Top Executive Turnover in Japanese Non-listed Firms: Causes and Consequences[1]

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Abstract

We examine the pattern of top executive turnover among small non-listed businesses in Japan using a unique panel data set of about 25,000 firms for 2001-2007 and find the following. First, the likelihood of a change in top executive among non-listed firms is independent of their ex-ante performance, especially when the firms are owned by the top executives themselves or by their relatives. Second, non-listed firms which experienced a top executive turnover saw an improvement in ex-post performance relative to firms without turnover. The extent of the improvement is similar between non-listed firms and listed firms. All of the above results indicate that underperforming non-listed firms do not face disciplinary pressure to replace their executive, but that once new top executives are in place, they exert high managerial effort and thus significantly improve their firm's profitability.

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1. Introduction

One of the worrying trends for Japan's economy is that, for many years now, the number of firms exiting the market has been considerably greater than the number of firms entering. As a result, the total number of firms in Japan has dropped sharply in the past two decades: from 5.35 million in 1986 to 4.21 million in 2006. Most of the decline can be attributed to the small and medium enterprise (SME) sector, where the number of firms has declined from 5.33 million in 1986 to 4.20 million in 2006.

One of the primary reasons for the shrinking population of SMEs is thought to be difficulties in attaining a smooth transition in management or a smooth transfer of the business from aging managers to their successors. The Small and Medium Enterprise Agency (2006) estimated that a quarter of all firm exits are explained by the failure to find a new top executive. In order to slow down the decline in the firm population, policy responses by the government have included a reduction in the inheritance tax for stocks held by owner-managers. This policy is designed to facilitate the process of top executive turnover among small businesses.

An important question in this context, however, is whether present patterns of top executive turnover in Japan's SME sector are efficient. If poor performance is not punished by the replacement of firms' top management or if the profitability of firms with new top executives does not improve, the government's policies to promote smooth managerial transition may be misguided. Against this background, the purpose of this paper is to examine the determinants of top executive turnovers and their effectiveness in improving the ex-post performance of firms, focusing on small businesses in Japan. Many of the previous studies on the determinants of top executive turnover, including Kaplan and Minton (1994), Kang and Shivdasani (1995), and Denis, Denis, and Sarin (1997), find that underperforming firms are more likely to replace their top executives than well-performing firms. They also find that ownership structures affect the turnover sensitivity to firm performance. However, the focus of these studies is limited to large listed firms and does not cover small businesses. Another strand of literature, which includes Huson, Malatesta, and Parrino (2004), Bennendsen el al. (2007), and Perez-Gonzalez (2006), focuses on the ex-post performance of firms that experienced managerial turnovers. However, their analyses are again either limited to large public firms (Huson et al. (2004)) or to a comparison between types of management turnover rather than a comparison between firms that experienced management turnover and those that did not (Bennendsen et al. (2007) and Perez-Gonzalez (2006)).

Our study therefore represents the first attempt to comprehensively examine the causes and consequences of managerial turnover among small privately-held business and compare the results with those for large public firms. Top executive turnovers among small non-listed firms are expected to be quite different from those among large listed firms in the way turnovers are

determined and the way they affect firms' performance. First, most small non-listed firms are run by owner-managers, while only a small minority of large listed firms are owned by their managers. When there is an effective external control threat by outside shareholders, this threat is likely to raise the probability that poorly performing top executives are replaced by other, more competent executives. However, managerial ownership reduces the relative importance of outside shareholders, insulates firms from such external controls, and eventually allows inefficient incumbent executives to stay in the firm. Managerial ownership may also result in insufficient performance improvements since it constrains the choice of succeeding managers to a limited pool of managerial talent.

Second, the shares of small privately-held firms are illiquid since they are not listed on the stock market and some of the external control mechanisms which require frequent market transactions are not applicable. For example, non-listed firms rarely face a threat of takeover which might lead directors to take disciplinary action, including the replacement of managers. Note, however, that certain other control mechanisms are still effective for non-listed firms, such as controls by the banks that extend loans to such firms. As suggested by Diamond (1984) in his theoretical model, banks are able to engage in monitoring activities as a delegated monitor and exert external controls over borrowing firms, including the replacement of incumbent managers.

Employing a unique panel data set of about 25,000 small non-listed firms for 2001-2007 as well as a panel data set of about 2,200 large listed firms for the same period, this paper provides two strands of analysis. First, we examine the determinants of top executive turnover, including firm characteristics, executive characteristics, managerial ownership, and bank-firm relationships. Second, we examine the ex-post performance of firms that experienced top executive turnover in comparison with that of firms that did not experience such turnover. We compare these two groups of firms using a matching estimation method.

We find that the likelihood of a change in top executives among non-listed firms is independent of their ex-ante performance, especially in the case of firms that are owned by top executives themselves or by their relatives. This contrasts with the finding that the management turnover likelihood among listed firms is negatively associated with their performance. We also find that non-listed firms that experienced a top executive turnover subsequently performed better than firms with no turnover. Moreover, the extent of performance improvements following managerial replacements is similar for small non-listed firms and large listed firms. All of the above indicate that non-listed firms, most of which are operated by owner-managers, do not experience disciplinary executive turnovers when they underperform. This is in sharp contrast with listed firms, which face a significant increase in the likelihood of management replacement when they underperform. However, once new top executives assume the

presidency of these non-listed firms, they exert high managerial effort and, as in the case of their listed counterpart, improve the firm's performance.

The paper proceeds as follows. Section 2 summarizes the previous literature and presents the empirical hypotheses. Section 3 then describes the data and the empirical approach used for the analysis, while Section 4 presents the empirical results. Section 5 concludes.

2. Empirical Hypotheses

Regarding the literature on top executive turnovers, one strand of research examines the determinants of these turnovers. Previous studies focus on disciplinary events such as a downturn of firms' business and examine if the probability of executive turnover is higher among underperforming firms. Many previous studies, concentrating on a variety of countries including the United States, Germany, and Japan, point to a significant association between poor performance and a higher incidence of management replacements.[4] The pioneering studies on Japanese firms are Kaplan and Minton (1994) and Kang and Shivdasani (1995). Analyzing the likelihood of outside board member appointments, Kaplan and Minton found that outside members previously employed by banks or other, non-financial firms are more frequently appointed as board members when the firm's stock performance is poor. They also found that these appointments subsequently increase the turnover of top executives within the firm. Meanwhile, Kang and Shivdasani examined the relationship between top executive turnover and firm performance and found that the likelihood of turnover is significantly related to industry-adjusted returns on assets, excess stock returns, and negative operating income.

Unfortunately, not only in the case of studies on Japan but also those on other countries, the scope of the analysis of the determinants of executive turnover is limited to large listed firms and small non-listed enterprises are not included. From the disciplinary point of view, small privately-held enterprises differ from large listed firms in two ways. First, most small non-listed firms are operated by owner-managers, while only a small minority of large listed firms are run by the owner-mangers. On the one hand, managerial ownership has a positive aspect in that it increases the power of top executives with sizable voting power and better aligns the interests of the two different groups of top managers and shareholders. Since agency problems are alleviated by managerial ownership, this is likely to increase the value of the firm. On the other hand, managerial equity ownership has negative implications for external control over the firm. Firms with owner-managers are insulated from external controls and thus can retain underperforming incumbent executives. Second, private firms whose shares are not traded on the stock market are less likely to face the threat of takeovers posed by external

[4] For studies on the United States and Germany, see Denis, Denis, and Sarin (1997) and Kaplan (1994), respectively.

controls than public firms. Shares issued by private firms are illiquid and some of the means to gain external control of a firm including takeover bids are difficult to exercise. Therefore, private firms are less likely to be pressured into replacing their management even when they underperform. In sum, for small non-listed firms, which are in most cases managed by their owners, we arrive at the following hypothesis on top executive turnover.

Hypothesis 1: Top executive turnover for small non-listed firms is less sensitive to their performance than for large publicly listed firms.

A related empirical hypothesis regarding the determinants of executive turnover concerns the effect of firms' governance mechanism. Denis, Denis, and Sarin (1997) report that the probability of top executive turnover is inversely related to the ownership stake of officers and directors. What Denis, Denis and Sarin found for large listed firms in the United States may also apply to non-listed firms with outside managers. Along a similar vein, Kang and Shivdasani, focusing on the role of large shareholders and banks, found that the sensitivity of turnovers to firms' performance is higher for firms with ties to main banks than those without such ties. In addition, they found that successors are more likely to come from outside the firm when firms have large shareholders and a main bank relationships. The role played by banks and corporate shareholders is also emphasized by Kaplan and Minton (1994), who show that underperforming firms are more likely to appoint outside board members from banks and non-financial corporations. What all these studies suggest is that outside shareholders, especially large ones, and main banks provide external control mechanisms for the governance of firms. Thus, these studies suggest the following hypothesis regarding the role of outside shareholders and main banks.

Hypothesis 2: A separation of ownership and management as well as close bank-firm relationships increase the sensitivity of top executive turnover to firm performance.

Another strand of literature, including Huson, Malatesta and Parrino (2004), mostly concentrate on publicly listed firms and concerns their performance after managerial turnovers. They examine the relationship between CEO turnover and firms' financial performance and contrast two hypotheses regarding firms' ex-post performance: the improved management hypothesis and the "scapegoat" hypothesis. The former states that management turnovers are likely to improve managerial quality and therefore ex-post performance. In contrast, the latter holds that firm performance has little to do with managerial quality and that managerial turnovers make no difference in ex-post firm performance. Comparing turnover and non-turnover firms, Huson,

Malatesta, and Parrino find a greater subsequent improvement in performance for turnover than for non-turnover firms and infer that the turnover improved managerial quality and this in turn positively contributed to firm performance. However, we should note that there may be differences in terms of the pool of available managerial talent between large listed firms and small non-listed businesses. Partly due to their small size, and partly due to the implicit constraint that succeeding executives must come from the family of the owner, non-listed firms may be limited in the extent to which they can improve the quality of their management following executive turnover.[5] Based on the above discussion, we posit the following hypothesis.

Hypothesis 3: The ex-post performance of small non-listed firms experiencing management turnover improves relative to that of firms experiencing no such turnover. However, the extent of improvement is less sizable among small non-listed firms than among large public firms.

3. Data Set and Empirical Approach

3.1 Data

We construct a firm-level panel data set to analyze the determinants of top executive turnover and the ex-post performance of firms that experienced executive turnover. Our data set consists of firms that responded to the Surveys of the Financial Environment (SFE) implemented by the Small and Medium Enterprise Agency (SMEA) of Japan in 2001-2003. For each SFE, a representative sample of 15,000 firms was randomly selected and sent questionnaires. The number of responding firms for each of the years was 7,656, 8,446, and 8,040, respectively. For each of these firms, we then added data from the Financial Information Database (FID) which covers the years 2001-2007 and is collated by Tokyo Shoko Research, Inc., a commercial credit research firm. The FID contains the balance sheet and income statements of firms as well as information on other firm characteristics. These include the name and age of the representative of a firm, the year/month that he/she assumed the presidency, the names of major stockholders, the names of the banks each firm transacted with, and whether the firm is listed or not.

For our analysis, we need information for at least three periods in order to examine the determinants of top executive turnover and the effect of turnovers on firms' ex-post performance. That is, we need to know whether the top executive of a firm changed between year *t-1* and *t* and the development of the firm's performance between year *t* and *t+1*. In practice, in order to measure firms' ex-post performance, it may be preferable to use more data points than *t+1*, and we actually have data for *t+2* and *t+3* for the analysis. Using this information, we estimate a

[5] This argument is based on Bennendsen et al. (2007).

probit model that takes account of the various factors that are likely to affect whether firms replace their top executive. Further, using the data for year t and $t+i$, where i=1, 2, 3, we measure the effect of top executive turnover on firms' ex-post performance by observing the difference between firms that experienced executive turnover and those that did not.

Using seven years of data, we construct three panel data sets for the years 2001-2005, 2002-2006, and 2003-2007. We then concatenate these three data sets into one panel data set. The initial year of each panel data set is labeled year *t-1*, the second year is year *t*, and the final year is year *t+3*. We add dummies representing the initial year in order to distinguish these three panel data sets with different starting years. For our analysis, we exclude the following observations from our data set. First, observations where any of the variables calculated as ratios in the analysis (described in the next subsection) fall into either the upper or lower 1 percentile of the total distribution were omitted from the sample. Next, based on the information on each firm's listing status in 2004, the data set is divided into two: a data set consisting of non-listed, privately-held firms and a data set consisting of listed firms. Note that our main focus is on the non-listed firms and the information on listed firms is mainly used for comparison with non-listed firms.

After screening our data as aforementioned, we are left with 25,290 observations of private firms and 2,198 observations of publicly listed firms. Among them, 1,526 and 284 firms respectively experienced a top executive turnover in the years 2002-2004. This implies that the top executive of the rest of the firms was unchanged. Note here that turnover rates differ significantly depending on whether firms are run by owner-managers or not. The turnover rate is high in the case of firms managed by outside top executives, while it is low in the case of firms run by owner-managers.

(Insert Table 1)

Table 1 shows the numbers of turnovers and the corresponding turnover rates for our data set. For the sample of non-listed firms, the turnover rate within one year is 6.0 percent, while for the sample of listed firms it is 12.9 percent. Furthermore, the most significant difference in terms of turnover rates can be found between firms run by outside executives and those run by owner-managers: Using a dummy variable to proxy managerial ownership of a firm that takes a value of one if the last name of the firm's top executive matches at least one of the last names of major shareholders and zero otherwise, we find that for firms with managerial ownership, the turnover rate is 3.5 percent, while in the case of firms run by outside managers, the figure becomes much higher, 17.7 percent.

3.2 Variables

(Insert Table 2)

This section presents a detailed description of the variables used in the analysis. Definitions are provided in Table 2. First, in order to distinguish whether a firm replaces its top executive or not in a year, we use a binary variable labeled *TURNOVER*. Turning to explanatory variables, the first category measures firms' performance and includes the return on assets (*ROA*) and the capital ratio (*CAP*). The second category also measures firms' performance, but focuses on whether a firm is in financial distress. Variables in this category are a dummy for a default (*DEFAULT*), a dummy for a negative ROA (*ROA_NG*), meaning that the firm is in deficit, a dummy for interest coverage being less than or equal to unity (*ICOVER_SM*), meaning that the operating profit is insufficient to cover interest expenses, and a dummy for a negative capital ratio (*CAP_NG*), that is, the firm has negative net worth. The third category measures the credit availability for a firm using the ratio of long-term loans (*LONG*) and short-term loans (*SHORT*) to the total asset amount. In addition, to measure firms' liquidity, the ratio of cash and deposits to the total asset amount (*CASH*) is used. Further, the ratio of interest payments to the total loan amount outstanding (*RATE*) is used, with a higher ratio indicating that credit is more limited. Note, however, that these variables are also affected by the demand for credit and do not necessarily represent the availability of funds. The fourth category consists of variables that control for firm age (*FIRMAGE*), firm size (*LnEMP*), and the demand for funds for capital investment (*FIXED*). Note that the variable *LnEMP* is also a proxy for the size of the human resources pool from which incumbent executives choose their successors. The fifth category is made up of variables representing the characteristics of top executives in terms of their age (*AGE*) and tenure (*TENURE*), i.e., the number of years they have served in their current managerial position. The final category of variables measures the extent of external control of a firm. As a proxy for managerial ownership, a binary variable representing whether a family member of the top executive is a major shareholder (*OWNERSHIP*) is used. Managerial ownership is expected to reduce the external pressure on the incumbent management. In addition, to consider another potential source of external control, namely financial institutions, a variable indicating whether the bank listed first by a firm in the FID is also a major shareholder (*MAINBANK*). [6] Most of the firms in the sample have established lending relationships with banks. However, a certain number of firms in the sample receive not only loans but also equity from these banks, suggesting a certain degree of outside control.

[6] The variable is similar to the one employed in Kang and Shivdasani (1995) to measure the degree of bank monitoring.

3.3 Empirical Approach

Using the data set just described, we proceed to examine the three hypotheses stated in Section 2. Note, however, that a simple comparison of the ex-post performance of firms that experienced a top executive turnover and those that did not is inappropriate because of possible selection bias. For example, if firms with an executive turnover are riskier than those without, then a simple comparison of the ex-post performance between these two groups confounds ex-ante riskiness and ex-post riskiness (changes in borrowers' riskiness after the top executive turnover). To circumvent this problem, we need to control for any possible selection bias in our estimation. To do so, we employ a matching estimation approach. The procedure is as follows:

(i) We implement a probit estimation that models the probability of top executive turnover in year *t* conditional on covariates observed in year *t-1*. Firms that experience turnover ($TURNOVER_t = 1$) are labeled treatment observations. We then attach a propensity score to each observation. The propensity score $e(\cdot)$ is defined as

$$e(X_{t-1}) \equiv \Pr(TURNOVER_t = 1 | X_{t-1}), \tag{1}$$

where X_{t-1} is a vector of covariates in the probit estimation. We focus on privately-held firms and implement baseline estimations. We also implement another set of estimations for public firms, which we call reference estimations.

(ii) Next, we implement another set of probit estimations including cross terms multiplied by the variables measuring the extent of external control of a firm, *MAINBANK* and *OWNERSHIP*. We implement estimations not only for non-listed firms but also for public firms. Estimations of (i) and (ii) are used to examine Hypotheses 1 and 2.

(iii) For each treatment observation, we identify matched observations from the sample of firms without turnover. The matched observations are those that have the "closest" propensity scores to a particular treatment observation and are labeled control observations. These matched observations are chosen from the same calendar year as the treatment observation. It should also be noted that we use a non-treated observation more than once as a control, that is, a non-treatment observation may be used as a control for one treatment observation and as a control for another treatment observation at the same time. There are several matching algorithms to find the "closest" control observations. As a base-line for our analysis, we employ

k-nearest matching, in which the arbitrarily determined *k* observations whose propensity scores are the closest to each treatment observation are chosen.[7]

(iv) Finally, we compare the change (yearly difference) in the ex-post performance variables of the treatment and the control group from year *t* to years *t+1*, *t+2*, and *t+3*. To be precise, to test Hypothesis 3, we use the difference-in-difference (DID) estimator regarding firms' ex-post performance variables described above, where the DID estimator is defined as $\Delta Y_{t+i}^{T} - \Delta Y_{t+i}^{C}$ and Y indicates the performance variable and uppercase T and C stand for the treatment and the control group, respectively. In our analysis, the DID estimator is superior to the traditional matching estimators in that time-invariant biases before and after executive turnovers are differenced out between the treatment. and the control group.[8]

One of the benefits of employing propensity score matching estimation is that we can match treatment and control observations using the scalar propensity score. The propensity score, which is the conditional probability of being treated given the value of observed characteristics, is a very useful variable in dealing with a highly dimensional vector of covariates. Rosenbaum and Rubin (1983) show that treatment observations (in our case firms that experienced a turnover) and control observations (firms that did not experience a turnover) with the same propensity score value have the same distribution of the full vector of covariates. It is thus sufficient to match firms in terms of the propensity score in order to obtain the same probability distribution of covariates for treatment and control observations.

In propensity score matching, an assumption known as unconfoundedness has to be satisfied so that the differences in ex-post performance variables between the treatment observations and the control observations with the same values for covariates are attributable to the treatment effect of changing their top executive. That is,

$$(\Delta Y_{t+i}^{T}, \Delta Y_{t+i}^{C}) \perp TURNOVER_t \left| \left(X_{t-1} \right) \right. \tag{2}$$

Rosenbaum and Rubin (1983) show that assumption (2) is identical to the following condition:

$$(\Delta Y_{t+i}^{T}, \Delta Y_{t+i}^{C}) \perp TURNOVER_t \left| e\left(X_{t-1} \right) \right. \tag{3}$$

[7] In this paper we use *k*=5. Because the results of our estimation may be sensitive to the matching algorithm we choose, as a robustness check, in Appendix Table 2, we also report results using different matching algorithms: 10-nearest matching, radius matching, and kernel matching. We find that the results are similar to those with the 5-nearest matching.

[8] Regarding the superiority of the DID estimator, see, e.g., Heckman, Ichimura, Smith, and Todd (1998).

Although there is no direct test for unconfoundedness, this assumption indicates the need to control for all relevant variables X_{t-1} that influence treatment assignments and ex-post performance variables. We believe that our data is rich enough to include the necessary covariates. Furthermore, the DID matching estimator that we use allows for the existence of differences in time-invariant unobservable characteristics between the treatment and the control group.

In addition to unconfoundedness, the following balancing condition of pretreatment variables given the propensity score must be satisfied (Becker and Ichino (2002)).

$$TURNOVER_t \perp X_{t-1} | e(X_{t-1}) \quad (4)$$

In other words, for a given propensity score, treatment observations are randomly chosen, and therefore, the treatment sample and the non-treated sample are on average identical.

In order to verify that (4) holds, we implement the following testing procedure after the first step of the matching observation: (i) based on the estimated probit model, we split the sample such that the average propensity scores of the treated and non-treated groups do not differ, and (ii) within all intervals, test that the means of every element of X_{t-1} do not differ significantly between treated and non-treated observations. If there are no statistically significant differences between the two, then we can proceed to estimate the treatment effect in the second step with some confidence. In our estimation for the treatment effects to be presented in the next section, we satisfy this balancing condition.

4. Results

4.1 Determinants of Top Executive Turnovers

We start with the baseline probit estimation. Table 3 lists the means of the variables we use in this estimation.

(Insert Table 3)

In the probit estimation we obtain conditional probabilities of a firm changing its top executive in year *t* given the values of observed firm performance, financial distress, credit availability, and other firm characteristics in year *t-1*. The dependent binary variable represents a turnover of the top executive in year *t* ($TURNOVER_t$). The following explanatory variables are used. First,

regarding firm performance, the return on total assets (ROA_{t-1}) to measure firms' annual profits and the capital-asset ratio (CAP_{t-1}) to measure firms' net worth are employed. Given the possibility that managerial turnovers may occur more frequently in times of financial distress, we use one dummy variable indicating whether the capital ratio is negative (CAP_NG_{t-1}). The next set of explanatory variables focuses on firms' credit availability conditions. We include the long-term borrowing ratio ($LONG_{t-1}$), the short-term borrowing ratio ($SHORT_{t-1}$), liquidity as measured by the cash and deposit to asset ratio ($CASH_{t-1}$), and the interest payment rate ($RATE_{t-1}$). In addition, we use variables on other firm characteristics, including firm age ($FIRMAGE_{t-1}$), firm size expressed in terms of the log of the number of employees ($LnEMP_{t-1}$), and the ratio of fixed tangible assets to total assets ($FIXED_{t-1}$). We also employ variables on the characteristics of top executives, including the age of the top executive (AGE_{t-1}) and his/her years of tenure ($TENURE_{t-1}$). Finally, we include the proxy for the managerial ownership ($OWNERSHIP_{t-1}$) and the main bank relationship ($MAINBANK_{t-1}$).

(Insert Table 4)

The baseline probit estimation results on top executive turnovers are presented in Table 4. In the estimation for non-listed firms, there are several significant coefficients. First, the performance variables ROA_{t-1} and CAP_{t-1} are negative and weakly significant. This indicates that badly performing firms are more likely to change their top executive than well-performing firms. Next, one of the variables indicating credit availability conditions, $LONG_{t-1}$, is negative and significant, which indicates that financially constrained firms facing a limited availability of long-term loans are more likely to change their top executive. $LnEMP_{t-1}$ has a positive and significant coefficient indicating that larger firms with abundant human resources and hence a larger pool of potential successors to the top executive tend to replace their executive more frequently than other firms. The age of the outgoing top executive (AGE_{t-1}) and his/her years of tenure ($TENURE_{t-1}$) are positive and significant, indicating that older top executives who have been president for many years are more likely to be replaced. Finally, the sign on $OWNERSHIP_{t-1}$ is negative and significant, while that on $MAINBANK_{t-1}$ is positive but insignificant.

In order to compare non-listed private firms with publicly listed firms, we also conducted a reference estimation results for publicly listed firms and the results are shown in the right-hand column of Table 4. As can be seen, there are only a few variables with significant coefficients, including ROA_{t-1}, AGE_{t-1}, and $OWNERSHIP_{t-1}$. The coefficient on ROA_{t-1} is significantly negative and its marginal effect on the turnover probability is more sizable than in the case of non-listed firms. For AGE_{t-1} and $OWNERSHIP_{t-1}$, the signs of the coefficients are

the same as those for non-listed firms.

Regarding Hypothesis 1, which suggests that executive turnover in small firms is less sensitive to firm performance, the results thus far are rather mixed. On the one hand, and in line with the hypothesis, the turnover probability is less sensitive to firm profitability (ROA_{t-1}) among non-listed private firms than among publicly listed firms; on the other hand, though, it is more sensitive to firms' net worth (CAP_{t-1}) among non-listed than among listed firms. Further, we have not yet closely examined Hypothesis 2, which predicts that the variables $OWNERSHIP_{t-1}$ and $MAINBANK_{t-1}$ affect the sensitivity of managerial turnover to firm performance. Hence, we will examine these two hypotheses with a more detailed specification.

(Insert Table 5)

In the next probit estimation, we introduce cross terms in which each of the explanatory variables representing firm performance are multiplied by $OWNERSHIP_{t-1}$ in order to examine if their parameters are significantly affected by firms' managerial ownership. Note that we first focus on $OWNERSHIP_{t-1}$ and its cross terms only rather than focusing on both $OWNERSHIP_{t-1}$ and $MAINBANK_{t-1}$ and their respective cross terms, since $MAINBANK_{t-1}$ is insignificant in the previous estimation and we do not expect to obtain meaningful statistical inferences from the estimation by including $MAINBANK_{t-1}$ as an explanatory variable. The estimation results for non-listed and listed firms are shown in the left- and right-hand columns of Table 5, respectively. There are important differences between Tables 4 and 5 in terms of the results for the performance variables for non-listed firm. ROA_{t-1} becomes insignificant in Table 5, while it was negative and significant in Table 4, implying that a decrease in profits has no significant impact on the probability of top executive turnover. Moreover, in Table 5, the sign of the coefficient on CAP_{t-1} becomes significantly negative, while that of the coefficient on $CAP_{t-1} * OWNERSHIP_{t-1}$ is significantly positive. This indicates that a lower capital ratio increases the likelihood of management turnover among firms *without* managerial ownership, while it does not have a significant impact on the likelihood of management turnover among firms *with* managerial ownership. In contrast, the introduction of the cross terms does not significantly affect the estimation results for listed firms. As in Table 4, we observe a negative and significant coefficient on ROA_{t-1} in Table 5, indicating that the top executive turnover likelihood increases among underperforming listed firms. Hence, by introducing additional explanatory variables, we find a significant difference between non-listed firms and listed firms in terms of the response to the firm's performance, which is consistent with Hypothesis 1. We also find that the separation of ownership and management in non-listed firms increases the sensitivity of top executive turnover to firms' net worth, which is consistent with Hypothesis 2.

Regarding the examination of another part of Hypothesis 2, that is, the role of bank-firm relationships, we find no significant changes in the turnover sensitivity to firm performance. We introduce another probit estimation that includes both $OWNERSHIP_{t-1}$ and $MAINBANK_{t-1}$ as well as their respective cross terms with performance variables. The results are shown in Table 6 and are qualitatively similar to those in Table 5 in that all the newly introduced variables, that is, $MAINBANK_{t-1}$ and its cross terms, are statistically insignificant. Thus, we fail to find evidence suggesting that bank-firm relationships play a role in affecting the sensitivity of top executive turnover to firm performance as Hypothesis 2 predicts.

(Insert Table 6)

On balance, regarding the relationship between performance and top executive turnover among non-listed firms, disciplinary pressure seems to be weaker among non-listed firms than listed firms. Furthermore, for non-listed firms with managerial ownership, the disciplinary pressure becomes even weaker. The only exception is when firms run by outside managers observe a decrease in their net worth. In this case, firms tend to replace their top executive more frequently than firms that does not experience a decrease in net worth. These results contrast with the results for the listed firms in which managerial turnovers are always significantly associated with firms' poor performance. Hence, in general, we can say that the results of our empirical analysis support Hypotheses 1 and 2.

4.2 Effects on Ex-post Firm Performance

Having obtained the propensity score for each observation, we match each treatment observation of a firm that experienced a top executive turnover in year *t* with control observations of firms that did not experience a turnover in that year. There are 1,526 treatment observations that experienced a turnover. We choose five neighboring control observations for each treatment observation in the same calendar year in terms of the distance measured by the propensity scores. We employ the specification of the probit estimation underlying Table 5 and calculate the propensity scores based on its parameters.[9]

For these treatment and control observations that are matched, in order to examine Hypothesis 3, we use several variables to measure the change in borrowers' performance between year *t* and year *t+i*, where *i = 1, 2, 3*. For both the treatment and the control group, the change in the performance variables is measured by ΔROA^{j}_{t+i} $(\equiv ROA^{j}_{t+i} - ROA^{j}_{t})$, ΔCAP^{j}_{t+i}, and $\Delta ICOVER^{j}_{t+i}$, where $j = \{T, C\}$ and *T* and *C* stand for the treatment and the control group,

[9] We employ a different set of propensity scores based on the specification of the probit estimation underlying Table 4 as a robustness check. The results, presented in Appendix Table 1, show no qualitative difference from those in Table 7.

respectively. We examine the change in the probability of financial distress. We use several ways to define borrower financial distress, including default, a negative ROA, interest coverage less than or equal to unity, and a negative capital ratio. We measure the probability of a firm falling into a certain type of distress and then take the difference in this probability between year t and year $t+i$. Hence, the change in distress probabilities is measured by $\Delta p^{j}_{t+i}(DEFAULT=1)$, [10] $\Delta p^{j}_{t+i}(ROA\_NG=1)$, $\Delta p^{j}_{t+i}(ICOVER\_SM=1)$, and $\Delta p^{j}_{t+i}(CAP\_NG=1)$, where $j=\{T,C\}$. Furthermore, we measure the change in several other variables describing firms' circumstances, including credit availability conditions ($\Delta LONG^{j}_{t+i}$, $\Delta SHORT^{j}_{t+i}$, $\Delta CASH^{j}_{t+i}$ $\Delta RATE^{j}_{t+i}$), the fixed tangible assets ratio ($\Delta FIXED^{j}_{t+i}$), sales ($\Delta SALES^{j}_{t+i}$), and employment (ΔEMP^{j}_{t+i}).

(Insert Table 7)

Turning to the results, we begin with the treatment effect of top executive turnover among non-listed firms, which is shown in the central column labeled "DID." Among the firm performance variables, ΔROA^{T}_{t+2} is significantly higher, by 0.3 percentage points, than ΔROA^{C}_{t+2} and ΔCAP^{T}_{t+3} is significantly higher, by 0.7 percentage points, than ΔCAP^{C}_{t+3}. Regarding the financial distress variables, $\Delta p^{T}_{t+3}(DEFAULT=1)$, $\Delta p^{T}_{t+2}(ROA\_NG=1)$, and $\Delta p^{T}_{t+2}(ICOVER\_SM=1)$ are significantly lower than $\Delta p^{C}_{t+3}(DEFAULT=1)$, $\Delta p^{C}_{t+2}(ROA\_NG=1)$, and $\Delta p^{C}_{t+2}(ICOVER\_SM=1)$, by 0.4, 3.4, and 3.9 percentage points, respectively. These results indicate that firms that experienced a management turnover are less likely to suffer from financial distresses than those that did not. [Interestingly, the better firm performance among non-listed firms is accompanied by a decreased dependence on long-term loans, shrinking sales, and lower employment.

Next, we look at the treatment effect of top executive turnover among listed firms. We find that listed firms that have experienced an executive turnover saw an increase in their profitability and a decrease in their probability of falling into financial distress, indicating that executive turnovers improve firms' performance. In contrast with the case of non-listed firms, this increasing profitability is accompanied by a reduced dependence on fixed tangible assets rather than by lower employment.

In sum, in the predictions of Hypothesis 3 do not seem to be supported. That is, we fail to find conclusive evidence that managerial turnovers improve the firm performance of large listed firms more than that of small non-listed firms. Instead, we find that both non-listed firms and listed firms experience a significant improvement in their profitability when a top executive

[10] Since we do not have data on defaults in year t, $\Delta p^{j}_{t+1}(DEFAULT=1)$ is actually $p^{j}_{t+1}(DEFAULT=1)$.

turnover occurs. One of the few differences among the two groups of firms is that non-listed firms significantly reduce their sales and employment after a top executive turnover, while listed firms reduce their capital stock.

5. Conclusion

In this paper, we examined the process of top executive turnover in small non-listed businesses in Japan using a unique panel data set of about 25,000 firms in 2001-2007. Consistent with our first and second hypotheses, the likelihood of a change in top executives of non-listed firms is independent of their ex-ante performance, especially when the firms are operated by the owners themselves or by their relatives. Also, non-listed firms which experienced a top executive turnover saw an improvement in their ex-post performance relative to firms with no turnover. Moreover, the extent of the improvement in firm performance following an executive turnover is similar for non-listed and listed firms, a result that is in conflict with our third hypothesis. All of these results suggest that underperforming non-listed firms do not face the threat of disciplinary executive turnover. However, when a turnover does take place, firms profitability improves significantly, suggesting that the new top executives exert high managerial effort.

The improvement in the performance of non-listed firms that experienced managerial turnover provides some evidence that such firms deserve policy assistance. Without any assistance, such firms may end up exiting the market, resulting in the potential loss of valuable resources such as accumulated intangible assets. Needless to say, for an optimal design of policies to facilitate business transfers, it is important to identify and target firms that are likely to experience an improvement in business performance as a result. Further, not only the relationship between managerial turnover and firm performance, but also how the relationship is affected by policies needs to be examined. These are difficult but intriguing research issues for the future.

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Table 1: Number of turnovers and turnover ratio

	Non-Listed			*Listed*		
	All	*OWNERSHIP=1*	*OWNERSHIP=0*	*All*	*OWNERSHIP=1*	*OWNERSHIP=0*
TURNOVER(t)=1						
Number of Firms	1526	722	804	284	48	236
Ratio	0.060	0.035	0.177	0.129	0.055	0.177

Table 2: Definitions of Variables

Turnover of Firms' Top Executive	
TURNOVER	1 if a new top executive assumes presidency of the firm in the year, 0 otherwise.
Firm Performance	
ROA	Ratio of pre-tax operating profits to total assets.
CAP	Ratio of capital to total assets.
Financial Distress	
DEFAULT	1 if a firm defaults, 0 otherwise.
ROA_NG	1 if *ROA* is negative (the borrower is in deficit), 0 otherwise.
ICOVER_SM	1 if *ICOVER* is less than or equal to one, 0 otherwise.
CAP_NG	1 if *CAP* is negative (the borrower has negative net worth), 0 otherwise.
Credit Availability	
LONG	Ratio of long-term loans (loans with more than 1 year maturity) to total assets.
SHORT	Ratio of short-term loans (loans with less than 1 year maturity) to total assets.
CASH	Ratio of cash and deposit holdings to total assets.
RATE	Ratio on interest expenses to total loan amount.
Other Firm Characteristics	
FIRMAGE	Number of years since the establishment of the firm.
LnEMP	Log of the number of employees.
FIXED	Ratio of fixed tangible assets to total assets.
Characteristics of Top Executive	
AGE	Age of the top executive.
TENURE	Number of years the incumbent top executive has been president of the firm.
Governance	
OWNERSHIP	1 if a family member of the CEO of the firm is a major shareholder, 0 otherwise.
MAINBANK	1 if the bank listed first by the firm is a major shareholder, 0 otherwise.

Note: Dummy variables for the industry of the firm are also included in the empirical analysis.

Table 3: Summary Statistics

	Non-Listed			*Listed*		
	All	*OWNERSHIP=1*	*OWNERSHIP=0*	*All*	*OWNERSHIP=1*	*OWNERSHIP=0*
	Mean (Standard Deviations)					
ROA(t-1)	0.019	0.018	0.022	0.035	0.049	0.027
	(0.055)	(0.055)	(0.051)	(0.046)	(0.053)	(0.039)
CAP(t-1)	0.234	0.236	0.224	0.388	0.421	0.366
	(0.212)	(0.212)	(0.212)	(0.190)	(0.186)	(0.190)
CAP_NG(t-1)	0.062	0.062	0.061	0		
	(0.241)	(0.241)	(0.239)			
LONG(t-1)	0.252	0.269	0.177	0.098	0.107	0.093
	(0.200)	(0.198)	(0.189)	(0.103)	(0.107)	(0.101)
SHORT(t-1)	0.160	0.156	0.180	0.116	0.106	0.123
	(0.160)	(0.157)	(0.170)	(0.118)	(0.111)	(0.122)
CASH(t-1)	0.170	0.178	0.134	0.113	0.147	0.091
	(0.125)	(0.126)	(0.112)	(0.090)	(0.101)	(0.073)
RATE(t-1)	0.025	0.026	0.021	0.020	0.020	0.019
	(0.012)	(0.012)	(0.012)	(0.011)	(0.012)	(0.010)
FIRMAGE(t-1)	39.705	39.887	38.869	50.374	42.861	55.277
	(22.306)	(22.604)	(20.871)	(24.408)	(23.189)	(23.940)
LnEMP(t-1)	3.581	3.406	4.383	6.323	5.831	6.644
	(1.321)	(1.236)	(1.397)	(1.235)	(0.976)	(1.280)
EMP(t-1)	98.2	71.4	221.0	1496.0	542.0	2118.6
	(403.701)	(160.695)	(879.074)	(4555.2)	(790.970)	(5736.917)
FIXED(t-1)	0.303	0.301	0.313	0.308	0.306	0.309
	(0.203)	(0.198)	(0.225)	(0.186)	(0.183)	(0.188)
AGE(t-1)	58.775	58.045	62.120	60.662	56.914	63.108
	(9.484)	(9.683)	(7.676)	(8.423)	(9.938)	(6.140)
TENURE(t-1)	12.591	14.160	5.405	8.280	14.347	4.320
	(10.584)	(10.590)	(6.965)	(9.267)	(10.438)	(5.583)
OWNERSHIP	0.821	1	0	0.395	1	0
	(0.384)			(0.489)		
MAINBANK	0.015	0.007	0.053	0.270	0.232	0.295
	(0.121)	(0.082)	(0.224)	(0.444)	(0.422)	(0.456)
Number of observations	25290	20757	4533	2198	868	1330

Table 4: Probit Estimation Results: Baseline

	Dependent variable: TURNOVER	
	Non-listed	*Listed*
ROA	-0.511 *	-2.008 **
	(0.285)	(0.952)
CAP	-0.194 *	0.033
	(0.101)	(0.285)
CAP_NG	-0.002	
	(0.071)	
LONG	-0.515 ***	-0.261
	(0.107)	(0.461)
SHORT	-0.191 *	0.377
	(0.105)	(0.397)
CASH	-0.086	-0.413
	(0.136)	(0.547)
RATE	-1.760	0.724
	(1.238)	(3.663)
FIRMAGE	0.0003	0.00004
	(0.001)	(0.002)
LnEMP	0.075 ***	-0.015
	(0.012)	(0.034)
FIXED	0.082	-0.316
	(0.085)	(0.250)
AGE	0.037 ***	0.041 ***
	(0.002)	(0.006)
TENURE	0.004 **	0.001
	(0.001)	(0.005)
OWNERSHIP	-0.737 ***	-0.463 ***
	(0.036)	(0.113)
MAINBANK	0.096	-0.109
	(0.084)	(0.084)
Constant	-3.437 ***	-3.233 ***
	(0.175)	(0.502)
Industry Dummies	Yes	Yes
Number of observations	25290	2198
Pseudo R-sq	0.154	0.094
Log Likelihood	-4877.125	-766.653

*Note: ***,**,* indicate a significance level of 1,5,10%, respectively.*

Table 5: Probit Estimation Results: Including *OWNERSHIP* and Its Cross Terms

	Dependent variable: TURNOVER	
	Non-listed	*Listed*
ROA	-0.481	-2.584 **
	(0.465)	(1.143)
CAP	-0.401 ***	0.090
	(0.139)	(0.307)
CAP_NG	0.066	
	(0.109)	
LONG	-0.491 ***	-0.239
	(0.108)	(0.460)
SHORT	-0.189 *	0.377
	(0.105)	(0.397)
CASH	-0.105	-0.509
	(0.136)	(0.556)
RATE	-1.630	1.294
	(1.237)	(3.662)
FIRMAGE	0.000	0.000
	(0.001)	(0.002)
LnEMP	0.076 ***	-0.008
	(0.012)	(0.034)
FIXED	0.075	-0.295
	(0.086)	(0.244)
AGE	0.037 ***	0.041 ***
	(0.002)	(0.006)
TENURE	0.003 **	0.001
	(0.001)	(0.005)
OWNERSHIP	-0.813 ***	-0.486 **
	(0.055)	(0.225)
*OWNERSHIP*ROA*	-0.010	2.315
	(0.575)	(1.919)
*OWNERSHIP*CAP*	0.342 **	-0.131
	(0.156)	(0.465)
*OWNERSHIP*CAP_NG*	-0.130	
	(0.144)	
Constant	-3.403 ***	-3.378 ***
	(0.177)	(0.508)
Industry Dummies	Yes	Yes
Number of observations	25292	2201
Pseudo R-sq	0.155	0.094
Log Likelihood	-4872.846	-766.965

*Note: ***,**,* indicate a significance level of 1,5,10%, respectively.*

Table 6: Probit Estimation Results: Including *OWNERSHIP* and *MAINBANK*

	Dependent Variable: TURNOVER	
	Non-listed	*Listed*
ROA	-0.410	-1.969
	(0.475)	(1.223)
CAP	-0.387 ***	-0.020
	(0.142)	(0.321)
CAP_NG	0.091	
	(0.112)	
LONG	-0.493 ***	-0.170
	(0.108)	(0.458)
SHORT	-0.190 *	0.387
	(0.105)	(0.398)
CASH	-0.107	-0.488
	(0.136)	(0.552)
RATE	-1.574	1.063
	(1.237)	(3.647)
FIRMAGE	0.000	0.000
	(0.001)	(0.002)
LnEMP	0.074 ***	-0.015
	(0.012)	(0.034)
FIXED	0.071	-0.306
	(0.086)	(0.244)
AGE	0.037 ***	0.041 ***
	(0.002)	(0.006)
TENURE	0.003 **	0.001
	(0.001)	(0.005)
OWNERSHIP	-0.805 ***	-0.502 **
	(0.055)	(0.224)
MAINBANK	0.181	-0.185
	(0.136)	(0.181)
*OWNERSHIP*ROA*	-0.064	1.996
	(0.581)	(1.910)
*OWNERSHIP*CAP*	0.329 **	-0.068
	(0.158)	(0.460)
*OWNERSHIP*CAP_NG*	-0.152	
	(0.145)	
*MAINBANK*ROA*	-1.046	-2.886
	(1.853)	(2.381)
*MAINBANK*CAP*	-0.197	0.382
	(0.436)	(0.443)
*MAINBANK*CAP_NG*	-0.435	
	(0.432)	
Constant	-3.401 ***	-3.289 ***
	(0.177)	(0.504)
Industry Dummies	Yes	Yes
Number of observations	25290	2198
Pseudo R-sq	0.155	0.095
Log Likelihood	-4871.515	-765.571

*Note: ***,**,* indicate a significance level of 1,5,10%, respectively.*

Table 7: Treatment Effects of Top Executive Turnovers: Based on Table 5 Specification

		5-Nearest Matching							
		Non-Listed				*Listed*			
		TURNOVER =1	*TURNOVER =0*	*DID*		*TURNOVER =1*	*TURNOVER =0*	*DID*	
ROA	*t+1*	0.024	0.027	0.001		0.030	0.034	0.003	
	t+2	0.028	0.029	0.003	*	0.038	0.036	0.005	*
	t+3	0.029	0.030	0.002		0.042	0.038	0.006	**
CAP	*t+1*	0.259	0.271	-0.002		0.385	0.391	0.009	
	t+2	0.267	0.279	0.000		0.393	0.393	0.013	*
	t+3	0.280	0.285	0.007	**	0.405	0.400	0.020	**
ICOVER	*t+1*	19.708	15.190	3.665	*	23.321	23.048	4.969	
	t+2	15.359	14.856	1.813		21.872	19.488	8.616	
	t+3	16.122	17.149	0.482		14.997	18.255	3.135	
p(DEFAULT)	*t+1*	0.000	0.002	-0.002	**	0.011	0.000	0.011	*
	t+2	0.003	0.003	-0.001		0.000	0.000	0.000	
	t+3	0.000	0.004	-0.004	***	0.000	0.002	-0.002	
p(ROA_NG)	*t+1*	0.183	0.147	-0.010		0.127	0.074	-0.039	
	t+2	0.144	0.143	-0.034	**	0.074	0.084	-0.087	***
	t+3	0.159	0.137	-0.024		0.068	0.082	-0.087	***
p(ICOVER_SM)	*t+1*	0.129	0.117	-0.027	**	0.109	0.055	-0.037	
	t+2	0.109	0.118	-0.039	***	0.071	0.069	-0.077	***
	t+3	0.135	0.116	-0.024		0.057	0.057	-0.074	***
p(CAP_NG)	*t+1*	0.040	0.033	0.001		0.011	0.001	-0.009	
	t+2	0.036	0.029	0.002		0.004	0.000	-0.015	*
	t+3	0.028	0.029	-0.005		0.000	0.000	-0.019	**
LONG	*t+1*	0.181	0.184	-0.002		0.093	0.082	0.000	
	t+2	0.177	0.180	-0.005		0.082	0.079	-0.004	
	t+3	0.168	0.176	-0.011	***	0.080	0.074	-0.002	
SHORT	*t+1*	0.159	0.156	-0.001		0.109	0.104	-0.002	
	t+2	0.148	0.147	-0.003		0.099	0.093	-0.003	
	t+3	0.141	0.139	0.000		0.085	0.087	-0.009	
CASH	*t+1*	0.145	0.147	0.002		0.097	0.096	0.003	
	t+2	0.140	0.145	0.001		0.099	0.093	0.008	*
	t+3	0.141	0.144	0.002		0.094	0.087	0.010	**
RATE	*t+1*	0.022	0.021	0.000		0.019	0.018	0.001	
	t+2	0.021	0.021	0.000		0.019	0.017	0.001	
	t+3	0.021	0.021	0.000		0.019	0.017	0.001	
FIXED	*t+1*	0.320	0.318	-0.001		0.294	0.285	-0.004	
	t+2	0.317	0.314	-0.001		0.282	0.274	-0.007	*
	t+3	0.314	0.313	-0.002		0.275	0.266	-0.009	*
SALES	*t+1*	12639000	13848000	-423222	*	177470000	212520000	-6771800	
	t+2	12712000	14350000	-1017900	**	185730000	225460000	-8930800	
	t+3	14087000	14994000	-1013700	*	196550000	237840000	-7808900	
EMP	*t+1*	184.8	210.9	-11.6	***	1826.4	1930.0	-54.8	
	t+2	184.8	221.3	-16.2	***	2074.5	1929.5	220.3	
	t+3	189.7	209.5	0.6		1644.1	1943.8	-102.1	

*Note: ***,**,* indicate a significance level of 1,5,10%, respectively.*

Appendix Table 1: Treatment Effects of Top Executive Turnover: Based on Table 4 Specification

		5-Nearest Matching							
		Non-Listed				*Listed*			
		TURNOVER =1	*TURNOVER =0*	*DID*		*TURNOVER =1*	*TURNOVER =0*	*DID*	
ROA	*t+1*	0.024	0.027	0.001		0.030	0.034	0.002	
	t+2	0.028	0.028	0.004	**	0.038	0.037	0.005	*
	t+3	0.029	0.030	0.003		0.042	0.038	0.006	*
CAP	*t+1*	0.259	0.269	-0.002		0.385	0.372	0.009	*
	t+2	0.267	0.274	0.000		0.393	0.375	0.015	**
	t+3	0.280	0.279	0.007	**	0.405	0.381	0.022	***
ICOVER	*t+1*	19.708	15.889	3.683	*	23.321	19.637	5.935	
	t+2	15.359	14.149	2.296		21.872	16.578	8.863	
	t+3	16.122	16.261	1.169		14.997	14.977	5.692	
p(DEFAULT)	*t+1*	0.000	0.001	-0.002	*	0.011	0.001	0.009	
	t+2	0.003	0.003	-0.001		0.000	0.000	0.000	
	t+3	0.000	0.003	-0.003	**	0.000	0.003	-0.003	
p(ROA_NG)	*t+1*	0.183	0.148	-0.010		0.127	0.089	-0.049	*
	t+2	0.144	0.143	-0.040	**	0.074	0.076	-0.073	**
	t+3	0.159	0.136	-0.031	*	0.068	0.081	-0.074	**
p(ICOVER_SM)	*t+1*	0.129	0.105	-0.023	*	0.109	0.078	-0.052	**
	t+2	0.109	0.113	-0.046	***	0.071	0.064	-0.063	**
	t+3	0.135	0.118	-0.033	**	0.057	0.062	-0.065	**
p(CAP_NG)	*t+1*	0.040	0.032	0.002		0.011	0.001	-0.005	
	t+2	0.036	0.032	-0.001		0.004	0.004	-0.015	
	t+3	0.028	0.030	-0.006		0.000	0.002	-0.017	*
LONG	*t+1*	0.181	0.185	-0.002		0.093	0.093	-0.002	
	t+2	0.177	0.180	-0.004		0.082	0.090	-0.008	*
	t+3	0.168	0.176	-0.010	***	0.080	0.088	-0.008	
SHORT	*t+1*	0.159	0.157	0.000		0.109	0.114	-0.004	
	t+2	0.148	0.148	-0.003		0.099	0.102	-0.004	
	t+3	0.141	0.141	-0.001		0.085	0.096	-0.010	
CASH	*t+1*	0.145	0.146	0.003	*	0.097	0.094	0.002	
	t+2	0.140	0.145	0.003		0.099	0.091	0.007	*
	t+3	0.141	0.142	0.003		0.094	0.087	0.008	*
RATE	*t+1*	0.022	0.022	0.000		0.019	0.019	0.000	
	t+2	0.021	0.021	0.000		0.019	0.018	0.001	
	t+3	0.021	0.021	0.000		0.019	0.017	0.001	
FIXED	*t+1*	0.320	0.320	-0.001		0.294	0.298	-0.005	*
	t+2	0.317	0.316	-0.003		0.282	0.286	-0.009	**
	t+3	0.314	0.316	-0.002		0.275	0.280	-0.011	**
SALES	*t+1*	12639000	14765000	-573558	**	177470000	192750000	-6916400	
	t+2	12712000	16483000	-1417100	***	185730000	190700000	-7225700	
	t+3	14087000	18961000	-2351200	***	196550000	202660000	-7042400	
EMP	*t+1*	184.8	206.7	-7.4	***	1826.4	1896.2	-66.1	
	t+2	184.8	217.5	-9.5	**	2074.5	1783.3	213.3	
	t+3	189.7	203.1	8.1		1644.1	1837.0	-117.6	*

*Note: ***,**,* indicate a significance level of 1,5,10%, respectively.*

Appendix Table 2: Treatment Effects with Different Matching Algorithms

		10-nearest matching		*kernel matching*		*radius matching*	
		Non-listed	*Listed*	*Non-listed*	*Listed*	*Non-listed*	*Listed*
		DID	*DID*	*DID*	*DID*	*DID*	*DID*
ROA	*t+1*	0.000	0.003	0.000	0.002	0.000	0.002
	t+2	0.003 *	0.005 *	0.003 **	0.006 **	0.003 *	0.006 **
	t+3	0.003	0.006 *	0.003	0.008 ***	0.003	0.007 **
CAP	*t+1*	-0.001	0.009 *	-0.001	0.009 *	-0.001	0.009 *
	t+2	0.000	0.011 *	0.002	0.012 *	0.001	0.012 **
	t+3	0.005 *	0.018 **	0.007 **	0.021 ***	0.006 *	0.022 ***
ICOVER	*t+1*	3.974 **	5.510	2.998	3.811	3.258 *	4.161
	t+2	2.254	9.797 *	0.309	8.558	0.846	8.710
	t+3	1.438	2.962	0.423	3.245	0.670	2.612
p(DEFAULT)	*t+1*	-0.002 **	0.011 *	-0.002 **	0.011 *	-0.002 **	0.011 *
	t+2	-0.002	0.000	-0.001	0.000	-0.001	0.000
	t+3	-0.004 ***	-0.003	-0.003 ***	-0.002 *	-0.003 ***	-0.002 **
p(ROA_NG)	*t+1*	-0.003	-0.038	-0.004	-0.031	-0.004	-0.031
	t+2	-0.030 *	-0.083 ***	-0.033 **	-0.074 ***	-0.033 **	-0.074 ***
	t+3	-0.022	-0.077 ***	-0.025 *	-0.078 ***	-0.024	-0.075 ***
p(ICOVER_SM)	*t+1*	-0.021	-0.039	-0.018	-0.036	-0.018	-0.035
	t+2	-0.035 **	-0.069 ***	-0.034 **	-0.065 ***	-0.035 **	-0.064 **
	t+3	-0.025	-0.069 **	-0.021	-0.073 ***	-0.021	-0.070 ***
p(CAP_NG)	*t+1*	0.001	-0.008	0.001	-0.007	0.002	-0.007
	t+2	0.002	-0.013	0.001	-0.014	0.001	-0.014
	t+3	-0.004	-0.017 **	-0.003	-0.018 **	-0.003	-0.018 **
LONG	*t+1*	-0.002	0.000	-0.003	-0.001	-0.003	-0.001
	t+2	-0.004	-0.005	-0.006 *	-0.005	-0.005 *	-0.006
	t+3	-0.010 **	-0.002	-0.010 ***	-0.003	-0.010 ***	-0.004
SHORT	*t+1*	-0.001	-0.003	-0.002	-0.003	-0.001	-0.002
	t+2	-0.003	-0.002	-0.004	-0.004	-0.003	-0.003
	t+3	0.000	-0.007	-0.001	-0.011 *	0.000	-0.009
CASH	*t+1*	0.002	0.001	0.003	0.001	0.003	0.001
	t+2	0.001	0.007 *	0.002	0.006	0.002	0.006
	t+3	0.001	0.009 **	0.002	0.007	0.002	0.007
RATE	*t+1*	0.000	0.001	0.000	0.001	0.000	0.001
	t+2	0.000	0.000	0.000	0.001	0.000	0.000
	t+3	0.000	0.001	0.000	0.001	0.000	0.001
FIXED	*t+1*	-0.001	-0.004	-0.001	-0.004 *	-0.001	-0.004
	t+2	-0.001	-0.007 *	-0.002	-0.008 **	-0.001	-0.007 *
	t+3	-0.001	-0.009 *	-0.002	-0.010 **	-0.001	-0.009 **
SALES	*t+1*	-541242 **	-7522100 *	-451416 *	-8073200 **	-477759 **	-7684600 *
	t+2	-1297900 ***	-9414600	-927111 **	-7644300	-1041700 ***	-7457300
	t+3	-1469000 **	-8126600	-1131700 **	-5825200	-1368600 ***	-5935400
EMP	*t+1*	-9.4 ***	-102.8	-5.2 ***	-149.1 **	-5.0 ***	-141.1 **
	t+2	-15.5 ***	189.2	-8.2 ***	173.8	-8.2 ***	183.0
	t+3	1.1	-127.3 *	-3.9	-143.4 **	-2.3	-134.1 **

*Note: ***,**,* indicate a significance level of 1,5,10%, respectively.*