

Corporate Ownership, R&D Investment and Performance of Canadian Firms

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ABSTRACT

In this study, we examine the interrelationship between ownership structures, R&D activity and the performance of Canadian firm. We argue that the concentration of corporate ownership will affect R&D investment choice, which will ultimately affect firm performance. Inspired by Cho's (1998) methodology, we use robust techniques to test the association between ownership concentration, R&D intensity and firm performance. Our results indicate that in the Canadian context, ownership concentration has a negative effect on R&D investment. On the other hand, R&D investment has a positive impact on performance. Hence, our findings suggest that because corporate ownership concentration is negatively associated with R&D investment, it could have a detrimental effect on firm performance.

Keywords: *Corporate ownership structure, CMS, ownership concentration, agency theory, innovation, R&D, firm performance, controlling shareholders.*

INTRODUCTION AND THEORETICAL FRAMEWORK

A number of scandals such as Enron, Worldcom and more recently the Madoff ponzi scheme, have contributed to make Corporate Governance a central issue of interest for both practitioners and academics. These scandals underline the importance of strengthening the protection of minority shareholders whose participation is essential to the equilibrium of financial markets. Although less spectacular than widely publicized financial scandals, the issue as to whether dominant shareholders can expropriate minority shareholders through sub-optimal investment decisions remains a central concern for corporate governance (Bebchuck et al., 2000). In this study, we attempt to shed some light on this issue by analyzing the links between ownership structure, R&D investment and firm performance.

Empirical studies show that R&D investment has a positive impact on economic growth, on firm value (Lev and Sougiannis, 1996; Chan et al., 2001; Johnson and Pazderka, 1993; Cho, 1998), and on firm performance (Hill and Snell, 1988; Lau, 1998). Nevertheless, numerous empirical studies show that agency conflicts may limit R&D investment. Agency theory predicts that a manager's incentive for making optimal investment decisions is positively associated with their stake in a firm's equity. From this perspective, ownership concentration may reduce the conflict of interests between managers and shareholders and motivate managers to pursue value-enhancing investment such as R&D. Thus, ownership concentration may be considered as a corporate governance mechanism to reduce Type I agency costs associated with manager-shareholder conflicts (Villalonga and Amit, 2006) that may induce sub-optimal investment decisions. Accordingly, empirical evidence shows that the concentration of corporate ownership alleviates these conflicts of interest and has a positive effect on both firm performance (Morck & al., 1988; McConnell & Servaes, 1990; Stulz, 1988) and R&D intensity (Cho,

1998; Hill & Snell, 1988, Barker & Mueller, 2002; Gompers & al., 2002). Most of these studies are based economies such as the United States where the ownership structures are generally widely-held.

However, Canadian firms are in general family-controlled and display high levels of ownership concentration. In Canada, as in most countries where corporate ownership structures are highly concentrated, other issues are relevant. First of all, in these countries, the conflicting agency relationship is at the level of the controlling-minority shareholders as opposed to the manager-shareholders' level. Therefore, the main agency problem that arises from concentrated corporate ownership environments is the entrenchment of the controlling shareholders who control the firm's resources and its impact on the minority shareholders, who provide financing, but who also run the risk of expropriation. In this context, entrenched shareholders may choose to allocate the firm's resources to increase their wealth regardless of the effect that their choices may have on the wealth of minority shareholders and other stakeholders. These agency costs are known in the literature as Type II agency costs (Villalonga and Amit, 2006). Furthermore, in European and Asian countries, as well as in Canada, Controlling Minority Structures (CMS hereafter) are more commonplace than in the United States. In CMS, controlling shareholders maintain control over a firm's voting rights while holding fewer cash flow rights, thus allowing them to control the firm while having a very small stake in its equity. Considering these major differences between the corporate ownership structures of American and Canadian firms, we believe that the empirical evidence gathered from American studies can not be generalized to the Canadian context.

For instance, Morck, Strangeland and Yeung (2002), show that Canadian firms that are widely-held or controlled by the founding owners invest more on R&D than heir-controlled firms. They argue that the concept of creative destruction with the renewal of products and services could threaten the actual wealth of the families who control large firms around the world. Creative destruction may then be the reason that large shareholders who want to maintain their vested interest in their firm's capital offset R&D investment. Therefore, ownership concentration may have a negative effect on R&D investment. Furthermore, Di Vito, Laurin and Bozec (2010), find that the corporate ownership structures of Canadian manufacturing firms do indeed affect R&D investment as well as their outcomes. The results of this study show that the concentration of the voting rights of controlling shareholders negatively affects the R&D activity of Canadian manufacturing firms.

The studies mentioned above contribute to our understanding of the effect of corporate ownership structures on R&D activity and firm performance but they do not verify the interrelationships between corporate ownership, R&D activity and firm performance. In this study, we attempt to determine the nature of these relationships using a system of equations in which R&D investment and firm performance are treated as endogenous variables. Our model is tested using a three stage least squares (3SLS) procedure. Based on a sample comprised of 205 Canadian manufacturing, our results show that ownership concentration has a significantly negative effect on R&D intensity which, in turn, has a positive effect on firm performance.

LITERATURE REVIEW

Corporate Ownership Structures and Firm Performance

Empirical findings from previous research investigating the link between ownership structure and firm value or performance, yield mixed results mainly due to the predominance of agency costs which vary according to different economic settings. Since Type 1 agency costs can be alleviated through ownership concentration, most of the studies in economic settings where ownership is generally dispersed,

such as in the United States, have generally found that ownership concentration has a positive effect on R&D intensity (Hill and Snell, 1988; Cho, 1998; Gompers et al., 2004), R&D outcomes (Francis and Smith, 1995) and corporate performance (Morck et al., 1988; McConnell and Servaes, 1990; Stulz, 1988; Hill and Snell, 1988, Gompers et al. 2004). Hence, ownership concentration seems to alleviate Type 1 agency costs and aligns the interests of both managers and shareholders. However at higher levels of concentration, agency problems associated with entrenchment seem to reverse the effect of the concentration of ownership on R&D, which becomes significantly negative (Cho, 1998; Gompers et al., 2004).

However, even in countries where ownership structures are most often widely-held, at higher levels of ownership concentration, Type 2 agency costs, which are associated with the entrenchment of controlling shareholders, may surface and negatively affect firm performance. Accordingly, empirical findings in some US studies show that at certain levels of concentration, the positive impact of ownership concentration on firm value reverses and becomes negative (Morck et al., 1988; McConnell and Servaes, 1990; Hermalin and Weibach, 1991; Gompers et al, 2004).

Away from the United States in most other countries including Canada, where ownership structures are highly concentrated, Type 2 agency costs related to the entrenchment of the controlling shareholders are prevalent. Empirical findings from studies in these settings yield conflicting results. In Sweden, Cronqvist and Nilsson (2003) find a negative relationship between ownership concentration and firm performance, while in a certain number of other European countries; Faccio and Lang (1999) observe the opposite. Classens et al. (2002) find a negative relationship between the concentration of voting rights and corporate performance on sample of firms from eight Asian countries. They also document a positive relationship between firm performance and the concentration of cash flow rights held by controlling shareholders. In Canada, a study by Bozec and Laurin (2007) find that the concentration of voting rights held by the main shareholder is positively related to firm performance. However, these authors also find a negative relationship between the excess voting rights (i.e. the separation of the voting and cash flow rights) held by the main shareholder and firm performance, but only when the cash flow rights of that shareholder are less than 25%. On the other hand, Morck et al. (2002) compare the effects of controlling shareholders on firm performance and find that, in Canada, widely-held firms outperform founder-controlled firms which in turn outperform heir-controlled firms.

All the previously cited studies analyzing corporate ownership structures as exogenous to firm performance, find that these structures have a significant effect (whether positive or negative) on the various metrics of a firm's performance. However, Demsetz and Lehn (1985) suggest that in countries where firms are widely-held and where shares are granted to managers in order to align their interests with those of shareholders, the concentration of ownership should be treated as endogenous to firm performance in equilibrium. In support of Demsetz and Lehn, Kole (1994) (cited by Cho, 1998) finds reverse causality between ownership concentration and firm value. These arguments raise doubt over the validity of the research studies that treat ownership structures as being exogenous to firm performance within a framework comprised of generally widely-held firms.

Corporate Ownership Structures and R&D Investment

The empirical findings from research analyzing the relationship between ownership concentration and R&D investment yield mixed results which differ, once again, depending on the different economic settings. The results from these studies seem to follow the same pattern as the ones analyzing the relationship between ownership structures and firm performance. As a result, in economic settings

comprised mainly of widely-held corporate ownership structures, findings generally show a positive relationship between ownership concentration, R&D investment (Hill and Snell, 1988; Cho, 1998; Baysinger et al., 1991 Gompers et al., 2004), and R&D outcomes (Francis and Smith, 1995).

However, in countries characterized by high levels of corporate ownership concentration, the findings suggest otherwise. Entrenchment issues which lead to Type 2 agency costs are predominant in European and Asian firms. Yafeh and Yosha (2003) find that ownership concentration has a significantly negative effect on R&D investment. In Germany, Czarnitzki and Kraft (2008) show that widely-held firms tend to invest more in R&D activity. Munari, Oriani and Sobrero (2006) find the same relationship on a sample of six European countries (France, Italy, Germany, Norway, Sweden and the United Kingdom). However no significant relationship is observed between ownership concentration and R&D intensity for Spanish firms (Tribo, Berrone and surroca, 2007). Gugler, Mueller and Yurtuglu (2004) analyze the relationship between corporate governance, ownership structures, and investment performance including R&D activity on a sample of firms from 61 different countries. They show that in countries with relatively weaker legal governance systems, widely-held firms have a better investment performance than closely-held ones. They argue that in countries where legal shareholder protection systems are not strongly enforced and ownership concentration is prevalent, entrenchment issues are more severe and lead to poorer investment performance. In Canada, Morck et al.(2002) report that firms are mainly family-controlled and have very little incentive to invest in R&D activities. They argue that Canadian controlling shareholders have established their wealth and that innovation would destroy “old capital” through “creative destruction”. Di Vito, Laurin and Bozec (2010) examine the relationship between ownership concentration and R&D activity in Canada, and find that the concentration of ownership has a negative impact on the intensity of R&D investment and on R&D outcomes as measured by the number of patents granted.

While most of the studies cited above analyze the effect of ownership structures on firm value or on R&D investment, most of them did not analyze the interrelationship between the three proxies. Cho (1998) on the other hand, analyzes the interrelationship between the concentration of corporate ownership, R&D intensity and firm performance on a sample of US firms and concludes that R&D investment affects corporate performance, which in turn affects ownership concentration. However, to our knowledge, no other study directly analyzes the interrelations between corporate ownership structures, R&D investment and firm performance in economic settings such as Canada, where ownership structures are highly concentrated, which is what we examine in this study.

RESEARCH HYPOTHESIS

We analyze the interrelationship between the concentration of corporate ownership, R&D intensity and firm performance. First, findings on the relationship between the concentration of corporate ownership and R&D activity are mixed and differ according to economic contexts. In economies mostly characterized by widely-held firms, ownership concentration could resolve the alignment problem and contribute to R&D intensity. However, in some countries where corporate ownership is highly concentrated, entrenchment issues could negatively affect investment in R&D (Czarnitzki and Kraft, 2008; Di Vito, Laurin and Bozec, 2010) and the outcomes of this investment (Gugler et al., 2004; Di Vito, Laurin and Bozec, 2010). Because the benefits of R&D remain highly uncertain, dominant shareholders may be reluctant to invest in innovative activities which may lead to the creative destruction of the firm’s current capital. In addition, entrenched shareholders are shielded against hostile takeover. As a result,

they may become somewhat inert and avoid investment in projects such as R&D, which require a great amount of effort. Furthermore, the relationship between R&D intensity and ownership concentration may differ according to the type of corporate ownership structure. Morck et al (2002) argue that family-controlled firms are reluctant to undertake R&D activities. In Canada, Di Vito, Laurin and Bozec, (2010) find a significantly negative relationship between R&D intensity and the concentration of ownership control. Hence, we believe that in Canada, ownership concentration is negatively associated with R&D intensity.

H1: In Canada, concentration of a firm's voting rights held by a controlling shareholder is negatively associated to the intensity of R&D investment.

Empirical studies generally find that R&D intensity has a significantly positive effect on the performance of firms regardless of whether the economic context is characterized by ownership concentration such as in Canada (Johnson and Pazderka, 1993) or whether the corporate ownership structures are generally dispersed like in the U.S. (Lev and Sougiannis, 1996; Chan et al., 2001). Based on the general findings in the literature, we predict a positive relationship between R&D intensity and firm performance.

H2: In Canada, the intensity of R&D investment is positively associated to firm performance.

Due to the fact that ownership concentration will affect firm performance through investment decisions, we argue that the statistically significant association between corporate ownership structures and firm performance found in most of the previously cited studies could be capturing the effect of corporate ownership structures on value-enhancing investment decisions.

Similar to Cho's (1998) study of firms in the US, we examine the interrelationship between ownership concentration, R&D intensity and firm performance. One important difference lies in the fact that this study is performed in a Canadian setting. Unlike the United-States, the corporate ownership structures of Canadian firms are historically highly concentrated and most often family-controlled. Therefore, firm performance is unlikely to affect corporate ownership through the portion of shares used for performance-based compensation. Hence, our results should be different from Cho's (1998) findings. We argue that corporate ownership structure will not directly affect firm performance; it will however have a significant impact on investments such as in R&D, which in turn should affect firm performance.

METHODOLOGY

Data Collection

Our initial sample consists of 259 Canadian manufacturing firms (sic codes ranging from 2000 to 3999) listed on the CanCorp Financials Professional database and for which data is available for any financial period between 1998 and 2005. We have excluded one firm with the head office located outside Canada as well as four firms for which financial or corporate ownership data is not available. To make sure that the absence of R&D activity of the selected firms was not driven by the specific characteristics of their industries, we have excluded all firms for which the average industry level of R&D spending was equal to zero. Our final sample consists of 205 firms and 1489 firm-year observations. Financial data has been retrieved from the Stock guide database. Information on corporate ownership structure has been collected using management proxies available on the SEDAR database.

Model and Variable Definition

We test the interrelationship between corporate ownership structure, R&D intensity and firm performance through a three stage least square procedure using the following model:

1. R&D f (PERFORMANCE, VOTING RIGHTS, FOUNDER, HEIR, INSTITUTIONAL, IND R&D, SIZE, DEBT, AGE, CASH);
2. PERFORMANCE f (R&D, VOTING RIGHTS, FOUNDER, HEIR, INSTITUTIONAL, SIZE, DEBT, AGE CASH)

We determine R&D intensity ($R\&D$) by the ratio of a firm's R&D expense to its total assets. This measure of R&D intensity is also used by Di Vito, Laurin and Bozec, (2010), Abdullah et al. (2002), Cho (1998) and Francis and Smith (1995).

To measure corporate performance, we use an adaptation of Tobin's Q, which is the most widely used proxy in the literature (Morck et al, 1988; Agrawal et Knowber, 1996 ;Cho, 1998; Hermalin et Weisbach, 1991; McConnell et Servaes, 1990; McConnell et Servaes, 1995; Cronqvist et Nilsson, 2003; Gompers, Ishii et Metrick, WP-2004). Tobin's Q is calculated by dividing the market value of a company (market value of common stock, preferred stock and debt) by the replacement value of its assets. Since the replacement value of assets is generally not available, previous studies use the most reasonable estimate, i.e. the book value of assets, as a proxy for Tobin's Q (Villalonga and Amit, 2006; Bozec and Laurin, 2007). We use a similar approach to measure firm performance by determining Tobin's Q as the market value of a firm's assets divided by the book value of total assets. To determine the numerator of our Tobin's Q ratio according to the availability of Canadian data, we calculate the market value of a firm's assets by the sum of market capitalization plus the book value of debt.

The concentration level of corporate control (VOTING RIGHTS) is the proxy we use for ownership concentration, a variable measured by the percentage of voting rights held by the ultimate dominant shareholder of a firm. This proxy is also used in other studies analyzing the effects of the concentration of voting rights on firm performance (Bozec and Laurin, 2007; Gompers et al., 2004; Cronqvist and Nilsson, 2003). In Canada, the presence of pyramid structures suggests that identifying the voting rights owned by the immediate dominant shareholder may not be sufficient to fully account for ownership concentration. Therefore, when the principal shareholder of a firm is another corporate entity, we find the principal shareholder of that entity, and so on, until we determine the ultimate dominant shareholder.

In our equations, we control for firm specific characteristics by including a series of control variables that previous studies link to our dependant variables. Inspired by other Canadian studies which argue that the presence of the firms' founders as opposed to heir-controlled firms may have a significant impact on R&D investment (Di Vito, Laurin and Bozec, 2010; Morck et al, 2002) and firm performance (Morck et al. 2002), we also include two dummy variables; FOUNDER and HEIR in our equations. FOUNDER is a dummy variable which takes the value of 1 when the original founders are present in the directorship or administration of the firm. Our other dummy variable; HEIR, takes the value of 1 when ownership concentration as measured by the concentration of voting rights is in the hands of the heirs of family-controlled firms. In addition to a considerable number of studies linking institutional ownership concentration with R&D intensity (Graves, 1988; Barker and Mueller, 2002; Munari et al., 2006) and firm performance (McConnell and Servaes, 1990; 1995) we also include a variable (INSTITUTIONAL) to control for the concentration level of the voting rights held by institutional investors.

Other firm characteristics such as a firms' size (SIZE), leverage (DEBT), age (AGE) and cash flow availability (CASH) are also controlled for in our equations. SIZE is determined by the natural logarithm of sales while leverage (DEBT) is determined by the ratio of a firm's long term debt divided by its total assets. We calculate a firm's age (AGE) according to the number of years from the beginning of its operations. We measure a firm's cash flow level by its cash flow to total assets ratio. Finally, the industrial levels of R&D spending are also known to have a significant impact on a firm's R&D intensity.

Hence, we include IND R&D in equation (1). IND R&D is measured by the average R&D/ASSETS ratio of all the firms included in the industrial sector of each of our sample firms.

RESULTS

Descriptive Statistics

Table 1 provides descriptive statistics for the key variables included in this study. In our sample, R&D expenses average to about 7% of firms' total assets which seems to be very close to the average level of R&D spending for the industrial sectors, a result similar to those obtained in other North American studies (see, for instance, Cho, 1998). As observed in Table 1, Canadian firms exhibit high levels of ownership concentration. The average concentration of voting rights for our sample firms is 28%. In addition, half of our sample firms have dominant shareholders who hold more than 20% of a firm's voting rights while 22% of the firms are controlled at levels exceeding 50%. Furthermore, 16% of our sample firms are Controlling Minority Structures. In our sample of Canadian manufacturing firms, the original founders are present and occupy a management or directoral position in 54% of the cases while 17% of our sample firms are controlled by the heirs of the founding family. Other statistics on firm characteristics (size, age, debt and cash flows) are also reported in Table 1 and are similar to other Canadian studies (see for instance Bozec and Laurin, 2007 or King and Santor, 2007).

Table 1: Descriptive statistics

This table reports the descriptive statistics of our key variables. The sample is an unbalanced panel data comprising 1489 firm-year observations, between 1998 and 2005.

	%	Minimum	Maximum	Mean	Std.
Dependent variables :					
R&D		0.000	1.200	0.069	0.146
Tobin Q		0.087	17	1.768	2.228
Independent and control variables:					
VOTING RIGHTS		0.000	1.000	0.275	0.252
INSTITUTIONAL		0.064	0.125	0.000	1.000
SIZE		4.864	17.026	11.482	2.432
DEBT		0.000	0.890	0.132	0.165
CASH		-4.876	1.406	-0.002	0.254
IND R&D		0.074	0.103	0.000	0.555
Ownership structure :					
FOUNDER	54%				
HEIR	17%				
VOTING RIGHTS \geq 10%	76%				
VOTING RIGHTS \geq 20%	50%				
VOTING RIGHTS \geq 50%	22%				
Controlling Minority Structure firms	16%				

Multivariate Regression Analyses

Next, we perform a series of panel regressions on R&D intensity and on corporate performance (Tobin's Q), as specified in equations (1) and (2). First, we examine R&D and Tobin's Q individually. This allows us to compare our findings with those reported in the literature that treat corporate ownership structure as exogenous. To test Hypothesis 1 we use a Tobit model for panel data where the ratio of R&D expense to total assets is the dependent variable. As for Hypothesis 2, we test it using an OLS panel

regression where our estimate of Tobin's Q is the dependent variable. The results of these analyses are presented in regressions 1 and 2 of Table 2.

As shown in regression 1 of Table 2, we find a significantly negative relationship between ownership concentration and R&D intensity. These results support H1. They show that for Canadian firms involved in industries that are active in R&D, the concentration of voting rights is negatively associated with R&D intensity. If the concentration of voting rights can be associated with "old capital", then our results support Morck et al.'s theory, according to which firms endowed with high levels of ownership concentration tend to act conservatively and invest less in R&D.

When testing equation (2), we observe a statistically positive relationship between the R&D and Tobin Q variables. However, unlike previous empirical research, when controlling for R&D in our regression model our results do not indicate any significant relationship between ownership concentration and performance. In line with our second hypothesis, these results show that for Canadian firms involved in industries that are active in R&D, the firms that perform better appear to be the ones which put more intensive efforts into R&D. Put together, our results tend to show that for firms involved in R&D active industries, ownership concentration could have a negative impact on performance through its negative association with R&D intensity. Once again, these results support Morck et al.'s assumptions with respect to what they call the "Canadian disease".

Table 2: Multivariate regression analyses on R&D intensity and corporate performance

This table reports the descriptive statistics of our key variables Column 1 reports a Tobit panel regression on R&D while column 2 presents an OLS panel regression on firm performance as measured by Tobin's Q. Columns 3 and 4 report a 3SLS panel regression with R&D and Tobin's q as the dependant instrumental variables. All regressions are performed on an unbalanced panel data comprising 1489 firm-year observations, between 1998 and 2005. Independent variables include VOTING RIGHTS, FAMILY, FOUNDER, HEIR, II, SIZE, DEBT, IND R&D, AGE, CASH, industry and year effects. Independent variables include CASH, SIZE, IND R&D, DEBT, industry and Year effects. *, **, ***: statistically significant for the threshold values of 10%, 5%, and 1% respectively. T values are in italics.

Dependent variables	Tobit Panel	OLS Panel	3 stage least square regression analysis	
	R&D #1	Tobin Q #2	R&D #3	Tobin Q #4
Tobin Q	0.019 <i>0.63</i>		0.025 <i>0.5</i>	
R&D		3.021*** <i>4.39</i>		7.846*** <i>5.97</i>
VOTING RIGHTS	-0.06*** <i>-2.74</i>	0.123 <i>0.34</i>	-0.038** <i>-1.99</i>	0.008 <i>0.03</i>
FOUNDER	-0.003 <i>-0.31</i>	-0.081 <i>-0.41</i>	-0.014 <i>-1.59</i>	0.075 <i>0.52</i>
HEIR	-0.021 <i>-1.6</i>	-0.471* <i>-1.88</i>	-0.006 <i>-0.22</i>	-0.381** <i>-1.91</i>
INSTITUTIONAL	-0.029 <i>-1.15</i>	-1.157** <i>-2.13</i>	-0.011 <i>-0.15</i>	-0.867* <i>-1.76</i>
SIZE	-0.02*** <i>-8.51</i>	-0.177*** <i>-3.84</i>	-0.007 <i>-0.78</i>	-0.083*** <i>-2.13</i>
DEBT	0.008 <i>0.43</i>	-0.538 <i>-1.13</i>		-0.524 <i>-1.26</i>
IND R&D	0.242*** <i>5.51</i>		0.204*** <i>5.31</i>	
AGE	0 <i>0.35</i>	0 <i>-0.12</i>	0.000 <i>0.07</i>	
	-0.161***	0.41	-0.178***	1.277***

CASH	<i>-18.03</i>	<i>1.65</i>	<i>-11.11</i>	<i>3.73</i>
	0.311***	3.171***	0.135	2.367***
Intercept	<i>10.7</i>	<i>3.69</i>	<i>0.59</i>	<i>3.87</i>
Year effect	yes**	yes***	yes***	yes***
Industry dummy		yes*	yes**	yes**
Log likelihood	1441.26			
R2		21.17%	48.45%	17.77%

Finally, in regressions 3 and 4 of Table 2, we analyze the relationship between ownership concentration, R&D intensity and firm performance using a three stage least squares simultaneous equations procedure¹. As specified in equations (1) and (2) of our research model, the dependent variables that are endogenously specified in the simultaneous equation procedure are R&D and Tobin Q. Our results indicate that R&D intensity has a significantly positive effect on firm performance. However, firm performance has no significant effect on R&D investment. Moreover, as predicted, ownership concentration (Voting rights) does not seem to have a direct impact on corporate performance, yet it has a significantly negative effect on R&D intensity which in turn has a significantly positive impact on Tobin's Q.

The relationships between most of our control variables and our dependent variables remain relatively unchanged when analyzing our two equations individually or simultaneously. Throughout most of our analyses, our results indicate that the size and the cash flow level of firms are negatively associated to R&D while the industrial level of R&D spending has a significantly positive effect on the firms' R&D intensity. Also, R&D intensity does not seem to be significantly affected by either the age or the leverage of our sample firms. Our results also indicate that heir-controlled firms do not perform as well as the other firms in our sample. These latter results are in line with Morck et al.'s (2002) findings. In addition, institutional ownership concentration has a significantly negative effect on corporate performance. We also observe negative relationships between corporate performance and the size of firms. Hence, our findings suggest that smaller firms tend to invest more in R&D activity and seem to perform better than larger ones, a phenomenon commonly documented in the literature. In addition our results indicate that the cash flow level of firms has a positive effect on corporate performance.

Although not reported in Table 2, all regressions were also run using different specifications where we begin by testing only firm specific control variables and introducing our different variables associated with corporate ownership and control. This approach allowed us to incrementally determine the relationship between ownership variables and the dependent variable and our results remained robust and relatively unchanged.

Overall, the results obtained in this study support our two research hypotheses. As predicted in H1, even when we control for the effects of the two endogenously determined variables, ownership concentration, measured by the percentage of voting rights held by the ultimate controlling shareholder, has a significantly negative impact on R&D intensity but not on firm performance. R&D intensity, in turn has a significantly positive impact on corporate performance, as predicted in our second research hypothesis. Hence, in line with the theoretical argumentation developed by Morck et al. (2002) that we put to test in this study, our results suggest that because it is negatively related to R&D intensity, ownership concentration could have a negative effect on firm performance.

¹ "Under 3SLS estimation, a structural equation is defined as one of the equations specified in the system. A dependent variable will have its usual interpretation as the left-hand side variable in an equation with an associated disturbance term. All dependent variables are explicitly taken to be endogenous to the system and are treated as correlated with the disturbances in the system's equations" (Stata User guide).

CONCLUSION

In this study, we test the relationship between three variables: The concentration of corporate ownership in Canadian firms, R&D intensity and corporate performance. Previous Canadian studies find that ownership concentration will positively influence corporate performance (Bozec and Laurin, 2007) yet will negatively affect R&D intensity (Di Vito, Laurin and Bozec, 2010). Inspired by previous literature, we argue that these three variables are interrelated. Our general findings indicate that the concentration of corporate ownership affects R&D intensity, which in turn affects corporate performance. However, in line with our research hypotheses, our results indicate that ownership concentration exacerbates R&D investment. On the other hand, our results also show that R&D investment contributes in increasing firm performance. These results are also in line with Morck et al's (2002) theoretical arguments suggesting that in Canada, where corporate ownership is generally controlled by large families whose wealth is built on "old capital", R&D activity may be hampered in avoiding "creative destruction". As R&D contributes to enhanced firm value and ensures economic growth, our findings raise serious concerns over how the corporate governance inefficiencies associated with the entrenchment of dominant shareholders in Canada may affect firm performance, global competition, and ultimately, future economic growth.

Although our study clarifies the link between ownership concentration, R&D investment and corporate performance in a Canadian context, some limitations must be taken into consideration when interpreting our results. First, in our theoretical development, we argue that entrenched dominant shareholders, who have a vested interest in the existing capital they have built, are reluctant to pursue R&D projects that will unavoidably cause the destruction of that "old capital". Hence, our proxy for "ownership concentration", as measured by the voting rights of dominant shareholders in a firm, is somehow linked to "old capital". However, the concentration of voting rights does not provide a full understanding of corporate ownership. To address this issue, we include other variables in our research model capturing the age of firms, the presence of firms' founders as well as heir-controlled firms. Another important limitation of this study is the focus on one particular measure of value-enhancing investment: R&D. Although our results indicate that ownership concentration has a significantly negative effect on R&D investment, firms with higher levels of ownership concentration may choose other ways to allocate their resources to increase firm performance. However, our study shows that when controlling for R&D, no significant relationship is detected between ownership concentration and firm performance. Hence to have a better picture of how ownership concentration is linked to firm performance, it would be worthwhile examining the link between ownership concentration and firm performance in terms of other types of investment choice, such as mergers and acquisitions, purchasing existing technologies, etc. These alternatives may pave the way to future research.

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