Volume 22, Number 3 – September 2020
China Accounting and Finance Review
中 国 会 计 与 财 务 研 究
2020 年 9 月 第 22 卷 第 3 期

The Impact of Controlling Families and Foreign Institutional Investors on Non-financial Performance Measures

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Received 18th of Frebuary 2020 Accepted 26th of August 2020

Abstract

This study examines how controlling family ownership and foreign institutional ownership affect companies' use of non-financial performance measures (NFPMs). We conducted two surveys (one in 2005 and the other in 2015) with publicly listed companies and used archival data from 254 respondent companies in Taiwan. Our results from the 2005 data show that foreign institutional ownership increases the use of NFPMs, while family control is not associated with the extent of NFPM use. After 10 years, the full sample shows that both controlling families and foreign institutional ownership have enhanced NFPM use. Furthermore, the full sample data reveal that controlling families demand more NFPMs when the CEO is not a family member. These results suggest that foreign institutional ownership increases the use of non-financial performance measures, shedding additional light on the trade-off between monitoring mechanisms and the design of optimal performance measures.

***Keywords*:** Controlling Families; Foreign Institutional Ownership; Non-Financial Performance Measures; Reporting Transparency

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I. Introduction

Large shareholders often serve as an important monitoring mechanism on firm policy and operating activities (Shleifer and Vishny, 1997; Hope *et al.*, 2012; Van Wesep, 2014; Yeh, 2014). Controlling families[2] who hold large equity shares and/or key management positions can directly monitor managerial behaviours and operating activities (Westhead and Cowling, 1998). By contrast, institutional investors cannot access internal information easily and often perform the role of external monitoring. Therefore, institutional investors are concerned about monitoring the firm's operating activities. Prior accounting research on ownership structure has mainly focused on financial performance (see Weir *et al.*, 2002; Anderson and Reeb, 2003; Larcker *et al.*, 2007; Ward *et al.*, 2009; Chung and Chan, 2012) and has paid little attention to its effect on monitoring mechanisms such as the use of non-financial performance measures (NFPMs). NFPMs include measures for customer loyalty, employee satisfaction, and process performance areas that are not finance related but ultimately affect financial performance (Ittner and Larcker, 2009). This study examines how two important types of ownership, controlling families and foreign institutional investors, a special type of large shareholder, affect the extent to which firms use NFPMs to assess company-wide performance.

Controlling families typically have long-term associations with a firm and often serve as an internal monitoring mechanism. By contrast, foreign institutional investors usually actively seek investment opportunities to diversify their portfolios internationally (Huang and Shiu, 2009; Liang *et al.*, 2012) and also have a good understanding of each country's investment environment and legal protections for investors. Performance measurement plays many important roles and provides a big-picture perspective on running a corporation. Often, companies include NFPMs such as indicators of customer satisfaction, product quality, and innovation in their strategic performance management frameworks and CEO compensation schemes (O'Connell and O'Sullivan, 2014). These NFPMs are important indicators of a firm's financial performance (Ittner and Larcker, 1998; Nagar and Rajan, 2005; Cohen *et al.*, 2012; O'Connell and O'Sullivan, 2014) and can help institutional investors better monitor the firm's operating activities and decide on a timely basis if any actions are needed.

Corporate governance has received increasing attention globally. In Asia, firms are predominantly controlled by families, and most controlling families are associated with pyramidal and cross-holding structures (Claessens *et al.*, 2000). This study uses the setting of Taiwan for two reasons. First, the ownership structure of Taiwanese firms is different from that of western countries. In addition to the vital role of family control (Masulis *et al.*, 2011), foreign institutional ownership plays an increasingly important role in the Taiwanese market (Huang and Shiu, 2009; Liang *et al.*, 2012). Yeh *et al.* (2001) report that, in 1995,

[2] "Controlling families" refers to family owners with the largest control rights (La Porta *et al.*, 1999; Yeh and Woidtke, 2005).

51.4 per cent of the publicly listed companies in Taiwan were family-controlled, using the cut-off criterion of 20 per cent. Also, analysing 251 Taiwanese listed companies in 1998, Yeh (2005) finds that 70.1 per cent of publicly listed companies had controlling shareholders, and families controlled 58.2 per cent of them. Furthermore, Taiwanese regulators and family-controlled firms have been actively reviewing and improving corporate governance mechanisms and reporting disclosure transparency. Because of these joint efforts, the trading value of foreign institutional investors[3] has exceeded that of domestic institutional investors in the Taiwanese stock market since 2005 (Chen *et al.*, 2008). Also, prior studies show that foreign institutional ownership plays a predominant role in shaping corporate governance practices outside the US (Barako *et al.*, 2006; Aggarwal *et al.*, 2011) and motivates Taiwanese firms to increase voluntary disclosure (Liang *et al.*, 2012).

Second, Taiwanese regulators improved the overall disclosure quality of the capital market by adopting the reporting transparency ranking system for all publicly listed companies in 2005. However, in 2015 they abolished the transparency ranking system and incorporated information disclosure evaluation into the corporate governance evaluation system. It is likely that the improvement of reporting transparency affects the demand for NFPMs by different types of large shareholder. Furthermore, the 10-year implementation of reporting transparency may influence demand for NFPMs among different types of large shareholder.

The use of NFPMs has increased significantly in Taiwan since the government established the transparency ranking system in 2005. For example, Lee and Yang (2011) conduct a survey about the performance measurement systems implementation in Taiwan and report that 54 per cent of publicly listed companies use a cause-and-effect performance measurement system that establishes the linkages between incentives, measures, and strategy. Also, Huang *et al.* (2013) find that more and more companies in the Taiwanese electronics industry are using internal process performance measures. Prior management accounting research has documented that performance measurement, a part of the governance mechanism, can increase goal congruence between shareholders and managers (e.g. Ittner and Larcker, 2009), and may also be used as a substitute for other monitoring mechanisms (Engel *et al.*, 2002). For instance, foreign institutional investors may resort to NFPMs to pinpoint operating problems and monitor managerial actions. They can also detect firms with high fraud risk by identifying inconsistent patterns between NFPMs and financial measures (Brazel *et al.*, 2009). Conversely, controlling families are able to monitor operating activities closely without relying on NFPMs. We thus expect that controlling families and foreign institutional investors may use NFPMs to different extents.

To test our hypotheses, we use both survey and archival data from publicly listed

[3] Foreign institutional investors have often included Taiwanese companies in their diversified investment portfolios (Huang and Shiu, 2009).

companies in Taiwan for the years 2005 and 2015. Our results from the 2005 data show a positive association between foreign institutional ownership[4] and a firm's use of NFPMs. This finding is quite robust whether we use the measure of their NFPM use at the aggregate level or from an individual perspective (i.e. customer, quality, and innovation). Also, it remains robust when we use three different measures of family control (i.e. family ownership, the cut-off point of 30 per cent voting rights, or the proportion of family members sitting on the board). This suggests that foreign institutional investors resort to using NFPMs to identify operating problems and evaluate managerial performance. Consistent with our conjecture, we find no association between controlling families and the firm's use of NFPMs in the 2005 sample, indicating that family owners do not rely on NFPMs to exercise their control over company policies or to monitor managerial activities. However, after 10 years (in 2015), our results show that both controlling families and foreign institutional investors increase a firm's use of NFPMs in the full sample (from 2005 and 2015).

Our additional analysis using the full sample reveals that when the CEO is not a family member, controlling families increase the firm's use of NFPMs and performance measures concerning customers and quality. In addition, we find a positive association between controlling families and reporting transparency, suggesting they may use higher reporting transparency as a signal to show their commitment not to extract the private benefit of control. While foreign institutional investors did not affect a firm's reporting transparency at the beginning of the implementation of a reporting transparency ranking system, their influence had increased 10 years later.

Our study adds to the literature on performance measurement and corporate governance in the following two aspects. First, prior research has primarily focused on whether organisational variables such as organisational culture (Henri, 2006), leadership type (Abernethy *et al.*, 2010), and organisational structure (Lee and Yang, 2011) affect the use of performance measurement systems. To extend these studies and respond to calls for the integration of performance measurement and governance mechanisms (Ittner and Larcker, 2009), we provide empirical evidence on the influence of ownership structure in a firm's use of NFPMs, which is an important element of monitoring mechanisms. Second, our study examines the role of two important types of ownership in Asian and emerging markets. Our results show that foreign institutional investors used NFPMs extensively in both the 2005 sample and the full sample. One plausible explanation is that foreign institutional investors serve in an external monitoring role and may bring advanced measurement systems to the governance process. While controlling families did not use NFPMs extensively in 2005, they had increased the use of NFPMs by 2015. Our study sheds

[4] The average shareholding by foreign individual investors is 0.43 per cent, which is much smaller than that of foreign institutional investors (9.66%). Therefore, we did not include foreign individual investors in our analysis.

additional light on why Taiwanese companies with high foreign institutional ownership have a stronger motivation to use NFPMs than those with low foreign institutional ownership. In addition, this finding has managerial implications for the controlling families who tend to increase the use of NFPMs.

The remainder of the paper is organised as follows: Section II discusses hypothesis development. Section III presents the sample data and empirical models, followed by empirical results in Section IV. Conclusions and a summary are provided in Section V.

II. Literature Review and Hypothesis Development

2.1 Family Control and Use of NFPMs

There are two types of agency problem: Type I and Type II (Villalonga and Amit, 2006). While Type I agency problems arise from the separation of ownership and management, Type II agency problems are caused by conflicts of interest between large and small shareholders. To reduce Type I agency problems and align managers' and shareholders' interests, shareholders can either monitor managers closely or give them incentives based on key performance measures. Because of the free-rider problem, individual shareholders are not interested in monitoring the companies in which they invest (Shleifer and Vishny, 1997). By contrast, family owners' wealth is closely tied to firm value and they generally have a long-term horizon, resulting in a strong incentive for them to monitor managers closely. This long investment horizon also permits family owners to move further along the firm's learning curve and provides them with better knowledge, proprietary information, and superior oversight (Anderson and Reeb, 2003). From the perspective of power, the more concentrated the authority, the less widespread the decision-making power (Jung and Avolio, 1999), suggesting that family owners can exercise effective control over corporate policy. Because controlling families have considerable discretion over firm policies and can monitor the firm's operating activities, Type I agency problems can be reduced to a minimum (Chen *et al.*, 2008).

On the other hand, controlling families can induce more severe Type II agency problems due to conflicts of interest between large and minority shareholders. Prior studies have shown some ways to mitigate Type II agency problems. For example, using a sample from eight East Asian economies, Fan and Wong (2005) find that firms with Type II agency problems are more likely to hire Big 5 auditors, which helps alleviate the share price discounts of client firms. Srinidhi *et al.* (2014) report that family firms with strong board governance are more likely to choose specialist auditors and exhibit higher earnings quality than non-family firms, suggesting that strong governance can effectively mitigate Type II agency problems embedded in ownership structures. Similarly, using a sample of S&P 1500 firms from 2000 to 2008, Kang (2014) report that, compared to non-family firms, family firms are more likely to hire industry-specialist auditors. Although the aforementioned

studies focus on external auditors and board governance, Kuo and Hung (2012) show that the existence of another blockholder in addition to controlling families not only reduces Type II agency problems but also improves independent directors' monitoring function.

As discussed earlier, family owners can exercise control through both their equity holdings and key managerial positions in the firm (Westhead and Cowling, 1998). The power of controlling families allows them to get involved in making major decisions about a firm's operations and in directly monitoring managerial behaviours. Ho *et al.* (2017), for example, show that family ownership leads to firm deviation in IT investment to increase firm value. An important advantage of family firms is that owners have a valuable and trust-based relationship with senior managers. Also, family owners tend to use personal relationships rather than formal mechanisms to implement operating activities and achieve strategic goals (Mintzberg and Waters, 1982). Because it is costly to measure and track performance measures, family owners may not consider the benefits of using NFPMs to outweigh the costs of collecting such information. Using small and medium-sized firms in Austria and southern Germany, Speckbacher and Wentges (2012)[5] examine the association between a firm's use of multi-perspective performance measures in a strategic target setting and the involvement of founding families in the top management team. Their results show that when founding families are involved in the top management team, the firm reduces its use of performance measures, both financial and non-financial, in setting strategic targets. Speckbacher and Wentges attributed this reduction in use of performance measures to founding families' effective communication of tacit knowledge with employees. In light of the above discussion, our first hypothesis is as follows:

H1: Family control is negatively associated with the extent of NFPM use.

2.2 Foreign Institutional Ownership and Use of NFPMs

Unlike individual shareholders who lack the sophistication, resources, and incentives to monitor managers, institutional investors possess professional knowledge and resources, and often hold large equity shares and thus have a strong incentive to reduce agency problems (Huang and Shiu, 2009). Chang *et al.* (2009) argue that foreign institutional investors possess superior knowledge and a significant amount of capital, which helps them predict the underlying asset returns in the Taiwanese option market. However, foreign institutional

[5] Speckbacher and Wentges (2012) use a binary variable to measure whether a company uses multi-perspective performance measures for setting strategic targets. Specifically, they examine whether their sample companies use financial measures and three or more non-financial measures across at least two perspectives (i.e. customer, internal process, employee, and supplier) to set strategic targets. As will be discussed later, we focus on the extent of the use of 17 NFPMs covering three dimensions (i.e. customer, quality, and innovation) to evaluate departmental operations.

investors are not directly involved in a firm's operating activities,[6] unlike controlling families, who have an information channel via a family CEO or family board members. To reduce agency problems, they have to use incentive-based compensation contracts or closely monitor the company's operating activities (Jensen and Meckling, 1976). As shown in Hartzell and Starks (2003), institutional ownership is positively associated with the pay-for-performance sensitivity of top management compensation; however, it is negatively associated with the level of executive compensation. This suggests that institutional investors use performance-based measures instead of higher pay to align managers' interests with their own. Often, foreign institutional investors monitor management through corporate governance mechanisms and information gathering (Gillan and Starks, 2003).

On the other hand, prior research shows that institutional investors increasingly put pressure on managers to act in the best interests of shareholders. Bushee (1998) highlights institutional investors' influence on discouraging managers' myopic R&D investment behaviour. Chung *et al.* (2002) find that large institutional ownership reduces managers' opportunistic earnings management. In addition, Parrino *et al.* (2003) show that institutional ownership declines in the year prior to forced CEO turnover. When institutional investors are dissatisfied with a firm's management, they can not only put pressure on managers, but also "vote with their feet".

Wang *et al.* (2014) show that institutional ownership is positively associated with environment information disclosure quality. NFPMs cover broad areas such as customers, quality, and innovation, and these performance measures can be either leading or lagging indicators. Consequently, NFPMs can help foreign institutional investors pinpoint potential problems in the firm's operations, ask managers to take corrective actions, and also predict the firm's future financial performance. Although it is expensive to collect NFPMs, foreign investors may find that the benefits exceed the costs. Due to the monitoring benefits, foreign investors may put pressure on firm managers to act in the best interests of shareholders. Therefore, we expect a positive association between foreign institutional ownership and the extent of NFPM use. Below is our second hypothesis:

H2: Foreign institutional ownership is positively associated with the extent of NFPM use.

III. Method

3.1 Sample and Data

Our first data collection of NFPM use was based on a large survey conducted by Lee and

[6] Although investors with large long-term stakes in a company may access the board of directors and management (Carleton *et al.*, 1998), they usually do not have direct access to first-hand information about the company.

Young (2011), which examine the effect of organisational structure and competition on the design of performance measurement systems and their joint effect on performance.[7] In 2005, we used their survey data containing 177 companies to examine the use of performance measures and the ownership structure of publicly listed companies on the Taiwan Stock Exchange. After excluding 37 surveys without companies' demographical data and 10 firms with missing financial data in the *Taiwan Economic Journal* (TEJ) database, our final sample consisted of 130 firms. We combined data on performance measures from the survey with financial data and information about family control and foreign institutional ownership from the TEJ database.

In 2015, Taiwanese regulators decided to abolish the reporting transparency ranking system. In order to capture the influence of controlling family and foreign institutional investors over the 10-year horizon, we mailed the questionnaires to publicly listed companies again. Table 1 presents the industry distribution of the 2005 sample and full sample. It shows that the electronics industry is the largest industry in our data, accounting for 32.31 and 33.86 per cent of the responses in the two samples.

Table 1 Industry Distribution by Two-Digit SIC Code

	2005 sample		Full sample	
Industry Classification	**Frequency**	**%**	**Frequency**	**%**
Electronics	42	32.31	86	33.86
Finance and insurance	14	10.77	25	9.84
Electric	10	7.69	22	8.66
Chemical	10	7.69	18	7.09
Textile	8	6.15	12	4.72
Other	8	6.15	11	4.33
Steel	7	5.38	12	4.72
Construction	7	5.38	13	5.12
Foods	5	3.85	12	4.72
Cement	4	3.08	7	2.76
Plastics	3	2.31	8	3.15
Marine	3	2.31	6	2.36
Securities	3	2.31	5	1.97
Wire	2	1.54	4	1.57
Glass	1	0.77	2	0.79
Rubber	1	0.77	4	1.57
Motor	1	0.77	3	1.18
Tourism	1	0.77	2	0.79
Paper			1	0.39
Trade			1	0.39
Total	130	100.00	254	100.00

[7] One of the co-authors sent the questionnaire packages, including a cover letter and a pre-addressed, postage-paid envelope, to the chief financial officers (CFOs) of all 698 companies listed on the Taiwan Stock Exchange. The reason for using CFOs as participants is their extensive knowledge of their firms' operations and performance measurement systems. The response rate of this survey is 25.4 per cent, which falls into the 15–25 per cent range reported in prior studies using executives (e.g. Lee *et al.*, 2001; Baines and Langfield-Smith, 2003; Henri, 2006).

3.2 Measures: Independent and Dependent Variables

Family control. Following prior studies (Yeh and Woidtke, 2005; Chang *et al.*, 2010), we measure the power of controlling families by using family ownership (*FAM_SHARE*) and the proportion of family members sitting on the board (*FAM_DIR*). In addition, we use the cut-off points of 10, 20, and 30 per cent of voting rights to define firms controlled by families. Because we observe qualitatively similar results using all three cut-off points, we include the cut-off point of 30 per cent voting rights (*FAM_> 30%*), the strictest definition of family firms, in our main results.[8]

Foreign institutional ownership. Following Huang and Shiu (2009), foreign institutional ownership (*FOR_INST*) is measured as the percentage of equity shares held by foreign institutional investors.

NFPMs. Lee and Young's (2011) survey questions were based on Hoque and James' (2000) study in a manufacturing setting. Therefore, they made some modifications to survey questions to render them appropriate for both manufacturing and service companies. There are 17 NFPMs covering three non-financial dimensions (i.e. customers, quality, and innovation) (see Appendix). Respondents were asked to indicate the extent of their use of the 17 NFPMs on a 5-point Likert scale (1 = not at all; 5 = to a great extent). We calculate the average score for the NFPM category with a higher score indicating more use of NFPMs. We also perform a factor analysis with varimax rotation to verify whether the 17 measures could be grouped into the three specific dimensions of the non-financial perspective. Table 2 presents the factor analysis results. Our data show that 13 items are loaded onto the non-financial perspectives,[9] and therefore we use these 13 items to compute average scores of the extent of the usage of NFPMs overall (*NFPM*), customer measures (*CUSTOMER*), quality measures (*QUALITY*), and innovation measures (*INNOV*). The Cronbach's α coefficients are high (from 0.85 to 0.86), indicating high internal consistency.

In Table 2, the *quality* perspective (Factor 1) contains four items: number of customer complaints, percentage of shipments returned due to poor quality, number of warranty repairs requested by customers, and ratio of defective output/total output. These performance measures represent the need to improve quality, which could help management pinpoint drawbacks of products/services and the processes that need further improvement. The *customer* perspective (Factor 2) includes four measures: market share, survey of customer satisfaction, customer response time, and on-time delivery. Market share measures the condition of customers' purchase of company products, while survey of customer satisfaction measures their post-purchase satisfaction. Both customer response time and on-time delivery evaluate customer service performance under time pressure. The more

[8] Results based on using the other two cut-off points are available upon request.

[9] Four items (i.e. labour efficiency variance, employee satisfaction, labour productivity, and availability of information systems) have factor loadings below 0.5. Therefore, they are removed from our analysis.

prompt the response to customers and on-time delivery, the better the performance in the customer dimension. Moreover, the *innovation* perspective (Factor 3) includes five measures: manufacturing/service lead time, time to market new products/services, number of new product/service launches, on-the-job training hours, and employees' suggestions. Manufacturing/service lead time and time to market new products/services measure the time spent in manufacturing and introducing new products/services, while the number of new product/service launches serves to assess a company's innovation. Employees' job training hours and their suggestions can help to gauge a company's learning environment.

Table 2 Factor Analysis of the NFPMs

	Factor Loadings after Varimax Orthogonal Rotation		
Item	**Factor 1 Quality**	**Factor 2 Customer**	**Factor 3 Innovation**
Market share	0.09	**0.55**	0.39
Survey of customer satisfaction	0.17	**0.84**	0.20
Customer response time	0.36	**0.78**	0.24
On-time delivery	0.41	**0.70**	0.19
Number of customer complaints	**0.72**	0.31	0.17
Percentage of shipments returned due to poor quality	**0.86**	0.12	0.10
Number of warranty repairs requested by customers	**0.68**	0.26	0.37
Ratio of defective output/total output	**0.83**	0.16	0.14
Manufacturing/service lead time	0.48	0.45	**0.52**
Time to market new products/services	0.29	0.16	**0.75**
Number of new product/service launches	0.22	0.08	**0.89**
On-the-job training hours	0.12	0.43	**0.59**
Employees' suggestions	0.06	0.36	**0.62**
Eigenvalues	7.78	1.58	1.36
Percentage of variance explained	50.27	11.30	8.48
Cronbach's α	0.86	0.86	0.85

3.3 Control Variables

We control for variables that may affect a firm's use of NFPMs. Prior studies have shown that leverage can explain a company's decision to adopt NFPMs (Ittner *et al.*, 1997; Said *et al.*, 2003; HassabElnaby *et al.*, 2005). Thus, we include leverage (*LEV*), measured as a firm's debt-to-equity ratio, in our model. We also include firm size (*SIZE*), proxied by the logarithm of total assets, because it may affect the design of the management control system (Chenhall, 2003). When the number of employees working in a company increases, management complexity intensifies. As a result, larger firms tend to use more NFPMs to

monitor operating activities (Hoque and James, 2000; Lillis and Veen-Dirks, 2008). We therefore control for the number of employees (*#EMP*). A company's growth opportunity is normally reflected in its share price but not necessarily in accounting information (Schiehll and Bellavance, 2009). That is, the greater the firm's growth, the less informative the accounting measures are. This suggests that a firm's growth opportunities affect its use of performance measures (Ittner and Larcker, 2002; Schiehll and Bellavance, 2009). In this regard, we include firm growth (*MB*), measured by the ratio of market value to its book value of assets (Engel *et al.*, 2002; Matějkay *et al.*, 2009), in our model. Additionally, prior studies report that firms operating in a regulated industry rely more heavily on the use of NFPMs (Ittner *et al.*, 1997; Said *et al.*, 2003). We thus control for regulated industry (*REG_IND*), coded 1 for firms operating in a regulated industry and 0 otherwise.

3.4 Empirical Models

We use the following model to test H1 and H2 (i.e. the relationship between family control, foreign institutional ownership, and the use of NFPMs):

$$MEASURE_{it} = \beta_0 + \beta_1 FAM\_CNTL_{it} + \beta_2 FOR\_INST_{it} + \beta_3 LEV_{it} + \beta_4 \#EMP_{it} + \beta_5 MB_{it} + \beta_6 REG\_IND_{it} + \varepsilon_i \quad (1)$$

where:

$MEASURE_{it}$ = the extent of NFPM use of firm i in year t, which may refer to $NFPM_{it}$, $CUSTOMER_{it}$, $QUALITY_{it}$, or $INNOV_{it}$;

FAM_CNTL_{it} = family control of firm i in year t. It refers to either FAM_SHARE_{it}, FAM_DIR_{it}, or $FAM\_> 30\%$;

FOR_INST_{it} = the percentage of equity shares held by foreign institutional investors of firm i in year t;

LEV_{it} = leverage of firm i in year t, measured by debt/equity ratio;

$\#EMP_{it}$ = the logarithm of the number of employees of firm i in year t;

MB_{it} = growth opportunities of firm i in year t;

REG_IND_{it} = the industry dummy variable in year t, whereby firm i in a regulated industry equals 1 and 0 otherwise.

In model (1), the industry fixed effect is controlled for. Recall that H1 predicts a negative association between family control and the extent of NFPM use; we therefore expect β_1 to be negative. H2 predicts a positive association between foreign institutional ownership and the extent of NFPM use, suggesting that β_2 will be positive.

IV. Results

4.1 Descriptive Statistics

Table 3 presents the descriptive statistics for the variables of the 2005 sample and full sample, including the years 2005 and 2015. As shown, the average use of NFPMs is rated 3.55 (on a 5-point scale) in the 2005 sample, indicating a moderate level of use.[10] Also, the average family ownership is 28.22 per cent, which is similar to the 30.33 per cent reported in Yeh and Woidtke (2005). And an average of 57.66 per cent of board seats are held by family members, which is similar to the 53 per cent reported in Lin (2005). In addition, our data show that foreign institutional investors own an average of 9.66 per cent of equity shares. The sample firms have an average of 1,577 employees and total assets of $1,654 million, and 15 per cent of them operate in regulated industries while 82 per cent choose Big 4 accounting firms as their auditors. The full sample also shows similar descriptive statistics.

Table 3 Descriptive Statistics for Key Variables

	2005 Sample					Full Sample				
Variable	N	Mean	Std Dev	Max	Min	N	Mean	Std Dev	Max	Min
NFPM	130	3.55	0.60	5.00	1.95	254	3.58	0.61	5.00	1.00
CUSTOMER	130	3.65	0.69	5.00	1.75	254	3.65	0.73	5.00	1.00
QUALITY	130	3.59	0.76	5.00	1.75	254	3.70	0.76	5.00	1.00
INNOV	130	3.39	0.65	5.00	1.60	254	3.41	0.64	5.00	1.00
FAM_DIR (%)	130	57.66	24.19	100.00	14.29	243	54.93	22.74	100.00	11.11
FAM_SHARE (%)	130	28.22	16.40	70.24	0.76	243	30.03	16.80	85.10	0.92
FOR_INST (%)	130	9.66	14.75	65.11	0.00	243	12.34	16.57	84.68	0.00
LEV (%)	130	236.37	482.95	3536.55	1.57	243	220.15	408.52	3536.55	1.57
#EMP	130	1,576.58	3,371.19	27,409.00	11.00	243	1,514.74	1.46	45,251.90	11
MB	130	1.33	1.12	9.74	0.32	243	1.32	1.030	9.74	0.28
REG_IND	130	0.15	0.36	1.00	0.00	243	0.12	0.33	1	0.00

NFPM: average usage of NFPMs (ranging from 1 to 5).
CUSTOMER: average usage of customer performance measures (ranging from 1 to 5).
QUALITY: average usage of quality performance measures (ranging from 1 to 5).
INNOV: average usage of innovation performance measures (ranging from 1 to 5).
FAM_DIR: proportion of FAM_DIR members.
FAM_SHARE: family ownership.
FOR_INST: foreign institutional ownership.
LEV: debt-to-equity ratio.
#EMP: number of employees, in the form of logarithm in regression analysis.
MB: market-to-book ratio.
REG_IND: a dichotomous variable that takes a value of 1 if the firm is in a regulated industry such as utilities and financial institutions, and 0 otherwise.

Table 4 shows Pearson correlations for the 2005 sample. We do not find significant correlations between family director (*FAM_DIR*), family ownership (*FAM_SHARE*), and the extent of NFPM use (*NFPM*). Consistent with H2, we find that foreign institutional

[10] Our untabulated results show that the average use of NFPMs ranges from 3.03 to 4.2, which suggests that on average our sample firms use these NFPMs in their planning, decision-making, or incentive compensation plans.

ownership (*FOR_INST*) is positively correlated with *NFPM* and each individual perspective of NFPMs. This indicates that foreign institutional investors tended to use NFPMs more extensively between 2005 and 2015 to better monitor a firm's operating activities. Since correlations between the extent of performance measure usage and ownership structure may be caused by other underlying variables, we turn to a regression analysis that considers all the variables jointly.

Table 4 Pearson Correlations

	1	2	3	4	6	7	8	9	10	12	13
1. *NFPM*	1.00										
2. *CUSTOMER*	0.87***	1.00									
	(0.00)										
3. *QUALITY*	0.85***	0.60***	1.00								
	(0.00)	(0.00)									
4. *INNOV*	0.85***	0.66***	0.57***	1.00							
	(0.00)	(0.00)	(0.00)								
6. *FAM_DIR*	-0.08	0.05	-0.17*	-0.09	1.00						
	(0.34)	(0.56)	(0.05)	(0.32)							
7. *FAM_SHARE*	-0.04	-0.002	-0.03	-0.09	0.34***	1.00					
	(0.62)	(0.98)	(0.75)	(0.32)	(0.00)						
8. *FOR_INST*	0.29***	0.28***	0.22*	0.25***	-0.18**	-0.14	1.00				
	(0.00)	(0.00)	(0.01)	(0.00)	(0.04)	(0.12)					
9. *LEV*	0.01	0.03	-0.18**	0.20**	0.23**	-0.11	-0.04	1.00			
	(0.94)	(0.72)	(0.04)	(0.02)	(0.01)	(0.22)	(0.64)				
10. *#EMP*	0.17*	0.13	0.13	0.17*	-0.01	-0.11	0.22**	0.05	1.00		
	(0.06)	(0.13)	(0.14)	(0.06)	(0.92)	(0.19)	(0.01)	(0.57)			
12. *MB*	0.16*	0.15*	0.11	0.14	-0.26***	-0.10	0.33***	-0.07	0.10	1.00	
	(0.08)	(0.09)	(0.20)	(0.10)	(0.00)	(0.26)	(0.00)	(0.41)	(0.27)		
13. *REG_IND*	-0.11	0.01	-0.29***	0.03	0.21**	-0.07	0.04	0.66***	0.16*	-0.07	1.00
	(0.23)	(0.94)	(0.00)	(0.71)	(0.02)	(0.40)	(0.68)	(0.00)	(0.07)	(0.45)	

p-value in parentheses. ***$p < 0.01$; **$p < 0.05$; *$p < 0.1$. Please see Table 3 for variable definitions.

4.2 Empirical Results

4.2.1 Ownership structure and NFPM usage

Table 5 summarises the regression results of family control, foreign institutional ownership, and the use of NFPMs. As shown in the 2005 sample (panel A of Table 5), none of the coefficients on the family control variables (*FAM_DIR, FAM_SHARE, and FAM_> 30%*) are significant. These results suggest that family control is not associated with the extent of NFPM usage and do not support H1—a negative association between family

control and the extent of NFPM use. Unlike the 2005 sample, the full sample shows significant and positive coefficients on *FAM_SHARE* (0.004, t = 1.68; column (5)) and *FAM_> 30%* (0.150, t = 1.89; column (6)). These results suggest that controlling family ownership is associated with the extent of NFPM usage and do not support H1—a negative association between family control and the extent of NFPM use.

By contrast, we find significant and positive coefficients on *FOR_INST* for all proxies for family control in panel A: *FAM_DIR* (0.010, t = 2.52; column (1)), *FAM_SHARE* (0.010, t = 2.53; column (2)), *FAM_> 30%* (0.010, t = 2.54; column (3)), *FAM_DIR* (0.007, t = 2.83; column (4)), *FAM_SHARE* (0.008, t = 3.10; column (5)), and *FAM_> 30%* (0.008, t = 3.11; column (6)). This shows that the effect of foreign institutional ownership on the use of NFPMs is very robust over the 10-year horizon. Therefore, our results support H2.

Table 5 The Relationship between Family Control, Foreign Institutional Ownership, and NFPMs

$$MEASURE_{it} = \beta_0 + \beta_1 FAM\_CNTL_{it} + \beta_2 FOR\_INST_{it} + \beta_3 LEV_{it} + \beta_4 \#EMP_{it} + \beta_5 MB_{it} + \beta_6 REG\_IND_{it} + \varepsilon_i$$

Panel A:	Dependent Variable: *NFPM*					
	2005 Sample			Full Sample		
Independent Variable	(1)	(2)	(3)	(4)	(5)	(6)
Intercept	3.443***	3.438***	3.442***	2.968***	2.849***	2.914***
	(9.75)	(9.84)	(10.22)	(12.63)	(11.94)	(13.55)
FAM_DIR	0.0001			0.001		
	(0.02)			(0.84)		
FAM_SHARE		0.0002			0.004*	
		(0.07)			(1.68)	
FAM_>30%			0.006			0.150*
			(0.06)			(1.89)
FOR_INST	0.010**	0.010**	0.010**	0.007***	0.008***	0.008***
	(2.52)	(2.53)	(2.54)	(2.83)	(3.10)	(3.11)
LEV	0.0003**	0.0003**	0.0003**	-0.00003	0.000002	-0.000007
	(2.05)	(2.06)	(2.05)	(-0.24)	(0.02)	(-0.06)
#EMP	0.040	0.040	0.040	0.064**	0.074**	0.072**
	(0.95)	(0.96)	(0.96)	(2.28)	(2.57)	(2.54)
MB	-0.007	-0.007	-0.007	0.023	0.013	0.012
	(-0.14)	(-0.14)	(-0.14)	(0.60)	(0.34)	(0.32)
REG_IND	-0.116	-0.118	-0.117	-0.241	-0.266*	-0.239
	(-0.28)	(-0.29)	(-0.28)	(-1.57)	(-1.73)	(-1.57)
Adj R^2	14.35%	14.35%	14.35%	6.43%	7.27%	7.56%
N	130	130	130	243	243	243

Panel B:	Dependent Variable: *CUSTOMER*					
	2005 Sample			Full Sample		
Independent Variable	(1)	(2)	(3)	(4)	(5)	(6)
Intercept	3.596***	3.676***	3.700***	2.866***	2.968***	2.928***
	(8.81)	(9.08)	(9.47)	(10.27)	(10.38)	(11.41)

FAM_DIR	0.002			0.003		
	(0.82)			(1.60)		
FAM_SHARE		0.001			0.002	
		(0.27)			(0.85)	
FAM_>30%			0.018			0.166*
			(0.15)			(1.77)
FOR_INST	0.011**	0.010**	0.010**	0.009***	0.009***	0.009***
	(2.42)	(2.34)	(2.33)	(2.92)	(2.94)	(3.11)
Adj R^2	13.54%	13.05%	13.01%	6.33%	5.60%	6.54%
N	130	130	130	243	243	243

Panel C:	Dependent Variable: *QUALITY*					
	2005 Sample			Full Sample		
Independent Variable	(1)	(2)	(3)	(4)	(5)	(6)
Intercept	3.278***	3.199***	3.213***	3.158***	2.815***	2.958***
	(7.43)	(7.32)	(7.63)	(10.99)	(9.70)	(11.27)
FAM_DIR	-0.002			-0.0001		
	(-0.50)			(-0.05)		
FAM_SHARE		0.0001			0.006**	
		(0.03)			(2.08)	
FAM_>30%			-0.020			0.182*
			(-0.15)			(1.89)
FOR_INST	0.010**	0.010**	0.010**	0.006**	0.008**	0.007**
	(2.04)	(2.11)	(2.11)	(2.06)	(2.50)	(2.40)
Adj R^2	15.82%	15.62%	15.64%	10.27%	11.89%	11.61%
N	130	130	130	243	243	243

Panel D:	Dependent Variable: *INNOV*					
	2005 Sample			Full Sample		
Independent Variable	(1)	(2)	(3)	(4)	(5)	(6)
Intercept	3.455***	3.439***	3.414***	2.880***	2.764***	2.857***
	(8.94)	(9.00)	(9.26)	(11.40)	(10.76)	(12.31)
FAM_DIR	-0.001			0.001		
	(-0.23)			(0.61)		
FAM_SHARE		-0.0004			0.004	
		(-0.12)			(1.39)	
FAM_>30%			0.021			0.100
			(0.18)			(1.17)
FOR_INST	0.008**	0.008**	0.009**	0.006**	0.007**	0.007**
	(2.02)	(2.05)	(2.08)	(2.33)	(2.56)	(2.48)
Adj R^2	11.62%	11.58%	11.60%	3.62%	4.25%	4.03%
N	130	130	130	243	243	243

t-values in parentheses. ***$p < 0.01$; **$p < 0.05$; *$p < 0.1$. Please see Table 3 for variable definitions. Industry fixed effect is controlled for. Regarding the control variables, panels A to D present qualitatively similar results, so we only list the results in panel A for brevity.

To delve deeper into the impact of family control and foreign institutional ownership on the use of NFPMs, we run regressions on three different perspectives (i.e. customers, quality, and innovation) individually. These regression results are summarised in panel B

(*CUSTOMER*), panel C (*QUALITY*), and panel D (*INNOV*) of Table 5. Our results show that none of the coefficients on family control variables (*FAM_DIR*, *FAM_SHARE*, *FAM_> 30%*) are significant in all three perspectives in the 2005 sample. One may question why controlling families do not use more measures of innovation because innovating activities may affect a firm's long-term value. One plausible explanation is that controlling families are directly involved in making decisions on research and development and capital investment, so they do not increase the use of innovation-related measures. Collectively, these results are consistent with the aggregate result that controlling families are not associated with the extent of NFPM usage.

Unlike the 2005 sample, the full sample shows significant and positive coefficients on family ownership in two non-financial perspectives: *CUSTOMER* (0.166, t = 1.77 for *FAM_> 30%*; panel B) and *QUALITY* (0.006, t = 2.08 for *FAM_SHARE*; 0.182, t = 1.89 for *FAM_> 30%*; panel C). Our results indicate that controlling family ownership increases the use of *CUSTOMER* and *QUALITY* performance measures.

By contrast, our results from the 2005 sample show significant and positive coefficients on *FOR_INST* in each non-financial perspective: *CUSTOMER* (0.011, t = 2.42 for *FAM_DIR*; 0.010, t = 2.34 for *FAM_SHARE*; 0.010, t = 2.33 for *FAM_> 30%*; panel B), *QUALITY* (0.010, t = 2.04 for *FAM_DIR*; 0.010, t = 2.11 for *FAM_SHARE*; 0.010, t = 2.11 for *FAM_> 30%*; panel C), or *INNOV* (0.008, t = 2.02 for *FAM_DIR*; 0.008, t = 2.05 for *FAM_SHARE*; 0.009, t = 2.08 for *FAM_> 30%*; panel D). In a similar vein, our results with the full sample show significant and positive coefficients on *FOR_INST* in each non-financial perspective: *CUSTOMER*, *QUALITY*, and *INNOV*. These overall results confirm the robustness of the impact of foreign institutional ownership on the use of NFPMs.

Regarding the control variables, panels A to D present qualitatively similar results, so we have only listed the results in panel A for brevity. Specifically, we find the coefficients of *LEV* and *#EMP* to be significant and positive, indicating that firms with higher leverage and more employees use NFPMs to a greater extent. This result is consistent with prior studies (Ittner *et al.*, 1997; Said *et al.*, 2003; HassabElnaby *et al.*, 2005).

4.3 Additional Analysis

4.3.1 The effects of family CEO on ownership structure and NFPM usage

In this section, we discuss whether having a family member as the CEO affects a firm's use of NFPMs. We divide the full sample into two subsamples, family CEO and non-family CEO, and report the regression results in Table 6.

As shown in panel A of Table 6, when the CEO is not a family member, there are significant and positive coefficients on *FAM_SHARE* (0.009, t = 2.58; column (4)) and *FAM_> 30%* (0.254, t = 2.16; column (6)). However, this association disappears when the

CEO is a family member. These results suggest that family firms tend to use more NFPMs to manage firm operations when their CEO is not a member of the controlling family. Perhaps this is because when a family member is at the helm, family owners tend to involve themselves personally rather than use formal mechanisms to monitor operating activities and to achieve strategic goals (Mintzberg and Waters, 1982).

Table 6 The Effects of Family CEO on the Relationship between Family Control, Foreign Institutional Ownership, and NFPMs

$$MEASURE_{it} = \beta_0 + \beta_1 FAM\_CNTL_{it} + \beta_2 FOR\_INST_{it} + \beta_3 LEV_{it} + \beta_4 \#EMP_{it} + \beta_5 MB_{it} + \beta_6 REG\_IND_{it} + \varepsilon_i$$

Panel A:	Dependent Variable: *NFPM*					
	(1)	(2)	(3)	(4)	(5)	(6)
Independent Variable	Family CEO	Non-family CEO	Family CEO	Non-family CEO	Family CEO	Non-family CEO
Intercept	3.143***	2.822***	3.246***	2.391***	3.097***	2.607***
	(9.63)	(7.78)	(9.52)	(6.75)	(10.24)	(8.00)
FAM_DIR	0.0002	0.001				
	(0.07)	(0.40)				
FAM_SHARE			-0.002	0.009**		
			(-0.48)	(2.58)		
FAM_>30%					0.060	0.254**
					(0.53)	(2.16)
FOR_INST	0.007*	0.008**	0.006	0.010***	0.007*	0.009***
	(1.72)	(2.34)	(1.54)	(2.91)	(1.80)	(2.72)
LEV	-0.0004	0.00005	-0.0004	0.0001	0.000	0.0008
	(-1.05)	(0.33)	(-1.07)	(0.73)	(-1.06)	(0.51)
#EMP	0.080*	0.075	0.074*	0.100**	0.085*	0.091**
	(1.94)	(1.78)*	(1.70)	(2.38)	(2.01)	(2.19)
MB	-0.083	0.054	-0.076	0.050	-0.094	0.051
	(-1.08)	(1.11)	(-0.96)	(1.05)	(-1.19)	(1.07)
REG_IND	-0.141	-0.277	-0.133	-0.351*	-0.142	-0.279
	(-0.53)	(-1.32)	(-0.50)	(-1.71)	(-0.53)	(-1.36)
Adj R^2	3.93%	6.84%	4.14%	11.72%	4.19%	10.31%
N	108	124	108	124	108	124

Panel B:	Dependent Variable: *CUSTOMER*					
	(1)	(2)	(3)	(4)	(5)	(6)
Independent Variable	Family CEO	Non-family CEO	Family CEO	Non-family CEO	Family CEO	Non-family CEO
Intercept	3.113***	2.695***	3.407***	2.455***	3.173***	2.587***
	(7.29)	(6.69)	(7.62)	(6.15)	(8.01)	(7.10)
FAM_DIR	0.002	0.002				
	(0.76)	(0.76)				
FAM_SHARE			-0.002	0.007*		
			(-0.52)	(1.84)		

FAM_>30%					0.108	0.240*
					(0.72)	(1.82)
FOR_INST	0.009**	0.009**	0.008	0.011***	0.010*	0.011***
	(1.83)	(2.46)	(1.55)	(2.83)	(1.87)	(2.76)
Adj R^2	2.82%	8,81%	2.53%	10.93%	2.76%	10.89%
N	108	124	108	124	108	124

Panel C:	Dependent Variable: *QUALITY*					
	(1)	(2)	(3)	(4)	(5)	(6)
Independent Variable	Family CEO	Non-family CEO	Family CEO	Non-family CEO	Family CEO	Non-family CEO
Intercept	3.260***	3.132***	3.233***	2.424***	3.113***	2.713***
	(8.17)	(7.05)	(7.74)	(5.62)	(8.40)	(6.83)
FAM_DIR	-0.002	-0.0004				
	(-0.55)	(-0.12)				
FAM_SHARE			-0.002	0.012***		
			(-0.35)	(2.80)		
FAM_>30%					0.039	0.334**
					(0.27)	(2.33)
FOR_INST	0.006	0.007	0.006	0.009**	0.007	0.008**
	(1.37)	(1.57)	(1.30)	(2.20)	(1.47)	(1.98)
Adj R^2	6.29%	9.31%	6.13%	14.98%	6.08%	13.30%
N	108	124	108	124	108	124

Panel D:	Dependent Variable: *INNOV*					
	(1)	(2)	(3)	(4)	(5)	(6)
Independent Variable	Family CEO	Non-family CEO	Family CEO	Non-family CEO	Family CEO	Non-family CEO
Intercept	3.057***	2.640***	3.099	2.294***	3.006***	2.521***
	(8.52)	(7.05)	(8.26)	(6.22)	(9.03)	(7.42)
FAM_DIR	-0.0002	0.001				
	(-0.10)	(0.49)				
FAM_SHARE			-0.001	0.008**		
			(-0.28)	(2.17)		
FAM_>30%					0.035	0.190
					(0.27)	(1.55)
FOR_INST	0.004	0.008**	0.004	0.010***	0.005	0.009**
	(1.01)	(2.29)	(0.92)	(2.75)	(1.06)	(2.54)
Adj R^2	1.00%	7.07%	1.07%	10.47%	1.06%	8.75%
N	108	124	108	124	108	124

t-values in parentheses. ***$p < 0.01$; **$p < 0.05$; *$p < 0.1$. Please see Table 3 for variable definitions. Industry fixed effect is controlled for. Regarding the control variables, panels A to D present qualitatively similar results, so we only list the results in panel A for brevity.

By contrast, we find significant and positive coefficients on *FOR_INST* for all the proxies for family control in panel A, except for column (3): *FAM_SHARE*. This shows that the effect of foreign institutional ownership on the use of NFPMs is robust, whether or not

the CEO is a family member.

We also run regressions on three different perspectives (i.e. customers, quality, and innovation) individually. These regression results are summarised in panel B (*CUSTOMER*), panel C (*QUALITY*), and panel D (*INNOV*) of Table 6. Our results show that when the CEO is not a family member, *FAM_SHARE* is significant and positive when the dependent variable is *CUSTOMER* (0.007, t = 1.84; panel B, column (4)), *QUALITY* (0.012, t = 2.80; panel C, column (4)), and *INNOV* (0.008, t = 2.17; panel D, column (4)). When there is a non-family CEO, *FAM_> 30%* is significant and positive when the dependent variable is *CUSTOMER* (0.240, t = 1.82; panel B, column (6)) and *QUALITY* (0.334, t = 2.33; panel C, column (6)). Our results indicate that controlling family ownership increases the use of *CUSTOMER*, *QUALITY*, and *INNOV* performance measures when the CEO is not a member of a controlling family. Nonetheless, when there is a family CEO, family control is not associated with the use of *CUSTOMER*, *QUALITY*, and *INNOV* at all.

Regarding *FOR_INST*, panel B presents qualitatively similar results to panel A. The effect of foreign institutional ownership on the use of *CUSTOMER* is very robust in the full sample, whether or not the CEO is a family member. However, we find that when there is a non-family CEO, coefficients on *FOR_INST* are significant and positive for two proxies for family control when the dependent variable is *QUALITY* in panel C: *FAM_SHARE* (0.009, t = 2.20; column (4)) and *FAM_> 30%* (0.008, t = 1.98; column (6)). Also, we find that when there is a non-family CEO, coefficients on *FOR_INST* are significant and positive for all proxies for family control: *FAM_DIR* (0.008, t = 2.29; column (2)), *FAM_SHARE* (0.010, t = 2.75; column (4)) and *FAM_> 30%* (0.009, t = 2.54; column (6)) when the dependent variable is *INNOV* in panel D.

Our overall results suggest that when there is a non-family CEO, controlling families demand more use of NFPMs to help them better understand the firm's operating activities so that appropriate actions can be taken on a timely basis. Also, foreign institutional investors tend to use all *CUSTOMER* performance measures and more *QUALITY* and *INNOV* performance measures when there is a non-family CEO.

4.3.2 Ownership structure and reporting transparency

In 2005, the Securities and Futures Institute (SFI), entrusted by the Taiwan Stock Exchange Corporation, and the Gre Tai Securities Market implemented an "Information Disclosure and Transparency Rankings System" (IDTRS) to evaluate the degree of reporting transparency for all the listed companies in Taiwan. Unlike self-reported measures, this transparency ranking is objective and can better measure a firm's overall disclosure behaviour. However, in 2015 Taiwanese regulators incorporated information disclosure evaluation into the corporate governance evaluation system and therefore abolished the transparency ranking system. Since our sample period includes the year when the ranking system was established (2005) and the year when the ranking system was abolished (2015),

we investigate the influence of controlling family and foreign institutional investors on reporting transparency to protect their investment in these two years.

In order to implement IDTRS, the SFI searches a firm's annual reports, online regulatory filings, and websites to evaluate its reporting transparency. There are 81 disclosure items in the IDTRS, grouped into the following five categories: compliance with mandatory disclosures, timeliness of reporting, disclosure of annual report (including financial and operating transparency, board and ownership structure), disclosure of financial forecasts, and corporate website disclosure.[11] Each disclosure item takes the form of a yes-no question with a "yes" response equal to 1 and a "no" response equal to 0.

To ensure accuracy of the rating, the SFI conducts a two-stage process. After summarising the points of the 81 disclosure items, a company's preliminary transparency rating is posted on the SFI website. All companies are required to contact the SFI via paper documents within two weeks if they believe that there are errors in their transparency ratings. Then the SFI will have the Ranking Committee (composed of experts from the accounting profession, industry, and academia) review the detailed information provided by the company and make a final evaluation of its transparency rating.[12] Based on the transparency ratings, companies are classified into six levels.

A potential endogeneity concern is that firms with more transparent disclosure may attract more foreign institutional investors. To alleviate the endogeneity concern, we use a lagging variable to identify the timing of changes. In addition, because reporting transparency rankings are ordinal, we use the following ordered logistic regression model with the industry fixed effect controlled for:

$$TRANS_{it+1} = \gamma_0 + \gamma_1 FAM\_CNTL_{it} + \gamma_2 FOR\_INST_{it} + \gamma_3 LEV_{it} + \gamma_4 SIZE_{it} + \gamma_5 MB_{it} + \gamma_6 REG\_IND_{it} + \gamma_7 BIG4_{it} + \varepsilon_i \quad (2)$$

where:

$TRANS_{it+1}$ = reporting the transparency ranking of firm i in year $t+1$;

$SIZE_{it}$ = the logarithm of total assets of firm i in year t;

$BIG4_{it}$ = a dummy variable that equals 1 if firm i is audited by a Big 4 auditor in year t, and 0 otherwise.

[11] For example, in the category of "annual reports", disclosure items include questions such as, "*Does the company's annual report disclose important accounting policy?"* and *"Does the company disclose compensation of board directors and supervisors?*"

[12] The IDTRS has four objectives. The first is to develop evaluation criteria that can examine local disclosure practices and comply with international standards; the second is to help companies to reduce cost of capital as disclosure levels increase; the third is to help investors better protect their investments through use of ranking results as an additional decision-making tool; the fourth is to help regulators better monitor the market. The IDTRS is proved to reduce accruals-based earnings management (Liu *et al.*, 2015) and mispricing of accruals for institutional investors (Lee and Lee, 2015), and thus is a valid measure of reporting transparency.

Table 7 presents regression results for family control, foreign institutional ownership, and reporting transparency. As shown in the 2005 sample, the coefficients on *FAM_SHARE* (0.042, *Wald Chi-squared* = 11.63; column (2)) and *FAM_> 30%* (0.984, *Wald Chi-squared* = 6.49; column (3)) are significant and positive. Also, our full sample indicates a mixed finding: the coefficient on *FAM_DIR* (-0.011, *Wald Chi-squared* = 4.13; column (4)) is significant and negative, the coefficient on *FAM_SHARE* (column (5)) is insignificant, and the coefficient on *FAM_> 30%* (0.686, *Wald Chi-squared* = 7.60; column (6)) is significant and positive. These results suggest that while the proportion of family members sitting on the board reduces the firm's reporting transparency, family ownership exceeding 30 per cent increases reporting transparency. Controlling families may use reporting transparency as a signal to show their commitment to restricting their ability to extract private benefits from control.

Table 7 Ordered Logistic Regression to Test the Relationship between Family Control, Foreign Institutional Ownership, and Reporting Transparency

$$TRANS_{it+1} = \gamma_0 + \gamma_1 FAM\_CNTL_{it} + \gamma_2 FOR\_INST_{it} + \gamma_3 LEV_{it} + \gamma_4 SIZE_{it} + \gamma_5 MB_{it} + \gamma_6 REG\_IND_{it} + \gamma_7 BIG4_{it} + \varepsilon_i$$

	Dependent Variable: *TRANS*					
	2005 Sample			Full Sample		
Independent Variable	(1)	(2)	(3)	(4)	(5)	(6)
FAM_DIR	0.012			-0.011**		
	(1.57)			(4.13)		
FAM_SHARE		0.042***			0.011	
		(11.63)			(2.21)	
FAM_>30%			0.984**			0.686***
			(6.49)			(7.60)
FOR_INST	0.015	0.013	0.012	0.018**	0.022**	0.023***
	(1.14)	(0.80)	(0.74)	(4.69)	(6.58)	(7.33)
LEV	-0.001	-0.001*	-0.001	0.0001	0.0001	0.0001
	(2.11)	(3.06)	(2.09)	(0.09)	(0.11)	(0.06)
SIZE	0.384**	0.531***	0.480***	0.216***	0.229***	0.250***
	(5.06)	(9.16)	(7.86)	(8.15)	(8.78)	(10.34)
MB	-0.094	-0.113	-0.097	-0.119	-0.092	-0.100
	(0.28)	(0.39)	(0.29)	(0.96)	(0.57)	(0.68)
REG_IND	1.760	1.358	1.574	0.588	0.356	0.420
	(1.38)	(0.82)	(1.11)	(1.54)	(0.56)	(0.79)
BIG4	1.646***	1.568***	1.587***	0.980***	1.073***	1.036***
	(8.98)	(8.13)	(8.30)	(7.92)	(9.52)	(8.89)
-2 Log Likelihood	345.05	345.05	345.05	774.766	774.766	774.766
Wald Chi-squared	53.91	58.08	56.32	46.83	45.18	50.08
(*p*-value)	(0.0004)	(0.0001)	(0.0002)	(<0.0001)	(<0.0001)	(<0.0001)
N	130	130	130	239	239	239

Wald Chi-squared values in parentheses. ***$p < 0.01$; **$p < 0.05$; *$p < 0.1$. Ordered logistic regressions are used for this model. Industry fixed effect is controlled for.

Our results also show that coefficients on *FOR_INST* are insignificant in the regression models in the 2005 sample. However, these coefficients become significant and positive in the full sample (0.018, *Wald Chi-squared* = 4.69 for *FAM_DIR*; 0.022, *Wald Chi-squared* = 6.58 for *FAM_SHARE*, and 0.023, *Wald Chi-squared* = 7.33 for *FAM_>30%*). As shown in Table 3, there is a significant increase in foreign institutional ownership: 12.34 per cent (in the full sample) versus 9.66 per cent (in the 2005 sample). The increase in the ownership causes foreign institutional investors to demand more NFPMs to help them monitor the firm's operating activities and, in turn, protect their investment.

Regarding the control variables, we find that firm size has a positive effect on reporting transparency, which is consistent with prior studies (Lang and Lundholm, 1993; Aksu and Kosedag, 2006; Laidroo, 2009). This suggests that larger companies have more pressure and resources to provide transparent financial reporting. Also, consistent with prior studies (e.g. Francis *et al.*, 1999), our data show that Big 4 auditors have a positive effect on reporting transparency.

In summary, our data show that controlling families tend to use reporting transparency as a signal to show their commitment to restricting their own ability to extract private benefits from control, which allows them to raise additional capital in the stock market at a lower cost of capital (Lang and Maffett, 2011). By contrast, foreign institutional investors had no impact on firms' reporting transparency in 2005; however, their influence has grown over the following 10 years.

V. Summary and Conclusion

This study extends prior research on performance measurement from focusing on organisational culture (Henri, 2006), leadership style (Abernethy *et al.*, 2010), and organisational structure (Lee and Yang, 2011) to ownership structure. We have examined how controlling families and foreign institutional ownership affect the use of non-financial performance measurement in two important years: 2005, when the reporting transparency system was adopted, and 2015, when the system was abolished. Our results show that family control had no association with NFPM usage in 2005. This lack of a relationship may be attributed to family owners' ability to directly monitor operating activities and managerial behaviours. Therefore, the data collection costs for NFPMs may have outweighed their additional benefits for controlling families. However, after 10 years (in 2015), controlling families have increased NFPM usage, including from customer and quality perspectives. According to the 2016 Taiwanese Family Enterprises Survey conducted by PricewaterhouseCoopers, 70 per cent of the respondents are faced with challenges in passing ownership and management to the next generation. Therefore, it is important to develop effective management and to design incentive systems to keep key management teams. In this regard, controlling families are likely to formalise their performance

evaluation system, including both financial and non-financial measures, to better incentivise management and also to monitor firm performance.

In contrast to controlling families, foreign institutional investors have a clear preference for the use of NFPMs, including overall measures and each of the three perspectives (customers, quality, and innovation). Apparently, it is costly for foreign institutional investors to access the company's internal information, so they need to find other ways to protect their investment (Huang and Shiu, 2009). Because NFPMs reveal detailed internal processes, they can help foreign institutional investors pinpoint potential problems in a firm's operations. NFPMs are also helpful in predicting firms' future financial performance. As a result, foreign institutional investors may conclude that the benefits associated with NFPMs outweigh the costs. Our additional analysis shows that our main results in the full sample are driven by the CEO not being a member of the controlling family. Controlling families also tend to increase reporting transparency, suggesting that they may use greater reporting transparency as a signal to show their commitment not to extract the private benefits of control. We also observe that foreign institutional investors did not affect a firm's reporting transparency at the beginning of the implementation of the reporting transparency ranking system; however, their influence has increased after 10 years.

Notwithstanding these contributions, our study has some limitations that offer opportunities for future research. First, although we use different proxies for family control (i.e. proportion of family board directors, family ownership, and family firms), they may not fully capture such control. Future research can refine our study by identifying and analysing the use of additional control mechanisms to examine the influence of family control on the use of performance measures. Second, our study has been conducted in a single market, and thus questions can be raised about the findings' generalisability to other Asian or emerging markets. An additional avenue that could be pursued by future research is whether there is a difference in the relationship between ownership structure and NFPM usage between emerging and developed markets.

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Appendix: Survey Questions

Part 1 Use of non-financial performance measures

Please rate the extent to which each of the following non-financial measures is used to evaluate your company-wide performance (1 = not at all; 5 = to a very great extent):

1. Market share
2. Survey of customer satisfaction
3. Customer response time
4. On-time delivery
5. Number of customer complaints
6. Percentage of shipments returned due to poor quality
7. Number of warranty repairs requested by customers
8. Ratio of defective output/total output
9. Manufacturing/service lead time
10. Time to market new products/services
11. Labour efficiency variance
12. Number of new product/service launches
13. Employee satisfaction
14. On-the-job training hours
15. Labour productivity
16. Employees' suggestions
17. Availability of information systems

Part 2 Organisational performance

Please rate each of the following dimensions of performance relative to your competitors' performance (1 = far below average; 5 = far above average):

1. Return on investment
2. Gross profit
3. Customer satisfaction
4. Product/service quality
5. Employee productivity

Part 3 Company profile

1. Please indicate which industry your company is in:

☐ Cement	☐ Foods	☐ Plastics	☐ Textile
☐ Electric	☐ Wire	☐ Chemical	☐ Glass
☐ Steel	☐ Rubber	☐ Motor	☐ Electronics
☐ Construction	☐ Marine	☐ Tourism	☐ Finance and insurance
☐ Securities	☐ Other		

2. Please indicate your company's capital (in millions of dollars):

☐ 10 – 16.67
☐ 16.67 – 33.33
☐ 33.33 – 50
☐ 50 – 66.67
☐ more than 66.67

3. Please indicate the number of employees in your company:

☐ fewer than 100
☐ 101 – 250
☐ 251 – 400
☐ 401 – 800
☐ more than 800