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Non-linear relationships among related party transactions, financial characteristics, corporate governance, and corporate value – Analysis of high-growth and low-growth food firms

*Joe-Ming Lee**

Department of Applied Economics, Fo Guang University, Yilan County, Taiwan
**Corresponding author: jmlee@mail.fgu.edu.tw*

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Abstract: This paper empirically investigates the relationship between related party transactions, financial characteristics, and corporate governance on the corporate value in Taiwan's food industry during 2008–2017. The results show that non-linear relationships among related party transactions, financial characteristics, corporate governance, and corporate value. This study recommends to low-growth food firms that they should strengthen the power of their financial performance and corporate governance.

Keywords: corporate governance; financial characteristics; firm growth; non-linear models; related party transactions

The general public in recent years has been unfamiliar with the degree of corporate governance in the food industry and may only recognise a brand or have a price impression on Taiwanese food firms. Due to food safety problems in the food industry, society, the competent authorities, the media, and investors have placed greater importance of corporate governance on the food industry. Because this industry specialises in the production of foods that many consumers need daily and has the responsibility for maintaining the nutrition and health sources of the general public, it should have a higher level of corporate governance. In addition to providing the safety quality of food or ingredients, the food industry must establish a high level of trust and professional management towards the public.

Corporate governance is a significant system in a firm's development process. Many studies in the literature have discussed the impact of corporate governance on an individual firm. Aguilera et al. (2018) offer the evidence that the corporate governance deviance considers both the institutional context and firm-level agency. Since a corporate's operating results must be presented to shareholders, financial performance is an important measure. In the industrial environment where corporate governance is valued, financial performance reflects the advantages and disadvantages of the corporate's operations through financial measures such as debt ratio, cash flow ratio, and asset turnover ratio. Corporate governance focuses on financial soundness and important metrics. In addition, related party transactions are accompanied by frequently occurring phenomena in the corporate's operation process, the degree of influence on the firm's value and it is still questionable and is a problem that many food manufacturers now face.

Different from the literature, in order to demonstrate the effectiveness of corporate governance in Taiwan's food industry this study divides the food industry into high-growth food firms and low-growth food firms to observe the impact of corporate governance, financial characteristics and related transactions on corporate value. The contribution of this paper is to observe different growth food firms, finding that high-growth firms have a positive influence on corporate value as it correlates to corporate governance, financial characteristics, and related

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party transactions. We note that low-growth food firms should strengthen their corporate governance and corporate finance. In addition to promoting food products that they sell, this study also observes the corporate governance of food firms in order to establish an objective trust relationship between consumers and food firms.

LITERATURE REVIEW

This study examines the differences in corporate governance, financial characteristics, and related party transactions exhibited by high-growth and low-growth food firms. Through these differences, we empirically analyse the impacts of corporate governance, financial characteristics, and related party transactions on corporate value and any non-linear relationships.

Corporate governance and corporate value

Mutlu et al. (2017) offer evidence that good corporate governance principles advocating board independence and managerial incentives are indeed associated with better firm performance. Owusu and Weir (2018) show that smaller board size and the presence of audit and remuneration committees decrease agency costs and also find that higher managerial and institutional ownership reduces agency costs. Singh et al. (2018) present that board size, number of board committees, and ownership concentration are positively linked with high organisational performance, and that board independence and chief executive officer (CEO) duality display a negative relationship.

Hypothesis 1. The relationship between corporate governance and corporate value has a non-linear relationship by firm growth threshold.

Related party transaction and corporate value

Licht (2018) reports that the regulation of related party transactions is the most important yardstick for the quality of corporate governance systems. It is a thorny issue because it is widely documented that corporate insiders abuse related party transactions for their own benefit. Kohlbeck et al. (2018) find that firms are more likely to enter into the regulation of related parties and that the firm value premium declines. Furthermore, all regulations of related parties are not the same, because the declining value premium is only associated with directors, officers, and major shareholders. Yung and Long (2009) show that supervisors' stock pledged ratio and the percentage of sales related to party transactions are done through pressure, opportunity, and rationalisation.

Hypothesis 2. The relationship between related party transactions and corporate value has a non-linear relationship by firm growth threshold.

Financial characteristics and corporate value

Azad et al. (2018) support that debtors' turnover, the quick ratio, the current ratio, and fixed asset turnover have impacts on firms' profitability. Das (2018) present that cash flow ratios help financial users get relevant information about financial resources for a specific time period. Cook et al. (2018) find that operating lease expenses are the major driver of firm returns. McConnell and Servaes (1995) investigate the relation between corporate value, leverage, and equity ownership, noting that low-growth firms' corporate value is positively correlated with leverage, whereas high-growth firms' corporate value is negatively correlated with leverage.

Hypothesis 3. The relationship between financial characteristics and corporate value has a non-linear relationship by firm growth threshold.

METHODOLOGY

Model basics

The model by Aguilera et al. (2018) and McConnell and Servaes (1995) is derived from the conventional theory and employs panel data to estimate the impacts of related party transactions, financial characteristics, and corporate governance on corporate value[1]. I construct the first equation as follows (Equation 1):

$$\ln CV_{it} = b_{1i} \ln RS_{it} + b_{2i} \ln RP_{it} + b_{3i} \ln FT_{it} + b_{4i} \ln FEE_{it} + b_{5i} \ln CASH_{it} + b_{6i} \ln DEBT_{it} + b_{7i} \ln MH_{it} + \\ + b_{8i} \ln DM_{it} + b_{9i} \ln DL_{it} + b_{10i} \ln BQH_{it} + b_{11i} \ln SE_{it} + b_{12i} \ln EPS_{it} + e_{it} \quad (1)$$

[1]This study sets up panels on quarterly data frequencies and takes the data from Taiwan Economic Journal databases (TEJ 2018).

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In Equation 1, CV_{it} is Tobin's Q; RS_{it} is related party transaction sales; RP_{it} is related party transaction purchases; FT_{it} is fixed asset turnover; FEE_{it} is operating expense ratio; $CASH_{it}$ is the cash flow ratio; $DEBT_{it}$ is the debt ratio; MH_{it} is the manager shareholding ratio; DM_{it} is the director and concurrent manager ratio; DL_{it} is directors' collateralized shares; BQH_{it} is the largest shareholder ratio; SE_{it} is scale; and EPS_{it} is earnings per share (Table 1).

Panel non-linear model

According to McConnell and Servaes (1995), this study uses *EPS* as the threshold variable for high-growth and low-growth firms and models a non-linear[2] relationship between related party transactions, financial characteristics, and corporate governance on corporate value, expressing the log equation as follows.

H_1. The relationship between corporate governance and corporate value has a non-linear relationship by firm growth threshold.

$$\ln CV_{it} = b_{1i} \ln RS_{it} + b_{2i} \ln RP_{it} + b_{3i} \ln SE_{it} + e_{it} + \\ + [b_{1i} \ln RS_{it} + b_{2i} \ln RI_{it} + b_{3i} \ln SE_{it}]\, g(EPSq_{it}; g, c) + e_{it} \quad (2)$$

where CV_{it} is Tobin's Q; parameter γ determines the speed and smoothness of the transition; and c is the threshold value.

H_2. The relationship between related party transactions and corporate value has a non-linear relationship by firm growth threshold.

Table 1. Main variable descriptions

Variable	Description	Theoretical predicted sign
Dependent variable		
Corporate value (*CV*)	ratio of a firm's market value to its asset replacement costs	
Related party transaction variables		
Related party transactions as sales (*RS*)	sales transaction object belonging to firm party relations	–
Related party transactions as purchase (*RP*)	purchase transaction object belonging to firm party relations	–
Financial characteristic variables		
Fixed asset turnover (*FT*)	ratio of the firm's net sales revenue to the average net value of fixed assets	+
Operating expense ratio (*FEE*)	proportion of the expenses incurred in doing business activities in operating income	–
Cash flow rate (*CASH*)	ability of companies to obtain enough cash to pay off debts through operations	+
Debt ratio (*DEBT*)	ratio of total debt to total assets	–
Corporate governance variables		
Manager shareholding ratio (*MH*)	internal corporate managers' shareholding ratio	+
Director and concurrent manager ratio (*DM*)	number of directors who serve as internal managers of the firm as a percentage of all directors	+/–
Directors' collateralized shares (*DL*)	pledged shares of directors over total shareholdings of directors	–
Largest shareholder ratio (*BQH*)	shareholder who holds more than 10% of shares, but does not hold the position of director and supervisor	+/–
Control variable		
Scale (*SE*)	total assets are used as the scale proxy variable	+/–
Threshold variable		
Earnings per share (*EPS*)	firm growth is the proxy variable	+

Source: authors' own calculations based on data provided by the Taiwan Economic Journal (TEJ 2018)

[2]See Gonzalez et al. (2005) for more details and the maximum number of transition functions, for which the model automatically determines the optimal number. The slope parameters and location parameters of the transition function and the slope parameters in each regime for all explicative variables are estimated by non-linear least squares (NLS).

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$$\ln CV_{it} = b_{1i}\ln FT_{it} + b_{2i}\ln FEE_{it} + b_{3i}\ln CASH_{it} + b_{4i}\ln DEBT_{it} + b_{5i}\ln SE_{it} + e_{it} + \\ + [b_{1i}\ln FT_{it} + b_{2i}\ln FEE_{it} + b_{3i}\ln CASH_{it} + b_{4i}\ln DEBT_{it} + b_{5i}\ln SE_{it}]\, g(EPSq_{it};g,c) + e_{it} \quad (3)$$

$$\ln CV_{it} = b_{1i}\ln MH_{it} + b_{2i}\ln DM_{it} + b_{3i}\ln DL_{it} + b_{4i}\ln BQH_{it} + b_{5i}\ln SE_{it} + e_{it} + \\ + [b_{1i}\ln MH_{it} + b_{2i}\ln DM_{it} + b_{3i}\ln DL_{it} + b_{4i}\ln BQH_{it} + b_{5i}\ln SE_{it}]\, g(EPSq_{it};g,c) + e_{it} \quad (4)$$

H_3. The relationship between financial characteristics and corporate value has a non-linear relationship by firm growth threshold.

This paper investigates the relationship between related party transactions, financial characteristics, and corporate governance on the corporate value in Taiwan's food industry and provides new evidence on the non-linear impacts under high-growth and low-growth food firms. This paper follows Schiavo and Vaona (2007) and uses a non-parametric and semi-parametric instrumental variable estimator to assess the non-linearities between inflation and economic growth. Omay and Kan (2010) uses the panel smooth transition model (PSTR model) to re-examine the threshold effects in the inflation-growth nexus with a cross-sectionally dependent non-linear panel of six industrialised economies covering the period 1972–2005. This important issue calls for further investigation in parallel to the theoretical improvements in non-linear estimation techniques. Once the transition variable and form of the transition function are selected, the PSTR models can be estimated by using non-linear least squares (NLLS). The optimisation algorithm can be disburdened by using good starting values.

This paper estimates Equations 2–4 using the panel approach that considers both food industry i and year t, with ε_{it} representing the fixed effects, deterministic trends, and error terms, respectively. Transition function $g(q_{it}; \gamma, c)$ is a continuous function of the observable variable q_{it} and is normalised to be bounded between 0 and 1. These extreme values are associated with regression coefficients β_0 and $\beta_0 + \beta_1$. The transition function is a logistic specification, shown as:

$$g(q_{i,t};g,c) = \left(1 + \exp\left(-g\prod_{j=1}^{m}(q_{i,t} - c_j)\right)\right)^{-1}$$
$$\text{with } \gamma > 0 \text{ and } c_1 \le c_2 \le \cdots \le c_m \quad (5)$$

We conclude that the relationship between related party transactions, financial characteristics, and corporate governance on corporate value is non-linear. Therefore, we employ a non-linear model to estimate that relationship, after carefully choosing between the PESTR (panel exponential smooth transition regression) and PLSTR (panel logistic smooth transition regression) family of models. The non-linear effect is represented by a continuum of parameters between two extreme regimes. We utilise the linearity test and the test of the choice between PESTR and PLSTR, where the problem is to identify the number of transition functions. The Fisher LM test (LMF) is generally used on the no remaining non-linearity test.

EMPIRICAL RESULTS

Descriptive statistics

Table 2 lists the *EPS* statistics, in which the minimum (–7.630), maximum (14.260), and mean (0.921) show that growth in the food industry is heterogeneous among individual firms. The operating mechanism of food firms includes financial characteristics, related person transactions, or corporate governance, which then feed back to the firm's value as a different effect.

The statistical values of related party transactions as sales (*RS*) have a minimum (0.000) and a maximum (97.340). The values of related party transactions as purchases (*RP*) also have a minimum (0.000) and a maximum (44.850), indicating that the trading behaviour of the related party transactions is not universal, with wide differences of them in the food industry.

In terms of corporate governance, large shareholder holdings (*BQH*) have a minimum (2.280) and a maximum (67.740), while managers holding shares (*MH*) also have a minimum (0.000) and a maximum (8.340). These shareholding structures are different in the food industry, indicating that food firms' corporate governance practices and professional performance are still not consistent with the market's perception.

Table 2 shows that related party transactions are negatively related to related party transactions as sales (*RS*) (–0.028) and related party transactions as purchases (*RP*) (–0.073). In terms of financial characteristics, the fixed asset turnover rate (*FT*) (0.399) is positively correlated with corporate value, and the debt ratio (*DEBT*) is negatively correlated with corpo-

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Table 2. Descriptive statistics and correlations

	CV (A)	*RS* (B)	*RP* (C)	*FT* (D)	*FEE* (E)	*CASH* (F)	*DEBT* (G)	*MH* (H)	*DM* (I)	*DL* (J)	*BQH* (K)	*SE* (L)	*EPS* (M)
Correlations													
(A)	1	–	–	–	–	–	–	–	–	–	–	–	–
(B)	–0.028	1	–	–	–	–	–	–	–	–	–	–	–
(C)	–0.073	0.336	1	–	–	–	–	–	–	–	–	–	–
(D)	0.399	–0.030	0.057	1	–	–	–	–	–	–	–	–	–
(E)	0.053	–0.193	0.080	–0.395	1	–	–	–	–	–	–	–	–
(F)	0.050	–0.082	–0.072	0.019	0.060	1	–	–	–	–	–	–	–
(G)	–0.181	–0.100	0.097	–0.129	0.034	–0.159	1	–	–	–	–	–	–
(H)	–0.128	–0.076	–0.119	–0.032	–0.207	0.027	0.031	1	–	–	–	–	–
(I)	–0.033	–0.023	0.005	–0.027	–0.099	–0.038	–0.219	0.368	1	–	–	–	–
(J)	–0.120	–0.111	0.126	–0.181	0.111	–0.025	0.299	0.139	0.081	1	–	–	–
(K)	0.200	0.389	–0.025	–0.135	–0.042	–0.091	–0.041	0.001	0.029	0.016	1	–	–
(L)	–0.178	–0.292	–0.010	–0.121	0.124	–0.001	0.486	–0.011	–0.288	0.069	–0.370	1	–
(M)	0.294	–0.168	–0.069	0.173	0.073	0.208	–0.014	–0.021	–0.119	–0.066	–0.167	0.235	1
Descriptive statistics													
Mean	1.183	8.422	2.530	4.523	17.60	16.499	39.414	24.679	0.705	11.287	24.709	15.720	0.921
Median	0.950	1.595	0.870	2.570	15.475	11.555	39.390	20.00	0.060	4.270	21.390	15.730	0.650
Maximum	3.950	97.340	44.850	49.190	81.480	868.950	90.490	66.670	8.340	73.440	67.740	19.842	14.260
Minimum	0.290	0.000	0.000	0.230	2.270	–715.040	1.500	0.000	0.000	0.000	2.280	13.120	–7.630
Standard deviation	0.635	19.345	5.039	5.978	11.689	60.102	17.529	14.926	1.244	15.110	13.574	1.310	1.289
Skewness	1.885	3.656	4.371	3.677	0.962	0.848	0.091	0.376	2.610	1.450	1.011	0.775	1.504
Kurtosis	6.466	16.139	28.738	18.434	4.040	93.287	2.275	2.638	10.348	4.646	3.786	4.259	18.867
Jarque-Bera	1 047.640	9 026.696	29 493.93	11 667.590	191.080	325 512.100	22.261	27.907	3 243.680	444.156	187.950	159.301	10 411.220

probability = 0.000; *CV* – corporate value; *RS* – related party transactions as sales; *RP* – related party transactions as purchase; *FT* – fixed asset turnover; *FEE* – operating expense ratio; *CASH* – cash flow rate; *DEBT* – debt ratio; *MH* – manager shareholding ratio; *DM* – director and concurrent manager ratio; *DL* – directors' collateralized shares; *BQH* – largest shareholder ratio; *SE* – scale; *EPS* – earnings per share

Source: authors' own calculations based on data provided by the Taiwan Economic Journal (TEJ 2018)

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rate value (–0.181). In terms of corporate governance, large shareholder holdings (*BQH*) are positively correlated with corporate value (0.200). Directors' collateralised shares (*DL*) are negatively correlated with corporate value (–0.120), indicating that these shares have a negative effect on corporate value. Food firms' *EPS* is negatively related to related party transactions.

Panel least squares results

Table 3 shows that the fixed effect is a suitable model for use herein. This study finds that related party transactions as sales (*RS*) (–0.015) and related party transactions as purchases (*RP*) (0.010) are negatively related to corporate value. This means the relationship between related party transactions and corporate value is negative. Food firms thus need to formulate measures and regulations for the improvement of related party transactions.

In terms of financial characteristics, there is a negative relationship between cash flow (*CASH*) and corporate value (–0.0004). Food firms implicitly have a great need to improve their cash flow management mechanism. In addition, the debt ratio has a significantly negative relationship with the operating expense ratio and corporate value. There is a significantly

Table 3. Panel least squares results

Variables	Model type					
	pool regression model		cross-section fixed effects		cross-section random effects	
	coefficient	standard error	coefficient	standard error	coefficient	standard error
C	1.026***	0.277	–4.439***	0.783	–1.967***	0.646
Related party transaction variables						
RS	–0.001***	0.001	–0.015***	0.005	–0.006**	0.003
RP	–0.009***	0.003	–0.010***	0.003	–0.011***	0.003
Financial characteristic variables						
FT	0.049***	0.003	0.013***	0.003	0.016***	0.003
FEE	0.012***	0.001	–0.026***	0.002	–0.022***	0.002
CASH	–0.0001	0.0002	–0.0004*	0.0001	–0.0004***	0.0001
DEBT	–0.002***	0.001	–0.008***	0.001	–0.006***	0.001
Corporate governance variables						
MH	0.039***	0.014	0.154***	0.017	0.146***	0.016
DM	0.0006	0.001	0.001	0.001	0.0006	0.001
DL	–0.0004	0.001	–0.0008	0.001	–0.001	0.0009
BQH	0.014***	0.001	0.005***	0.001	0.006***	0.001
Control variable						
SE	–0.037***	0.016	0.411***	0.051	0.237***	0.041
Threshold variable						
EPS	0.124378***	0.013	0.014	0.010	0.024***	0.010
Effects test						
Cross-section F			72.865; *p*-value = 0.0000			
Cross-section chi-square			992.410; *p*-value = 0.0000			
Correlated random effects – Hausman test						
Cross-section random			66.954; *p*-value = 0.0000			
Suitable model: cross-section fixed effects						

*, **, and *** denote 10, 5, and 1% significance levels, respectively; *C* – constant; *RS* – related party transactions as sales; *RP* – related party transactions as purchase; *FT* – fixed asset turnover; *FEE* – operating expense ratio; *CASH* – cash flow rate; *DEBT* – debt ratio; *MH* – manager shareholding ratio; *DM* – director and concurrent manager ratio; *DL* – directors' collateralized shares; *BQH* – largest shareholder ratio; *SE* – scale; *EPS* – earnings per share

Source: computed by this study

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positive relationship between fixed asset turnover and corporate value.

There is a significantly positive relationship between large shareholder holdings (*BQH*) and corporate value (0.005). This indicates that the shareholdings of large shareholders contribute to their firm's value. Therefore, we confirm that corporate governance is positive for the development of the food industry.

Panel non-linear model test

This study discusses the non-linear relationship between related party transactions, financial characteristics, corporate governance, and corporate value, and uses *EPS* as a threshold for separating high-growth food firms and low-threshold food firms. I test the hypothesis of no remaining non-linearity, whenever $m = 2$ or $m = 3$, and take one transition function. In this case, there are two transition functions, with Tables 4–6 reporting the results.

Table 4 shows that the relationship between related party transactions and corporate value exhibit a structural change in both high-growth and low-growth firms. It belongs to the high-growth food firm, related party transactions as sales (*RS*) have a significantly positive relationship with corporate value (0.0204), indicating that high-growth food firms have a professional management mechanism for the sales of related party transactions. On the contrary, low-growth food firms' sales of related party transactions (*RS*) have a significantly negative relationship with corporate value (–0.0102), indicating that these firms should have strong management over such related party transactions. However, related party transactions as purchases (*RP*) have a significantly negative relationship with corporate value in both low and high-growth food firms. This study thus reminds food firms to avoid relationships that exude conflicts of interest with stakeholders and to consider the most professional and sustainable strategy for corporate value.

Table 5 discusses the relationship between food firms' financial characteristics and corporate value. For high-growth food firms, we find that their fixed asset turnover ratio (*FT*) (0.0477) and cash flow ratio (*CASH*) (0.0006) have a significantly positive relationship with corporate value, indicating that such firms have good financial performance. Finding that the operating expense ratio and the debt ratio have a non-significant relationship with corporate value. Conversely, low-growth food firms have a significantly negative relationship with corporate value, both in terms of cash flow ratio (*CASH*) (–0.0008), operating expenses (*FEE*) (–0.0303), and debt ratios (*DEBT*) (–0.0105). This study thus reminds low-growth food firms to establish a professional management model for financial performance and financial leverage in order to turn into high-growth food firms.

Table 6 notes that managers holding shares (*MH*) have a significantly positive relationship with corporate

Table 4. Panel non-linear model results of relationship transaction and corporate value

Variables	Firm type			
	low-growth firms		high-growth firms	
	coefficient	standard error	coefficient	standard error
RS	–0.0102***	0.0051	0.0204***	0.0078
RP	–0.0088***	0.0021	0.0804***	0.0083
SE	0.2511***	0.0710	0.2573***	0.0019
H_0: linear model; H_1: non-linear model with at least one threshold variable				
Wald tests (LM)	$W = 67.496$; p-value = 0.000			
Fisher tests (LMF)	$F = 7.790$; p-value = 0.000			
LRT tests (LRT)	$LRT = 69.991$; p-value = 0.000			
Estimated location parameters	0.905			
Estimated slope parameters	11.519			
RSS	114.54			

*, **, and *** denote 10, 5, and 1% significance levels, respectively; *RS* – party transaction sales ; *RP* – party transaction purchases; *SE* – scale; RSS – residual sum of squares

Source: computed by this study

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Table 5. Panel non-linear model results of financial characteristics and corporate value

Variables	Firm type			
	low-growth firms		high-growth firms	
	coefficient	standard error	coefficient	standard error
FT	0.0109	0.0076	0.0477***	0.0081
FEE	–0.0303***	0.0046	0.0804	0.0037
CASH	–0.0008***	0.0003	0.0006***	0.0005
DEBT	–0.0105***	0.0032	–0.0127	0.0021
SE	0.5023***	0.0784	0.5049	0.0075
H_0: linear model; H_1: non-linear model with at least one threshold variable				
Wald Tests (LM)	W = 73.073; p-value = 0.000			
Fisher Tests (LMF)	F = 5.059; p-value = 0.000			
LRT Tests (LRT)	LRT = 76.007; p-value = 0.000			
Estimated location parameters	0.4469			
Estimated slope parameters	8.2565			
RSS	93.521			

*, **, and *** denote 10, 5, and 1% significance levels, respectively; *FT* – fixed asset turnover; *FEE* – operating expense ratio; *CASH* – cash flow rate; *DEBT* – debt ratio; *SE* – scale; RSS – residual sum of squares

Source: computed by this study

value (0.1505). Directors' collateralised shares (*DL*) have a significantly negative relationship with corporate value (–0.0124), indicating that high-growth food firms follow the proper corporate governance philosophy and promote a professional equity structure.

This study conversely finds that low-growth food manufacturers, regardless of managers holding shares (*MH*) or directors' collateralised shares (*DL*), run contrary to the impacts of high-growth food firms' features on corporate governance. This study re-

Table 6. Panel non-linear model results of corporate governance and corporate value

Variables	Firm type			
	low-growth firms		high-growth firms	
	coefficient	standard error	coefficient	standard error
MH	–0.7845**	0.1021	0.1505***	0.1530
DM	0.0363***	0.0072	–0.018***	0.0103
DL	0.0264***	0.0088	–0.0124***	0.0130
BQH	0.0329***	0.0107	–0.0084***	0.0166
SE	0.0396	0.0702	0.2126***	0.0313
H_0: linear model; H_1: non-linear model with at least one threshold variable				
Wald Tests (LM)	W = 102.273; p-value = 0.000			
Fisher Tests (LMF)	F = 7.322; p-value = 0.000			
LRT Tests (LRT)	LRT = 108.148; p-value = 0.000			
Estimated location parameters	–1.742			
Estimated slope parameters	0.325			
RSS	95.433			

*, **, and *** denote 10, 5, and 1% significance levels, respectively; *MH* – manager shareholding ratio; *DM* – director and concurrent manager ratio; *DL* – directors' collateralized shares; *BQH* – largest shareholder ratio; *SE* – scale; RSS – residual sum of squares

Source: computed by this study

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minds low-growth firms to introduce professionalism in their corporate governance. In particular, the food industry has very important social responsibilities, and hence establishing professional corporate governance will enable the industry to gain the trust and brand value of the public. This paper empirically finds that corporate governance is an important cornerstone of food industry development. From the empirical results, corporate governance has a major impact on corporate performance in this industry, because it requires better corporate governance standards than other industries, as food safety is related to the health of the general public. Therefore, food firms' organisation and internal control measures must continue to develop.

CONCLUSION

This paper examines the non-linear relationships among related party transactions, financial characteristics, corporate governance, and corporate value, using a panel of 30 Taiwanese food firms during 2008–2017. According to the results of the panel non-linear models, the relationships among these four factors in the food industry are non-linear.

The results of the panel least squares indicate that the fixed effect model is the most suitable one for this industry. This model finds that related party transactions, financial characteristics, and corporate governance have an impact on corporate value, offering strong evidence that corporate governance in Taiwan's food industry requires important and professional management performance.

According to the results of the panel non-linear models, for high-growth food firms, the manager's shareholding ratio has a significantly positive relationship with corporate value, while directors' collateralised shares have a significantly negative relationship with corporate value. This means that high-growth firms promote a high level of corporate governance. However, for low-growth food manufacturers, the relationship between low corporate governance and corporate value is exactly the opposite of that of high-growth food firms.

In terms of financial performance, high-growth food firms are indeed better than low-growth food firms, implying that the latter should pursue professional financial performance in order to turn into high-growth food firms. In addition, related party transactions show that the relationship between corporate value and the management mechanism of such transactions is better in high-growth food firms than in low-growth food firms. On the whole, food industry firms still need to avoid engaging in a large number of related party transactions before they have installed a professional relationship management system. The empirical results present that low-growth food firms lack strong corporate governance, and this is also an essential factor in the difference between the two groups of firms. More urgently, a necessary strategy is for high-growth food firms to improve their corporate governance system.

This study finally reminds low-growth food firms to become better and more positively involved in professional management, improve their financial characteristics, and strengthen corporate governance. In particular, the food industry has high standards of social responsibility. Management performance in this aspect is more important to investors and the social public. The establishment of a professional business attitude and brand value is thus indispensable for becoming a high-growth food firm. In the future, this study will extend the discussion to cover the relationship between market concentration and stock return volatility in the food industry.

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