Does ownership matter? Evidence of the effect of foreign investors on the risk-taking behavior of Japanese firms[ϒ]

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Abstract

Consistent with a bank-centered financial system, Japanese firms exhibit a remarkably low level of performance variability. The increased involvement of foreign investors motivated by shareholder value is thus likely to have triggered a major shift in their risk-taking behavior. Our results confirm this intuition as the volatility of stock returns, market-to-book value, and profitability is found to have significantly increased with the level of foreign ownership. Controlling for endogeneity provides even higher point estimates supporting anecdotal evidence that foreign investors have targeted Japanese firms taking unusually low risk. Overall, our results highlight the considerable impact that some categories of investors can have on corporate decisions.

Keywords: risk taking; performance volatility; foreign investors; ownership; heteroskedasticity tests

JEL classification: G30, G32, G34

1. Introduction

The importance of risk taking is well recognized. To expect a higher return, investors must take greater risks. At the firm level, a similar issue exists. To create shareholder value, firms must invest in projects that are generally associated with high idiosyncratic risk. However, managers are often reluctant to undertake this kind of projects (Fama, 1980). While shareholders can diversify away the firm's idiosyncratic risk, managers must retain that risk. As a result, they may prefer to forgo positive NPV projects that have high idiosyncratic risk. May (1995) and Holmstrom (1999) explain that managers consider their personal risk when making decisions that affect their firm's risk. Bertrand and Mullainathan (2003) show that when presented with the opportunity, plant managers tend to go for the safe course of action. Likewise, Amihud and Lev (1981) suggest that their motivation for undertaking unrelated mergers is to reduce the risk to their human capital.

To restore the incentives for greater risk taking, one approach is to provide equity-based compensation. Smith and Stulz (1985), Dechow and Sloan (1991) and Wright et al. (2007) argue that this type of contracts contributes to align the incentives of managers with those of shareholders, thus resulting in higher risk taking. Chen et al. (2006) show that the effect of stock options on various measures of risk is particularly strong in the banking industry. The other way to control deviations from optimal risk-taking is to enhance the firm's governance system. Consistent with this view, John et al. (2008) show that better governance is associated with greater risk-taking measured by cash flow volatility. Low (2009) highlights the disciplinary role of takeover threats. US firms that became less exposed to takeovers due to an exogenous change in regulation reduced their risk exposure. However, Low (2009) also notes that incentives contributed towards mitigating this risk reduction propensity.

In this paper, our objective is to evaluate the influence that foreign investors have played on the risk-taking behavior of Japanese firms. There are clear reasons why one might expect to find a significant positive effect. First, corporate governance in Japan is relatively favorable to creditors (Shleifer and Vishny, 1997). In this system, the main objective is less to maximize the firm's value than it is to preserve its survival. This might explain why Japanese firms exhibit the lowest cash flow volatility in the cross-country study of John et al. (2008). In addition, Nguyen (2009) shows that bank-controlled firms display a considerably lower level of idiosyncratic volatility in Japan. King and Wen (2010) explain that strong bondholder governance is associated with more low-risk investments. In contrast, foreign investors should be motivated by shareholder return (Ahmadjian and Robbins, 2005). They are also likely to be large institutions which have the power to influence firm policy (Shleifer and Vishny, 1986). In line with this view, Baba (2009) shows that the increased participation of foreign investors in the Japanese stock market has contributed to a significant increase in dividend payouts. Likewise, Ahmadjian and Robbins (2005) provide evidence that foreign ownership increased the likelihood of downsizing and asset divestiture.

Following Cheng (2008) our investigation begins with a cross-sectional analysis. The results show a strong consistent relation between foreign ownership and risk taking, regardless of the performance benchmarks used to infer risk and irrespective of industry adjustments. We then use instrumental variables to control for the endogeneity of ownership and risk taking. The remarkable outcome is to observe a stronger positive effect, which suggests that foreign investors tend to select low-risk firms.[1] This explanation is consistent with anecdotal evidence that foreign investors have picked out cash-rich firms and the fact that these firms are characterized by lower risk.[2]

We also take into account unobserved firm characteristics by running random and fixed firm-effects regressions. In line with Adams et al. (2005) risk is measured for each firm and at each point in time by the absolute deviation from the firm's expected performance. Detection of a statistically significant effect is facilitated by the substantial time-variation in foreign ownership, which is not the case of most governance variables which barely vary over time (Zhou, 2001). Finally, we show that other ex ante measures of risk-taking such as R&D and advertisement expenses, and the occurrence and amount of acquisitions are also positively related to the level of foreign ownership. Overall, the results indicate that ownership structure can have a significant impact on corporate decisions, and is therefore likely to have an effect on firm performance although this link has been empirically difficult to establish.

[1] The aim may be to rectify an unusual level of risk aversion or to induce firms to implement new policies that result in higher risk-taking. In this respect, the strategy adopted by Shinsei Bank is particularly revealing. In 2000, Shinsei became the first Japanese bank to be controlled by a group of foreign investors. Following a more aggressive business model, the bank heavily invested in collateralized debt obligations (CDOs) compared to other Japanese banks which by and large avoided these relatively risky financial products.

[2] See Baba (2009) for anecdotal evidence taken from the financial press.

The rest of the paper is organized as follows. Section 2 describes the data and methodology. Section 3 presents the empirical results. Section 4 concludes.

2. Data and methodology

2.1. Sample and data sources

Our base sample is represented by all Japanese firms listed on the Tokyo Stock Exchange over the period 1998-2007. We start from 1998 because consolidated accounts are available from that year. Financial institutions, i.e. banks, securities and insurance companies, are excluded because of their different performance and risk-taking characteristics. We also require at least 6 consecutive years of operations to compute performance volatility measures. This reduces the sample to 1,615 firms providing 15,619 firm-year observations.

Like Baba (2009) our main data source is AMSUS (Active Management Support System) offered by Quick Corp. The primary data is the same as Nikkei NEEDS which has been extensively used in Japanese accounting and finance research. The database also provides aggregate shareholding information, such as institutional ownership, corporate ownership and foreign ownership. Kang and Stulz (1997) observe that Japan is the only major country where this information is available. To control for the endogeneity of foreign ownership,[3] we obtain information on ADR listings from adr.com, while information on executive stock options is sourced from Nikkei CGES, a database on the corporate governance of Japanese firms.[4]

2.2. Measurement and determinants of risk

The main empirical issue is to measure and relate risk to its potential determinants. In line with Cheng (2008) we define risk as the volatility over time of a firm's performance measure (called within-firm across-time volatility). This procedure is relatively standard. In fact, it has been extensively applied to stock returns to produce estimates of return volatility and its systematic and idiosyncratic components. For example, Nguyen (2009) examines the effect of family and bank control on the risk-taking of Japanese firms using relative idiosyncratic risk as the measure of anticipated risk. Likewise, Konishi and Yasuda (2004) investigate the role

[3] That is to identify the variation in foreign ownership unrelated to the unexplained variation in risk-taking.

[4] The data is also from the Nihon Keizai (Nikkei) newsgroup. See Aman and Nguyen (2008) for more details on some of the most important variables and their relation to corporate performance.

of regulation (capital adequacy requirements) on the risk-taking behavior of Japanese banks while Pathan (2009) examines the role of board power on the risk-taking behavior of US bank holding companies.

Following Cheng (2008) we consider 3 measures of performance: ROA, Tobin's Q, and stock returns. ROA is defined as operating income over total assets, Tobin's Q is proxied by the market to book value of assets, and monthly stock returns are adjusted for dividends and splits. These three measures are obviously correlated. For instance, higher returns are likely to be associated with higher Q ratios. Both also reflect higher realized or anticipated profitability. As a result, a positive correlation is also likely to exist between the corresponding volatility measures. In this regard, Wei and Zhang (2006) show that the higher (idiosyncratic) return volatility of US firms can be explained by their greater earnings variability.

In addition, we calculate industry-adjusted volatility using the 2-digit classification from the Tokyo Stock Exchange. For example, industry-adjusted volatility of ROA is computed as the volatility of ROA minus the median industry ROA in the same year.[5] These measures take out the variation in performance over time common to the industry, and can be viewed as measures of idiosyncratic volatility.

This way of measuring risk has the disadvantage of collapsing the initial panel (of 15,619 firm-year observations) into a single cross section (of 1,615 firms). To explain the cross sectional difference in risk, we thus calculate the average value of the explanatory variables over the sample period. The association between the 2×3 risk-taking measures and their determinants is estimated by OLS with standard errors corrected for heteroskedasticity.

$$\begin{aligned} RISK_i = \gamma_0 + \gamma_1 FOROWN_i + \gamma_2 LNTA_i + \gamma_3 DEBT_i + \gamma_4 CAPEX_i + \gamma_5 AGE_i \\ + \varphi \cdot IND_i + \eta_i \end{aligned} \qquad (1)$$

RISK represents the standard deviation of ROA, Tobin's Q (logged) or stock returns calculated over the sample period (with or without industry-adjustment); FOROWN is the level of foreign ownership; LNTA is the log of total assets; DEBT is the ratio of total debt to total assets; CAPEX is capital expenditures divided by sales; AGE is measured by the number

[5] Using mean-adjusted performance provides qualitatively similar results.

of years since the firm's listing; IND is a vector of industry dummies based on the stock exchange's 2-digit industry classification; and η_i is the error term.

2.3. Endogeneity issues

Significant bias may occur because of endogeneity of (foreign) ownership. In particular, OLS will overstate the influence of foreign ownership if foreign investors tend to invest in high-risk firms (perhaps because of their higher expected returns). On the other hand, if foreign investors choose to invest in low-risk firms with the view of correcting their greater deviation from optimal risk-taking, OLS estimates will understate their positive influence on the firm's risk-taking behavior. To control for this endogeneity problem, we follow John et al. (2008) and use an instrumental variable approach.

Our identification procedure involves two firm-level instruments. The first instrument, ADR, indicates that the firm had an active American Depository Receipt (ADR) over the sample period. ADR issuance suggests interest from US investors and should therefore be highly correlated with the level of foreign ownership. Analyzing the ownership of Japanese firms, Kang and Stulz (1997) find that ADRs are associated with higher foreign ownership.[6] At the same time, existence of an ADR program does not affect the firm's capital structure (or its balance sheet). Hence, there is no reason to believe that it should have an effect on the firm's risk-taking policy other than through the influence of foreign investors.

The second instrument, ESO, indicates that the firm's top executives have received stock options. This initiative should indicate that the firm is opened to US-style capitalism and in particular shareholder value creation, which should appeal to foreign investors.[7] Although theory suggests that stock-related compensation might induce higher risk taking, the empirical evidence is rather mixed.[8] Hence, we do not expect ESO to be correlated with the unexplained components of risk taking, which is a critical requirement for a valid instrument.

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[6] Aggarwal et al. (2005) observe similarly that US mutual funds invest more in emerging market firms that have ADR programs. The explanation appears to be that these firms have better quality disclosures.

[7] ESO may also reflect the firm's better governance, and could thus provide a strong motive for foreign investors to increase their stockholding in line with the argument articulated in the previous footnote.

[8] Rajgopal and Shevlin (2002) document that stock options are associated with increased exploration risk in the oil and gas industry. However, Cohen et al. (2000) show that the effect on risk taking is generally small and does

Although the above arguments provide a strong justification for the choice of our instruments, it is also important to verify empirically that their suggested properties are actually satisfied. Regarding the requirement of significant correlation with the endogenous regressor, we follow John et al. (2008) and check the robust F-value for the joint significance of the instruments in explaining foreign ownership in the first-stage equation. In addition, we compute the partial R^2 which measures the fraction of the variation of risk explained by the instruments net of their effect through the (other) exogenous variables. Regarding the requirement of absence of correlation with the error term, we perform a Hansen J-test and verify that it is not rejected.

2.4. Unobservable firm characteristics

Another concern is that the results could derive from unobserved firm characteristics, such as managerial risk aversion, which could stem from different managerial horizons or demographic traits. To control for these missing variables, we use a panel regression approach with random and fixed firm-effects. To generate risk estimates at each point in time, we follow Adams et al. (2005) and Pathan (2009) and define risk as the absolute deviation from the firm's expected performance.

Expected ROA and Tobin's Q (logged) are predicted with the following models including year and industry dummies:

$$\begin{aligned} \text{ROA}_{i,t} = {} & \gamma_0 + \gamma_1 \text{FOROWN} + \gamma_2 \text{LNTA}_{i,t} + \gamma_3 \text{DEBT}_{i,t} + \gamma_4 \text{CAPEX}_{i,t} + \gamma_5 \text{AGE}_{i,t} \\ & + \lambda \cdot \text{YR}_t + \varphi \cdot \text{IND}_i + u_i + \varepsilon_{i,t} \end{aligned} \tag{2}$$

$$\begin{aligned} \text{LNQ}_{i,t} = {} & \gamma_0 + \gamma_1 \text{FOROWN}_{i,t} + \gamma_2 \text{ROA}_{i,t} + \gamma_3 \text{LNTA}_{i,t} + \gamma_4 \text{DEBT}_{i,t} + \gamma_5 \text{CAPEX}_{i,t} \\ & + \gamma_6 \text{AGE}_{i,t} + \lambda \cdot \text{YR}_t + \varphi \cdot \text{IND}_i + u_i + \varepsilon_{i,t} \end{aligned} \tag{3}$$

Consistent with Adams et al. (2005) and Cheng (2008) we include foreign ownership in the performance equations on the premise that ownership structure affects the level as well as the volatility of the firm's performance.

not seem to affect shareholder wealth. Lewellen (2003) argues that stock options may actually discourage risk taking if they are in the money.

To predict stock returns, we use the CAPM and Fama and French (1993) three-factor model

$$R_{i,t} - RF_t = \alpha_i + \beta_i (RM_t - RF_t) + \varepsilon_{i,t} \tag{4a}$$

$$R_{i,t} - RF_t = \alpha_i + \beta_i (RM_t - RF_t) + \gamma_i HML_t + \varphi_i SMB_t + \varepsilon_{i,t} \tag{4b}$$

RM is the monthly return on a value-weighted market index; RF is the one-month repo rate. SMB (small minus big) and HML (high minus low) are the returns on the zero-investment factor-mimicking portfolios constructed according to Fama and French (1993).

In equations 2-4, the error term $\varepsilon_{i,t}$ represents the unexpected component of performance. Since we are interested in the deviation from expected performance, we take the absolute value of $\varepsilon_{i,t}$ as the proxy for firm i's risk-taking at time t. This variable is then regressed on the variables appearing on the right-hand side of the Tobin's Q equation.

$$\begin{aligned} \left|\varepsilon_{i,t}\right| = \gamma_0 + \gamma_1 FOWN_{i,t} + \gamma_2 ROA_{i,t} + \gamma_3 LNTA_{i,t} + \gamma_4 DEBT_{i,t} + \gamma_5 CAPEX_{i,t} \\ + \gamma_6 AGE_{i,t} + \lambda \cdot TIME_t + \varphi \cdot IND_i + \eta_{i,t} \end{aligned} \tag{5}$$

With the residuals from equations 2-3, TIME is a vector of year dummies. With the residuals from equations 4, TIME is a vector of month dummies. Since the variables on the right-hand side are clearly persistent, we follow Petersen (2009) and estimate the equations with standard errors clustered by firm.

3. Results

3.1. Sample statistics

Table 1 presents descriptive statistics for the sample. Volatility of ROA is seen to be remarkably low at less than 2.5% which underlines the aversion of Japanese companies towards risk. This figure is consistent with the results of John et al. (2008) in which Japanese firms exhibit the lowest level of cash flow volatility in a sample of 39 countries. In particular, this level is several times lower than the cash flow volatility of US firms (2.1% against 9%). Volatility of industry-adjusted ROA is slightly lower suggesting that only a small part of the firm's profitability is governed by industry conditions. Consistent with Hamao et al. (2003) volatility of monthly stock returns is about 11.75% which corresponds to an annual volatility of 40.7%. This level is noticeably lower than the return volatility of US firms. The lower industry-adjusted return volatility suggests a significant commonality of returns within each industry. Note that Tobin's Q is logged to minimize the influence of outliers.[9]

All the variables appear to be well-behaved. Average ROA, Tobin's Q and debt/total assets are close to the figures given in Nguyen et al. (2009). On the other hand, average R&D/sales is significantly lower since we don't exclude non-R&D reporting firms. Average foreign ownership over the sample period is 8.6%. However, the involvement of foreign investors has sharply increased from 6.91% in 1998 to 12.94% in 2007. Baba (2009) obtains higher ratios for a sample of larger firms (listed on the first section of the Tokyo Stock Exchange).[10] About 14.1% of the firms had an ADR and 26.9% had stock option plans. Finally, the average volume of acquisitions is relatively low (0.215% of total assets) since few firms (13.3% in any given year) are active in the market for corporate assets.

3.2. Cross-sectional regressions

Table 2 presents the cross-sectional analysis in line with Cheng (2008). The models for ROA and return volatility in Japan exhibit a similar goodness of fit as in the case of US firms. However, we obtain a much better fit for log of Tobin's Q than if we had used Tobin's Q. For the three performance measures employed for estimating risk taking, foreign ownership appears to be associated with significantly higher risk. Industry-adjusted measures provide similar indications. Concerning the other covariates, the effect of firm size is statistically significant and consistently negative which reflects the greater geographic and product diversification available to larger firms. Firm age also appears to produce a similar reduction in risk taking. Consistent with Adams et al. (2005) leverage has a positive effect on the volatility of stock returns. In contrast Cheng (2008) finds that the leverage has no effect on the return volatility of US firms. Capital investments appear to reduce return risk, but have a negligible effect on the volatility of ROA and Tobin's Q which is consistent with the findings of Adams et al. (2005) based on US firms.

[9] We avoid winsorizing the Q ratio because this might cause a downward bias in the volatility estimates; potentially assigning zero volatility to otherwise highly-volatile firms.

[10] We also find that larger firms have significantly higher foreign ownership. See section 3.3.

The results indicate that the impact of foreign ownership is economically significant. As a matter of fact, a one standard deviation increase in foreign ownership can be associated with a $0.0637 \times 8.91 = 0.57\%$ increase in ROA volatility. This impact is substantial in comparison with the $0.5367 \times 1.469 = 0.79\%$ decrease in ROA volatility resulting from a one standard deviation increase in firm size (the most significant covariate). As importantly, the impact of foreign ownership on ROA volatility is higher compared to the effect of a one standard deviation change in firm age (0.33%) or leverage (0.27%). Likewise, a one standard deviation increase in foreign ownership is associated with a $0.1192 \times 8.91 = 1.024$ % increase in the volatility of monthly returns. In contrast, return volatility is expected to be reduced by about 2% (1.6%) following a one standard deviation increase in firm size (leverage).

To provide a comparison with the effect of board size examined by Cheng (2008) a one standard deviation increase in board size can be associated with a $0.0211 \times 0.28 = 0.60\%$ decrease in ROA volatility and a $0.0396 \times 0.28 = 1.13\%$ decrease in return volatility. Thus the marginal effects appear to be surprisingly similar, but one should keep in mind that ROA and stock return volatility is several times higher in the US.

3.3. Control for endogeneity

As in other governance studies, there are reasons to suspect reverse causality or simultaneity between the level of risk taken by Japanese firms and the investment decisions made by foreign investors. For instance, foreign investors may have a preference for high-risk firms because they are perceived to offer better investment prospects. Consequently, although foreign investors may not induce any change in business policy in the firms in which they hold stakes, OLS regressions would point to a positive effect from foreign ownership. Alternatively, risk could be related to trade exposure to overseas markets. For example, a large proportion of sales generated in the US should be associated with higher risk because firms would face more competitive markets as well as they would be exposed to exchange rate fluctuations compared to domestic firms. At the same time, this higher overseas exposure may reduce information asymmetries and prompt greater investments from foreign investors (Kang and Stulz, 1997). This situation would also generate a positive relationship, but no causal link.

As a first attempt to dispel concerns that performance variability may cause changes in foreign ownership, we follow Cheng (2008) and substitute the first observation of foreign ownership to the average ownership in the cross sectional regressions. The point estimates on foreign ownership are found to be similar but somewhat smaller. For example, the coefficient for ROA volatility is 0.0412 (compared to 0.0637) and the coefficient for return volatility is 0.0678 (compared to 0.1192). These results are not tabulated to save space. Instead, we use an instrumental variable approach. As mentioned in section 2.3, the effectiveness of this approach critically depends on the availability of valid instruments. In our case, the instruments consist of indicators of an ADR and executive stock options (ESO). We have argued why these instruments should be highly correlated with the endogenous regressor (i.e., foreign ownership) and why they should not be correlated with the unexplained component of risk-taking (i.e., the error term in the second-stage equation).

Table 3 contains the results of the two-stage least-squares regressions. The first-stage indicates that ADR and ESO are highly significant with the expected signs. In fact, foreign ownership is almost 6% higher when Japanese firms have an ADR program and 2.36% higher when they have outstanding stock options. Jointly, the two instruments are highly significant with a robust F-value greater than 37. The Anderson-Rubin test also clearly rejects the hypothesis that the instruments are irrelevant. The partial R^2 (8.68%) is very significant as the instruments account for almost one fifth of the total R^2 (49.62%). Consistent with Kang and Stulz (1997), the coefficients on the included exogenous regressors indicate that foreign ownership is associated with larger, more profitable, better capitalized (with a lower leverage ratio) and rapidly growing firms (as suggested by their high capital expenditures).

The second-stage results show that predicted foreign ownership is highly significant in explaining performance variability. All the coefficients are statistically significant and about 2 times larger compared with OLS estimates. This finding supports the view that foreign investors target low-risk firms because of their inefficient (suboptimal) level of risk-taking with the purpose of correcting this inefficiency and improving the firm's performance. As Baba (2009) clearly shows, one way to achieve this is to force firms to reduce their cash reserves by increasing their dividend payouts.

Since the number of instruments is greater than the number of endogenous variables (two instruments for one endogenous regressor) the exogeneity of the instruments can be evaluated using the Hansen J-test.[11] Here, the test indicates that the instruments are valid since the hypothesis of an absence of correlation between the instruments and the error term in the second-stage equation(s) cannot be rejected even at the 10% level. Hence, the instruments (ADR and ESO) can be legitimately excluded from the second-stage regressions.

Our attention to the exogeneity of the instruments explains why we do not include cash holdings and dividend payout as instruments, despite indications that they determine the level of foreign ownership (Baba, 2009). Indeed, we find that foreign ownership exhibits a strong positive (negative) association with the firm's cash holdings (payout ratio) consistent with the intuition that foreign investors have targeted cash-rich firms. However, these variables are also highly correlated with all the risk-taking measures. For instance, cash holdings contribute to a significant proportion of the cross sectional variation in risk unexplained by the other regressors, and hence does not qualify as a valid instrument.

3.4. Heteroskedasticity tests

Since unobservable firm characteristics may still cause bias, we run heteroskedasticity tests on annual (for ROA and Q) and monthly (for stock returns) panels of performance volatility measures (Glejser, 1969). Following Adams et al. (2005) firm effects are considered to be randomly distributed and the error terms are clustered by firm in line with Petersen (2009). For ROA and Tobin's Q, risk is measured by the ex-post deviation from the predicted ROA and LNQ using performance equations 2-3. For deviation from expected returns (i.e., unexpected returns) we use the CAPM (Adams et al, 2005) and the Fama French three-factor model (Cheng, 2008). The residual does not include the firm effect which is assumed to be part of the firm's predicted performance. Our intention is to put greater emphasis on the time variation in the residual (i.e. performance volatility).

[11] The output is directly obtained with the command ivreg2 in Stata. Alternatively, it can be calculated by saving the error term from the second-stage regression; then regressing this error term on the excluded instruments and other control variables. The F-test for the joint significance of the instruments multiplied by the number of instruments is χ^2 distributed with 1 degree of freedom. For information, the critical values at the 10%, 5% and 1% levels are respectively 2.71, 3.84 and 6.63.

The panel regression results are reported in Table 4. As already observed, foreign ownership is positively and significantly associated with all the risk-taking proxies. Compared with the OLS estimates, the random-effect GLS estimates are reduced by half, but remain highly significant. This result is consistent with the difference observed between the OLS and 2SLS estimates and confirms in a more direct way that foreign ownership is associated with increased performance volatility. The regression results also indicate that increases in firm size are associated with lower risk, consistent with greater diversification benefits. The passage of time reflected in the increasing firm age also leads to lower risk. On the other hand, the higher risk associated with higher financial leverage is only apparent with idiosyncratic volatility (unexpected returns from the CAPM and Fama-French models).

For further evidence, we run fixed firm-effect regressions for ROA and Tobin's Q volatility, but not for stock returns since ownership data are only available annually. This approach is made possible by the significant time-variation in the foreign ownership variable, which other studies could not perform given the highly persistent nature of most governance variables examined in the literature (e.g., board size or CEO power).[12,13] The results given in Table 5 show that foreign ownership continues to have a significant effect on risk taking although the point estimates are marginally lower compared to the random-effect coefficients. Indeed, the coefficient for ROA volatility is 0.0257 with a robust (clustered) t-ratio of 3.94, while for the volatility of ln(Q) the coefficient is 0.0013 with a robust (clustered by firm) t-ratio of 3.14.

We also ask ourselves if there is a threshold before foreign ownership starts to affect corporate policies. To answer this question, we distinguish the case where the lagged level of foreign ownership is above 10%. The results provided in the last two columns of Table 5 show that introducing this threshold is irrelevant since the difference in the coefficients is negligible. We increase (decrease) the threshold to 20% (5%) but do not observe any change. Hence, it is possible to conclude that the effect of foreign ownership on corporate risk taking is linear and that it can be detected at any level of ownership.

[12] For example, Gompers et al. (2003) indicate that their anti-takeover index is relatively stable at the firm level and observe that most of the time-variation affecting the index comes from changes in the sample due to mergers, bankruptcies, and inclusion of new firms.

[13] In the absence of substantial time-variation, Zhou (2001) shows that fixed firm-effects may fail to detect a relationship even when the data is known to contain one.

Finally, we investigate whether a change relative to the distribution of foreign ownership has a similar impact on corporate risk. Our approach is to split the ownership distribution by quartiles and analyze the change in risk taking associated with a change in ownership quartile. This approach has the advantage of controlling the positive trend in foreign ownership displayed over the sample period. Because of that trend, an absolute increase in foreign ownership may potentially correspond to a decrease relative to the distribution of ownership.

To provide evidence regarding the significant time variation in foreign ownership we start by computing the transition probabilities between ownership quartiles. The results in Table 6 show that foreign ownership tends to remain high in firms where it is already high. Indeed, the probably to stay in the high ownership quartile is more than 85%. Similarly, firms in the low foreign ownership quartile have a probability of more than 76% to remain in that quartile. However, the likelihood of staying in any of the two middle quartiles is only about 2/3. In fact, there is a nontrivial probability that foreign ownership increases or decreases by two quartiles in the space of one year. This time variation is in sharp contrast to the relative stability of management ownership and other governance variables (Zhou, 2001; Gompers et al., 2003).

Table 7 presents the panel regressions of the absolute deviation of ROA and Tobin's Q on foreign ownership ranked by quartile. The estimates using random firm-effects suggest that a relative increase in foreign ownership by one quartile is associated with a 0.24% increase in the absolute deviation of ROA. This increase is economically significant considering that the standard deviation of the (cross sectional) volatility of ROA is about 2.2%. Similarly a quartile change in foreign ownership is associated with a significant change in the absolute deviation of the log of Q. The panel regressions with fixed firm-effects confirm the results with somewhat lower point estimates and t-statistics.

3.5 Ex ante measures of risk

We finally provide results for three ex-ante measures of risk taking: R&D intensity, advertising expenditures, and acquisitions. Kothari et al. (2002) argue that R&D expenses correspond to investments in high-risk projects. As a matter of fact, the rationale for the expensing of R&D investments (rather than their capitalization) is to reflect their highly uncertain payoffs. According to Cheng (2008) this explains why firms with larger boards tend to exhibit lower R&D expenditures. Coles et al. (2006) relate increases in R&D expenditures to managerial incentives to take risk through the sensitivity of CEO wealth to stock volatility. King and Wen (2010) also use R&D expenditures as a proxy for managerial risk taking.

Following Chan et al. (2001) and Nguyen et al. (2009) we scale R&D expenditures by total sales over the same period. Because their payoffs also present a high degree of uncertainty, we use advertising expenditures scaled by total sales as an indicator of high-risk investments. Consistent with Cheng (2008) we consider the amount of acquisitions scaled by total assets and its corresponding dummy. To address the potential bias due to the existence of a lower bound at zero, we increment the first 3 ratios by one and take their log. In line with Baba (2009) the equation involving the acquisition dummy is estimated using a generalized random-effects Probit model.

The regression results are reported in Table 8. For all the risk-taking measures, the effect of foreign ownership appears to be positive and statistically significant. Consistent with Nguyen et al. (2009), most of the variation in R&D intensity comes from cross-sectional differences (particularly, industry affiliation). Nonetheless, within-firm R^2 is reasonably high. R&D investments also appear to decrease with the firm's size and profitability although their cross-sectional level is positively associated with these factors (Nguyen et al. 2009). Advertising expenditures does not display the same cross-sectional pattern as shown from the comparatively lower between-firms R^2. Yet, the coefficient on foreign ownership is also significantly positive. As with the R&D measure, higher size and profitability are associated with lower advertising expenses, consistent with the existence of economies of scale.

Both the indicator of external acquisitions and the measure of their relative amount to the firm's assets appear to increase with the level of foreign ownership. But, in contrast to intangible investments in R&D or advertisement, both the occurrence and level of tangible investments tend to increase with the firm's size and profitability. Assuming that acquisitions represent relatively risky investments, the results support the notion that foreign investors have made a positive impact on the risk-taking behavior of Japanese firms.

4. Conclusion

Several stylized facts distinguish Japanese firms in cross-country studies. One of them is their extremely high level of liquid assets. For instance, Dittmar et al. (2003) show that corporate cash reserves in Japan is twice as large as in other countries. This precautionary behavior is consistent with a high level of managerial risk aversion. In fact, Japanese firms exhibit the lowest cash flow volatility in the sample analyzed by John et al. (2008). Hence, the involvement of foreign investors, and particularly US institutional investors, is likely to have triggered a significant change in their business policies. In line with this argument, Ahmadjian and Robbins (2005) observe a significant increase in restructuring while Baba (2009) find that Japanese firms have increased their dividends following increases in foreign ownership.

In this paper, we have hypothesized that foreign investors have also prompted Japanese firms to increase their risk taking behavior. The empirical results based on a large sample of firms listed over the period 1998-2007 overwhelmingly support this hypothesis. All the risk-taking proxies represented by ROA, Tobin's Q and stock return volatility increase with the level of foreign ownership. The estimates are not only statistically significant, but their magnitude is comparable to the effect of firm size and leverage, which are well-known for their potential to reduce or increase risk.

After controlling for the endogeneity of ownership as in John et al. (2008), the influence of foreign investors is found to be even stronger, with point estimates about twice as large. This is explained by the fact that foreign investors have targeted low-risk firms. Consistent with this view, Baba (2009) indicates that foreign investors tend to select cash-rich firms (with the aim of extracting their excess cash) which should also display a lower risk profile. Further analysis using panel regressions shows that increases in foreign ownership are associated with increases in all the indicators of risk, and in particular the volatility of ROA and Tobin's Q. Several ex-ante measures of risk, such as R&D intensity and corporate acquisitions, also display a positive association with foreign ownership. Hence, whilst apparently resisting the control of foreign investors, Japanese firms appear to have been influenced by the presence of the latter in their ownership structure. This result supports the notion that ownership matters. By affecting a number of key corporate decisions some categories of investors also have the power to affect firm performance.

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Table 1:
Descriptive statistics for the sample

Variables	Mean	Std dev	Pctile 25	Median	Pctile 75
Panel A: Cross-sectional data (N = 1,615 firm observations)					
Standard deviation of performance					
ROA (in %)	2.469	2.116	1.20	1.91	3.00
Ln(Q)	0.205	0.163	0.10	0.16	0.26
Return (in %)	11.754	4.474	8.83	11.01	13.61
Industry-adjusted ROA (%)	2.334	2.006	1.20	1.79	2.79
Industry-adjusted ln(Q)	0.175	0.145	0.09	0.13	0.21
Industry-adjusted Return (%)	9.978	3.824	7.70	9.26	11.20
Average firm characteristics and instrumental variables					
Foreign ownership (in %)	8.590	8.910	2.07	5.55	12.34
ROA (in %)	4.766	3.978	2.45	4.11	6.40
Tobin's Q	1.293	1.170	0.93	1.08	1.29
Ln(total assets)	11.339	1.469	10.33	11.12	12.15
Total debt/Total assets	0.247	0.180	0.09	0.23	0.37
Capex/sales	0.049	0.066	0.02	0.04	0.06
Firm age	30.81	19.07	9.5	39.5	47.5
ADR (dummy)	0.141	0.347	0	0	0
ESO (dummy)	0.269	0.443	0	0	1
Panel B: Time series cross sectional data (N = 15,619 firm-year observations)					
Absolute deviation from predicted performance					
ROA (in %)	1.728	2.199	0.50	1.12	2.17
Ln(Q)	0.131	0.164	0.04	0.09	0.16
R&D/sales (in %)	1.842	8.167	0	0.56	2.44
Advertising/ sales (in %)	0.539	1.795	0	0	0.27
Acquisitions/total assets (in %)	0.215	3.235	0	0	0
Acquisition dummy	0.133	0.340	0	0	0
Panel C: Time series cross sectional data (N = 184,540 firm-month observations)					
Absolute deviation from predicted monthly return					
CAPM	7.605	8.996	2.34	5.23	9.88
Fama French 3-factor model	6.998	8.261	2.20	4.88	9.10

The sample consists of 1,615 firms listed on the Tokyo Stock Exchange over the period 1998-2007. Standard deviation of performance is calculated over the whole sample. Absolute deviation from predicted performance is described in equations 2-5. ROA is operating income over total assets. Tobin's Q is the market to book value of assets. Returns are calculated monthly and adjusted for dividends and stock splits. Industry-adjusted performance is computed by subtracting the industry's average performance. Firm age is the number of years since the firm's listing. ADR indicates that the firm has an American Depository Receipt. ESO indicates that executives have received stock options. Financial data is from Nikkei AMSUS. ESO is from Nikkei CGES. ADR is from adr.com.

Table 2
Within-firm across-time performance volatility and foreign ownership

	Standard deviation			Standard deviation of industry-adjusted		
	ROA	Ln(Q)	Stock return	ROA	Ln(Q)	Stock return
FOROWN	0.0637 ***	0.0057 ***	0.1192 ***	0.0630 ***	0.0054 ***	0.1175 ***
	(6.15)	(7.48)	(6.61)	(6.30)	(7.23)	(6.78)
ROA	-0.0367	0.0010	-0.1742 ***	-0.0556	0.0014	-0.1488 ***
	(-0.76)	(0.36)	(-3.51)	(-1.19)	(0.53)	(-3.19)
LNTA	-0.5367 ***	-0.0316 ***	-1.4169 ***	-0.5410 ***	-0.0263 ***	-1.2253 ***
	(-8.93)	(-7.04)	(-11.01)	(-9.23)	(-6.02)	(-10.10)
DEBT	1.5320 ***	-0.0692 ***	8.8975 ***	0.9892 ***	-0.0347 *	6.5697 ***
	(4.77)	(-3.12)	(14.25)	(3.17)	(-1.70)	(11.93)
CAPEX	-0.5938	0.1530 **	-6.5656 ***	0.3702	0.1593 **	-4.1332 ***
	(-0.71)	(2.01)	(-5.05)	(0.51)	(2.05)	(-3.45)
AGE	-0.0174 ***	-0.0006 **	0.0014	-0.0208 ***	-0.0009 ***	-0.0121 **
	(-4.33)	(-2.35)	(0.22)	(-5.36)	(-3.86)	(-2.08)
F value	14.37 ***	21.5 ***	27.53 ***	14.15 ***	31.96 ***	22.73 ***
R^2	0.2657	0.3306	0.3767	0.2742	0.3155	0.3377

The sample consists of 1,615 firms listed on the Tokyo Stock Exchange over the period 1998-2007. Performance variability is calculated over the sample period. ROA is operating income over total assets. Ln(Q) is the log of market to book value of assets. Stock returns are adjusted for dividends and stock splits. Industry-adjusted performance is computed by subtracting the industry's median performance. All the explanatory variables are averaged over the sample period. FOROWN is the percentage of shares owned by foreign investors. LNTA is the log of total assets. DEBT is total debt over total assets. CAPEX are capital expenditures over sales. AGE is the number of years since the firm's listing. All regressions include a constant and industry dummies. Standard errors are corrected for heteroskedasticity. ***, **, * indicate significance at the 1%, 5%, and 10% level.

Table 3:
Instrumental variable regressions

	1st stage:	2nd stage: Standard deviation of performance		
	FOROWN	ROA	Ln(Q)	Return
Predicted FOROWN		0.1729 ***	0.0136 ***	0.2205 ***
		(5.47)	(6.29)	(4.49)
ADR	5.9719 ***			
	(6.42)			
ESO	2.3648 ***			
	(5.26)			
ROA	0.4190 ***	-0.0935 *	-0.0032	-0.2269 ***
	(6.20)	(-1.87)	(-1.22)	(-3.92)
LNTA	2.3902 ***	-0.9109 ***	-0.0588 ***	-1.7638 ***
	(11.34)	(-7.27)	(-6.90)	(-8.03)
DEBT	-8.9363 ***	2.5591 ***	0.0056	9.8497 ***
	(-7.64)	(6.06)	(0.18)	(13.55)
CAPEX	13.6879 ***	-2.2842 **	0.0300	-8.1327 ***
	(2.89)	(-2.27)	(0.36)	(-5.33)
AGE	-0.0135	-0.0155 ***	-0.0005 *	0.0032
	(-1.12)	(-3.93)	(-1.82)	(0.48)
F-test instruments	37.06 ***			
Anderson-Rubin test	17.00 ***			
Partial R^2	0.0868			
Hansen J-test		1.972	1.354	0.184
p-value		0.1602	0.2446	0.6675
F value	29.73 ***	10.64 ***	14.77 ***	25.43 ***
R^2	0.4962	0.1489	0.2262	0.3543

The sample consists of 1,615 firms listed on the Tokyo Stock Exchange over the period 1998-2007. Performance variability is calculated over the sample period. ROA is operating income over total assets. Ln(Q) is the log of market to book value of assets. Stock returns are adjusted for dividends and stock splits. All the explanatory variables are averaged over the sample period. FOROWN is the percentage of shares owned by foreign investors. ADR indicates that the firm had an ADR. ESO indicates that the firm has awarded executive stock options. LNTA is the log of total assets. DEBT is total debt over total assets. CAPEX are capital expenditures over sales. AGE is the number of years since the firm's listing. All regressions include a constant and industry dummies. Standard errors are corrected for heteroskedasticity. ***, **, * indicate significance at the 1%, 5%, and 10% level.

Table 4:
Glejser heteroskedasticity tests with random firm-effects

	Absolute deviation from predicted performance							
	ROA		Ln(Q)		Return (CAPM)		Return (FF)	
FOROWN	0.0327	***	0.0022	***	0.0418	***	0.0495	***
	(5.20)		(6.73)		(8.53)		(10.89)	
ROA	-0.0957	***	0.0016	**	-1.5900		0.3754	
	(-5.12)		(2.25)		(-1.61)		(0.41)	
LNTA	-0.4276	***	-0.0264	***	-0.7926	***	-0.8041	***
	(-8.20)		(-8.99)		(-15.02)		(-15.97)	
DEBT	-0.3605		-0.0199		3.1732	***	2.8012	***
	(-1.49)		(-1.12)		(7.85)		(8.22)	
CAPEX	0.2922		-0.0013		0.2567		0.0905	
	(0.85)		(-0.05)		(0.50)		(0.18)	
AGE	-0.0081	***	-0.0306	**	-0.0091	***	-0.0120	***
	(-3.95)		(-2.46)		(-2.81)		(-3.77)	
Fixed effects	year, industry		year, industry		month, industry		month, industry	
R^2								
. within	0.0550		0.0677		0.0732		0.0355	
. between	0.2542		0.2364		0.3118		0.2991	
. overall	0.1509		0.1487		0.0945		0.0591	
Wald χ^2	14,148	***	269,242	***	11,656	***	6,187	***

Predicted performance is described in equations 2-4. Absolute deviation from predicted performance is the absolute value of the residual excluding firm effects described in equation 5. ROA is operating income over total assets. Q is the market to book value of assets. Returns are predicted either using the CAPM or Fama-French (FF) three-factor model. FOROWN is the percentage of shares owned by foreign investors. LNTA is the log of total assets. DEBT is total debt over total assets. CAPEX is capital expenditures over sales. AGE is the number of years since the firm's listing. The sample for ROA and LNQ consists of 15,619 firm-year observations. The sample for stock returns consists of 184,540 firm-month observations. The equations are estimated using GLS random effects with standard errors clustered by firm. ***, **, * indicate significance at 1%, 5%, and 10%.

Table 5:
Glejser heteroskedasticity tests with fixed firm-effects and ownership threshold

	Absolute deviation from predicted performance							
	ROA		Ln(Q)		ROA		Ln(Q)	
FOROWN	0.0257	***	0.0013	***	0.0279	**	0.0012	
	(3.94)		(3.14)		(2.09)		(1.27)	
FOROWN × lagged FOROWN > 10%					-0.0024		0.0002	
					(-0.26)		(0.24)	
ROA	-0.1006	***	0.0029	***	-0.1005	***	0.0029	***
	(-4.75)		(3.45)		(-4.77)		(3.44)	
LNTA	-0.9450	***	-0.1099	***	-0.9431	***	-0.1100	***
	(-4.43)		(-7.89)		(-4.50)		(-7.92)	
DEBT	-0.7172		0.0426		-0.7184	*	0.0427	
	(-1.65)		(1.19)		(-1.65)		(1.20)	
CAPEX	0.7454	**	0.0382		0.7482	**	0.0380	
	(2.23)		(1.39)		(2.24)		(1.38)	
AGE	0.0291	***	-0.0013	*	0.0285	***	-0.0012	*
	(3.13)		(-1.93)		(3.06)		(-1.81)	
Fixed effects	year, firm		year, firm		year, firm		year, firm	
R^2								
. within	0.0595		0.0840		0.0595		0.0840	
. between	0.0910		0.0724		0.0921		0.0721	
. overall	0.0498		0.0372		0.0503		0.0370	
F value	15.64	***	36.35	***	14.93	***	33.93	***

Predicted performance is described in equations 2-3. Absolute deviation from predicted performance is the absolute value of the residual excluding firm effects described in equation 5. ROA is operating income over total assets. Q is the market to book value of assets. FOROWN is the percentage of shares owned by foreign investors. LNTA is the log of total assets. DEBT is total debt over total assets. CAPEX is capital expenditures over sales. AGE is the number of years since the firm's listing. The sample consists of 15,619 firm-year observations. The equations are estimated using fixed firm-effects with standard errors clustered by firm. ***, **, * indicate significance at 1%, 5%, and 10%.

Table 6:
Transition probabilities between foreign ownership quartiles (in percentage)

	Foreign ownership quartile (year N+1)			
	1	2	3	4
Foreign ownership quartile (year N)				
1	76.6	17.6	4.7	1.1
2	16.2	66.6	15.8	1.4
3	1.6	17.3	68.0	13.1
4	0.2	0.9	13.1	85.8

The sample consists of 15,619 firm-year observations from 1998 to 2007.

Table 7:
Panel regressions using foreign ownership quartiles

	Random firm effects				Fixed firm effects			
	ROA		Ln(Q)		ROA		Ln(Q)	
QRTFRGN	0.2391	***	0.0177	***	0.1812	***	0.0085	***
	(6.35)		(8.15)		(4.81)		(3.39)	
ROA	-0.0951	***	0.0016	**	-0.1515	***	0.0013	*
	(-5.11)		(2.29)		(-6.12)		(1.81)	
LNTA	-0.4143	***	-0.0263	***	-0.5552	**	-0.0770	***
	(-8.89)		(-9.16)		(-2.58)		(-4.68)	
DEBT	-0.3623		-0.0175		-1.7120	***	0.0261	
	(-1.48)		(-0.99)		(-3.35)		(0.59)	
CAPEX	0.3321		0.0016		0.7789	**	0.0144	
	(0.97)		(0.06)		(2.41)		(0.49)	
AGE	-0.0076	***	-0.0003	**	0.0556	***	-0.0084	***
	(-3.74)		(-2.04)		(4.22)		(-8.59)	
Fixed effects	year, industry		year, industry		year, firm		year, firm	
R^2								
. within	0.0525		0.0675		0.0905		0.0671	
. between	0.2496		0.2304		0.0362		0.0648	
. overall	0.1446		0.1446		0.0181		0.033	
Wald test | F value	14,399	***	267,307	***	16.40	***	35.83	***

The dependent variable is the absolute deviation from the firm's expected performance based on ROA and the log of Tobin's Q. QRTFRGN is the foreign ownership quartile. ROA is operating income over total assets. Q is the market to book value of assets. QRTFRGN is the foreign ownership quartile in a given year. LNTA is the log of total assets. DEBT is total debt over total assets. CAPEX is capital expenditures over sales. AGE is the number of years since the firm's listing. The sample consists of 15,619 firm-year observations. The equations are estimated using random and fixed firm-effects. Standard errors are clustered by firm. ***, **, * indicate significance at 1%, 5%, and 10%.

Table 8:
Ex ante measures of risk taking and foreign ownership

	R&D expenses/sales		Advertising expenses/sales		Acquisitions /total assets		Acquisition dummy	
FOROWN	0.1482	***	0.0246	***	0.0025	***	0.0031	***
	(5.41)		(3.48)		(3.62)		(5.65)	
ROA	-0.0701	***	-0.0126	***	0.0028	***	0.0012	*
	(-13.67)		(-9.11)		(3.01)		(1.75)	
LNTA	-0.3843	***	-0.0769	***	0.0116	***	0.0392	***
	(-3.98)		(-3.06)		(3.54)		(10.10)	
DEBT	0.4660		0.2479	***	0.0351	*	0.0069	
	(1.53)		(3.13)		(1.84)		(0.34)	
CAPEX	-0.1283		-0.1404	***	0.0323	**	0.0242	
	(-0.74)		(-2.83)		(2.27)		(1.43)	
AGE	-0.0057	**	-0.0006		-0.0006	***	-0.0005	*
	(-2.38)		(-0.93)		(-2.70)		(-1.82)	
Fixed effects	year, industry		year, industry		year, industry		year, industry	
R^2								
. within	0.0337		0.0481		0.0207		0.0517	
. between	0.4631		0.1313		0.1117		0.1600	
. overall	0.4176		0.1254		0.0446		0.0837	
Wald χ^2	3042.06	***	1573.17	***	640.82	***	1134.51	***

R&D/sales, Advertising/sales and Acquisitions/total assets are added to one and logged. The acquisition dummy indicates that the volume of acquisitions is positive. FOROWN is the percentage of shares owned by foreign investors. ROA is operating income over total assets. LNTA is the log of total assets. DEBT is total debt over total assets. CAPEX are capital expenditures over sales. AGE is the number of years since the firm's listing. The models are estimated using GLS random effects with standard errors clustered by firm, except for the Acquisition dummy where a generalised probit with random firm effects is used. The sample consists of 15,619 firm-year observations. ***, **, * indicate significance at 1%, 5% and 10%.