

# Ownership Structure and Firm Performance: The Role of R&D

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**Abstract:** *This study aims to examine the impact of ownership structure (i.e. family ownership, government ownership, and foreign ownership) on firm performance, viz. Tobin's Q and return on assets. The impact of R&D on the relationship between ownership structure and firm performance is also assessed using a sample of 201 Malaysian public listed companies for the period of 2002-2011. Findings show that family ownership and foreign ownership positively relate to firm performance, but not government ownership. More importantly, R&D strengthens the relationship between family ownership and foreign ownership with firm performance respectively. While prior studies have shown that ownership structure is related to firm performance, this paper contributes to a new understanding of the role of R&D in moderating the relationship between ownership structure and firm performance.*

**Keywords:** *Family ownership, foreign ownership, government ownership, ownership structure, performance; research and development (R&D)*

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## 1. Introduction

Ownership structure may reflect on firm performance, and the differences in ownership structure have produced different impacts on firm performance. Therefore, it is not surprising that Demsetz and Villalonga (2001) found no statistically significant relationship between ownership structure and firm performance, while studies by Wahal and McConnell (2000), Berrone,

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Surroca, and Tribo (2007), and Francis and Smith (1995) showed different results. In illustrating this, Gürsoy and Aydoğan (1998) documented that the ownership structure is related to the presence of certain owners such as family, government, and foreign shareholders who can influence firm performance, and this scenario causes the dispersion of ownership and control that ultimately create agency problems. In Malaysia, there are clear examples of ownership structure's effect on firm performance. The IOI Group, under the helm of Tan Sri Dato' Lee Shin Cheng and his family for example, achieved a profit of around RM 600 million in 2011, thereby enabling it to be listed in the coveted Malaysia's Top Ten Property Developers category in 2011. The UEM Land Holdings Berhad, which is wholly owned by Khazanah Nasional Berhad and a top performer in the property sector, increased its net profit by 55% to RM 301 million in 2011. This study is different compared with previous studies (for example, Lean, Ting, & Kweh, 2015) as it looks at ownership identity, while Lean et al., (2015) on the other hand examine concentration of ownership. An extended study of ownership identity under the context of ownership structure is important because of the potential economic consequences brought by owners such as family, government and foreign shareholders.

Additionally, in the present competitive business market, companies may need to invest in research and development (R&D), which is one of the major means of achieving sustainable competitive advantages. However, R&D investments are also associated with more severe agency problems (Berrone et al., 2007). Research and Development can be defined as "expenditures" on: (i) product innovation activities, including introduction of new products and quality improvement of old products; (ii) process innovation activities, including introduction of new and more efficient production processes, as well as quality improvement of old production processes; and (iii) any activity linked to better organisation and management of innovations (Kastl, Martimort, & Piccolo, 2013). In 2011, the gross expenditure on R&D to gross domestic product in Malaysia was only 1.1% compared with Singapore's 2.3% (The Star, 2013). This figure shows that Malaysian firms have yet to fully recognise the importance of R&D, leaving them too dependent on foreign expertise and technology. Although R&D expenditure in Malaysia has been steadily increasing since 2000, only a few companies, such as Proton and Petronas, are taking R&D seriously (Malaysian Science and Technology Information Centre [MASTIC], 2015).

Ren, Chandrasekar, and Li (2012) argued that investments in R&D increased firm performance. Building on a well-established relationship between ownership structure and firm performance, this study thus examines the following research questions: (i) Does ownership structure affect firm performance? and (ii) What is the role of R&D in moderating the relationship between ownership structure and firm performance?

The first objective of this study is to investigate the relationship between ownership structure and firm performance. In addition, this study attempts to expand the current literature on ownership structure and firm performance by adding R&D as a moderator. This study also examines whether R&D plays a significant role in moderating the performance of a firm in relation to its ownership structure. In summary, to the best of our awareness, there is a noticeable absence of research focusing on ownership structure, R&D, and firm performance.

This study contributes to the debate on performance measurement from several dimensions. First of all, we attempt to test the moderating effect of R&D on the relationship between ownership structure and firm performance. Second, two measures of performance, namely Tobin's Q and return on assets, are employed in this study. The former measures the market-based performance of a firm, while the latter indicates the accounting-based performance. The findings of this study can be used to assess the impact of ownership structure on firm performance for public listed companies in Malaysia.

The remainder of this paper is organised as follows: section 2 reviews the literature on this topic, section 3 explains data and methodology used in this study while section 4 discusses empirical findings. The conclusion and recommendations are presented in Section 5.

## **2. Literature Review**

### ***2.1 Agency Theory***

Jensen and Meckling (1976) opined that the separation of ownership and control would cause a conflict of interest between the manager and shareholders, whereby the former does not act in the best interest of the latter. They also argued that managerial share-ownership may reduce managerial incentives to consume perquisites, expropriate shareholders' wealth, and thus help align the interests of managers and shareholders to lower agency costs and increase firm value.

### ***2.2 Family Ownership and Firm Performance***

A research conducted by Lee (2004) on 63 public listed companies in the United States in 2002 found that family firms have a positive influence on firm performance. He reported that the high level of trust and commitment in family firms resulted in greater efficiency and profitability. Yammesri and Lodh (2004) agreed with the positive impact of family-owned firms and performance on 240 non-financial firms in Thailand in a study they

conducted from 1998 to 2000. They argued that family shareholders have an advantage when it comes to information on firm performance because of their large stakes and close relationship with those in senior managerial positions. Studies conducted in Chile (Martinez, Stohr, & Quiroga, 2007) and in Canada (King & Santor, 2008) have confirmed this. These studies agreed that family-controlled firms performed significantly better than non-family run firms due to better managerial monitoring and better investment decisions. However, when Lauterbach and Vaninsky (1999) examined the effect of ownership structure on firm performance for 280 Israeli firms from 1992 to 1994, it was found that owner-managed firms appear to be the least efficient in generating profits compared with non-owner managed firms. Overall, it can be deduced that family-controlled firms generally have longer investment horizon and are thus related to higher firm performance (Singal & Singal, 2011). However, the nepotism that may result in having family members in the management team may cause competitive disadvantages (De Massis, Kotlar, Campopiano, & Cassia, 2013; Che & Langli, 2015).

### ***2.3 Government Ownership and Firm Performance***

Empirical evidence does not show any specific pattern in the effects of government ownership on firm performance. In a more conventional view, government ownership is expected to have a negative effect on the company's performance. Zeitun and Tian (2007) and Zeitun (2009) found that government ownership showed a negative significant relationship to performance in Jordan. In China, Tian and Estrin (2008) reported that the increase in government shareholding decreases the value of the firms to a certain point before the increment improves the corporate value. These findings were due to government-linked companies pursuing political objectives instead of profit maximisation, resulting in high political costs (Kang, 2009). However, Han and Suk (1998) showed a positive relationship between institutional ownership and stock prices, indicating that institutional owners are active in monitoring management. Uddin, Halbouni, and Raj (2014) found that government-linked companies have better accounting-based performance, but lower market-based performance, indicating that these companies are undervalued by the investors.

### ***2.4 Foreign Ownership and Firm Performance***

Abor and Biekpe (2007) findings confirm the positive impact of foreign ownership and firm performance in Ghana. They explained that foreign owner managers have more international exposure and skills in modern management technique and control systems, thereby lowering the agency

cost. Halkos and Tzeremes (2010), Ghahroudi (2011), and Uwuigbe and Olunsanmi (2012) also found that foreign ownership has a positive impact on firm performance in Turkey, Japan, and Nigeria. They suggested that the positive impact was due to managerial efficiency, technical skills, and state of technology foreign owners brought into the working environment. Specifically, foreign investors provide expertise and monitoring (Choi, Sul, & Min, 2012) and they are more productive (Abdelgouad, Pfeifer, & Gelubcke, 2015), all of which enable them to bring more resources into the companies.

## ***2.5 R&D and Firm Performance***

While much evidence confirmed that ownership structure is associated with performance, recent studies have also documented that R&D plays an important role in firm performance. Zhang, Li, Hitt, and Cui (2007) examined the contingent relationship between R&D intensity and performance of international joint ventures (IJV). Using samples of manufacturing IJVs in China, they found that R&D intensity did not have a direct positive relationship with performance. Ownership structure was introduced as a moderating variable between the two, but it was found that ownership structure alone did not support the proposition that R&D intensity was positively related to performance due to the weak property rights protection in China, where everyone can easily access and misappropriate the IJV's innovation. Sun and Anwar (2015) concluded that productivity gains in Chinese mining firms were mainly derived from R&D activities. Their findings have been used to encourage domestic firms in China's coal mining industry to conduct R&D in order to increase domestic production, consequently reducing reliance on imports. In Taiwan, Hsu, Lien, and Chen (2015) revealed an inverse U-shaped relationship between R&D activities and performance. Their study conducted between 2000 and 2010 further suggested that the benefits of R&D internationalisation outweigh the costs following the boosting of innovation. However, in Korea, Lee, Kim, and Lee (2010) demonstrated that the presence of R&D negatively influences a firm's performance. Their study examined the R&D activities and their impact on the financial and non-financial performance of 100 ICT firms, with a focus on small and medium firms.

In Malaysia, Hamezah, Norman, Romlah and Zaleha (2010) examined the relationship between corporate governance and R&D reporting among firms listed on the Malaysian MESDAQ market. They found that government ownership has an influence over the quantitative and financial R&D disclosure, as the government is able to fulfil the information need directly by contacting the firms. However, family, foreign, and institutional ownership have no influence on R&D disclosure due to the conflict of

interest between owners and outsiders. Meanwhile, Ghazali (2010) studied the impact of corporate governance on corporate performance as well as the impact of corporate governance on corporate performance. They found that foreign ownership is statistically associated with the Tobin's Q. In another study, Nurul and Rashidah (2011) compared the performance of 47 GLCs and 47 non-GLCs. Ahmad (2011) investigated the relationship between ownership structure and operating performance of selected IPO companies in Malaysia. Rasiah (2003) indicated that the local electronic firms are generally better endowed with R&D capabilities than foreign firms in Malaysia. His study also highlights that R&D activities are extremely low in Malaysia. In 2009, Rasiah investigated the different ownership structure and R&D activities of firms in China, Indonesia, Malaysia, the Philippines and Taiwan. His findings show that foreign firms rely on home plants to undertake R&D. As of today, no study has been conducted to investigate the direct impact of ownership identity as a main independent variable and R&D as a moderating variable on performance in Malaysia.

Logically, investing in R&D enables companies to enhance their performance because an improvement in their production process might result in product innovation and creation or even cost efficiency. In other words, a firm with high intensity of R&D activities can achieve competitive advantages by differentiating itself from competitors, with which it can gain more profits. With respect to cost efficiency, R&D can reduce production or process costs without compromising quality. Therefore, R&D should result in a higher level of profitability. In short, the more R&D-intensive a firm is, the greater its firm performance will be. This is particularly evident in firms with special ownership characteristics such as government, family, and foreign owners. Since ownership structure and R&D collectively result in better firm performance, this study tests the joint moderating effect of R&D on the ownership-performance relationship. Based on the above discussion, this study thus attempts to further investigate this relationship in Malaysia with updated data and improved methodology. It is hoped that the findings of this study is able to bridge the research gap and shed some light on the situation in Malaysia.

### **3. Data and Methodology**

This study examines (the relationship between ownership structure and firm performance as well as the impact of R&D on the relationship between ownership structure and firm performance. To achieve these objectives, this study designs multivariate tests, particularly OLS regression models, which control various variables that prior relevant literature identifies as affecting firm performance.

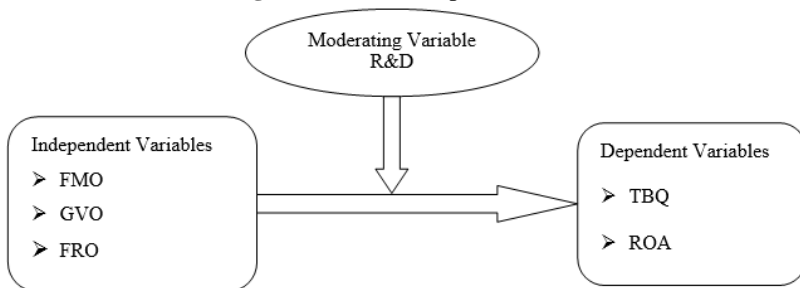
### 3.1 Source of Data

All 831 companies listed in the Main Board of Bursa Malaysia (Stock Exchange of Malaysia) as of 3 September 2012 were selected as sample for this study. These listed companies represent all nine sectors of the economy, namely plantation, property, consumer, construction, trading and services, technology, finance, mining, and industrial products. However, due to different regulatory requirements only 793 companies were chosen after excluding finance, insurance and unit trust companies. Data were further screened using the following criteria: (1) the firm is listed in Bursa Malaysia before 2002; (2) the firm has 10 years of complete data from 2002 to 2011; and (3) the firm has full information of the 30 largest shareholders listed in its annual reports. After screening through the samples based on these three criteria, 201 public-listed companies were chosen as final sample for the 10-year period having full available data. Data used in this study are drawn from two separate databases: the company's annual reports and DataStream.

### 3.2 Conceptual Model

Figure 1 shows the conceptual framework of this study, which is designed to examine the impact of ownership structure on firm performance. Another purpose of the model below is to assess how R&D affects the relationship between ownership structure and firm performance. The independent variables or ownership structure consists of family ownership (FMO), government ownership (GVO), and foreign ownership (FRO).

**Figure 1:** The conceptual model



#### 3.2.1 Model and variable measurements

We explain the independent variable, moderating variables, control variables, and dependent variables as follows:

*Dependent variables:* (i) Tobin's Q (TBQ) is calculated as the sum of total market value and debt divided by total assets. (ii) Return on Assets (ROA) is net income divided by total assets (Cao, Sun, & Yu, 2004).

*Explanatory variables:* (i) Family ownership (FMO) is one of the main variables, which is measured by dividing the sum of percentage of shares held by the family shareholders with the top 30 shareholders list in the company (Margaritis & Psillaki, 2010). (ii) Government ownership (GVO) is another testing variable, which is measured by dividing the sum of percentage of shares held by the government or government agency and financial institutions with the top 30 shareholders (Margaritis & Psillaki, 2010; Nurul & Rashidah, 2011; Zeitun & Tian, 2007). (iii) Foreign ownership (FRO) is defined as the percentage of total shares held by foreign shareholders in the company. We include foreign investors and foreign institutions such as foreign banks, securities companies, and insurance companies as foreign ownership (Abor & Biekpe, 2007; Ghazali, 2010; Uwuigbe & Olusanmi, 2012).

*Moderating variable:* Research and Development (R&D) is measured by dividing the Net Intangible Asset by Total Asset (Zeng & Lin, 2011).

*Control variables:* (i) Firm size (SIZE) is measured by the log of sales. The relationship between leverage and size is expected to be positive, and it is supported by previous studies (Rajan & Zingales, 2012). (ii) Debt Ratio (DEBT) is the ratio of total debts to total equities. This indicator captures the characteristics of a firm's indebtedness (Ting & Lean, 2011).

The following are the hypotheses:

Hypothesis 1: Ownership structure has a significant impact on firm performance.

Hypothesis 2: R&D moderates (or influences) the relationship between ownership structure and firm performance.

To examine the impact of ownership structure on performance, we establish Model 1 and Model 2 as follows:

$$TBQ_{it} = \lambda_0 + \lambda_1 FMO_{it} + \lambda_2 GVO_{it} + \lambda_3 FRO_{it} + \lambda_4 SIZE_{it} + \lambda_5 DEBT_{it} + Year\ dummies + Sector\ dummies + \varepsilon_{it} \quad (\text{Model 1})$$

$$ROA_{it} = \alpha_0 + \alpha_1 FMO_{it} + \alpha_2 GVO_{it} + \alpha_3 FRO_{it} + \alpha_4 SIZE_{it} + \alpha_5 DEBT_{it} + Year\ dummies + Sector\ dummies + \varepsilon_{it} \quad (\text{Model 2})$$

From the models, the subscript  $i$  and  $t$  represent the firm and time respectively;  $\lambda_i$  and  $\alpha_i$ ,  $i = 1$  to 5 are coefficients of the respective independent and control variables and  $\varepsilon_{it}$  is the error term. We test the model with pooled



OLS regressions and include dummies to control the year effects and sector effects respectively in the models.

In order to examine the moderating effect of R&D on the relationship, we add an interactive term in the models. Hence, Models 3 and 4 are designed as shown below to evaluate the moderating effects of R&D and ownership structure (FMO, GVO, and FRO) on firm performance:

$$TBQ_{it} = \beta_0 + \beta_1 FMO_{it} + \beta_2 GVO_{it} + \beta_3 FRO_{it} + \beta_4 SIZE_{it} + \beta_5 DEBT_{it} + \beta_6 (FMO * R\&D)_{it} + \beta_7 (GVO * R\&D)_{it} + \beta_8 (FRO * R\&D)_{it} + Year\ dummies + Sector\ dummies + \varepsilon_{it} \quad (\text{Model 3})$$

$$ROA_{it} = \delta_0 + \delta_1 FMO_{it} + \delta_2 GVO_{it} + \delta_3 FRO_{it} + \delta_4 SIZE_{it} + \delta_5 DEBT_{it} + \delta_6 (FMO * R\&D)_{it} + \delta_7 (GVO * R\&D)_{it} + \delta_8 (FRO * R\&D)_{it} + Year\ dummies + Sector\ dummies + \varepsilon_{it} \quad (\text{Model 4})$$

From the models, subscript  $i$  and  $t$  represent the firm and time respectively.  $\beta_i$  and  $\delta_i$ ,  $i = 1$  to  $8$  are coefficients of the respective independent control and moderating variables;  $\varepsilon_{it}$  is error term. Again, we employ pooled OLS regressions to test the models. Similarly, dummies are included to control the year effects and sector effects, respectively.

## 4. Findings and Analysis

### 4.1 Descriptive Statistics

Table 1 shows the descriptive statistics for firm performance and the explanatory variables across the sample of 201 companies for the period 2002-2011 (10 years). Based on the table, TBQ and ROA are relatively far apart from each other, with TBQ having a mean of 1.01 while ROA has a mean of 0.05. The vast difference in value is due to the different approach used in measuring firm performance, where the former uses market value approach while the latter uses accounting value approach (Tian & Estrin, 2008). In terms of ownership structure, FMO, GVO, and FRO have means of 0.2609, 0.4368, and 0.0919 respectively. From here, the sample shows that most of the companies in Malaysia are government-owned. As for R&D, it has a mean of 0.0397 among the 201 samples, indicating that not many companies in Malaysia are undertaking R&D activities, consistent with what was reported by Mohd, Latif, Bakar, Hussin, and Ismail (2006). SIZE and DEBT have a mean of 12.3652 and 0.4491 respectively. The high value of SIZE indicates that companies have higher sales activities which lead to sales growth. The growth brings about economies of scale enabling the company to gain higher profit and generate greater performance (Lun & Quaddus,

2011). DEBT is less than half of the companies' capital structure, implying that companies in Malaysia rely more on equity financing rather than debt financing. The result is consistent with Ehikioya's (2009) findings.

**Table 1:** Descriptive statistics

	Mean	Median	Maximum	Minimum	Std. Dev.
TBQ	1.0101	0.8715	7.5602	0.0000	0.6275
ROA	0.0500	0.0525	0.7234	-1.3871	0.1173
FMO	0.2609	0.1640	0.9903	0.0000	0.2643
GVO	0.4368	0.3947	1.0000	0.0000	0.2874
FRO	0.0919	0.0235	0.9441	0.0000	0.1561
R&D	0.0397	0.0068	0.8719	-0.0302	0.0890
SIZE	12.3652	12.3005	17.2877	0.0000	1.5734
DEBT	0.4491	0.4360	7.3309	0.0000	0.3189

With respect to the variables of interest, we further report the mean R&D value for foreign, family, and government-owned firms. Table 2 shows that the R&D activities in government-owned firms are on average the highest among all types of ownerships. A test of difference shows that significant differences exist among the three types of ownership.

**Table 2:** Test for equality of means of R&D

Category	N	Mean	Std. Dev.
FMO	661	0.0209	0.0476
GVO	1206	0.0516	0.1060
FRO	143	0.0262	0.0562
All	2010	0.0397	0.0890
ANOVA F-test Value		27.8607***	

## 4.2 Pearson Correlation Analysis

Table 3 reports the Pearson correlation coefficients. The FMO shows a negative correlation with TBQ and ROA. FMO is negatively correlated with TBQ at 1% significant level. The GVO is also negatively correlated with TBQ and ROA is significant at 5%. The reason could be that the focus of the government is towards social benefits instead of profit maximisation of the company (Zeitun, 2009). Meanwhile, R&D seems to have a negative correlation with all variables, except for GVO. The SIZE has a significant positive correlation with TBQ, ROA, and R&D. Larger firm size indicates that the sales or revenue of the company are high, leading to better performance (Margaritis & Psilaski, 2010). Revilla and Fernandez (2012) suggested that large firms are efficient innovators through their larger sales

base since they have advantage in terms of scale and have greater resources to finance innovation. Hence, with better innovation, larger firms are expected to have better performance as shown by the positive correlation. DEBT shows a vice versa significant correlation with TBQ and ROA. It positively correlates with TBQ, but negatively correlates with ROA. This result is consistent with the study conducted by Nazrul, Rubi, and Huson (2008). King and Santor (2008) explained that Tobin's Q is a forward-looking measurement that reflects the market's valuation of the firm's assets, while ROA is a backward-looking measurement that reflects the historical prices of the assets. Thus, the use of DEBT may produce different impacts in the two performance measurement.

**Table 3:** Pearson correlation

	TBQ	ROA	FMO	GVO	FRO	R&D	SIZE
ROA	0.153**						
FMO	-	-0.015					
GVO	0.096***						
FRO	-0.032	-	-				
R&D	-0.028	0.083**	0.555**				
SIZE	0.404**	0.145**	-	-			
DEBT	-0.028	-0.037	0.268**	0.140**			
	-0.028	-0.037	-	0.224**	-0.018		
	0.152**	0.312**	-	0.167**	0.275**	0.071**	
	0.344**	-	-	0.270**	0.112**	0.094**	-0.022
		0.266**	0.138**				0.032

Note: \*\* and \*\*\* denote the statistical significance at the 5%, and 1% levels, respectively.

### 4.3 Regression Analysis

Table 4 reports the pooled OLS regression results of using TBQ (model 1) and ROA (model 2) as dependent variables. The multicollinearity test was conducted and used a cut-off value of  $VIF^1$  less than 5 (Robert, 2007), with the results showing that there was no multicollinearity among the variables. The coefficient of determination of adjusted  $R^2$  shows that 29.70% and 19.05% for TBQ and ROA respectively can be explained by the variance of the independent and controlled variables in the model. The regression model is reliable for prediction, given that F-stat is statistically significant at the 1% level.

**Table 4:** Regression analysis - Main effect

Variables	Model 1		Model 2	
	Coefficient	<i>t</i>	Coefficient	<i>t</i>
Constant	0.3493***	2.9328	-0.1936***	-8.1044
FMO	0.1751***	2.8426	0.0043	0.3443
GVO	0.0030	0.0547	-0.0391***	-3.5989
FRO	1.6010***	18.3584	0.0512***	2.9279
SIZE	0.0127	1.5250	0.0234***	14.0348
DEBT	0.6049***	16.0681	-0.0986***	-13.0582
Year Dummies	Yes		Yes	
Industry Dummies	Yes		Yes	
	Adj. R <sup>2</sup> =0.2970		Adj. R <sup>2</sup> =0.1905	
	F-stat=43.4314***		F-stat =24.6373***	

Note: \*\* and \*\*\* denote the statistical significance at the 5%, and 1% levels, respectively.

Our findings show that FMO and FRO are significantly and positively related to TBQ. Both FMO and FRO are positively related to ROA; however, only the coefficient of FRO reaches the 1% significance level. As for FMO, the result is consistent with the findings of Anderson and Reeb (2003). The positive relationship show that a family member has greater interest in the company and understands the business better. Eventually, the cost of efficiency is enhanced, thereby promoting a higher return on investment and performance (Lee, 2004). The statistically significant positive result for FRO with TBQ is consistent with Ghazali's study (2010). Besides having higher confidence level, foreign investors may contribute via managerial efficiency, technical skills, and technology brought into the local companies, hence, improving the firm's performance (Uwuigbe & Olunsanmi, 2012). On the other hand, government ownership does not have any impact on TBQ, but it is found to be significantly negative-related to ROA and it is in line with the study conducted by Zeitun and Tian (2007). The significant negative relationship implied that the focus of the government is on social benefits instead of profit maximisation of the company (Zeitun, 2009). As a result, the performance of the company weakens. The SIZE is found to be positively significant to the performance of the company. When sales volume increases, it means that the company is performing well in generating revenue through its operation. The DEBT shows a positive significant result with TBQ, but the opposite for ROA. The inconsistent result of DEBT shows that it increases firm performance when measured by TBQ, but decreases the performance when measured with ROA. This mixed result is similar to the study conducted by Nazrul et al. (2008).

**Table 5:** Regression analysis - Moderating effect

Variables	Model 3		Model 4	
	Coefficient	<i>t</i>	Coefficient	<i>t</i>
Constant	0.6138***	4.7681	-0.1568***	-5.9148
FMO	0.5437***	2.9601	-0.0722**	-1.9082
GVO	0.0617	0.4910	0.0189	0.7324
FRO	-3.0298***	-7.1183	-0.3354***	-3.8264
SIZE	0.0170**	2.0911	0.0232***	13.9209
DEBT	0.6111***	16.6393	-0.1003***	-13.2650
R&D	-0.1383	-1.0287	-0.0532**	-1.9228
<i>Interaction terms</i>				
FMO*R&D	-0.4758***	-1.8950	0.1131**	2.1870
GVO*R&D	-0.0360	-0.2283	-0.0696**	-2.1441
FRO*R&D	5.7838***	11.1010	0.4879***	4.5480
Year Dummies	Yes		Yes	
Industry Dummies	Yes		Yes	
	Adj. R <sup>2</sup> =0.3422		Adj. R <sup>2</sup> =0.2020	
	F-stat =44.5548***		F-stat=22.1860***	

Note: \*, \*\* and \*\*\* denote the statistical significance at the 10%, 5%, and 1% levels respectively.

To evaluate the influence or moderating effect of R&D on the association between ownership structure and performance, we include an interaction term of R&D and ownership structure (FMO, GVO, and FRO). Mean centring of variables before analysing moderated multiple regression model is often advocated for reducing multicollinearity that is caused by the interaction term of two variables as an independent variable in the regression model. The results of Model 3 and Model 4 are presented in Table 5.

In terms of family-owned companies, there exists a moderating effect of R&D to family-owned companies and performance. The FMO, when moderated with R&D, gives a significant positive result in Model 4, suggesting that R&D strengthens the relationship between FMO and performance. As family firms are more conservative and risk-averse (Schulze, Lubatkin, & Dino, 2003), they would probably invest less in or are sceptical towards R&D. This could be due to the fact that family firms are under pressure to maximise shareholder profit and their accountability to minority shareholders means they prefer to use traditional method to succeed. Hence, ensuring the success of the firms through R&D is not critical and essential for family-controlled firms. With that, family owners may be tempted to discourage R&D investments to achieve family control goals. Morck and Yeung (2004) explained that the discouragement occurs because they do not feel well-equipped to deal with complex technology issues that are involved in R&D activities. As such, R&D weakens the relation between

FMO and firm performance from market value perspective. However, the coefficient of FMO\*R&D is significantly positive in Model 4, suggesting that from the book value perspective R&D will strengthen the positive association between family-controlled firms and firm performance.

Moving on to GVO, R&D strengthens the negative relationship between GVO and performance. This negative impact of R&D towards GVO and performance is consistent with Karray and Kriaa (2009). The GVO has lower motivation to innovate, as it is subjected to bureaucracy and lack communication. Hess, Gnuasekarge, and Hover (2008) pointed out that it is due to government ownership pursuing social or political goals instead of maximising firm value. Hence, adopting R&D activity in government ownership firms will not benefit its performance. The low motivation results in poor management if the GVO undertakes R&D and thus affects the performance negatively.

On the other hand, foreign-owned companies benefit the most from investments in R&D. The results in Table 5 indicates that R&D moderates the relationship positively and significantly between FRO and performance at 99% confidence level. The result is consistent with Hsu et al. (2015), who agreed that a firm's experience in foreign expansion may have a positive moderating impact on the relationship between R&D internationalisation and innovation performance, as domestic firms normally cannot provide efficient support for advanced R&D activities. Operating in a foreign country enables the firms to gain new knowledge from foreign markets and R&D activities moderate the firm performance positively. In other words, the strong participation, along with the right knowledge and expertise in running R&D, has strengthened the relationship between FRO and company performance. As such, FRO\*R&D positively influences the performance of firms. Although Karray and Kriaa (2009) found a negative impact of R&D on foreign-owned firms in the Tunisian context, the opposite is seen in the Malaysian context. By having efficient management, technical skills, and technology introduced by foreign investors in Malaysian companies, it may boost the firm's motivation to innovate (Uwuigbe & Olunsanmi, 2012).

#### ***4.4 Discussion - Policy Implications***

It is necessary for investors, who are interested in investing in public-listed companies in Malaysia, to first identify the ownership structure of the company. As shown in the results, family-owned and foreign-owned companies typically outperform government-owned companies in terms of performance. This suggests that investors have a higher chance and possibility to gain higher returns from investing in these types of companies when managed by family or foreign owners. However, it is also important to note that an ownership structure, when coupled with R&D, may provide

different results. The R&D activities and their moderating effects on the relationship between ownership structure and firm performance as found in this study should be taken into consideration. In other words, this study highlights the significance of foreign ownership and the complementary effect of R&D.

Therefore, policymakers should provide greater incentives such as tax exemption or subsidies to companies, particularly for family-owned and government-owned companies so that they would be more open to change and encourage active participation and management in R&D. Additionally, policymakers can outsource the technology or adapt the technology and skills used by foreign-owned companies in the Malaysian context. They can achieve this objective by reaching agreements with foreign owners in terms of knowledge- and technology-transfer. By doing so, companies will be able to reap the benefit of practising R&D, hence increasing their competitiveness and performance. The inefficiency of the performance of government-owned firms calls for the need to reduce governmental control on firms and to bring in new professionals to run the company. Policymakers should be proactive and responsive in encouraging successful technological research and development. Therefore, they should set policies that promote not only technological capabilities, but also ownership identity. This study raises an important question for government-owned companies in R&D investment. Although government-owned companies are found to have the highest amount of mean R&D, the benefits of technology advancement are not truly reaped to maximise shareholders' profit. Therefore, policymakers should look into this matter to prevent any abuse of intellectual property, which is the result of R&D.

In summary, a family owned business does not face much conflict of interests and emphasises on achieving good performance to benefit everyone. Family-owned companies are more committed and command greater level of trust in managing the business. The significantly positive coefficient of FMO is supported by Lee (2004). Secondly, GVO is found to be significantly and negatively related to ROA. When government is involved, the firm's activities may become politically motivated and shy away from profit maximisation. Shleifer and Vishny (1998) suggested that the government has a "grabbing hand" that pushes firms to act in a way that benefits politicians and bureaucrats. Meanwhile, foreign-owned companies illustrate a significantly positive relation with firm performance. Foreign-owned companies have managerial efficiency and advanced technologies and skills in managing the company. These factors contribute to the positive impact on their performance as discovered by Uwuigbe and Olunsanmi (2012). With respect to the moderating factor, this could be due to family members in the firm who are doubtful and do not have the necessary

knowledge in the investment and management of R&D. Martinez et al. (2007) identified that family-owned companies are resistant to change while Anderson and Reeb (2003) suggested that family-owned firms avoid acting opportunistically to preserve the long-term survivability and reputation of their firm. This explains the negative effect of investing in R&D to enhance performance. The technical skills and state-of-the-art technologies brought in have served as a platform for the company to venture into R&D activities effectively, hence improving the company's performance.

## **5. Conclusion**

This study examines the impact of ownership structure on firm performance. It also examines the influence (or moderating effect) of R&D on the association between ownership structure and firm performance. Results confirm that ownership structure does have an impact on firm performance. First, both family and foreign ownerships are significantly and positively related to Tobin's Q. However, government ownership is significantly and negatively related to firm performance. This study also makes a new discovery in terms of the moderator effect of R&D in stimulating performance of family owned firms. The R&D activities also strengthen the positive effect of foreign ownership on firm performance. In summary, the findings corroborate with the argument in the introduction, whereby the difference in ownership structure produces different impacts on the companies' investment decision and performance.

It is recommended that investors who are interested in investing in public-listed companies in Malaysia first identify the ownership structure of the company. Our results show that investors have a higher chance and possibility to gain higher return from investing in family-owned and foreign-owned companies. Policymakers should consider provide direct funding alongside incentives such as tax exemption or subsidies to companies, particularly to family-owned companies so that they would be more open to change and encourage active participation and management in R&D. The inefficiency of government-owned firms also calls for the need to reduce governmental control on firms and to bring in new professionals to enhance company operations.

Like most studies, this study is subjected to some limitations. First, the sample size is limited to only public-listed companies in Malaysia. Second, we do not assume whether performance leads to ownership identity, or whether ownership identity leads to higher performance. The problem of endogeneity bias may be investigated in future research.



## Notes

- <sup>1</sup> Based on the result, the VIF for FMO=1.826, GVO=1.721, FRO=1.326, SIZE=1.156 and DEBT=1.035.

## References

- Abdelgouad, A.F., Pfeifer, C., & Gelubcke, J.P.W. (2015). Ownership structure and firm performance in the Egyptian manufacturing sector. *Economics Bulletin*, 35(4), 2197-2212.
- Abor, J., & Biekpe, N. (2007). Corporate governance, ownership structure and performance of SMEs in Ghana: Implications for financing opportunities. *Corporate Governance*, 7(3), 288-300.
- Ahmad, A. (2011). Ownership structure and the operating performance of Malaysia companies. *International Review of Business Research Papers*, 7(6), 1-14.
- Anderson, R.C., & Reeb, D.M. (2003). Founding-family ownership and firm performance: Evidence from S&P 500. *The Journal of Finance*, 58(3), 1301-1327.
- Berrone, P., Surroca, J., & Tribo, J.A. (2007). Do the type and number of blockholders influence R&D investments? New Evidence from Spain. *Corporate Governance: An International Review*, 15(5), 828-842.
- Cao, T., Sun, W., & Yu, J. (2004). Capital structure, ownership structure, growth opportunities and firm performance. *Nankai Business Review*, 1, 57-63.
- Che, L., & Langli, J.C. (2015). Governance structure and firm performance in private family firms. *Journal of Business Finance & Accounting*, 42(9-10), 1216-1250.
- Choi, H.M., Sul, W., & Min, S.K. (2012). Foreign board membership and firm value in Korea. *Management Decision*, 50(1-2), 207-233.
- De Massis, A., Kotlar, J., Campopiano, G., & Cassia, L. (2013). Dispersion of family ownership and the performance of small-to-medium size private family firms. *Journal of Family Business Strategy*, 4(3), 166-175.
- Demsetz, H., & Villalonga, B. (2001). Ownership structure and corporate performance. *Journal of Corporate Finance*, 7(3), 209-233.
- Ehikioya, B.I. (2009). Corporate governance structure and firm performance in developing economies-evidence from Nigeria. *Corporate Governance*, 9(3), 231-243.
- Ghahroudi, M. (2011). Ownership advantages and firm factors influencing performance of foreign affiliates in Japan. *International Journal of Business and Management*, 6(11), 119-137

- Ghazali, N.A.M. (2010). Ownership structure, corporate governance and corporate performance in Malaysia. *International Journal of Commerce and Management*, 20(2), 109-119.
- Gürsoy, G., & Aydoğan Aydoğan, K. (1998). Equity ownership structure, risk-taking and performance-an empirical investigation in Turkish companies. *Emerging Markets Finance & Trade*, 38(6), 6-25.
- Halkos, G. E., & Tzeremes, N. (2010). The effect of foreign ownership on smes performance-an efficiency analysis perspective. *Journal of Production Analysis*, 34(2), 167-180.
- Hamezah, M.N., Norman, M.S., Romlah, J., & Zaleha, A.S. (2010). Corporate governance and R&D reporting in Malaysian MESDAQ market. *International Journal of Economics and Management*, 4(2), 350-372.
- Han, K.C., & Suk, D.Y. (1998). The effect of ownership structure on firm performance: Additional evidence. *Review of Financial Economics*, 7(2), 143-155.
- Hess, K., Gnuasekarge, A., & Hover, M. (2008). State dominant and non-state dominant ownership concentration and firm performance: Evidence from China. *International Journal of Managerial Finance*, 6(4), 264-289.
- Hsu, C.W., Lien, Y.C., & Chen, H. (2015). R&D internationalization and innovation performance. *International Business Review*, 24(2), 187-195.
- Jensen, M.C., & Meckling, W.H. (1976). Theory of the firm-managerial behaviour, agency costs and ownership structure. *Journal of Financial Economics*, 3(4), 305-360.
- Kang, Y. (2009). The impacts of ownership structure on performance of listed firms in China. *International Area Studies Review*, 13(1), 241-263.
- Kastl, J., Martimort, D., & Piccolo, S. (2013). Delegation, ownership concentration and R&D spending: Evidence from Italy. *The Journal of Industrial Economics*, 61(1), 84-107.
- Karray, Z., & Kriaa, M. (2009, April). Innovation and R&D investment of Tunisian firms-a two regime model with selectivity correction. Paper presented at *Economic Research Forum*.
- King, M.R., & Santor, E. (2008). Family values: Ownership structure, performance and capital structure of Canadian firms. *Journal of Banking and Finance*, 32(11), 2423-2432.
- Francis, J., & Smith, A. (1995). Agency costs and innovation: Some empirical evidence. *Journal of Accounting and Economics*, 19(2-3), 383-409.

- Lauterbach, B., & Vaninsky, A. (1999). Ownership structure and firm performance: Evidence from Israel. *Journal of Management and Governance*, 3(2), 189-201.
- Lean, H.H., Ting, I.W.K., & Kweh, Q.L. (2015). Ownership concentration, family ownership and leverage: Evidence from Malaysia. *Malaysian Journal of Economic Studies*, 52(2), 117-133.
- Lee, J. (2004). The effects of family ownership and management on firm performance. *S.A.M Advanced Management Journal*, 69(4), 46-60.
- Lee, Y., Kim, S., & Lee, H. (2011). The impact of service R&D on the performance of Korean information communication technology small and medium enterprises. *Journal of Engineering and Technology Management*, 28(1-2), 77-92.
- Lun, V.Y.H., & Quaddus, M.A. (2011). Firm size and performance: A study on the use of electronic commerce by container transport operators in Hong Kong. *Expert Systems with Applications*, 38(6), 7227-7234.
- Margaritis, D. & Psillaki, M. (2010). Capital structure, equity ownership and firm performance. *Journal of Banking & Finance*, 34(3), 621-632.
- Malaysian Science and Technology Information Centre, MASTIC. (2015). *National Research and Development (R&D) Survey*. Retrieved from <http://mastic.mosti.gov.my/en/web/guest/statistik-kajian-rnd-kebangsaan>
- Martinez, J.I., Stohr, B.S., & Quiroga, B.F. (2007). Family ownership and firm performance: Evidence from public companies in Chile. *Family Business Review*, 20(2), 83-94.
- Mohd, K., Latif, R., Bakar, R., Hussin, W., & Ismail, K. (2006). Value-relevance of R&D expenditure-experience from Malaysia. *IIUM Journal of Economics and Management*, 4(2), 205-226.
- Morck, R., & Yeung, B. (2004). Family control and the rent-seeking society. *Entrepreneurship: Theory and Practice*, 28(4), 391-409.
- Nazrul H.A.R., Rubi, A., & Huson, J.A. (2008). Ownership structure and corporate performance - A comparative analysis of government linked and non-government linked companies from Bursa Malaysia. *Journal of Finance and Economics*, 61, 42-56.
- Nurul A.N., & Rashidah, A.R. (2011). Government ownership and performance of Malaysian government-linked companies. *International Research Journal of Finance and Economics*, 61(1), 42-56.
- Rajan, R.G., & Zingales, L. (2012). What do we know about capital structure? Some evidence from international data. *The Journal of Finance*, 50(5), 1421-1460.
- Rasiah, R. (2003). Foreign ownership, technology and electronics exports from Malaysia and Thailand. *Journal of Asian Economics*, 14(5), 785-811.

- Ren, H., Chandrasekar, K., & Li, B. (2012). Moderating effects of board and managerial incentive on the relationship between R&D investment and firm performance—evidence from listed manufacturing firms in China. *The Journal of International Management Studies*, 7(1), 41-55.
- Revilla, A.J., & Fernandez, Z. (2012). The relation between firm size and R&D productivity in different technological regimes. *Technovation*, 32(11), 609-623.
- Robert M.O. (2007). A caution regarding rules of thumb for variance inflation factors. *Quality & Quantity*, 41(5), 673-690.
- Schulze, W.S., Lubatkin, M.H. & Dino, R.N. (2003). Toward a theory of agency and altruism in family firms. *Journal of Business Venturing*, 18(4), 473-490.
- Shleifer, A., & Vishny, R. (1998). *The grabbing hand: Government pathologies and their cures*. Cambridge: Harvard University Press.
- Singal, M., & Singal, V. (2011). Concentrated ownership and firm performance: Does family control matter?. *Strategic Entrepreneurship Journal*, 5(4), 373-396.
- Sun, S., & Anwar, S. (2015). R&D status and the performance of domestic firms in China's coal mining industry. *Energy Policy*, 79, 99-103.
- Tian, L., & Estrin, S. (2008). Retained state shareholding in Chinese PLCs. *Journal of Comparative Economics*, 36(1), 74-89.
- Ting, I.W.K., & Lean, H.H. (2011). Capital structure of government linked companies in Malaysia. *Asian Academy of Management Journal of Accounting and Finance*, 7(2), 137-156.
- Uddin, M.H., Halbouni, S., & Raj, M. (2014). Performance of government-linked firms listed on two stock exchanges of the United Arab Emirates: An empirical study. *Emerging Markets Finance and Trade*, 50(sup 1), 212-236.
- Uwuigbe, U., & Olunsanmi, O. (2012). An empirical examination of the relationship between ownership structure and the performance of firms in Nigeria. *International Business Research*, 5(1), 208-215.
- The Star. (2013, October 26). Economic Report 2013/2014: Intensifying efforts to encourage R&D. *The Star Online*. Retrieved from <http://www.thestar.com.my/business/business-news/2013/10/26/intensifying-efforts-to-encourage-rd/>
- Wahal, S., & McConnell, J. (2000). Do institutional investors exacerbate managerial myopia?. *Journal of Corporate Finance*, 6(3), 307-329.
- Yammitesri, J., & Lodh, S.C. (2004). Is family ownership a pain or gain to firm performance?. *Journal of American Academy of Business*, 4(1/2) 263-270.

- Zeitun, R. (2009). Ownership structure, corporate performance and failure: Evidence from panel data of emerging market the case of Jordan. *Corporate Ownership and Control*, 6(4), 96-114.
- Zeitun, R., & Tian, G.G. (2007). Does ownership affect a firm's performance and default risk in Jordan?. *Corporate Governance*, 7(1), 66-82.
- Zeng, T., & Lin, H. (2011). Ownership structure and R&D spending-evidence from China's listed firms. *Chinese Management Studies*, 5(1), 82-93.
- Zhang, Y., Li, H., Hitt, M.A., & Cui, G. (2007). R&D Intensity of international joint venture performance in an emerging market: Moderating effects of market focus and ownership structure. *Journal of International Business Studies*, 38(6), 944-960.