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Ownership concentration and technological innovation: International evidence from developing markets

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Abstract

In this paper we examine how concentrated ownership structure affects product and process in-novation in emerging markets. Empirical results indicate that, on average, concentrated owner-ship impedes firm-level innovation in developing economies. Further analysis indicate that the identity of the main shareholder have differential impact on the probability of intro-ducing product or process innovation. Specifically, concentrated ownership has negative im-pact on the firm's propensity to innovate only when the main shareholder is the private indi-vidual or a family. However, this effect of concentrated ownership on innovation is positive if the largest shareholder is either domestic or a foreign business group.

Keywords: corporate innovation, ownership structure, ownership concentration

1 Introduction

Concentrated ownership and firm performance has fascinated researchers since long (La Por-ta et al 1999). An important area in this line of research relates to how concentrated own-ership can influence innovation investments (Choi et al., 2011). Several theoretical explana-tions have been put forward to explain these relationships. Agency theory states that concen-trated owner-ship can mitigate agency issues which are usually associated with diffused ownership. Since innovation investments are complex, risky, and can expose managers to ex-cessive risks (e.g., job loss or loss of remuneration in case of innovation project failures), this may result in caus-ing risk averse managers to adopt conservative investment policies and di-vert resources to in-vestments which may not create value to shareholders. Concentrated ownership can provide in-centives to shareholders to invest in monitoring managers and re-duce agency costs, thus facili-tating the alignment of ownership and control rights (Shleifer and Vishny, 1997). Concentrated shareholders can influence firm's decisions to adopt value-enhancing R&D investments and curb managerial misbehavior. Thus we hypothesize that concentrated ownership has positive effect on innovation, according to agency theory (Wahal and McConnell, 2000).

Several empirical works from data on the U.S. public companies emphasizes advantages of concentrated ownership in alleviating managerial agency costs. Nevertheless, an extensive lit-erature have shown that agency problems do arise due to concentrated ownership (Melis, 2000). These agency problems are related to shareholder-shareholder conflicts (type II agen-

cy prob-lems). Since concentrated ownership can expose minority shareholders to potential expropria-tion and rent-seeking by controlling shareholder, this might affect the incentive of other stake-holders (e.g., managers and minority investors) and external financiers to exert efforts in inno-vation activities ex-ante as might anticipate potential expropriation by controlling sharehold-ers. This may limit firm's ability to access external capital that will be needed for innovation investments, thus limiting firm's innovation investments. This proposition is commonly known as stake-holder approach to innovation (Grossman and Hart, 1986). We test these two compet-ing hypotheses in the context of the developing markets where concentrated ownership is quite ubiquitous employing World Bank Enterprise Surveys (WBESS hereafter).

We also examine the proposition that concentrated ownership might induce risk aversion as controlling shareholders are exposed to excessive risks due to their concentrated capital invest-ed in the firm (Facio et al. 2010). This risk aversion might induce conservative investment and financial policies for risk diversification, leading to lower innovation investments (Beatty and Zajac, 1994).

Finally, we also examine if identity of the controlling shareholders matter for innovation. WBESS allows us to identify the main shareholder, as it provides not only the share ownership but also the identity of the largest owner. Specifically, we consider if the main owner is the in-dividual investor or a family, domestic business group, and a foreign-owned corporate group. The identity of the main owner was captured through dummy variables, and their interaction terms with the ownership concentration variables was used to identify the differential effect of each owner type.

2 Methodology/Materials

The aforementioned research objectives are tested employing WBESS data for twenty one de-veloping markets. WBESS are firm-lever surveys conducted in 138 countries, mainly develop-ing economies. These surveys contain rich data on firm-level financial information, ownership structure, innovation activities, human resources, establishment's legal status, labor productivi-ty, financial performance, and some qualitative information on obstacles encountered by firms that are related to competition, infrastructure, and institutional environment.

Our methodological approach takes into account the endogeneity of ownership concentration (OC hereafter), as emphasized in the literature (Pindado and Torre, 2004). This endogeneity is addressed through an instrumental variable approach. Finding the right instruments for owner-ship, which may not be related to such performance indicators as firm's innovation propensity, has been a challenging work (Chen et al., 2014). This is further made difficult due to the cross-sectional nature of our data as it is drawn from the enterprise surveys where only one round of survey from each country is included in the analysis. Nevertheless, as in Gonzalez et al. (2017), we use average industry-country Herfindahl ownership Concentration Index as an instrument for our two ownership concentration variables namely (i) share ownership held by the main shareholder and (ii) sum of the share ownership percentage of the three largest owners. The second instrument is related to the firm's banking relationships, measured as the number of outstanding loans held by an establishment (Minetti et al. 2015). This variable is assumed to in-fluence establishment's capital structure decisions, which consequently can affect ownership structure. We employ Neway's (1987) Amemya's Generalized Least Squares (AGLS) and two-stage least squares (2SLS) estimations.

Establishment's innovation performance was measured through two binary variables. Product innovation (0/1) equals 1 if new or improved products were introduce by the establishment, 0 else. Similarly, Process innovation is an indicator variable for whether establishment intro-duced process or related innovation. These two direct measures were constructed from innova-tion-related information from different questions in the innovation sub-sections of the WBESS. A number of control variables were included in the regression estimates, based on the previous studies on innovation. These controls include firm size, age, two dummy variables for whether establishment has multi-plant operations, and whether establishment has formal employee training; percentage of employees with university degree (EUDC) and with skilled workers (SKWORK); four indicator variables capturing different degree of product market completion: C1 (1-3 competitors), C2 (4-6 competitors), C3 (7-15) and C4 (15+ competitors); Exports (%); quality certification (0/1), and industry and country fixed effects.

4 Results/Findings

We begin with the baseline estimations for the AGLS and 2SLS, examining the overall impact of OC on innovation. The coefficient estimates, presented in Table 1, for both measures of OC are negative and statistically significant for product and process innovation. The results are consistent with those of Minetti et al (2015) and Czarnitzki and Kraft (2004) for Italian and German firms. These findings are, however, inconsistent with those from empirical works on the U.S. public firms. Key conclusions from those papers is that OC has positive impact on in-novation. Their results are mainly in line with agency theory that emphasize "agency cost min-imization effect" of OC. Empirical results of this paper, by contrast, suggests that type II agen-cy problems arising from potential expropriation of minority shareholders or the risk aversion hypothesis might impede corporate innovation (Classens et al. (2002).

Two robustness tests were applied to assess whether main results still carry through. One re-lates to carrying out separate regressions for small firms (number of employees fewer than the medium firm size) and large firms. Original results of negative effects of OC on innovation hold for large firms only. This may imply that agency issues arising from OC due to expropria-tion risks may not hamper innovation in smaller firms as there may be no or little distinction between main and minority shareholders due to smaller firm size. Differences between the two types of owners may be insignificant as they may be part of an extended family or connected through formal or informal connections. Second robustness check relates to splitting the sam-ple whether an establishment belongs to a high-technology or low-tech sectors, based on the Pavitt et al. (1989) taxonomy. Results presented in Table 1 show that the effect of OC is more distinct for low tech firms than for the high-tech firms, implying that the negative effect OC is dampened in high-tech sectors due to the very nature of these sectors' dependency on innova-tion to remain competitive in the long run.

Next, we untangle the negative effect of OC by exploring if the identity of the main owner in-fluence innovation. Table 2 contains results for AGLS and 2SLS models that incorporate inter-action terms of different types of main owners with the two proxies of OC. We find positive ef-fect of the interaction terms that capture domestic business group and foreign-owned business groups as the largest shareholder. The reference is the dummy variable that captures whether the largest shareholder is the domestic individual or a family. Thus the positive coefficients of the two interaction terms indicate that establishments where the corporate groups are the main shareholder are likely to innovate more than the establishments where main shareholders are domestic individuals or a family.

In the final analysis, it was examined whether corporate diversification can moderate the OC and innovation relationships. For this purpose, a binary variable was constructed that captured product market diversification if the establishment's total revenue from the core business was less than 70 percent ((Kranenburg et al. 2004). A positive coefficient of an interaction term of this variable with main OC measure (Table 2) indicates that the degree of corporate diversifica-tion may affect innovation, corroborating the risk aversion hypothesis.

5 Discussion and conclusion

Ownership concentration is a particularly importance corporate governance phenomenon that has gain traction of researchers in the recent past. The paper documents that OC negatively influences on establishment's innovation propensity. Empirical results corroborate the expropriation risks hypothesis of the OC. Results also tend to support the risk aversion hypothesis that the lack of corporate diversification could aggravate the negative relationship between OC and innovation. Additional analysis shows own type can have differential impact on the establishment's innovative capacity. Specifically, establishments where main owners are domestic investors or a family are likely to have lower innovation propensity than those firms where largest owners are corporate groups.

Panel A: Base-line estimations	Product Innovation				Process Innovation			
	AGLS		2SLS		AGLS		2SLS	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Largest owner	-1.53**		-0.7432**		-3.326***		-1.747***	
	(1.050)		(0.375)		(0.752)		(0.372)	
Herfindhal concentration index		-1.026**		-0.446***		-1.811***		-0.687***
		(0.531)		(0.130)		(0.364)		(0.144)
Control Variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Wald test (p-value)	7.43(0.003)							
Sargan Test (p-values)			0.623(0.451)					
N	10,630	9,285	10,630	9,285	10,63	9,285	10,630	9,285
			-0.274		-3.072***		-1.661***	
Panel B: Small firms								
Largest shareholder	-1.634		(0.301)		(1.127)		(0.423)	
	(1.322)			-0.325		-2.026***		-0.859***
Herfindahl Concentration		-0.938		(0.175)		(0.620)		(0.226)
		(0.791)						
Control Variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Panel C: Large Firms								
Largest shareholder	-2.623**		-1.377***		-3.907***		-1.865***	
	(1.481)		(0.472)		(1.141)		(0.537)	
Herfindahl Concentration		-1.356**		-0.350**		-1.750***		-0.825***
		(0.581)		(0.177)		(0.429)		(0.195)
Control Variables	Y	Y	Y	Y	Y	Y	Y	Y
Panel D: High-tech sectors								
Largest shareholder	-2.561*		-1.425*		-1.829	-0.932		
	(1.253)		(0.627)		(1.316)	(0.630)		
Herfindahl Concentration		-1.453*		-0.959**			-0.867	-0.437
		(1.057)		(0.319)			(0.669)	(0.308)
Panel E: Low-tech sectors								
Largest shareholder	-3.122**		-0.939***		-4.592***		-1.992***	
	(1.233)		(0.321)		(1.040)		(0.438)	
Herfindahl Concentration		-1.305**		-0.396***		-2.054***		-0.872***
		(0.593)		(0.147)		(0.435)		(0.175)

Table 2

Owner types, Diversification and innovation

Coefficients and (standard errors) in the table. ***<0.01, ** <0.05 and *<0.10. Coefficients for control variables are not reported for brevity.

	AGLS		2SLS	
	Product Innovation (1)	Process Innovation (2)	Prod. Innovation (3)	Process Innovation (4)
Largest shareholder	-2.430**	-3.835***	-0.768***	-1.698***
	(0.959)	(0.774)	(0.260)	(0.333)
Largest shareholder*Domestic business group	0.678***	0.816***	0.214***	0.366***
	(0.182)	(0.148)	(0.0496)	(0.0638)
Largest shareholder*Foreign business group	0.472*	0.922***	0.131*	0.387***
	(0.280)	(0.223)	(0.0756)	(0.0971)
Over-identification test (p-values)			0.589	
Chi-sq F			20.70***	
N	10,526	10,525	10,526	10,525
Panel B:				
Largest shareholder*Diversification	0.0499***	0.0594***		
	(0.0160)	(0.0212)		
controls	Y	Y		

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