse merger sample and Panel B reports the distribution of PIPE financing in regression sample.

Panel A: Distribution of Follow-up PIPE Financing in Initial Sample

	Total No. of RMs	No. of RMs have PIPE Financing within 6 months	Percentage	No. of RMs have PIPE Financing within 3 years	Percentage
Non-shell Based	1,309	568	43.39%	1,106	84.49%
Shell Based	3,467	742	21.40%	2,315	66.77%
Domestic	3,992	999	25.03%	2,789	69.86%
Foreign	784	311	39.67%	632	80.61%
	Total No. of RMs	No. of RMs have PIPE Financing within 6 months	Percentage	No. of RMs have PIPE Financing within 3 years	Percentage
Domestic-Nonshell	964	421	43.67%	808	83.82%
Domestic-Shell	3,028	578	19.09%	1,981	65.42%
Foreign-Nonshell	345	147	42.61%	298	86.38%
Foreign-Shell	439	164	37.36%	334	76.08%

Panel B: Distribution of Follow-up PIPE Financing in Regression Sample

	Total No. of RMs	No. of RMs have PIPE Financing within 6 months	Percentage	No. of RMs have PIPE Financing within 3 years	Percentage
Non-shell Based	418	189	45.22%	365	87.32%
Shell Based	1,061	289	27.24%	770	72.57%
Domestic	1,105	324	29.32%	814	73.67%
Foreign	374	154	41.18%	321	85.83%
	Total No. of RMs	No. of RMs have PIPE Financing within 6 months	Percentage	No. of RMs have PIPE Financing within 3 years	Percentage
Domestic-Nonshell	245	113	46.12%	209	85.31%
Domestic-Shell	860	211	24.53%	605	70.35%
Foreign-Nonshell	173	76	43.93%	156	90.17%
Foreign-Shell	201	78	38.81%	165	82.09%

Table 9: Effects of PIPE Financing on RM Companies Long-run Performance

This table presents the effects of PIPE financing on RM companies long-run performance. Panel A reports the return analyses, Panel B reports the ROA analysis and Panel C reports the interaction analyses by inserting an interaction term between shell dummy and PIPE dummy. PIPE dummy equals to 1 if a RM company can receive PIPE investments within 6 months after the reverse merger transaction, otherwise it equals to 0. The dependent variables are firm's return on total asset (ROA) and holding period stock return, respectively. ROA_{t-year} stands for the firm's ROA t fiscal years after the reverse merger and it is calculated as $Net\ Income_t / [(total\ assets_{t-1} + total\ assets_t) / 2]$. The 1-year, 2-year and 3-year holding period returns are the 252, 504 and 756 trading days buy-and-hold returns of the surviving company after the close date of reverse merger transaction, respectively. If a company is delisted within the calculation period, the total return is calculated until the delisting date. All control variables are winsorized at 1th and 99th percentile. Superscripts ^{***}, ^{**}, ^{*} denote statistical significance at the 1%, 5% and 10% levels, respectively.

Panel A: Return Analysis

	Full Sample			Non-shell RM Subsample			Shell RM Subsample		
	Return _{1-year}	Return _{2-year}	Return _{3-year}	Return _{1-year}	Return _{2-year}	Return _{3-year}	Return _{1-year}	Return _{2-year}	Return _{3-year}
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
PIPE	0.1765*	0.1923***	0.2139**	0.1552	0.1861**	0.1988**	0.1977**	0.2235***	0.2333***
	(1.73)	(2.64)	(2.45)	(1.53)	(2.37)	(2.33)	(2.01)	(2.98)	(2.76)
Assets	0.0002	0.0003	0.0004*	-0.0002	-0.0003	-0.0003	0.0003	0.0005	0.0006**
	(0.65)	(0.79)	(1.82)	(-0.71)	(-0.88)	(-1.02)	(0.98)	(1.35)	(2.14)
Debt	0.0412	-0.0207	-0.0325	0.0547	0.0331	-0.0178	0.0339	-0.0425	-0.0523
	(0.41)	(-0.17)	(-0.34)	(0.63)	(0.19)	(-0.14)	(0.35)	(-0.45)	(-0.62)
Cash Burn Rate	-0.0268	-0.1286*	-0.1912**	-0.0207	-0.0928	-0.1634*	-0.0483	-0.1498**	-0.2712***
	(-0.45)	(-1.72)	(-2.34)	(-0.33)	(-1.03)	(-1.79)	(-0.76)	(-2.22)	(-2.78)
R&D/Sales	-0.1006	-0.0523	-0.1368	-0.0826	0.0442	-0.0657	-0.1203	-0.1023	-0.1679
	(-0.84)	(-0.41)	(-0.95)	(-0.65)	(0.52)	(-0.77)	(-1.15)	(-0.89)	(-1.32)
Turnover	-0.0537*	-0.0339*	-0.0499**	-0.0737*	-0.0684**	-0.0725**	-0.0468	-0.0194	-0.0416*
	(-1.85)	(-1.94)	(-2.23)	(-1.99)	(-2.21)	(-2.39)	(-1.51)	(-1.55)	(-1.92)
Constant	1.0324	0.0459	-0.2249	1.4325	0.1027	-0.1793	0.9964	-0.0286	-0.3928
	(0.80)	(0.16)	(-0.37)	(1.12)	(0.38)	(-0.09)	(0.73)	(-0.16)	(-0.45)
Year Dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry Dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1,426	1,417	1,357	406	401	376	1,020	1,016	981
R-squared	0.082	0.096	0.119	0.388	0.396	0.401	0.121	0.117	0.139

Panel B: ROA Analysis

	Full Sample			Non-shell RM Subsample			Shell RM Subsample		
	ROA _{1-year}	ROA _{2-year}	ROA _{3-year}	ROA _{1-year}	ROA _{2-year}	ROA _{3-year}	ROA _{1-year}	ROA _{2-year}	ROA _{3-year}
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
PIPE	0.3539** (2.23)	0.4273*** (2.71)	0.3924*** (2.99)	0.2776** (2.12)	0.3692*** (2.64)	0.3542*** (2.73)	0.4587*** (2.68)	0.5823*** (3.39)	0.5562*** (3.65)
Assets	0.0024*** (2.65)	0.0022** (2.30)	0.0025*** (2.78)	0.0022** (2.34)	0.0021** (2.32)	0.0024** (2.39)	0.0026*** (2.91)	0.0024** (2.29)	0.0027*** (3.35)
Debt	-0.1425** (-2.41)	-0.0897* (-1.84)	-0.1725*** (-2.68)	-0.1629** (-2.43)	-0.1349** (-2.26)	-0.2038*** (-3.23)	-0.1037* (-1.89)	-0.0756 (-1.45)	-0.1436** (-2.42)
Cash Burn Rate	-0.0475 (-1.09)	-0.0632* (-1.84)	-0.0573 (-1.31)	-0.0437 (-0.74)	-0.0469 (-1.13)	-0.0518 (-1.34)	-0.0528 (-1.42)	-0.0682** (-2.31)	-0.0711 (-1.29)
R&D/Sales	-0.3861*** (-3.84)	-0.2636*** (-2.95)	-0.3194*** (-3.75)	-0.2544** (-2.45)	-0.2621** (-2.36)	-0.2784** (-2.41)	-0.4557*** (-4.13)	-0.3022*** (-2.87)	-0.3666*** (-3.34)
Turnover	-0.0133 (-0.45)	0.0079 (0.23)	-0.0098 (-0.36)	-0.0101 (-0.38)	0.0109 (0.73)	-0.0115 (-1.01)	-0.0145 (-0.77)	-0.0055 (-0.21)	-0.0066 (-0.31)
Constant	0.4485 (0.72)	-0.0987 (-0.54)	0.2966 (1.02)	0.5572 (1.04)	-0.1027 (-0.77)	0.6384 (1.15)	0.3676 (0.43)	-0.0608 (-0.35)	-0.2233 (-0.36)
Year Dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry Dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1,214	961	730	322	283	215	892	678	515
R-squared	0.094	0.109	0.128	0.421	0.455	0.498	0.199	0.231	0.286

Panel C: Interaction Analysis

	ROA _{1-year}	ROA _{2-year}	ROA _{3-year}	Return _{1-year}	Return _{2-year}	Return _{3-year}
	(1)	(2)	(3)	(4)	(5)	(6)
Shell	-0.0786 (-1.25)	-0.0655 (-1.37)	-0.1056 (-1.34)	-0.0647 (-1.43)	-0.0732 (-1.35)	-0.0910* (-1.97)
Shell*PIPE	0.0548* (2.01)	0.0519** (2.35)	0.0783*** (-2.92)	0.0326* (1.83)	0.0575* (1.89)	0.0733** (2.38)
PIPE	0.3008* (1.72)	0.3262* (1.88)	0.3654** (2.36)	0.1633 (1.52)	0.1849** (2.22)	0.1966** (2.17)
Assets	0.0036** (2.11)	0.0028* (1.92)	0.0038** (2.15)	0.0003 (0.93)	0.0004 (0.72)	0.0006 (1.07)
Debt	-0.1129* (-1.94)	-0.0715** (-2.25)	-0.1213* (-1.81)	-0.0383 (-1.27)	-0.0592* (-1.92)	-0.0222 (-1.44)
Cash Burn Rate	-0.0425 (-0.43)	-0.0328 (-0.52)	-0.0499 (-0.67)	-0.0211 (-0.18)	-0.0323 (-0.71)	-0.0427 (-1.03)
R&D/Sales	-0.2908** (-2.13)	-0.1999* (-1.70)	-0.2033*** (-2.68)	-0.0322 (-0.62)	-0.0111 (-0.34)	-0.0429 (-0.61)
Turnover	-0.0078 (-0.52)	-0.0092 (-0.66)	-0.0073 (-0.59)	-0.0479 (-1.44)	-0.0528* (-1.68)	-0.0524* (-1.85)
Constant	0.2932 (0.96)	0.3822*** (2.73)	0.4196*** (2.86)	0.1465 (0.30)	0.1869 (0.91)	-0.0977 (-1.33)
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1,226	965	732	1,453	1,441	1,366
R-squared	0.151	0.137	0.160	0.071	0.123	0.115

Table 10: PIPE Finance and Outperformance of RM Companies

This table presents the effects of PIPE financing on the outperformance of non-shell based RM companies. Panel A compares the performance between non-shell RMs without PIPE financing and shell RMs with PIPE financing, Panel B compares the performance between non-shell RMs with PIPE financing and shell RMs with PIPE financing and Panel C compares the performance between non-shell RMs with PIPE financing and shell RMs without PIPE financing. PIPE dummy equals to 1 if a RM company can receive PIPE investments within 6 months after the reverse merger transaction, otherwise it equals to 0. The dependent variables are firm's return on total asset (ROA) and holding period stock return, respectively. ROA_{t-year} stands for the firm's ROA t fiscal years after the reverse merger and it is calculated as $Net\ Income_t / [(total\ assets_{t-1} + total\ assets_t) / 2]$. The 1-year, 2-year and 3-year holding period returns are the 252, 504 and 756 trading days buy-and-hold returns of the surviving company after the close date of reverse merger transaction, respectively. If a company is delisted within the calculation period, the total return is calculated until the delisting date. All control variables are winsorized at 1th and 99th percentile. Superscripts ^{***}, ^{**}, ^{*} denote statistical significance at the 1%, 5% and 10% levels, respectively.

Panel A: Compare the performance between non-shell RMs without PIPE financing and shell RMs with PIPE financing.

	ROA_{1-year}	ROA_{2-year}	ROA_{3-year}	$Return_{1-year}$	$Return_{2-year}$	$Return_{3-year}$
	(1)	(2)	(3)	(4)	(5)	(6)
Shell	0.0852** (2.10)	0.0677* (1.84)	0.0623 (1.44)	0.0575* (1.71)	0.0943** (2.43)	0.0764** (2.33)
Assets	0.0012*** (4.17)	0.0011*** (6.66)	0.0010** (6.02)	0.0015 (1.52)	0.0017* (1.71)	0.0011** (2.24)
Debt	-0.1018** (-2.23)	-0.0571** (-2.00)	-0.0619* (-1.65)	-0.0362 (-1.16)	-0.0376** (-2.10)	-0.0114 (-0.51)
Cash Burn Rate	-0.0653 (-0.94)	-0.0231 (-0.84)	0.0525 (1.22)	0.0064 (0.35)	0.0057 (0.61)	0.0040 (0.88)
R&D/Sales	-0.3420*** (-3.24)	-0.1929*** (-3.58)	-0.2021*** (-3.35)	0.0389 (0.49)	-0.0108 (-0.29)	-0.0030 (-0.08)
Turnover	-0.0062 (-1.17)	-0.0031 (-1.09)	-0.0054 (-1.54)	-0.0327** (-2.43)	-0.0512** (-2.27)	-0.0488* (-1.94)
Constant	0.2216 (1.03)	-0.0927 (-0.68)	0.2084 (1.33)	-0.5852*** (-3.45)	-0.1981 (-0.58)	-0.4263 (-1.43)
Year and Ind FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	443	389	322	518	509	476
R-squared	0.288	0.302	0.347	0.243	0.267	0.272

Panel B: Compare the performance between non-shell RMs with PIPE financing and shell RMs with PIPE financing.

	ROA _{1-year}	ROA _{2-year}	ROA _{3-year}	Return _{1-year}	Return _{2-year}	Return _{3-year}
	(1)	(2)	(3)	(4)	(5)	(6)
Shell	-0.0076 (-0.77)	-0.0329* (-1.68)	-0.0132 (-1.22)	-0.0182 (-0.65)	-0.0255* (-1.70)	-0.0364* (-1.78)
Assets	0.0026*** (8.08)	0.0019*** (7.11)	0.0014*** (5.02)	0.0005 (1.09)	0.0010** (2.44)	0.0013*** (3.10)
Debt	-0.0927* (-1.86)	-0.0830** (-2.48)	-0.1111** (-2.58)	-0.0222 (-0.59)	-0.0376* (-1.89)	-0.0378*** (-2.78)
Cash Burn Rate	-0.0701 (-0.39)	-0.0728 (-0.44)	-0.0581 (-0.59)	-0.0816 (0.95)	0.0105 (0.58)	-0.0501 (-0.21)
R&D/Sales	-0.3947*** (-4.46)	-0.2214*** (-3.71)	-0.2096*** (-3.45)	-0.1019 (-1.11)	-0.0489 (-1.16)	-0.0365 (-0.81)
Turnover	0.0086 (0.78)	-0.0041 (-0.67)	-0.0077 (0.72)	-0.0311* (-1.69)	-0.0303* (-1.77)	0.0490* (1.83)
Constant	-0.0131 (-0.03)	-0.1052 (-0.63)	0.2194 (0.84)	0.1084 (0.21)	-0.5716*** (-3.05)	0.2535 (1.38)
Year and Ind FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	365	312	263	478	470	384
R-squared	0.331	0.346	0.396	0.292	0.293	0.305

Panel C: Compare the performance between non-shell RMs with PIPE financing and shell RMs without PIPE financing.

	ROA _{1-year}	ROA _{2-year}	ROA _{3-year}	Return _{1-year}	Return _{2-year}	Return _{3-year}
	(1)	(2)	(3)	(4)	(5)	(6)
Shell	-0.1948** (-2.35)	-0.2235*** (-2.99)	-0.2495*** (-3.69)	-0.1598** (-2.44)	-0.1859*** (-2.70)	-0.1981*** (-2.81)
Assets	0.0025*** (8.00)	0.0019*** (7.10)	0.0015*** (5.15)	0.0009 (1.25)	0.0010** (2.22)	0.0013*** (3.25)
Debt	-0.1205** (-2.27)	-0.1029*** (-2.81)	-0.1455*** (-3.03)	-0.0237 (-0.63)	-0.0377* (-1.76)	-0.0382*** (-2.92)
Cash Burn Rate	-0.0523 (-0.17)	-0.0601 (-0.36)	-0.0557 (-0.64)	-0.0316 (-0.98)	0.0205 (0.58)	-0.0223 (-0.17)
R&D/Sales	-0.4123*** (-4.23)	-0.2336*** (-3.96)	-0.2068*** (-3.21)	-0.0948 (-1.02)	-0.0328 (-0.76)	-0.0429 (-0.82)
Turnover	0.0088 (0.84)	0.0032 (0.69)	-0.0068 (-0.75)	-0.0505* (-1.85)	-0.0702* (-1.93)	-0.0889** (-2.34)
Constant	0.1486 (0.61)	0.3157 (1.36)	0.2341 (0.94)	0.0588 (0.12)	-0.5787*** (-3.01)	0.2319 (1.29)
Year and Ind FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	845	773	687	960	952	901
R-squared	0.133	0.139	0.146	0.102	0.115	0.127

Table 11: Comparison of RM companies and Matched Penny IPO Companies

Panel A: Comparison of Short-Run Return

Panel A of this table presents the short-run stock return comparison of non-shell or shell based RM companies and their matched penny stock IPO companies. The return of window (1, 10) is the first 10 trading days buy-and-hold return of the company after the event. The return of window (1, 20) is the first 20 trading days buy-and-hold return of the company after the event. Market adjusted return is the raw return minus the return of equal weighted market index. Superscripts ^{***}, ^{**}, ^{*} denote statistical significance at the 1%, 5% and 10% levels, respectively.

Raw Return						
	Non-Shell RM	Penny Stock IPO	Difference	Shell RM	Penny Stock IPO	Difference
(1,10)	0.1633*** (2.88)	0.0425** (2.12)	0.1208*** (2.76)	0.1617*** (2.99)	0.0523*** (2.64)	0.1094*** (2.72)
(1,20)	0.2946*** (3.41)	0.1127*** (2.67)	0.1819*** (4.06)	0.2731*** (4.11)	0.1359*** (3.87)	0.1372*** (4.23)
Market Adjusted Return						
	Non-Shell RM	Penny Stock IPO	Difference	Shell RM	Penny Stock IPO	Difference
(1,10)	0.1529*** (2.73)	0.0378* (1.90)	0.1151*** (2.83)	0.1589*** (2.78)	0.0501** (2.49)	0.1088*** (2.85)
(1,20)	0.2733*** (3.21)	0.1024*** (2.63)	0.1709*** (3.92)	0.2602*** (4.02)	0.1298*** (3.65)	0.1304*** (4.06)

Panel B: Comparison of Long-run Performance

Panel B of this table presents the regression analyses of the long-run operating performance and stock returns of non-shell or shell-based RM companies and their matched penny stock IPO companies. Panel B presents the regression analysis of the long-run stock return performance of non-shell or shell based RM companies and matched IPO companies. The dependent variables are firm's return on total asset (ROA) and holding period stock return, respectively. ROA_{t-year} stands for the firm's ROA t fiscal years after the event and it is calculated as $Net\ Income_t / [(total\ assets_{t-1} + total\ assets_t) / 2]$. The 1-year, 2-year and 3-year holding period returns are the 252, 504 and 756 trading days buy-and-hold returns of the company after the event, respectively. If a company is delisted within the calculation period, the total return is calculated until the delisting date. RM equals to 1 if the firm goes public through reverse merger and equals to 0 if it goes public through IPO. Assets is the firm's total asset. All control variables are winsorized at 1th and 99th percentile. Superscripts ***, **, * denote statistical significance at the 1%, 5% and 10% levels, respectively.

	Non-Shell Based RMs and Matched Penny IPOs			Shell Based RMs and Matched Penny IPOs		
	Return _{1-year}	Return _{2-year}	Return _{3-year}	Return _{1-year}	Return _{2-year}	Return _{3-year}
	(1)	(2)	(3)	(4)	(5)	(6)
RM	0.1059 (0.78)	0.1031 (0.56)	0.1838 (0.30)	0.1305 (0.72)	-0.0082 (-0.02)	0.0146 (0.06)
Assets	0.0776 (1.41)	0.0518 (0.78)	0.0823 (1.01)	0.0022 (0.30)	0.0101** (2.65)	0.0108*** (4.73)
Debt	-0.3216 (-0.56)	0.2287 (0.41)	0.2025 (0.38)	0.1784 (1.13)	0.0701 (1.01)	0.0507 (0.97)
Cash Burn Rate	-0.0603 (-0.99)	-0.0623 (-0.26)	-0.1290 (-0.70)	0.0915 (1.22)	0.0836* (1.71)	0.1090** (2.42)
R&D/Sales	0.0870 (1.05)	0.0320 (0.47)	0.0252 (0.80)	0.1110 (0.58)	0.1312 (1.10)	0.0542 (1.38)
Constant	-1.0340 (-0.57)	-1.2475 (-0.39)	-0.0852 (-0.03)	-2.4558 (-1.13)	-0.1602 (-0.13)	-0.7099 (-1.41)
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	243	231	214	332	317	299
R-squared	0.369	0.391	0.479	0.281	0.316	0.352

	Non-Shell Based RMs and Matched Penny IPOs			Shell Based RMs and Matched Penny IPOs		
	ROA _{1-year}	ROA _{2-year}	ROA _{3-year}	ROA _{1-year}	ROA _{2-year}	ROA _{3-year}
	(1)	(2)	(3)	(4)	(5)	(6)
RM	-0.3562 (-1.27)	-0.1329 (-0.65)	0.0307 (0.14)	-0.2864* (-1.72)	-0.3043*** (-2.68)	-0.2694* (-1.72)
Assets	0.0422** (2.13)	0.0497 (1.59)	0.0222 (0.70)	0.0035 (1.22)	0.0071 (1.52)	0.0043 (1.23)
Debt	0.1048 (0.41)	-0.1517 (-0.66)	-0.1998 (-0.78)	0.1047 (0.66)	-0.1289 (-1.03)	-0.2330** (-2.05)
Cash Burn Rate	-0.0415 (-0.35)	-0.0762 (-1.23)	-0.1453*** (-3.18)	-0.0602 (-0.21)	-0.0610 (-0.94)	-0.1005 (-0.82)
R&D/Sales	-0.1532 (-0.18)	-0.1622 (-0.93)	-0.1204 (-0.06)	-0.1473* (-1.95)	-0.1275 (-0.20)	-0.1556 (-0.26)
Constant	0.1812 (0.29)	-0.3644*** (-4.27)	-0.2470 (-0.49)	-0.2853 (-0.74)	0.4000** (2.02)	0.5702** (2.52)
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	167	158	145	189	177	162
R-squared	0.615	0.683	0.627	0.528	0.410	0.389

Former Politicians Serving as Independent Directors: How Do They Affect Firm Performance?

Abstract

By using a cross-country sample, I find that the presence of former politicians serving as independent directors (PIDs) in a company is associated with certain firm-level, industry-level and country-level characteristics. Furthermore, I investigate the effects of PIDs on the firm's future performance and find that PIDs have an adverse effect on firm's operating performance as well as firm value. This phenomenon is especially severe if a firm is in a heavy regulated industry. However, the adverse effect of PIDs can be mitigated if a firm is in a country with a legal system providing more protection to shareholders, or in a country with better corporate governance provisions.

Keywords: Independent Director, Former Politician, Long-run performance, Legal System, Corporate Governance

JEL Classification: G30, G34

1. Introduction

Although numerous literatures have documented the positive effect of independent directors on corporate governance²⁶, the overall effect of independent directors on firm future performance is ambiguous. In a survey paper, Bhagat and Black (1999) report that most studies find little evidence on the positive relation of the board independency and firm performance, while some papers even find a negative relation between them. In a follow up study, Bhagat and Black (2000) attempt to explain this puzzle by using a large sample with a long horizon, but still conclude that a higher degree of board independence does not significantly improve firm performance.

Recently, a growing number of research works has been trying to explain this issue by focusing on the role of outside directors with particular backgrounds or characteristics on the corporate governance and firm performance. Normally, outside directors have both monitoring duties (Fama and Jensen 1983) and advisory duties (Hermalin and Weisbach 1998). How well the directors fulfill these two duties determines the effectiveness of boards and affects the firm's future performance. Directors with unique backgrounds or characteristics may have a more superior (inferior) ability of monitoring or advising than other directors. For example, Booth and Deli (1996) find that bankers on board will reduce the firm's leverage since they would like to monitor the managers closely to protect the bank's interest. On the other

²⁶ For example, Weisbach (1988) finds that CEO turnover is more sensitive to firm performance in firms with outsider-dominated boards than in firms with insider-dominated boards. Cotter, Shivdasani and Zenner (1997) argue that an independent board is more likely to use resistance strategies to enhance shareholder wealth of the target company in a tender offer.

hand, Kroszner and Strahan (2001) argue that bankers on board would cause the conflict of interest between shareholders and debtholders, which could offset the benefit of the monitoring from the banker. Fahlenbrach, Low and Stulz (2010) find that firms that appoint outside CEO as directors have higher stock-price reaction, but do not affect the firm's operating performance. Furthermore, Masulis, Wang and Xie (2010) find that firms with foreigner independent directors could make better cross-border acquisitions when the targets are from the home regions of those directors, but have significantly poorer performance because foreigner independent directors have an adverse effect on corporate governance.

In this paper, by using the cross-country data, I investigate the role of former politicians who serve as independent directors in the firm's future performance around the world. Former politicians can be considered as a unique type of directors because of following reasons. First, former politicians have working experience, connections and certain influence in the government so that they may add values to the firm by creating a good relationship with the government. Second, former politicians may be lack of certain business experience, such as accounting, finance and governance so that they may not be able to evaluate the firm's performance and provide effective advice to firm's business. Third, former politicians may already have ties to the management before sitting on the board so that they may be less effective monitors. Last, in some countries, politicians are always linked with corruption or rent-seeking activities so that they may act in the best interests of themselves rather than shareholders. Therefore, the appointment of former politicians as independent director

may be a double-edged sword. They may weaken the effectiveness of the board, but at the same time, they may offer valuable expertise and advice related to the government issues and they could also help the firm to connect with the government more closely.

A Merrill Lynch television advertisement in 2002 said: “Marrying Washington and Wall Street Adds Value for Shareholders”. The logic behind this statement is firms are always dependent on external environments, and this dependency creates risk and uncertainty, which in turn affects firm performance. Firms that create linkages with important sources of external dependency can reduce uncertainty because these linkages buffer firms from environmental fluctuations. Government policy, regulation, and enforcement are major forces in the external environment of business. Despite trends toward lower trade barriers and deregulation worldwide, government policy still holds enormous impact on the operations of firms. Therefore, the best link between firms and government is the politician. Former politicians serving as independent directors may enhance the advisory capability of boards because the working in the government gives them first-hand knowledge of government policies, spread human networks and reputations. These resources may allow former politicians to provide valuable insight and assistance to firms, especially to those which need to follow government policies closely and to those that have direct or indirect business with the government. Kim and Zhang (2013) find that politically connected firms are more tax aggressive than non-connected firms. It suggests that politically connected firms may have tax advantage than those non-connected firms. Therefore, it is reasonable to hypothesize that those firms with former politicians on

board as independent directors may enjoy potential tax savings so that their income position may be strengthened. Furthermore, even though the politicians are retired, they may still have networks inside the government and could influence certain government policies. Therefore, the former politicians may bring value to firms if they become the independent directors on the board and from this prospective, I have reason to hypothesize that the firm will be better off after a former politician joins in.

On the other hand, former politicians may have adverse effects on the firm's future performance for several reasons. First, former politicians may not have business experience so that they may not be familiar with the firm's industry, operations, strategies, governance processes and may also not be able to effectively understand a firm's financial statements. Thus, former politicians may neither provide meaningful advice on a firm's business, nor govern the firm's operations effectively.

Second, conventionally, a director is considered independent if he has neither financial nor familial ties to the manager or to the firm. But recently, Hwang and Kim (2009) argue that social ties are also important in determining the independency of a director. It is reasonable to hypothesize that the former politician may already have had certain ties to the firm's management when he was in the office, especially in some countries with poor country-level governance. In this case, the former politicians who serve the independent director positions may become the allies, rather than the monitors, to the top management.

Third, Shleifer and Vishny (1994) argue that politicians themselves will extract at least some of the rents generated by connection. Some empirical papers also

document that corporate political connections are costly to firms due to rent-seeking by politicians. Aggarwal, Felix and Wang (2009) find that those firms that contribute to political candidates for federal offices in the U.S. suffer a worse future stock excess return. Fan, Wong and Zhang (2007) find that privatized firms with political-connected CEOs underperform those without political-connected CEOs by almost 18% based on 3-year post-IPO stock returns, earnings growth, sales growth, and change in returns on sales. Bertrand et al (2006) get similar results using France data. Fisman et al (2006) examine the value of political connections of U.S companies to Vice President Richard Cheney and find that the value of such connections is zero. They argue that this phenomenon implies that U.S. institutions are effective at controlling political rent-seeking. All the above studies show that politicians could do the rent-seeking by using the power they have, which harms the firm value. And this phenomenon should be more pronounced inside countries with weak governance and legal environment.

Given the benefits and costs associated with former politicians as independent directors, the net effect on overall board effectiveness, corporate decision making, and long-run firm performance is an intriguing empirical question. My investigation focuses on the following issues: How prevalent are former politicians serving as independent directors (PID) on the boards of worldwide public firms? What kind of firms is more likely to have PIDs? What is the overall effect of PIDs on a firm's long-term performance? Whether the PIDs add more value to firms under heavier regulation by the government? How could country-level corporate governance and the

legal system affect the function of PIDs?

In this paper, by analyzing a sample of 11480 firms and 63306 firm-year observations across 45 countries from 2000 to 2009, first of all, I find that the presence of a former politician on the board is prevalent around the world. 12% of firms in my sample have at least one former politicians sitting on the board. Conditional on the presence of the former politicians, 64% of them are independent directors. Furthermore, the presence of PIDs is fairly distributed across years. The percentage of firms that have PIDs varies from 5.58% to 6.59% across years, which is quite stable. Not surprisingly, the presence of PIDs is highest in those industries in which firms are heavily regulated by the government or have a close business relationship with the government. More specifically, the top 6 industries with the highest presence of PIDs are: Gas, Water and Multi-utilities (13.03%), Tobacco (12.98%), Aerospace and Defense (12.98%), Electricity (12.83%), Insurance (11.69%) and Telecommunication (11.67%).

We next estimate a logistic regression for the determinants of PIDs. I find that the presence of PIDs is strongly associated with certain firm level, industry level and country level factors. More specifically, from a firm level perspective, a firm with a larger board or higher percentage of independent directors is more likely to appoint a former politician as an independent director. Furthermore, PIDs are more likely to appear in a larger firm, a lower levered firm or a firm with more capital expenditures. From an industry level perspective, a firm in a heavier regulated industry is more likely to have PIDs, while from a country level perspective, a firm in common law

countries, developed countries or countries with good anti-self dealing provisions is less likely to appoint a former politician as an independent director.

To address the effect of PIDs on the firm's future operating performance and firm value, I estimate cluster regressions of the firms next year ROA and Tobin's Q on a PID dummy and a group of control variables. I find that the presence of PIDs significantly weakens the firm's operating performance as well as the firm value. These findings suggest that the cost of appointing a former politician as an independent director is much larger than the benefit of doing that. Furthermore, I also test the effect of the percentage of former politicians on the board on the firm's future performance. The percentage is of interest because the dummy only examines two large groups but the percentage provides a clearer picture throughout the whole sample. I find that a firm with a higher percentage of former politicians serving as independent directors on the board performs much poorer and its firm value is also lower. I acknowledge that a large portion of the firms in my sample is from the United States, so to mitigate the concern that my results are not a worldwide phenomenon but are just driven by a U.S. subsample, I exclude all U.S. firms and repeat the tests using the remaining sample. I find similar results in the subsample without U.S. firms, so that I can conclude that the significant poor performance of firms with PIDs is not due to the sample selection bias.

One potential reason of the negative effect of PIDs on firm's future performance could be due to the endogeneity problem. Those firms which have PIDs on board might be less competitive compared to other firms in the market in the first place.

PIDs may have no effect on firm's performance at all and the poorer future performance of those firms may just be because of their initial disadvantages. In order to mitigate this endogeneity concern, I conduct a 2-stage regression analysis and the results seem to be robust.

Next I examine whether PIDs can add more value to firms in heavy regulated industries. It is reasonable to believe that the effects of PIDs on firm performance will be more pronounced in heavy regulated industries. Compared to firms in light regulated industries, firms in heavy regulated industries may benefit more from appointing former politicians as independent directors and in turn establishing a stable connection with the government. It is because the business of a heavy regulated firm depends more on the government preferences and policies. Therefore, establishing a stable channel to communicate with the public regulators may be critical to the firm's future business strategies. If a firm is able to get important information from the government insiders before the release of new policies, it can adopt to those new policies more smoothly without suffering erratic fluctuations.

In the mean time, PIDs in those heavy regulated firms should be much busier than PIDs in light regulated firms. In this case, they may put more attention to the external relationship building so that their monitoring duties may not be fulfilled. In an unreported statistics, I find that PIDs in heavy regulated firms are more likely to miss the board meetings. This inadequate monitoring may have adverse effects on the firm's performance. More importantly, PIDs in heavy regulated firms are more influential and powerful, so that it will be much easier for them to act in their own

benefits rather than in the shareholders' benefits. Furthermore, the rent they extract in heavy regulated industries may be much more than the amount they can get in light regulated industries.

I define heavy regulated industries according to Baron (2000). Overall, I find that the regulated firms with PIDs perform even worse. It suggests that the adverse effects of PIDs increase with the importance and power of PIDs. Former politicians may bargain for more personal compensations than regular independent directors and may also extract more personal benefits from their influence and power in the company. They may even require kickbacks from the company in exchange for their maintenance of the connection with the government.

Next, I want to understand if a better country-level legal or governance environment could mitigate the adverse effects of PIDs on firm performance. According to López-de-Silanes, La Porta, Shleifer and Vishny (1997, 1998), countries adopting a common law legal system provide better protection to shareholders. Therefore, I hypothesize that the performance of firms with PIDs in common law should be improved. Furthermore, Djankov, López-de-Silanes, La Porta and Shleifer (2006) create a country-level Anti-Self Dealing index to measure the hurdle that the controlling shareholder must jump over to do self dealing in each country. I use the Anti-Self Dealing index as a proxy for the country-level corporate governance provisions and argue that a country with a higher Anti-Self Dealing index has better corporate governance environment. Therefore, I hypothesize that the performance of firms with PIDs in countries with a higher Anti-Self Dealing index should also be

improved.

I find that both the return on assets (ROA) and Tobin's Q of firms with PIDs in common law countries have been significantly improved. Similar results are also found for those firms with PIDs in lower anti-self dealing index countries. These results suggest that a better country-level legal system or stronger country-level corporate governance provision can indeed mitigate the negative effects of PIDs. In such an environment, shareholders are more protected because it is more difficult for the politicians to extract rents from them.

In the last part of this paper, I compare the change of performance between firms with PIDs in heavy regulated industries and light regulated industries on condition of better country-level environments. It is reasonable to believe that PIDs should add more value to firms in heavy regulated industries. A worse performance is observed because of the severe rent-seeking problem that offsets the value they add to the firm. If those rent-seeking activities are mitigated by adopting a more shareholder-oriented legal system, or a stricter corporate governance provision, I can hypothesize that the performance of regulated firms with PIDs should be improved more than the performance of unregulated firms with PIDs. My hypothesis is supported by the results. I find that both the ROA and Tobin's Q of regulated firms with PIDs increase by a larger amount than those measures of unregulated firms with PIDs.

Overall, my findings suggest that former politicians are not effective independent directors. The cost of appointing a former politician as independent director exceeds the benefit generated. This adverse effect is more significant if a firm has close

business relations with the government or a firm is under heavy regulation by the government. However, a better country-level legal system or stricter corporate governance provisions could mitigate the adverse effects caused by former politicians. This mitigation effect is most pronounced if a company is in a heavy regulated industry.

My paper contributes to the existing literature from following aspects. First, it extends the literature on the effectiveness of independent directors with particular background or characteristic by examining former politicians. Second, it is the first paper that examines the effects of former politicians on firm's performance by using cross-country data. Previous literature on the effects of political connections on the firm performance normally just focus on the developing countries (Fisman 2001, Faccio 2006, Faccio, Masulis and McCoonell 2006, Claessens, Feijen and Laeven 2008) or just on the United States (Goldman, Rocholl and So 2009). This paper provides a wider picture on this issue. Third, my paper has focused on the effects of former politicians serving as independent directors on the future operating performance and firm value, but most previous literature just focus on the short-run announcement effects. The announcement effects may only reflect the investors' short-run perspective about the firm, but cannot truly reflect the contributions of former politicians to the firm in the future.

The remainder of this paper is structured as follows. Section 2 describes my data and sample selection procedures. Section 3 presents our empirical results and main findings. Section 4 concludes this paper.

2. Data and Sample Selections

2.1 Definition of Former Politician

In this paper, a politician should be a person who has at least one of following positions: a) Member of parliament (MP); b) Minister; c) Head of State; d) Top officer of a state-level government department or division (For example, Head of taxation policy division of federal treasury; Chairman of national commission for corporate governance).

Clearly, the former politicians are just those politicians who were holding the above mentioned positions in the government but already retired from the position before they joined in the boards of firms.

2.2 Sample Selection

My initial sample is generated from the BoardEx database. I start from collecting former politician data, board size data and the total number of independent directors from BoardEx, which is a leading database on the board composition of public listed firms in more than 50 countries. The greatest advantage of this database is that it contains the comprehensive biographic information of all former and incumbent directors in every firm, such as detailed employment histories. The employment history includes the detailed descriptions of all past and current jobs for the directors, regardless of his current directorship status. The starting and ending date of each job are also provided. Therefore, I can identify whether a director is a former politician by searching keywords in his employment history. If a person was a politician before serving as an independent director of a firm, I just pick him up and call him as PID. I

further create a PID dummy, which equals to 1 if a firm has a PID on board in a particular year, otherwise the dummy equals to 0. The board size equals the total number of directors of a firm in a particular year. And the percentage of independent directors equals the total number of independent directors in a particular year divided by the board size. Furthermore, I also get the home country and industry classification of each firm from BoardEx. All firms with missing board size, number of independent directors, home country or industry classification are excluded. I restrict my sample period to from 2000 to 2009 since before 2000 the coverage of BoardEx is very limited.

I get the financial data from WorldScope. All the firms with missing financial data are removed from the initial sample. I further remove the countries that have less than 5 firms with both director information and financial data available. Finally, my sample consists of 11480 firms or 63306 firm-year observations across 45 countries.

2.3 Sample Distribution and Summary Statistics

Panel A of table 1 presents the sample distribution across years. I find that the presence of PIDs in firms is relatively stable over time. The percentage of firms with PIDs only varies from 5.58% to 6.59% in 10 years. Panel B of table 1 presents the sample distribution across countries. I find that the presence of a former politician on the board is prevalent around the world. 12% of firms in my sample have at least one former politicians sitting on the board. Conditional on the presence of the former politicians, 64% of them are independent directors. One important shortcoming of my sample is that a large portion of firms come from the United States so that my

findings may be driven by the U.S. firms. In order to mitigate this concern, I repeat all my major tests by excluding U.S. firms and confirm that all results are still there. Thus, all the findings in this paper are not likely to be biased due to the sample selection.

Panel C of table 1 presents the sample distribution across industries. Not surprisingly, I find that the presence of PIDs is highest in those industries in which firms are heavily regulated by the government or have a close business relationship with the government. More specifically, the top 6 industries with highest presence of PIDs are: Gas, Water and Multi-utilities (13.03%), Tobacco (12.98%), Aerospace and Defense (12.98%), Electricity (12.83%), Insurance (11.69%) and Telecommunication (11.67%).

Panel A of table 2 presents the summary statistics of financial and director related variables of all firm-year observations in my sample. The director related variables include the PID dummy, the percentage of PIDs on the board (number of former politicians serving as independent directors/board size), board size and percentage of independent directors. The financial variables include firm size (Total Assets), return on assets (Net Income/Average Total Assets), asset growth rate, leverage (Total Debt/Total Assets), Tobins' Q ((total assets + market value of equity – book value of equity)/total assets), R&D (R&D Expenditures/sales), Capex (Capital expenditure/Sales) and Cash (Cash and Cash Equivalents/asset). All the variables are winsorized at their 1% and 99% percentiles to mitigate the influence of outliers.

Panel B of table 2 presents the correlation between each variable. I find that the

PID dummy has a significant correlation with all major director related and financial variables, except with asset growth rate. More specifically, the PID dummy has a significantly positive correlation with board size, percentage of independent directors, ROA, total assets, leverage and capex. On the other hand, PID dummy has a significantly negative correlation with Tobin's Q, R&D and cash.

3. Results and Main Findings

3.1 Determinants of Appointing PIDs

In this section, I estimate logit regressions of the PID dummy on a group of variables to find what kind of firms is more likely to appoint former politicians as independent directors. Panel A of table 3 presents the regression results by using the full sample and Panel B of table 3 repeats the test by using a non-US subsample. All the independent variables are lagged for one year related to the year of presence of the PID dummy. First of all, across all 6 columns in Panel A, I find that certain variables always have significant coefficients. Firms having larger boards or having a higher percentage of independent directors are more likely to have former politicians serving as independent directors. This is easy understand because a larger board providing more director positions makes it easier for a former politician to get an independent directorship there. A higher board independency means a firm would like to appoint more independent directors rather than insiders, so that the PIDs are more likely to appear in that kind of firm. Moreover, larger firms are more likely to appoint PIDs. From the correlation test I find that firm size has a significantly positive correlation with both board size and board independency, so that it is not surprising to find this

result. Although leverage and capital expenditures have significantly positive coefficients in the full sample analyses, both of them lose their significance in the non-US subsample.

I further show that certain industry-level and country-level factors can also determine the appointment of PIDs. First, from the industry-level perspective, it is reasonable to hypothesize that if a firm is in a heavy regulated industry, it is more likely to appoint former politicians as independent directors. The reason is that the business of the firms in the heavy regulated industries is either closely connected with the government or severely affected by the change of regulations set by the government. In this case, those firms must be more eager to have an expert on board who has first-hand knowledge of government policies and a certain influence inside the government. Former politicians are the best candidate. Therefore, I would like to examine whether firms in heavy regulated industries are more likely to appoint PIDs. Column (2) of Panel A shows that firms in heavy regulated industries are indeed more likely to appoint former politicians as independent directors. The coefficient of 'Regulated' dummy is significantly positive at 1% level.

From the country-level perspective, I have reason to suppose that firms in countries with a shareholder-oriented legal system are less likely to appoint PIDs. This is because such a legal system should exhibit more transparency of regulation, uniform application of the law, and rigorous enforcement of penalties associated with violations of the law (Faccio 2006). Therefore, it is harder for former politicians to influence the public policy or to get benefits for the firms by evading the regulations,

except for those people who held really powerful positions in the government before. LLSV (1997, 1998) provide the insight investigation into the legal system for 49 countries and argue that both legal environment and enforcement matter for the investors protections. They find that the countries with common law systems have stronger legal protections than countries with civil law systems. Therefore, I use a ‘Common Law’ dummy to proxy for a better legal system and want to estimate its effect on the appointment of PIDs. Column (3) of Panel A shows that firms in common law countries are less likely to appoint former politicians as independent directors, as firms may not see enough value from such an appointment. But I further hypothesize that if a firm in common law countries has PIDs on board, those people should be really influential in the government so that they can add more value to the firms than those PIDs in civil law countries.

Furthermore, based on a similar argument to that above, I hypothesize that firms in countries with stricter corporate governance provisions are less likely to appoint PIDs. DLLS (2006) build a country-level anti-self-dealing index to measure the hurdle that the controlling shareholder must jump over to do self dealing in each country. The higher is the hurdle, the higher is the index. I use the anti-self dealing index as a proxy for the corporate governance provision and examine its effect on the appointment of PIDs. Column (4) of Panel A shows that firms in countries with a higher anti-self dealing index are less likely to appoint former politicians as independent directors.

To confirm my arguments and findings from the tests in column (3) and (4), I

hypothesize that firms in developed countries must be less likely to appoint PIDs. Shleifer and Vishny (1997) find that less developed countries have poorer country-level investor protections, less government transparency and worse legal environments than developed countries. So I can conclude that developed countries should capture the characteristics of both better legal systems and stricter corporate governance provisions to some extent. Column (5) of Panel A supports my hypothesis. I observe a significant negative coefficient for the ‘Developed Country’ dummy, which shows that firms in developed countries are less likely to have PIDs on board.

In column (6) of Panel A, I put all firm-level, industry level and country level variables together to check the overall effects of those variables on the appointment of PIDs. I find that most variables still maintain their coefficients sign and significance except the anti-self dealing index. It suggests that the power of this proxy is absorbed by the other two country level proxies, but this result will not affect my conclusion on the determinants of appointment of PIDs.

Last but not least, all the results are confirmed by using a non-US sample in Panel B. It suggests that the determinant factors I find are indeed a worldwide phenomenon rather than driven by US firms.

In summary, I conclude that the presence of PIDs is strongly associated with certain firm level, industry level and country level factors. More specifically, from a firm level perspective, a firm with a larger board or higher percentage of independent directors is more likely to appoint a former politician as an independent director. Furthermore, PIDs are more likely to appear in a larger firm, a lower levered firm or a

firm with more capital expenditures. From an industry level perspective, a firm in a heavier regulated industry is more likely to have PIDs, while from a country level perspective, a firm in common law countries, developed countries or countries with good anti-self dealing provisions is less likely to appoint a former politician as an independent director.

3.2 Effects of PIDs on Firm Performance

In this section, I investigate the effects of PIDs on firms' future operating performance and firm values. According to the arguments in the introduction, PIDs may bring both benefits and costs to the firms. However, the overall effect of PIDs on a firm's future performance is still ambiguous. If the value added by PIDs exceeds the costs they induced, a positive relation between the PID dummy and the performance measure will be observed; otherwise, a negative relation will prevail. I use the firm's ROA as a proxy for the operating performance and Tobin's Q as a proxy for the firm value. All prevalent firm level characteristics that may affect a firm's future performance are controlled²⁷. Both ROA and Tobin's Q are the post 1 year value related to the presence of the PID. Similarly, I report the cluster regression results by using the full sample in the Panel A of Table 4 and repeat all the tests by excluding US firms in Panel B.

In column (1) of Panel A, I find that the PID dummy has a significantly negative

²⁷ They are board size (Eisenberg, Sundgren and Wells 1998, Coles, Daniel and Naveen 2008), board independency (Hermalin and Weisback 2003), firm size (Banz 1981, Gompers and Metrick 2001), leverage (Lang, Ofek and Stulz 1996), asset growth rate (Cooper, Gulen and Schill (2008), R&D (Sundaram, John and John 1996), capital expenditure (McConnel and Muscarella 1985), cash intensity (Larrain and Yogo 2008).

effect on the firms next year ROA. The coefficient of the PID dummy is -0.0114 and statistically significant at the 1% level. In economic terms, it suggests that by controlling all the other variables, the next year ROA of firms with PIDs is about 1.14% lower than that of firms without PIDs. In order to mitigate the possible year effects and industry effects, I include both year dummy and industry dummy in the regression in column (2). The result does not change much. The coefficient of PID dummy is slight higher with a value of -0.0106 but still statistically significant at 1% level.

Next, I use the percentage of PID sitting on the board instead of PID dummy to repeat the tests in the previous two columns. The percentage is of interest because the dummy only examines two large groups, but the percentage provides a clearer picture throughout the whole sample. Column (3) and (4) present the regression results and I find that the coefficients of PI percent are both significantly negative and statistically significant at 1% level. These results show that a higher PID percentage will cause a lower next year ROA.

Overall, we can see that the presence of the PIDs will adversely affect the firm's operating performance, and the higher the percentage of former politicians on board, the poorer the operating performance.

In column (5), I further find that the presence of the PIDs also has a significantly negative effect on the next year firm value. The coefficient of the PID dummy is -0.0507 and statistically significant at 1% level. In economic terms, it suggests that by controlling all the other variables, the next year Tobin's Q of firms with PIDs is about 5.07% lower than that of firms without PIDs. Again, I include both year dummy and

industry dummy in the regression in column (6) and observe similar results. Column (7) and (8) report the regressions on the percent of former politicians serving as independent directors on the board. The coefficients on the PI percent are both significantly negative, regardless of whether year and industry fixed effects are controlled.

To confirm my results are not due to sample selection bias, I repeat all tests in Panel B by using a non-US sample. In this case, the coefficient of the PID dummy on next year Tobin's Q becomes insignificant, if year fixed effect and industry fixed effect are not controlled. But all the other results are consistent with what I found in Panel A. So I can still conclude that the findings in Panel A are not likely driven by the U.S. sample.

In unreported tests, I compare the firm performance before and after it appoints a PID by conducting time-series analyses. I find that both ROA and Tobin's Q of the firm one year after the appointment of PID are significantly lower than those values one year before the appointment. These findings are consistent with the adverse effect of PIDs observed in Table 4.

In summary, these findings suggest that the cost of appointing former politicians as independent directors exceed the benefit of doing so, resulting in a future poorer operating performance of the firm and a lower firm value.

3.3 Potential Endogeneity Problem

One potential reason for my findings in table 4 could be due to the endogeneity problem. Those firms which have PIDs on board might be less competitive compared

to other firms in the market in the first place. PIDs may have no effect on firm's performance at all and the poorer future performance of those firms may just be because of their initial disadvantages. In order to mitigate this endogeneity concern, I conduct a 2-stage regression analysis by using the industry median PI percent as an instrument variable. My motivation for using the industry PI percentage is that because of the similar competitive environment and production technology, peer firms in the same industry are likely to adopt comparable political link building policy. Indeed, I find firm's PI percent is highly correlated with the instrument from the first stage regressions in Table 5, suggesting that the relevance condition is met.

In the second stage regressions, if I do not control for the year and industry fixed effect, the predicted PI percent has a significantly negative relation with firms next year operating performance. The coefficient is -0.0267 and the p value is 0.075. However, if year and industry fixed effects are controlled, the coefficient on the predicted PI percent loses its significance, although it is still negative. On the other hand, firms next year value is always significantly negative related to the predicted PI percent. Without controlling for the year and industry fixed effect, the coefficient on the predicted PI percent is -0.4411 and significant at 5% level. After controlling for fixed effects, the coefficient becomes even more pronounced. The magnitude of the coefficient becomes more negative and the significance level increases to 1%.

Taken together, I can conclude that the negative effect of PIDs on firm's future performance is less likely due to the endogeneity problem.

3.4 Effects of PIDs on Firm's Performance in Regulated Industries

In this section, I examine whether PIDs can add more values to firms in heavy regulated in heavy regulated industries. I define heavy regulated industries according to Baron (2000). It is reasonable to believe that the effects of PIDs on the firm performance will be more pronounced in heavy regulated industries. Since the business of the firms in the heavy regulated industries is either closely connected with the government or severely affected by the change of regulations set by the government, establishing a stable channel to communicate with the public regulators may be critical to the firm's future business strategies. If a firm is able to get important information from the government insiders before the release of new policies, it can adopt to those new policies more smoothly without suffering erratic fluctuations. Former politicians may provide such assistances. On the other hand, PIDs in heavy regulated firms are normally more influential and powerful than those in light regulated industries, so that it will be much easier for them to act for their own benefits rather than for the shareholders' benefits in heavy regulated industries. The most straightforward way is to bargain for more personal compensations than regular independent directors. Furthermore, the rent they extract in heavy regulated industries may be much more than the amount they can get in light regulated industries. In the worse case, they may even require kickbacks from the company in exchange for their maintenance of the connection with the government.

In the tests, I use a 'Regulated' dummy to indicate if a firm is in a heavy regulated industry. Column (1) of table 6 shows that the interaction term of the PID

dummy and the Regulated dummy is significantly negative related to the firm's next year ROA at the 5% level. This result shows that firms with PIDs in heavy regulated industries perform even worse than those firms without PIDs in heavy regulated industries. More specifically, in the heavy regulated industries, firms with PIDs under-perform firms without PIDs in terms of operating performance by 0.83%. Although the adverse effect of PIDs on the operating performance of firms in regulated industries is relatively small, the adverse effect on the firm value is much stronger. Column (2) shows that the interaction term of PID dummy and Regulated dummy is significantly negative related to the firms next year Tobin's Q at the 1% level. More importantly, in heavy regulated industries, the value of firms with PIDs is lower than the value of firms without PIDs by 13.4%. In column (3) and (4), I repeat the tests in the Non-US subsample and similar results are presented.

In summary, I can conclude that although firms in heavy regulated industries are more eager to appoint former politicians as independent directors, they cannot benefit from the appointment and even suffer more losses. This finding suggests that more costs to the firm are associated with the increase of influence and power of PIDs in the firm.

3.5 Effects of PID on Firm's Performance in Different Environments

According to the results in previous sections, I find that the presence of PIDs on average results in a poor operating performance of the firm and a lower firm value. This adverse effect is more severe if a firm is in a heavy regulated industry. This phenomenon is most likely due to the rent-seeking by the former politicians. In order

to support this argument, I would like to check if the rent-seeking behavior can be mitigated by certain external forces, whether the operating performance and the value of firms with PIDs can be increased or not. To address this verification, in this section I examine the performance of the firms with PIDs under different country-level environments. I argue it will be more difficult for former politicians to do rent-seeking in countries with better protection to the shareholders or in countries with better corporate governance provisions. LLSV (1997, 1998) argue that countries adopting common law legal systems provide better protection to shareholders. DLLS (2006) create an anti-self dealing index to measure the hurdle that the controlling shareholder must jump over to do self dealing in each country. I use the common law legal system as a proxy for better shareholder protection, and use the anti-self dealing index as a proxy for stricter corporate governance provision. If the adverse effects of PIDs are mainly due to the rent-seeking by the former politicians, I hypothesize that the firms with PIDs in common law countries or in countries with higher anti-self dealing index should have a better performance than the firms with PIDs in civil law countries or in countries with lower anti-self dealing index.

In the tests, I use a ‘Common Law’ dummy to indicate if a firm is in a common law country. Column (1) of table 7 shows that the interaction term of the PID dummy and the Common Law dummy is significantly positive related to firms next year ROA at the 1% level. This result shows that the operating performance of firms with PIDs in common law countries has been significantly improved. Column (2) shows that the interaction term of the PID dummy and the Anti-Self Dealing Index is also

significantly positive related to firms next year ROA at the 1% level. This result shows that the operating performance of firms with PIDs in higher anti-self dealing index countries has also been significantly improved. Column (3) and (4) show that the value of firms with PIDs has been significantly increased in common law countries and in higher anti-self dealing index countries, respectively. I redo all the tests by using a non-US subsample and the results are presented in column (5) to (8). Again, I can conclude that the US firms are not the driven force for my full sample results.

In table 8, I examine both the effects of the industry level factor and country level factors on the performance of firms with PIDs. Column (1) of table 8 shows that a common law legal system can also significantly improve the operating performance of firms with PIDs in heavy regulated industries. Column (2) shows that a higher country level anti-self dealing index has the similar effect. Column (3) and (4) find similar results on the firm values. Verifying the results in column (5) to (8) by excluding non-US firms still provides consistent results as what I have in the full sample.

In summary, I can conclude that the adverse effects of PIDs on the firm's performance can be mitigated by adopting better legal system or stricter corporate governance provision. If the external forces are strong enough, the cost of appointing former politicians as independent directors will be significantly reduced.

3.6 Whether PIDs are inherently bad?

All the previous findings provide direct evidence on the cost of PIDs. Even

though PIDs adding value to firms is a reasonable hypothesis, no direct evidence can prove that. Then a question may be asked by people: whether PIDs are inherently bad? To answer this question, I want to make two hypotheses. First, If PIDs are inherently bad, they will not add any value to the firms. In this case, change of country level environments will have comparable effects on the firms with PIDs in heavy regulated industries and the firms with PIDs in light regulated industries. Second, however, if PIDs are not inherently bad, and they indeed can add more values to firms in heavy regulated industries, change of country level environments will have different effects on firms with PIDs in heavy regulated industries and the firms with PIDs in light regulated industries. More specifically, the operating performance and values of firms with PIDs in heavy regulated industries should be improved more.

To test these two hypotheses, I separate the sample into two subsamples: firms in heavy regulated industries and firms in light regulated industries. By comparing column (1) and (4) of table 9, I find that without controlling any country level environment variable, firms with PIDs in light regulated industries perform better than firms with PIDs in heavy regulated industries. This finding is consistent with what I have had in table 6. However, in column (2), after including the interaction term of the PID dummy and the Common Law dummy in the regression, I find a significantly positive coefficient of the interaction term with a value of 0.0318 and a significance level of 1%. But in column (4), the coefficient of the interaction term is only 0.199 and significant at the 10%. This result suggests that in common law countries, the operating performance of firms with PIDs in heavy regulated industries is improved

more than the operating performance of such firms in light regulated industries. Similarly, by comparing column (3) and (6), I find that the coefficient of the interaction term of the PID dummy and the Anti-Self Dealing Index in column (3) has a value that doubles the value of coefficient of interaction term in column (6), on condition that both values have the same significant level. This result suggests that in countries with higher anti-self dealing index, the operating performance of firms with PIDs in heavy regulated industries is improved more than the operating performance of such firms in light regulated industries.

Furthermore, by examining the change of Tobin's Q from column (7) to column (12), I can get the similar findings. In common law countries or in countries with higher anti-self dealing index, the value of firms with PIDs in heavy regulated industries is improved more than the value of such firms in light regulated industries.

Based on the observations, I can argue that PIDs can add values to the firm. The reason for an observed worse performance is because the severe rent-seeking problem offsets the value they add to the firm. If those rent-seeking activities are mitigated by adopting a more shareholder-oriented legal system, or by a stricter corporate governance provision, the performance of regulated firms with PIDs should be improved more than the performance of unregulated firms with PIDs.

4. Conclusion

In this study, I examine the effects of former politicians serving as independent directors of firms on the firms' future performance across 45 countries. I find that the

presence of PIDs is strongly associated with certain firm level, industry level and country level factors. More specifically, a firm with a larger board or a higher percentage of independent directors is more likely to appoint a former politician as an independent director. Furthermore, PIDs are more likely to appear in a larger firm, a lower levered firm or a firm with more capital expenditures. From an industry level perspective, a firm in a heavier regulated industry is more likely to have PIDs, while from a country level perspective, a firm in common law countries, developed countries or countries with good anti-self dealing provisions is less likely to appoint a former politician as an independent director.

Next, I investigate the future performance of firms after appointing former politicians as independent directors. By using ROA and Tobin's Q as proxies for firm performance, I find that the overall effect of PIDs on firm performance is negative, which means that the appointment of former politicians as independent directors would decrease the firm's operating performance and value.

Moreover, I find that the overall effect is even worse for firms in highly regulated industries, which has higher incentives to appoint former politicians as independent director. I argue that it is because the former politicians are busier and they play more important roles in highly regulated industries so that they are either much less effective monitors or more aggressive rent-seekers or both. However, the better legal environment and country-level corporate governance system could mitigate the costs to some extent.

Last but not least, I provide evidence shows that former politicians are indeed

able to add values to the firms. The reason for an observed worse performance is likely due to the severe rent-seeking which offsets the value they may add to the firm.

Since there are a remarkable number of firms in developed countries have PIDs on board, in the future, it would be interesting to test whether there is any difference between “Liberal” and “Conservative” political parties. Taken U.S. as an example, since Republicans and Democrats normally have different background and political philosophies, they may differently affect the firm performance by serving as PIDs. Furthermore, politicians’ party affiliation may be important to the firms since different firms may have different political preference. In a preliminary comparison, I find that Republicans are more popular than Democrats in the firms in U.S. More analyses could be carried out as long as the political party information of former politicians can be accurately collected.

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Appendix A: Procedures to Identify PID

In order to identify politicians in BoardEx, first of all, I need to define the term “politician”. There are many people working for the government, but not all of them can be called politicians. According to previous literature (Faccio 2006), I define politician as a person who has at least one of following positions: a) Member of Parliament (Or equivalent); b) Minister; c) Head of State and d) Top officer of state-level government department or division (For example, head of taxation policy division of federal treasury, or chairman of national commission for corporate governance). The next step is to identify those politicians in BoardEx. There is a sheet in BoardEx (director_profile_employment) provides detailed information about every director’s employment history, including company names, start and end year, roles in the company and the job descriptions. First, I search “Government” under Company Name to pick up all people worked for the government; second, I search “MP”, “Member of Parliament” and “Minister” under Role Name to pick up politicians belong to type (a) and (b). Third, I read the job descriptions one by one to pick up politicians belong to type (c) and (d). After this stage, I have a sample includes all politicians satisfied my searching criteria. If the start or end year is missing in the BoardEx, I manually search the information online to fill it up. Last, I merge this politician sample with another sheet (board_listed_associations) which indicates whether a director is independent or not by unique director ID and remove those people who join in the company as independent directors before they work for the government. After that, my PID sample is created. The following table indicates the

number of observations I obtained for each step.

Steps	Keywords	Number of Observations obtained
1	"Government" under Company Name	2934
2	"MP", "Member of Parliament" or "Minister" under Role Name to Identify type (a) and (b)	504
3	Read the job description to identify type (c) and (d)	1557
Total Politicians		2061
4	Merge with board data to identify PID	1132
Total Former Politicians on Board		1783
Total Former Politicians as Independent Directors (PID)		1132

Table 1: Sample Distribution

The sample in this paper consists of 11480 firms and 63306 firm-year observations across 45 countries from 2000 to 2009. PID means a former politician serving as an independent director. Panel A of this table reports the distribution of firms and the percentage of PIDs across years. Panel B of this Table reports the distribution of firms and the percentage of PIDs across countries. Panel C of this table reports the distribution of firm-year observations and the percentage of PIDs across industries.

Panel A: Distribution of Sample by Years

Year	Total No.of firms	No.of firms with PID	Percent
2000	2848	159	5.58%
2001	3512	220	6.26%
2002	3746	247	6.59%
2003	5891	360	6.11%
2004	7191	426	5.92%
2005	8329	464	5.57%
2006	8815	496	5.63%
2007	9075	549	6.05%
2008	8754	546	6.24%
2009	5145	317	6.16%
Overall	63306	3784	5.98%

Panel B: Distribution of firms with Politicians on Board by Countries

	Total No. of Firms	No. of firms have politicians on Board	Percent	No. of firms have politicians as independent directors	Percent
Argentina	5	1	20.00%	0	0.00%
Australia	437	104	23.80%	84	19.22%
Austria	50	13	26.00%	5	10.00%
Belgium	92	21	22.83%	18	19.57%
Brazil	17	7	41.18%	2	11.76%
Canada	382	90	23.56%	79	20.68%
Chile	5	1	20.00%	0	0.00%
China	90	16	17.78%	18	20.00%
Cyprus	9	4	44.44%	4	44.44%
Denmark	31	7	22.58%	4	12.90%
Egypt	5	5	100.00%	2	40.00%
Finland	35	10	28.57%	11	31.43%
France	311	71	22.83%	52	16.72%
Germany	210	42	20.00%	2	0.95%
Greece	47	4	8.51%	1	2.13%
Hong Kong	42	3	7.14%	2	4.76%
Iceland	14	1	7.14%	0	0.00%
India	146	38	26.03%	29	19.86%
Ireland	88	25	28.41%	20	22.73%
Israel	91	31	34.07%	17	18.68%
Italy	119	43	36.13%	35	29.41%
Japan	28	3	10.71%	0	0.00%
Luxembourg	24	5	20.83%	5	20.83%
Malaysia	20	4	20.00%	3	15.00%
Mexico	13	0	0.00%	0	0.00%
Netherlands	118	43	36.44%	31	26.27%
New Zealand	8	1	12.50%	1	12.50%
Nigeria	5	2	40.00%	1	20.00%
Norway	101	28	27.72%	5	4.95%
New Guinea	5	2	40.00%	3	60.00%
Poland	19	4	21.05%	2	10.53%
Portugal	28	15	53.57%	11	39.29%
Puerto Rico	10	0	0.00%	0	0.00%
Russian	33	8	24.24%	5	15.15%
Singapore	16	4	25.00%	3	18.75%
South Africa	26	6	23.08%	6	23.08%
South Korea	5	1	20.00%	1	20.00%
Spain	76	38	50.00%	20	26.32%
Sweden	165	23	13.94%	10	6.06%
Switzerland	92	9	9.78%	6	6.52%
Taiwan	9	1	11.11%	1	11.11%
Turkey	12	3	25.00%	1	8.33%
UAE	8	0	0.00%	0	0.00%
UK	2673	232	8.68%	123	4.60%
United States	5760	403	7.00%	264	4.58%
Overall	11480	1372	11.95%	887	7.73%

Panel C: Distribution of Sample by Industry

Industry	No. of Observations	No. of Obsevs with PIDs	Percent
Gas, Water & Multiutilities	660	86	13.03%
Tobacco	131	17	12.98%
Aerospace & Defense	763	99	12.98%
Electricity	873	112	12.83%
Insurance	1668	195	11.69%
Telecommunications	968	113	11.67%
Construction	1664	169	10.16%
Industrial Transportation	1159	110	9.49%
Forestry & Paper	268	25	9.33%
Beverages	386	35	9.07%
Oil & Gas Producers	3482	292	8.39%
Mining	2459	205	8.34%
Chemicals	1171	91	7.77%
Media	2546	197	7.74%
Travel & Leisure	2401	180	7.50%
Food Producers	1357	99	7.30%
Banks	4690	323	6.89%
Leisure Goods	613	37	6.04%
Retailers	3313	193	5.83%
Automobiles & Parts	674	36	5.34%
Household Goods & Home Constr	1085	50	4.61%
Financial Services	2947	128	4.34%
Software & Computer Services	4256	184	4.32%
Support Services	3437	140	4.07%
General Industrials	1759	71	4.04%
Investments	3638	141	3.88%
Industrial Engineering	1839	67	3.64%
Pharmaceuticals & Biotechnolog	3152	106	3.36%
Electronic & Electrical Equipm	2190	70	3.20%
Technology Hardware & Equipmen	3739	105	2.81%
Health Care Equipment & Servic	2979	81	2.72%
Personal Goods	1039	27	2.60%
Overall	63306	3784	5.98%

Table 2: Summary Statistics and Correlation

Panel A of this table presents the summary statistics of all firm-year observations in our sample. PID equals to 1 if a firm has at least one former politician as its independent director, otherwise equals to 0. PI percent is the percentage of former politicians serving as independent directors in the firm's board, which equals to total number of former politicians serving as independent director/Board Size; Board Size is the total number of directors in a firm's board. Ipercent is the percentage of independent directors in a firm's board. ROA equals to net income/average total assets. AT growth is the asset growth rate. Leverage equals total debt/total assets. Tobin's Q is calculated as (total assets + market value of equity – book value of equity)/total assets. R&D is firm's research and development expenditure/Sales. Capex is the firm's capital expenditure/Sales. Cash is the cash and cash equivalent/total assets. Panel B of this table reports the correlation between each variable. p-value is reported in the parentheses.

Panel A: Summary Statistics

Variables (N=63306)	Mean	Stand Dev	Median
PID (dummy)	0.060	0.237	0.000
PI Percent	0.014	0.064	0.000
Board Size	9.967	4.749	9.000
Ipercent	0.475	0.254	0.500
ROA	0.009	0.147	0.040
AT Growth	0.141	0.345	0.070
Leverage	0.213	0.207	0.170
Tobin's Q	1.730	1.070	1.323
R&D	0.130	0.664	0.000
Capex	0.048	0.063	0.028
Cash	0.194	0.224	0.102
Total Assets (in Thousand USD)	7288.009	28420.761	548.311

Panel B: Correlation of Variables

	PID	PI Percent	Board Size	Ipercent	ROA	Total Assets	AT Growth	Leverage	Tobin's Q	R&D	Capex	Cash
PID	1											
PI Percent	0.831 (0.0000)	1										
Board Size	0.125 (0.0000)	0.039 (0.0000)	1									
Ipercent	0.087 (0.0000)	-0.033 (0.0000)	-0.085 (0.0000)	1								
ROA	0.055 (0.0000)	0.035 (0.0000)	0.189 (0.0000)	-0.013 (0.0015)	1							
Total Assets	0.143 (0.0000)	0.089 (0.0000)	0.367 (0.0000)	-0.020 (0.0000)	0.044 (0.0000)	1						
AT Growth	-0.001 (0.8573)	0.012 (0.0047)	-0.058 (0.0000)	-0.054 (0.0000)	0.183 (0.0000)	-0.014 (0.0006)	1					
Leverage	0.038 (0.0000)	0.026 (0.0000)	0.133 (0.0000)	-0.012 (0.0034)	0.025 (0.0000)	0.087 (0.0000)	-0.036 (0.0000)	1				
Tobin's Q	-0.038 (0.0000)	-0.027 (0.0000)	-0.101 (0.0000)	-0.009 (0.0446)	-0.094 (0.0000)	-0.116 (0.0000)	0.116 (0.0000)	-0.240 (0.0000)	1			
R&D	-0.029 (0.0000)	-0.023 (0.0000)	-0.086 (0.0000)	0.049 (0.0000)	-0.418 (0.0000)	-0.047 (0.0000)	-0.017 (0.0000)	-0.076 (0.0000)	0.241 (0.0000)	1		
Capex	0.031 (0.0000)	0.039 (0.0000)	-0.042 (0.0000)	-0.035 (0.0000)	0.078 (0.0000)	-0.081 (0.0000)	0.123 (0.0000)	0.133 (0.0000)	0.106 (0.0000)	-0.057 (0.0000)	1	
Cash	-0.059 (0.0000)	-0.041 (0.0000)	-0.181 (0.0000)	0.038 (0.0000)	-0.316 (0.0000)	-0.113 (0.0000)	0.073 (0.0000)	-0.386 (0.0000)	0.407 (0.0000)	0.395 (0.0000)	-0.172 (0.0000)	1

Table 3: Determinants of PID Appointments

Panel A of this table reports the logit regression results of the determinants of PID in the full sample. The dependent variable is equal to 1 if there is at least one former politician is appointed as independent director, otherwise 0. Panel B repeat the tests by using Non-US subsample. ‘Regulated’ equals to 1 if a firm is in a highly regulated industry, otherwise 0; ‘Common Law’ equals to 1 if a firm is from a common law country, otherwise 0; ‘Developed Country’ equals to 1 if a firm is from a developed country, otherwise 0; Anti-Self Dealing is the anti-self-dealing index built by DLLS (2006) to measure the country-level self dealing. The definitions of the remaining independent variables are the same as what I provide in Table 2. All the independent variables are lagged for 1 year. p-value is reported in the parentheses. ***, ** and * indicate 1%, 5% and 10% significant levels, respectively.

Panel A: Determinants of PID (Full Sample)

	PID (Dummy)					
	(1)	(2)	(3)	(4)	(5)	(6)
Constant	-3.4939*** (0.000)	-3.5479*** (0.000)	-3.1183*** (0.000)	-3.2546*** (0.000)	-3.0363*** (0.000)	-3.7305*** (0.000)
Regulated		0.0862*** (0.004)				0.0891*** (0.003)
Common Law			-0.5042*** (0.000)			-0.9170*** (0.000)
Anti-Self Dealing				-0.2554*** (0.000)		0.2183 (0.232)
Developed Country					-0.5138*** (0.000)	-0.2710*** (0.000)
Ipercent	1.1265*** (0.000)	1.1058*** (0.000)	1.4815*** (0.000)	1.1452*** (0.000)	1.1911*** (0.000)	1.6117*** (0.000)
Boardsize	0.1023*** (0.000)	0.1005*** (0.000)	0.1812*** (0.000)	0.0906*** (0.001)	0.1358*** (0.000)	0.3281*** (0.000)
Size (log)	0.1924*** (0.000)	0.1923*** (0.000)	0.1613*** (0.000)	0.1878*** (0.000)	0.1886*** (0.000)	0.1501*** (0.000)
Leverage	-0.2551*** (0.000)	-0.2406*** (0.000)	-0.2566*** (0.000)	-0.2570*** (0.000)	-0.2397*** (0.000)	-0.2047*** (0.001)
ROA	0.0002 (0.828)	0.0002 (0.853)	0.0001 (0.936)	0.0002 (0.840)	-0.0002 (0.825)	-0.0004 (0.694)
Tobin's Q	-0.0098 (0.473)	-0.0080 (0.556)	0.0009 (0.947)	-0.0068 (0.619)	-0.0186 (0.173)	0.0030 (0.821)
R&D	0.0245 (0.381)	0.0220 (0.432)	0.0123 (0.663)	0.0227 (0.418)	0.0246 (0.379)	0.0054 (0.849)
Capex	1.1592*** (0.000)	1.1401*** (0.000)	1.1695*** (0.000)	1.0698*** (0.000)	1.0720*** (0.000)	1.1522*** (0.000)
Year Fixed Effect	Yes	Yes	Yes	Yes	Yes	Yes
Industry Fixed Effect	Yes	Yes	Yes	Yes	Yes	Yes
Country Fixed Effect	Yes	Yes	Yes	Yes	Yes	Yes
R Square	0.128	0.129	0.144	0.128	0.133	0.154
Observations	47,167	46,371	47,167	46,974	47,167	46,178

Panel B: Determinants of PID (Non-US Sample)

	(1)	(2)	(3)	(4)	(5)	(6)
Constant	-3.6467*** (0.000)	-3.6073*** (0.000)	-3.4552*** (0.000)	-3.3257*** (0.000)	-3.3464*** (0.000)	-3.0214*** (0.000)
Regulated		0.0827** (0.042)				0.0838** (0.042)
Common Law			-0.1302*** (0.000)			-0.0300 (0.651)
Anti-Self Dealing				-0.2384*** (0.000)		-0.1932* (0.093)
Developed Country					-0.3044*** (0.000)	-0.2794*** (0.000)
Ipercent	1.9821*** (0.000)	2.0482*** (0.000)	2.0426*** (0.000)	2.0011*** (0.000)	2.0071*** (0.000)	2.0947*** (0.000)
Boardsize	0.5939*** (0.000)	0.5783*** (0.000)	0.5639*** (0.000)	0.5612*** (0.000)	0.6000*** (0.000)	0.5502*** (0.000)
Size (log)	0.1274*** (0.000)	0.1173*** (0.000)	0.1221*** (0.000)	0.1200*** (0.000)	0.1276*** (0.000)	0.1099*** (0.000)
Leverage	-0.0341 (0.680)	-0.0594 (0.475)	-0.0461 (0.578)	-0.0401 (0.630)	-0.0222 (0.788)	-0.0537 (0.520)
ROA	-0.0019 (0.196)	-0.0016 (0.270)	-0.0021 (0.160)	-0.0021 (0.158)	-0.0024 (0.108)	-0.0022 (0.132)
Tobin's Q	0.0240 (0.195)	0.0171 (0.358)	0.0260 (0.160)	0.0278 (0.133)	0.0128 (0.494)	0.0113 (0.548)
R&D	0.0480 (0.186)	0.0382 (0.298)	0.0465 (0.202)	0.0452 (0.214)	0.0530 (0.142)	0.0400 (0.274)
Capex	0.6478 (0.112)	0.5006 (0.153)	0.6462 (0.212)	0.4659 (0.176)	0.5394 (0.138)	0.2259 (0.400)
Year Fixed Effect	Yes	Yes	Yes	Yes	Yes	Yes
Industry Fixed Effect	Yes	Yes	Yes	Yes	Yes	Yes
Country Fixed Effect	Yes	Yes	Yes	Yes	Yes	Yes
R Square	0.214	0.219	0.216	0.215	0.217	0.221
Observations	21,339	20,543	21,339	21,146	21,339	20,350

Table 4: Effects of PID on Firm's Performance

Panel A of this table presents the effects of PID on firm's performance using the full sample. Panel B of this table presents the effects of PID on firm's performance using Non-US subsample. The dependent variables are ROA_{t+1} and Tobin's Q_{t+1} , respectively. PID equals to 1 if a firm has at least one former politician as its independent director, otherwise equals to 0. PI percent is the percentage of former politicians serving as independent directors in the firm's board, which equals to total number of former politicians serving as independent director/Board Size; The definitions of the independent variables are the same as what I provide in Table 2. p-value is reported in the parentheses. ***, ** and * indicate 1%, 5% and 10% significant levels, respectively.

Panel A: Effects of PID on Firm's Performance (Full Sample)

	ROA _{t+1}				Tobin's Q _{t+1}			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Constant	-0.0971 (1.000)	-0.1492*** (0.002)	-0.0597 (1.000)	-0.0604 (0.431)	1.2136 (0.996)	0.4338*** (0.009)	1.1572*** (0.000)	0.0798 (0.839)
PID (dummy)	-0.0114*** (0.000)	-0.0106*** (0.000)			-0.0507*** (0.010)	-0.0517*** (0.008)		
PI Percent			-0.0327*** (0.001)	-0.0288*** (0.003)			-0.2216*** (0.004)	-0.2271*** (0.003)
Ipercent	0.0037 (0.264)	0.0051 (0.160)	-0.0261*** (0.000)	-0.0257*** (0.000)	0.0499* (0.055)	0.1146*** (0.000)	0.0307 (0.336)	0.1250*** (0.000)
Boardsize	-0.0064*** (0.000)	-0.0064*** (0.000)	-0.0080*** (0.001)	-0.0067*** (0.005)	0.3672*** (0.000)	0.2980*** (0.000)	0.3933*** (0.000)	0.3290*** (0.000)
Size (log)	0.0251*** (0.000)	0.0260*** (0.000)	0.0235*** (0.000)	0.0245*** (0.000)	-0.0841*** (0.000)	-0.0632*** (0.000)	-0.0800*** (0.000)	-0.0598*** (0.000)
Leverage	-0.1298*** (0.000)	-0.1338*** (0.000)	-0.1273*** (0.000)	-0.1299*** (0.000)	-0.5306*** (0.000)	-0.4562*** (0.000)	-0.5213*** (0.000)	-0.4473*** (0.000)
R&D	-0.0828*** (0.000)	-0.0737*** (0.000)	-0.0831*** (0.000)	-0.0734*** (0.000)	0.1229*** (0.000)	0.0768*** (0.000)	0.1093*** (0.000)	0.0635*** (0.000)
Cash	-0.0979*** (0.000)	-0.0659*** (0.000)	-0.1019*** (0.000)	-0.0645*** (0.000)	1.5198*** (0.000)	1.3599*** (0.000)	1.5862*** (0.000)	1.4077*** (0.000)
Capex	-0.0027 (0.821)	0.0265** (0.044)	0.0090 (0.454)	0.0345* (0.012)	1.4704*** (0.000)	1.5808*** (0.000)	1.4857*** (0.000)	1.6378*** (0.000)
AT Growth	0.1144*** (0.000)	0.1146*** (0.000)	0.1156*** (0.000)	0.1157*** (0.000)	0.2284*** (0.000)	0.2023*** (0.000)	0.2155*** (0.000)	0.1892*** (0.000)
Year Fixed Effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry Fixed Effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country Fixed Effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
R-squared	0.356	0.381	0.365	0.392	0.236	0.264	0.239	0.266
Observations	50,566	49,734	44,902	44,079	35,429	34,811	31,693	31,080

Panel B: Effects of PID on Firm's Performance (Non-US Sample)

	ROA				Tobin's Q			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Constant	-0.1059 (1.000)	-0.0633** (0.015)	-0.0570 (1.000)	-0.1897** (0.015)	0.5153*** (0.000)	-0.1163 (1.000)	1.3400*** (0.000)	0.2374 (0.376)
PID (dummy)	-0.0171*** (0.000)	-0.0151*** (0.000)			-0.0340 (0.161)	-0.0550** (0.023)		
PI Percent			-0.0369*** (0.001)	-0.0317*** (0.003)			-0.1626** (0.048)	-0.1912** (0.020)
Ipercent	0.0196*** (0.000)	0.0204*** (0.000)	-0.0152*** (0.005)	-0.0135** (0.031)	0.1403*** (0.000)	0.2384*** (0.000)	0.0700 (0.110)	0.2225*** (0.000)
Boardsize	-0.0126*** (0.000)	-0.0140*** (0.000)	-0.0099*** (0.004)	-0.0080** (0.023)	0.3048*** (0.000)	0.1983*** (0.000)	0.3549*** (0.000)	0.2396*** (0.000)
Size (log)	0.0260*** (0.000)	0.0278*** (0.000)	0.0235*** (0.000)	0.0251*** (0.000)	-0.0975*** (0.000)	-0.0723*** (0.000)	-0.0887*** (0.000)	-0.0633*** (0.000)
Leverage	-0.1237*** (0.000)	-0.1388*** (0.000)	-0.1169*** (0.000)	-0.1306*** (0.000)	-0.4193*** (0.000)	-0.4043*** (0.000)	-0.3504*** (0.000)	-0.3290*** (0.000)
R&D	-0.0785*** (0.000)	-0.0748*** (0.000)	-0.0799*** (0.000)	-0.0760*** (0.000)	0.1589*** (0.000)	0.0987*** (0.000)	0.1269*** (0.000)	0.0624** (0.020)
Cash	-0.0658*** (0.000)	-0.0533*** (0.000)	-0.0637*** (0.000)	-0.0465*** (0.000)	1.3413*** (0.000)	1.2329*** (0.000)	1.4464*** (0.000)	1.3089*** (0.000)
Capex	-0.0140 (0.437)	0.0365* (0.063)	0.0099 (0.614)	0.0601*** (0.006)	1.6143*** (0.000)	1.4404*** (0.000)	1.6393*** (0.000)	1.5130*** (0.000)
AT Growth	0.1075*** (0.000)	0.1103*** (0.000)	0.1048*** (0.000)	0.1076*** (0.000)	0.1557*** (0.000)	0.1423*** (0.000)	0.0990*** (0.000)	0.0889*** (0.002)
Year Fixed Effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry Fixed Effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country Fixed Effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
R-squared	0.328	0.354	0.328	0.358	0.217	0.268	0.219	0.272
Observations	23,648	22,816	18,195	17,372	16,350	15,732	12,688	12,075

Table 5: 2-Stage Regressions

This table presents the 2-stage regression results in help to mitigate the endogeneity concerns. In stage 1, the dependent variable PI percent is the percentage of former politicians serving as independent directors in the firm's board, which equals to total number of former politicians serving as independent director/Board Size. The Instrument Variable is the industry median of PI Percent. In the second stage, the dependent variables are ROA_{t+1} and Tobin's Q_{t+1} , respectively. PI Percent_Predicted is the valued of PI Percent predicted from stage 1. The definitions of other independent variables are the same as what I provide in Table 2. p-value is reported in the parentheses. ***, ** and * indicate 1%, 5% and 10% significant levels, respectively.

DV	Stage 1 PI Percent	Stage 2 ROA_{t+1}	Stage 1 PI Percent	Stage 2 ROA_{t+1}	Stage 1 PI Percent	Stage 2 Tobin's Q_{t+1}	Stage 1 PI Percent	Stage 2 Tobin's Q_{t+1}
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Constant	0.0119 (0.113)	-0.0964*** (0.005)	0.0014 (1.000)	-0.1649*** (0.000)	0.0119 (0.113)	0.8680*** (0.000)	0.0014 (1.000)	0.7225*** (0.000)
Industry PI Percent (instrument)	0.8999*** (0.000)		0.8957*** (0.000)		0.8999*** (0.000)		0.8957*** (0.000)	
PI Percent_Predicted		-0.0267* (0.075)		-0.0122 (0.403)		-0.4410** (0.011)		-0.5835*** (0.001)
Ipercent	0.0014 (0.428)	-0.0261*** (0.000)	0.0021 (0.282)	-0.0258*** (0.000)	0.0014 (0.428)	0.0316 (0.322)	0.0021 (0.282)	0.1272*** (0.000)
Boardsize	0.0002 (0.863)	-0.0080*** (0.001)	-0.0005 (0.738)	-0.0067*** (0.005)	0.0002 (0.863)	0.3941*** (0.000)	-0.0005 (0.738)	0.3298*** (0.000)
Size(log)	0.0018*** (0.000)	0.0235*** (0.000)	0.0019*** (0.000)	0.0245*** (0.000)	0.0018*** (0.000)	-0.0794*** (0.000)	0.0019*** (0.000)	-0.0589*** (0.000)
Leverage	-0.0032** (0.014)	-0.1273*** (0.000)	-0.0023* (0.099)	-0.1299*** (0.000)	-0.0032** (0.014)	-0.5224*** (0.000)	-0.0023* (0.099)	-0.4486*** (0.000)
R&D	-0.0001 (0.664)	-0.0831*** (0.000)	0.0002 (0.673)	-0.0734*** (0.000)	-0.0001 (0.664)	0.1092*** (0.000)	0.0002 (0.673)	0.0636*** (0.000)
Cash	0.0039*** (0.004)	-0.1019*** (0.000)	0.0058*** (0.000)	-0.0646*** (0.000)	0.0039*** (0.004)	1.5869*** (0.000)	0.0058*** (0.000)	1.4105*** (0.000)
Capex	0.0168*** (0.001)	0.0089 (0.460)	0.0100* (0.076)	0.0344** (0.012)	0.0168*** (0.001)	1.4900*** (0.000)	0.0100* (0.076)	1.6403*** (0.000)
AT Growth	-0.0003	0.1156***	-0.0010	0.1157***	-0.0003	0.2153***	-0.0010	0.1886***

	(0.747)	(0.000)	(0.314)	(0.000)	(0.747)	(0.000)	(0.314)	(0.000)
Year Fixed Effect	No	No	Yes	Yes	No	No	Yes	Yes
Industry Fixed Effect	No	No	Yes	Yes	No	No	Yes	Yes
Country Fixed Effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
R-squared	0.257	0.365	0.264	0.391	0.257	0.239	0.264	0.265
Observations	44,924	44,902	44,101	44,079	44,924	31,693	44,101	31,080

Table 6: Effects of PID on Firm's Performance in Regulated Industries

This table presents the effects of PID on firm's performance in regulated industries. The dependent variables are ROA_{t+1} and Tobin's Q_{t+1} , respectively. PID equals to 1 if a firm has at least one former politician as its independent director, otherwise equals to 0. 'Regulated' equals to 1 if a firm is in a highly regulated industry, otherwise 0; The definitions of the independent variables are the same as what I provide in Table 2. p-value is reported in the parentheses. ***, ** and * indicate 1%, 5% and 10% significant levels, respectively.

	Full Sample		Non-US Sample	
	ROA_{t+1} (1)	Tobin's Q_{t+1} (2)	ROA_{t+1} (3)	Tobin's Q_{t+1} (4)
Constant	0.0783*** (0.000)	1.6551*** (0.000)	-0.0928*** (0.000)	1.4217*** (0.000)
PID	-0.0080** (0.010)	0.0024 (0.934)	-0.0173*** (0.000)	0.0229 (0.549)
PID*Regulated	-0.0083** (0.047)	-0.1340*** (0.000)	-0.0022* (0.062)	-0.1260*** (0.006)
Regulated	-0.0072*** (0.000)	0.0134 (0.214)	-0.0132*** (0.000)	-0.0346** (0.027)
Ipercent	0.0041 (0.262)	0.1402*** (0.000)	0.0228*** (0.000)	0.2715*** (0.000)
Boardsize	-0.0070*** (0.000)	0.3314*** (0.000)	-0.0144*** (0.000)	0.2153*** (0.000)
Size (log)	0.0259*** (0.000)	-0.0773*** (0.000)	0.0274*** (0.000)	-0.0658*** (0.000)
Leverage	-0.1292*** (0.000)	-0.5733*** (0.000)	-0.1274*** (0.000)	-0.5196*** (0.000)
R&D	-0.0818*** (0.000)	0.1210*** (0.000)	-0.0768*** (0.000)	0.1706*** (0.000)
Cash	-0.0991*** (0.000)	1.4929*** (0.000)	-0.0695*** (0.000)	1.3022*** (0.000)
Capex	-0.0012 (0.916)	1.3917*** (0.000)	-0.0176 (0.336)	1.6906*** (0.000)
AT Growth	0.1125*** (0.000)	0.2076*** (0.000)	0.1080*** (0.000)	0.1662*** (0.000)
Year Fixed Effect	Yes	Yes	Yes	Yes
Industry Fixed Effect	Yes	Yes	Yes	Yes
Country Fixed Effect	Yes	Yes	Yes	Yes
R-squared	0.361	0.239	0.337	0.190
Observations	49,640	34,811	22,763	15,732

Table 7: Effects of PID on Firm's Performance in Different Environments

This table presents the effects of PID on firm's performance in different country level legal and governance environments. The dependent variables are ROA_{t+1} and Tobin's Q_{t+1} , respectively. PID equals to 1 if a firm has at least one former politician as its independent director, otherwise equals to 0. "Common Law" equals to 1 if a firm is from a common law country, otherwise 0; Anti-Self Dealing is the anti-self-dealing index built by DLLS (2006) to measure the country-level self dealing. The definitions of the independent variables are the same as what I provide in Table 2. p-value is reported in the parentheses. ***, ** and * indicate 1%, 5% and 10% significant levels, respectively.

	Full Sample				Non-US Sample			
	ROA_{t+1} (1)	ROA_{t+1} (2)	Q_{t+1} (3)	Q_{t+1} (4)	ROA_{t+1} (5)	ROA_{t+1} (6)	Q_{t+1} (7)	Q_{t+1} (8)
Constant	-0.1259*** (0.000)	-0.1144*** (0.000)	0.5397*** (0.000)	-0.6242 (0.108)	-0.2300*** (0.000)	-0.1452** (0.043)	0.3649 (0.434)	-0.0243 (0.790)
PID	-0.0277*** (0.000)	-0.0483*** (0.000)	-0.1534*** (0.000)	-0.1614*** (0.005)	-0.0298*** (0.000)	-0.0509*** (0.000)	-0.1685*** (0.000)	-0.1720*** (0.002)
PID*Common Law	0.0268*** (0.000)		0.1488*** (0.000)		0.0312*** (0.000)		0.2423*** (0.000)	
PID*Anti-Self Dealing		0.0601*** (0.000)		0.1779* (0.052)		0.0587*** (0.000)		0.2148** (0.017)
Common Law	-0.0138*** (0.000)		0.0367** (0.013)		-0.0164*** (0.000)		-0.0651*** (0.001)	
Anti-Self Dealing		0.0930 (0.309)		3.5005*** (0.000)		0.0955 (0.297)		3.6582*** (0.000)
Ipercent	0.0104*** (0.002)	0.0052 (0.154)	0.2042*** (0.000)	0.1143*** (0.000)	0.0286*** (0.000)	0.0207*** (0.000)	0.2780*** (0.000)	0.1599*** (0.000)
Boardsize	-0.0071*** (0.000)	-0.0065*** (0.000)	0.3090*** (0.000)	0.2985*** (0.000)	-0.0141*** (0.000)	-0.0142*** (0.000)	0.1676*** (0.000)	0.2618*** (0.000)
Size (log)	0.0260*** (0.000)	0.0260*** (0.000)	-0.0571*** (0.000)	-0.0635*** (0.000)	0.0273*** (0.000)	0.0278*** (0.000)	-0.0587*** (0.000)	-0.0903*** (0.000)
Leverage	-0.1337*** (0.000)	-0.1337*** (0.000)	-0.4554*** (0.000)	-0.4553*** (0.000)	-0.1384*** (0.000)	-0.1386*** (0.000)	-0.4267*** (0.000)	-0.4251*** (0.000)
R&D	-0.0742*** (0.000)	-0.0737*** (0.000)	0.0738*** (0.000)	0.0768*** (0.000)	-0.0760*** (0.000)	-0.0747*** (0.000)	0.0946*** (0.000)	0.1629*** (0.000)
Cash	-0.0649*** (0.000)	-0.0658*** (0.000)	1.3794*** (0.000)	1.3609*** (0.000)	-0.0509*** (0.000)	-0.0533*** (0.000)	1.2395*** (0.000)	1.3395*** (0.000)
Capex	0.0350*** (0.008)	0.0257* (0.053)	1.6744*** (0.000)	1.5890*** (0.000)	0.0530*** (0.006)	0.0353* (0.074)	1.6656*** (0.000)	1.5981*** (0.000)
AT Growth	0.1162*** (0.000)	0.1145*** (0.000)	0.2138*** (0.000)	0.2025*** (0.000)	0.1131*** (0.000)	0.1102*** (0.000)	0.1648*** (0.000)	0.1420*** (0.000)
Year Fixed Effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry Fixed Effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country Fixed Effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
R-squared	0.376	0.381	0.248	0.263	0.344	0.354	0.232	0.233
Observations	49,734	49,581	34,811	34,705	22,816	22,663	15,732	16,244

Table 8: Effects of PID on Firm's Performance in Different Industries and Environments

This table presents the effects of country level legal and governance environments on the change of performance of regulated firms with former politicians serving independent directors. The dependent variables are ROA_{t+1} and Tobin's Q_{t+1} , respectively. PID equals to 1 if a firm has at least one former politician as its independent director, otherwise equals to 0. "Common Law" equals to 1 if a firm is from a common law country, otherwise 0; Anti-Self Dealing is the anti-self-dealing index built by DLLS (2006) to measure the country-level self dealing. The definitions of the independent variables are the same as what I provide in Table 2. p-value is reported in the parentheses. ***, ** and * indicate 1%, 5% and 10% significant levels, respectively.

	Full Sample				Non-US Sample			
	ROA_{t+1} (1)	ROA_{t+1} (2)	Q_{t+1} (3)	Q_{t+1} (4)	ROA_{t+1} (5)	ROA_{t+1} (6)	Q_{t+1} (7)	Q_{t+1} (8)
Constant	-0.0894*** (0.000)	-0.0823*** (0.000)	0.9629*** (0.000)	1.2804*** (0.000)	-0.0891*** (0.000)	-0.0670*** (0.000)	1.5051*** (0.000)	1.4331*** (0.000)
PID	-0.0052* (0.090)	-0.0035 (0.256)	-0.0110 (0.703)	-0.0166 (0.565)	-0.0131*** (0.000)	-0.0127*** (0.001)	0.0327 (0.383)	0.0363 (0.335)
PID*Regulated*Common Law	0.0201*** (0.000)		0.1964*** (0.000)		0.0221*** (0.000)		0.2753*** (0.000)	
PID*Regulated*Anti-Self Dealing		0.0373** (0.008)		0.3274*** (0.000)		0.0421*** (0.003)		0.3544*** (0.000)
PID*Regulated	-0.0273*** (0.000)	-0.0370*** (0.000)	-0.2539*** (0.000)	-0.3256*** (0.000)	-0.0234*** (0.000)	-0.0378*** (0.000)	-0.2958*** (0.000)	-0.3713*** (0.000)
Common Law	-0.0117** (0.000)		0.0426*** (0.003)		-0.0163*** (0.000)		-0.0669*** (0.000)	
Anti-Self Dealing		-0.0164*** (0.000)		-0.1075*** (0.000)		-0.0253*** (0.000)		-0.2099*** (0.000)
Ipercent	0.0079** (0.018)	0.0019 (0.542)	0.2501*** (0.000)	0.2862*** (0.000)	0.0290*** (0.000)	0.0264*** (0.000)	0.3064*** (0.000)	0.3274*** (0.000)
Boardsize	-0.0074*** (0.000)	-0.0094*** (0.000)	0.3589*** (0.000)	0.3536*** (0.000)	-0.0140*** (0.000)	-0.0144*** (0.000)	0.2029*** (0.000)	0.1828*** (0.000)
Size (log)	0.0256*** (0.000)	0.0259*** (0.000)	-0.0713*** (0.000)	-0.0760*** (0.000)	0.0262*** (0.000)	0.0263*** (0.000)	-0.0709*** (0.000)	-0.0753*** (0.000)
Leverage	-0.1310*** (0.000)	-0.1314*** (0.000)	-0.5648*** (0.000)	-0.5642*** (0.000)	-0.1283*** (0.000)	-0.1272*** (0.000)	-0.5304*** (0.000)	-0.5302*** (0.000)
R&D	-0.0828*** (0.000)	-0.0828*** (0.000)	0.1234*** (0.000)	0.1228*** (0.000)	-0.0788*** (0.000)	-0.0790*** (0.000)	0.1692*** (0.000)	0.1684*** (0.000)
Cash	-0.0983*** (0.000)	-0.0989*** (0.000)	1.5201*** (0.000)	1.5114*** (0.000)	-0.0691*** (0.000)	-0.0679*** (0.000)	1.2830*** (0.000)	1.2757*** (0.000)
Capex	0.0019 (0.872)	0.0004 (0.972)	1.5114*** (0.000)	1.5136*** (0.000)	-0.0105 (0.554)	-0.0148 (0.410)	1.6742*** (0.000)	1.6765*** (0.000)
AT Growth	0.1135*** (0.000)	0.1134*** (0.000)	0.2193*** (0.000)	0.2265*** (0.000)	0.1100*** (0.000)	0.1096*** (0.000)	0.1688*** (0.000)	0.1737*** (0.000)
Year Fixed Effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry Fixed Effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country Fixed Effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
R-squared	0.356	0.356	0.222	0.222	0.326	0.326	0.190	0.192
Observations	49,640	49,487	34,811	34,705	22,763	22,610	15,732	15,626

Table 9: Change of Performance in Different Environments – Subsample Analyses

I separate the sample into 2 subsamples according to the regulated industries. ‘Regulated’ means a firm is in a highly regulated industry. This table presents the subsample analyses of the effects of country level legal and governance environments on the change of performance of regulated firms with former politicians serving independent directors. The dependent variables are ROA_{t+1} and Tobin’s Q_{t+1} , respectively. PID equals to 1 if a firm has at least one former politician as its independent director, otherwise equals to 0. ‘Common Law’ equals to 1 if a firm is from a common law country, otherwise 0; Anti-Self Dealing is the anti-self-dealing index built by DLLS (2006) to measure the country-level self dealing. The definitions of the independent variables are the same as what I provide in Table 2. p-value is reported in the parentheses. ***, ** and * indicate 1%, 5% and 10% significant levels, respectively.

	Regulated			Not Regulated			Regulated			Not Regulated		
	ROA_{t+1} (1)	ROA_{t+1} (2)	ROA_{t+1} (3)	ROA_{t+1} (4)	ROA_{t+1} (5)	ROA_{t+1} (6)	Q_{t+1} (7)	Q_{t+1} (8)	Q_{t+1} (9)	Q_{t+1} (10)	Q_{t+1} (11)	Q_{t+1} (12)
Constant	-0.0709*** (0.000)	-0.0642*** (0.000)	-0.0523*** (0.000)	-0.1198*** (0.000)	-0.1088*** (0.000)	-0.0876*** (0.000)	1.1914*** (0.000)	1.2178*** (0.000)	1.4075*** (0.000)	0.9567*** (0.000)	0.9082*** (0.000)	0.9250*** (0.000)
PID	-0.0144*** (0.000)	-0.0291*** (0.000)	-0.0399*** (0.000)	-0.0058* (0.061)	-0.0096*** (0.000)	-0.0571*** (0.000)	-0.1297*** (0.000)	-0.2912*** (0.000)	-0.4369*** (0.000)	-0.0247 (0.405)	-0.0789* (0.083)	-0.2494*** (0.008)
PID*Common Law		0.0318*** (0.000)			0.0199* (0.072)			0.2325*** (0.000)			0.1020* (0.079)	
PID*Anti-Self Dealing			0.0830*** (0.000)			0.0405*** (0.000)			0.4917*** (0.000)			0.3726** (0.013)
Common Law		-0.0081*** (0.001)			-0.0156*** (0.000)			-0.0325 (0.170)			0.0781*** (0.000)	
Anti-Self Dealing			-0.0142*** (0.007)			-0.0199*** (0.000)			-0.3467*** (0.000)			0.0265 (0.469)
Ipercent	0.0036 (0.437)	0.0076 (0.136)	0.0040 (0.390)	0.0010 (0.803)	0.0104** (0.020)	0.0020 (0.619)	0.3949*** (0.000)	0.4097*** (0.000)	0.4087*** (0.000)	0.1966*** (0.000)	0.1398*** (0.000)	0.1919*** (0.000)
Boardsize	-0.0100*** (0.000)	-0.0098*** (0.000)	-0.0111*** (0.000)	-0.0077*** (0.001)	-0.0066*** (0.003)	-0.0092*** (0.000)	0.4093*** (0.000)	0.4091*** (0.000)	0.3771*** (0.000)	0.3206*** (0.000)	0.3089*** (0.000)	0.3233*** (0.000)
Size (log)	0.0262*** (0.000)	0.0259*** (0.000)	0.0260*** (0.000)	0.0259*** (0.000)	0.0253*** (0.000)	0.0256*** (0.000)	-0.1029*** (0.000)	-0.1034*** (0.000)	-0.1082*** (0.000)	-0.0506*** (0.000)	-0.0452*** (0.000)	-0.0493*** (0.000)

Leverage	-0.1247*** (0.000)	-0.1241*** (0.000)	-0.1247*** (0.000)	-0.1335*** (0.000)	-0.1336*** (0.000)	-0.1336*** (0.000)	-0.5350*** (0.000)	-0.5354*** (0.000)	-0.5476*** (0.000)	-0.6106*** (0.000)	-0.6091*** (0.000)	-0.6095*** (0.000)
R&D	-0.0723*** (0.000)	-0.0724*** (0.000)	-0.0724*** (0.000)	-0.1079*** (0.000)	-0.1078*** (0.000)	-0.1079*** (0.000)	0.0973*** (0.000)	0.0975*** (0.000)	0.0957*** (0.000)	0.2045*** (0.000)	0.2030*** (0.000)	0.2038*** (0.000)
Cash	-0.1526*** (0.000)	-0.1530*** (0.000)	-0.1535*** (0.000)	-0.0487*** (0.000)	-0.0493*** (0.000)	-0.0503*** (0.000)	1.4086*** (0.000)	1.4080*** (0.000)	1.3919*** (0.000)	1.5741*** (0.000)	1.5813*** (0.000)	1.5782*** (0.000)
Capex	-0.0770*** (0.000)	-0.0775*** (0.000)	-0.0790*** (0.000)	0.1131*** (0.000)	0.1122*** (0.000)	0.1113*** (0.000)	1.2575*** (0.000)	1.2554*** (0.000)	1.2207*** (0.000)	1.6923*** (0.000)	1.6831*** (0.000)	1.7014*** (0.000)
AT Growth	0.0876*** (0.000)	0.0879*** (0.000)	0.0879*** (0.000)	0.1364*** (0.000)	0.1368*** (0.000)	0.1369*** (0.000)	0.1628*** (0.000)	0.1626*** (0.000)	0.1748*** (0.000)	0.2760*** (0.000)	0.2714*** (0.000)	0.2744*** (0.000)
Year Fixed Effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry Fixed Effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country Fixed Effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
R-squared	0.448	0.448	0.448	0.286	0.287	0.287	0.262	0.263	0.265	0.196	0.197	0.197
Observations	20,777	20,777	20,706	28,863	28,863	28,781	14,531	14,531	14,479	20,280	20,280	20,226