

# FOREIGN EQUITY, EXPORTING AND FIRM INNOVATION

## ABSTRACT

Our goal has been to contribute to the ongoing effort to better understand how different types of global engagement influence firms' innovation. Specifically, we differentiate two types of global engagement, i.e. absorbing foreign equity and exporting. And another intension is to explore the boundary condition of the relationships mentioned above. We use the National High-growth Firms in High-tech Zones Database collected by the Ministry of Science and Technology of China (MOST). We finally get a 3-year panel data (from 2010 to 2012) to test the hypotheses. The results show that foreign equity has an inverted U-shaped impact on firms' innovation performance, while exporting positively affects innovation. Our results also indicate that state ownership positively moderates the relationship between exporting and innovation performance, and innovation capability positively moderates the relationship between foreign equity and innovation performance. First, our study finds different influence mechanisms of two types of global engagement on firms' innovation, and we provide an integrated framework for analysing them, which is an extension of existing research. In addition to examining the direct effects of global engagement, the article also contributes to answering the question, "Under what conditions do foreign equity and exporting generate more innovation performance?" We first construct a contingency model and advances extant literature by confirming empirically that the focal firms' institutional origins and capabilities greatly moderate firms' internationalization process.

**Key words:** Foreign equity; Exporting; State ownership; Innovation capability

## INTRODUCTION

In recent years researchers have documented a robust correlation between global engagement and innovation (Criscuolo & Martin, 2009): plants and/or firms that export or, even more so, are part of a multinational enterprise, tend to generate better innovation than their purely-domestic counterparts (Criscuolo et al., 2010). A very active research area is currently attempting to document and better understand this correlation between global engagement and innovation (Helpman et al., 2004; Trefler, 2004).

The existing literature tends to explain how the certain global engagement activity influences innovation, for example, the effects of exporting, outsourcing or foreign direct investments (FDI) (Choi et al., 2012; Helpman et al., 2004; Luong et al., 2017). Researchers believe that firms could obtain advanced technologies, market information and management skills via global engagement and thereby improve their innovation (Huang & Zhang, 2017). However, these studies do not provide an integrated framework for contrastive analysis of the impacts of different means of engagements, which leaves a critical research gap. In addition, much internationalization innovation research focuses on established firms (Criscuolo & Martin, 2009). In fact, internationalization also greatly influences small and young firms' innovation. For those firms, exporting and absorbing foreign capital (inward FDI), are their main choices for global engagement (Araujo & Salerno, 2015). Hence, we place two types of global engagement, i.e. foreign equity and exporting, into a holistic framework, to better understand how foreign equity and exporting affect a focal firm's innovation performance and to explore the differences between these effects.

Furthermore, previous studies that examined the direct effects of global engagement also failed to answer the question, "Under what conditions do these activities generate innovation performance?" Given that the two internationalization activities may present different challenges for domestic firms, and thus demand different organizational resources and knowledge from domestic firms, we posit that their impacts are contingent on the institutional origins as well as capabilities of those firms, which have important implications for the firms' organizational resources and knowledge (Chen et al., 2016). However, extant literatures have paid little attention on these factors. This paper tries to address to this question by highlighting how state ownership and innovation capability moderate the effects of both foreign equity and exporting on focal firm's innovation. While several empirical studies have highlighted the direct positive effects of state ownership (Chen et al., 2016; Zhou et al., 2017) and innovation capability (Silvestre & Neto, 2014; Zhou & Wu, 2009), few have explored their possible interactions with global engagement. Specifically, we suggest that state ownership and innovation capability can significantly moderate the effects of foreign equity and exporting, thus building contingency mechanisms.

Based on the arguments above, this study focuses on the effect of foreign equity and exporting on a focal firm's innovation performance, as well as the moderating effects of state ownership and innovation capability. We find that the

foreign equity has an inverted U-curved impact on firms' innovation performance, while exporting has a positive linear effect on firm's innovation performance. We also find evidence that in such an international innovation project, state ownership and innovation capability of a firm can positively moderate the foreign equity/exporting--performance relationships.

This article contributes to existing research in the following ways. First, our study finds different influence mechanisms of two types of global engagement on firms' innovation, and we provide an integrated framework for analyzing them, which is an extension of existing research. Second, this study constructs a contingency model and advances extant literature by confirming empirically that the focal firms' institutional origins greatly moderate firms' internationalization innovation process, specifically, state-owned firms and non-state firms should fit with different types of internationalization activities. Third, it also suggests that internationalization innovation research should delve more deeply into firms own characteristics and their effects on firms' internationalization process, such as their innovation capabilities, which we find significantly moderate the effect of foreign equity.

This article is structured as follows: we first derive and formalize our theoretical prediction, and then we test them empirically using the data of Chinese high-growth firms. Section three describes the data and methods, and section four reports the empirical findings. In the final section, we discuss the main findings and draw several conclusions and implications for both academics and innovation practitioners.

## **CONCEPTUAL FRAMEWORK AND HYPOTHESES**

### **Foreign Equity and Firms' Innovation Performance**

Foreign equity or inward foreign direct investment (FDI) affects firms' behaviors and performance for a multiplicity of reasons. One important reason is that it removes barriers to capital flows, and another is because it reduces firm-level barriers to cross-border information flows and corporate governance (Luong et al., 2017; Oxelheim & Randøy, 2003). Previous research has found that foreign equity positively influences the domestic firms' innovation. Based on the resource based view (RBV) (Barney, 1991), foreign equity provides domestic firms with heterogeneous or even complementary resources. Foreign owners share advanced technical and managerial knowledge and resources beyond mere financial contributions (Choi et al., 2011; Luo, 2002). Those important resources help firms generate innovation (Zhou & Li, 2012). Additionally, the

expanded resources base enhances firms' flexibility and ability to adapt to the changes in technology and market (Volberda, 1996).

On the one hand, foreign equity positively influences firms' innovation. First, foreign owners provide domestic firms with advanced technologies and managerial knowledge, and help firms remain competitive (Choi et al., 2011). This is particularly important for firms in emerging countries, where recent studies have shown foreign-owned firms to be more innovative than domestic firms (Falk, 2008). Second, foreign investors can encourage domestic partners to invest more in technology development by using their ownership shares as leverage (Chang et al., 2006; Choi et al., 2011). Third, foreign equity's positive effects also come from the commitments of resources to technology transfer, technical collaborations, managerial resource sharing, and the appointments of foreign directors to boards (Khanna & Palepu, 2000; Douma et al., 2006). As a result, firms with a high proportion of foreign ownership may be in a better position to access advanced foreign innovation resources than firms with private investors.

On the other hand, foreign equity also has its dark side. First, foreign equity's marginal effect will decrease as foreign equity moves to more (David et al., 2010). Resources that offered by the foreign owners will become limited, and too much knowledge from foreign owners will also lead to difficulty of knowledge transfer and integration (Corredoira & McDermott, 2014). Those undue exotic resources and knowledge will be difficult to understood and assimilated by the domestic firms, and increase the cost of knowledge integration. Hence, the effect of foreign equity on firm's innovation will become negative.

Besides, when foreign equity is on a large majority level, foreign owners gain more control from native owners. Therefore, native owners will be more likely to see their foreign partners as competitors and view the expanding of foreign equity as a threat (Luong et al., 2017). Native owners thus inhibit the development of foreign equity on the strength of their local advantages, which decreases the effects of foreign equity.

Thus, we posit the following:

*Hypothesis 1: Foreign equity has an inverted U-curved impact on firms' innovation performance.*

## **Exporting and Firms' Innovation Performance**

Exporting is the most prevalent form of international expansion. Theory and existing empirical work tell us that there is a strong relationship between

exporting and firms' productivity (Criscuolo et al., 2010; Makri et al., 2017). However, a less explored aspect of firms' performance and exporting is how exporters benefit from foreign competition in export markets and as a result improve their domestic innovation activities (Girma et al., 2008).

Firstly, an argument goes that export activity leads to better innovation in terms of the "learn-by-exporting" effect (Araujo & Salerno, 2015; Mun, 2017). Learning by exporting is purportedly driven by information exchange from the foreign market, often through export intermediaries or directly from customers (Salomon & Shaver, 2005). Compared with learning from foreign partners, which always leads firms to passive acceptance of exotic knowledge and thereby increasing the cost of knowledge integration, learning by exporting requires firms to learn from foreign markets voluntarily. Therefore, exporting provides firms with the chances to be exposed to a richer source of market information and technology on export markets (Salomon & Jin, 2010), which can lead firms to improve their resource base (or knowledge base) (Girma et al., 2008) and facilitate innovation.

Secondly, exporters are also influenced by the "market discipline" caused by the export markets (Wakelin, 1998). Firms who compete on export markets always become aware of those advanced foreign technologies and have to respond to the diverse needs of sophisticated foreign customers, as well as diverse market standards. In this case, exporters are motivated to increase their R&D input and upgrade their 'knowledge base' and innovation capability at home (Girma et al., 2008) to maintain competitive advantage on export markets, which enhances their innovation performance.

Thirdly, exporting provides profits for firms. Huge profits earned from the export markets can be seen as the important financial resources required by innovation (Berry, 2006). As a result, exporting earnings facilitates R&D investments.

Thus, we posit the following:

*Hypothesis 2: Exporting is positively associated with firms' innovation performance.*

### **The moderating effects of state ownership**

In emerging economies such as China, government plays a key role in affecting firms' behaviour (Choi et al., 2011; Zhou et al., 2017). As a result, researchers have recently revisited state capitalism, focusing on whether government control may stimulate innovation and competitive advantage (Lazzarini, 2015) and how various forms or levels of state ownership foster firms' performance (Musacchio et al., 2015). According to the institutional view (Peng et al., 2008), government

plays an important role in developing firms' innovation capabilities through direct intervention and its industrial and Science and Technology (S&T) policies. We would expect that because state-owned enterprises (SOEs) have access to policy information, government support, and valuable resources (Chen et al., 2014); they have significant incentives and access to important infrastructure that will facilitate government-initiated innovation (Chang et al., 2006).

While researchers claim a direct relationship between state ownership and innovation performance, we argue instead for its moderating effects. Different from non-state firms, SOEs are actually governed by the governments (Shleifer, 1998). The government endorsements (and usually the long histories) of state-owned firms and their stable organizational structures signal to potential foreign partners that they are reliable, accountable, and reproducible (Chen et al., 2016; Hannan & Freeman, 1984). In addition, as government-owned entities, SOEs always enjoy privileges granted and supported by the government (Chen et al., 2014; Zhou et al., 2017), and are able to gain more scarce resources from governments, giving them great resource advantages. Thus, foreign owners would tend to collaborate with their state-owned partners, and are more willing to share their knowledge and information.

Moreover, SOEs are the firms with majority government ownership (Boisot & Child, 1996; Zhou et al., 2017). Accordingly, SOEs negotiate better and have stronger voice deals with their foreign partners (Chen et al., 2016), and are not likely to see foreign owners as potential competitors or threats compared with their private counterparts. Hence, the relationship between foreign owners and native state owners could be closer to promote knowledge transfer and interaction, which can also help firms learn better and acquire more advanced technologies and knowledge from their foreign partners. That also enhances innovation.

Thus, we posit the following:

*Hypothesis 3a: State ownership strengthens the positive effects of foreign equity on firms' innovation performance.*

We also posit that state ownership will strengthen the effect of exporting on innovation performance. First, compared with their private counterparts, SOEs typically inherit abundant political, financial, and physical resources from their state-owned predecessors (Musacchio & Lazzarini, 2014). Also, in emerging economies such as China, as government-owned entities, SOEs enjoy privileges granted and supported by the government (Chen et al., 2014; Zhou et al., 2017),

and are able to gain more scarce resources from governments to invest in R&D activities. This relative resource advantage of state-owned firms allows them to minimize the extent of knowledge adaptation required of the firms (Chen et al., 2016). As a result, state ownership enables firms learn better from the exporting markets (those advanced technologies, market and managerial knowledge) and acquire knowledge more effectively, which enhances the “learn-by-exporting” effect and leads to better innovation.

Second, SOEs efficiently use more export earnings to invest in innovation. Governments in emerging economies often intervene in state-owned firms’ activities through their actions to regulate the economy and through national strategic planning (Sun & Liu, 2014). For instance, the Chinese government views innovation (especially internationalization innovation) as one of the top national priorities and encourages firms to invest in innovation development (Chen et al., 2014). As a result, as the main vehicles for implementing China’s ambitious innovation plan, SOEs must respond to the government’s call and invest their resources in R&D activities. Those strong regulatory pressures motivate SOEs to spend more export earnings in innovation (Zhou et al., 2017).

Thus, we posit the following:

*Hypothesis 3b: State ownership strengthens the positive effect of exporting on firms’ innovation performance.*

### **The moderating effects of innovation capability**

To develop innovation, firms invest heavily in the building of innovation capabilities that offer the skills and abilities to deploy and utilize various resources and know-how (Song et al., 2005; Zhou & Wu, 2009). Following the growing awareness of the importance of innovation capabilities, a robust body of literature is examining how firms learn and absorb external resources (Cohen & Levinthal, 1990), how firms accumulate (Figueiredo, 2002) and manage their resources (Capaldo et al., 2017), how firms create new knowledge and innovate (Zhou & Li, 2012), and what type of capabilities are needed to innovate (O Reilly & Tushman, 2008; Schilke, 2014). In particular, in this paper, innovation capability refers to a firm’s ability to employ various resources to achieve desired innovation outcomes (Afuah, 2002).

First, a firm with higher level of innovation capabilities also has superior absorptive capacity, which encourages receptivity to external resources (Zhou & Wu, 2009). As a result, when getting access to foreign resources, firms with higher level of innovation capabilities are able to learn and absorb the resources

more effectively (Wu & Chen, 2012). Even when foreign owners have yet to contribute much to the domestic firms, those firms with greater innovation capabilities can still employ and

utilize those limited resources effectively to achieve desired innovation outcomes (Lichtenthaler & Lichtenthaler, 2009).

Second, firms with higher level of innovation capabilities always have greater development potential and larger knowledge base (Silvestre & Neto, 2014), thereby being more attractive to foreign owners. Hence, foreign owners would trust the domestic firms, and are more willing to share their technologies and knowledge with native owners to maintain the long-term relationship (Caner & Tyler, 2015), and contribute to the development of the domestic firms voluntarily. In addition, because of the advantages of resources and capabilities, native owners seldom see their foreign partners as competitors, and are less likely to impede the development of foreign equity (Luong et al., 2017).

Thus, we posit the following:

*Hypothesis 4a: Innovation capability strengthens the positive effects of foreign equity on firms' innovation performance.*

We also posit that firms with higher level of innovation capabilities can acquire foreign resources more effectively from the export markets. First, innovation capabilities bring about adaptability, which facilitates knowledge transfer (Chen et al., 2016). Adaption will be less costly when firms have a better understanding of the interaction between a potential business practice and other parts of the organization (Williams, 2007), and such understanding is precisely provided by innovation capabilities. When being exposed to a richer source of market information and advanced foreign technologies on export markets (Girma et al., 2008), firms with higher level of innovation capabilities are able to adapt quickly to those new external resources, which ensures resource matching and integration (Lakemond et al., 2016). That can promote foreign knowledge acquisition and strengthen the “learn-by-export” effects, thus enhance innovation outcomes (Chen et al., 2016).

Furthermore, innovation capability is also a firm's knowledge base underpins how well it can use new knowledge to achieve desired innovation outcomes (Cohen & Levinthal, 1990). Higher level of innovation capabilities means broader and deeper knowledge base (Zhou & Li, 2012) and better learning ability. Hence, firms with superior innovation capabilities are more likely to understand and recognize the value of those advanced technologies and managerial knowledge

from the exporting market (Zhou & Wu, 2009), and can also absorb and utilize them efficiently (Zahra & George, 2002), which promotes innovation.

Thus, we posit the following:

*Hypothesis 4b: Innovation capability strengthens the positive effect of exporting on firms' innovation performance.*

Figure 1 depicts our integrated conceptual model.

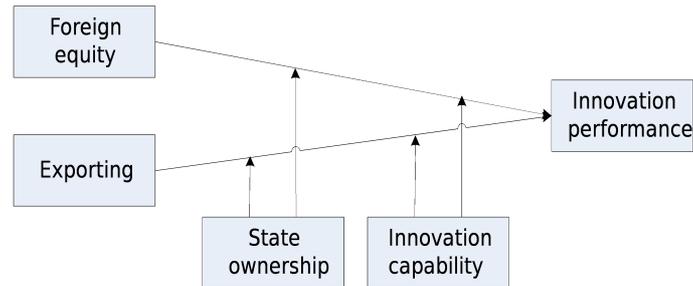


Figure 1: Conceptual Framework and Research Model

## METHOD

### Data Collection

We use the National High-growth Firms in High-tech Zones Database collected by the Ministry of Science and Technology of China (MOST) to test our model. MOST gives certification of High-growth Firm to Chinese firms every year, with such evaluation factors as firms' age, sector, total revenue, R&D intensity, the percentage of new products revenue, productivity, etc. The numbers of high-growth firms certified by MOST change every year. The database provides basic information of firms regarding the name, address, and contact information; business nature and scope; major products and services; personnel; innovation and R&D activities; and so on. MOST developed a questionnaire, and collected the data from the firms in High-tech Zones in China, who are certified as "high-growth" by Ministry of Science and Technology of China.

To estimate our model, we drop the samples that are fragmentary in some indispensable statistical entries. Then, we get an unbalanced 4-year panel data (from 2010 to 2013) of high-growth firms in High-tech Zones, with total of 4790 firms' samples. But we consider 1-year time lag of innovation performance, and change the dependent variable to the innovation performance in the next year, so we finally get a 3-year panel data (from 2010 to 2012) to test the hypotheses.

### Measures

We adopted most constructs from prior studies and modified some of the measures to reflect our study's specific context.

### *Dependent Variables*

*Innovation performance.* Extant literatures propose several indicators to measure firm's innovation performance, such as the value of new products (Fritsch, 2002), new products sales (Liu & White, 1997), the number of patents (Acs et al., 2002; Hagedoorn & Cloudt, 2003) and the number of patent citations (Trajtenberg, 1990). Among these indicators, scholars dispute on the feasibility of equating patent counts with the level of innovation activity (Archambault, 2002; Griliches, 1990). They argue that patent data can neither represent all important technological innovations nor reflect the importance of different innovations (Li, 2009). In response to this, we used the value of new products as the measure of innovation performance. The value of new products measures a firm's ability to introduce new products, which is a critical indicator of innovation performance (Bianchi et al., 2016).

However, since it takes time to introduce and commercialize new products, the time lag is an important issue in innovation research. Considering a time lag exists between innovation efforts and innovation outcome, we considered 1-year time lag of innovation performance. Therefore, we used the value of new products in the next year (nplag) to measure innovation performance.

### *Independent Variables*

*Foreign equity.* Following the literature on foreign equity (Aggarwal et al., 2011; Gompers & Metrick, 2001), we used the sum of shares held by all organizations domiciled in a different country from where the firm's stock is listed, as part of the firm's total number of shares outstanding (foreeq).

*Exporting.* For the measure of export, consistent with previous literature (Ganotakis & Love, 2012; Pla-Barber & Alegre, 2007), we used the value of total export (exporting) to measure exporting.

### *Moderating Variables*

*State ownership.* We created a dummy variable to indicate whether a firm was a state-owned firm (i.e., a firm with majority state ownership) (stateown). Because ownership structure does not change often, this measure is an enduring, objective indicator (Zhou et al., 2017).

*Innovation capability.* Based on Gatignon and Xuereb's (1997), Song and his colleagues' (2005) work, we used the number of patents possessed (appatent) by each firm in each year to measure firms' innovation capability (Gatignon & Xuereb, 1997; Song et al., 2005).

### *Control Variables*

We used a number of control variables that may influence a firm's innovation.

*Firm size.* Firm size is an important attribute that shapes firms' behaviors and decisions (Schumpeter, 1934). It was measured as the total assets of the firm (in million Chinese RMB) (totasset).

*Firm age.* Firm age was taken as the number of years since the firm's first listing (age) (Choi et al., 2011).

*Industry effect.* Prior studies have suggested the heterogeneity across industries affects a firm's innovations differently (Leiponen & Drejer, 2007). We thus controlled for the type of industry to which each firm belongs. Following the industry categories set by the National Bureau of Statistics of China, we capture industry effect with 3 dummy variables (industry1, industry2, industry 3) (i.e., agriculture, manufacturing, services and high-tech industries).

*R&D investments.* We controlled for internal R&D investments (rdexpense), to take into account that the firm may achieve innovation through internal R&D efforts (Schildt et al., 2012).

Descriptive statistics and correlations for the variables are provided in Table 1.

## **RESULTS**

First, we run the Hausman Test to decide whether fixed effect or random effect panel data model is suitable for our estimation (Greenberg, 2004). The results of Hausman Test, as shown in Table 2 are all less than 0.000 which means that models with fixed effect are more appropriate than models with random effect. Therefore, we employ the fixed-effect panel data model approach to estimate the explanatory power of foreign equity and exporting on firms' innovation performance, as well as the moderating effect of state ownership and innovation capability. Table 2 provides the estimating results of our whole model. A review of correlations among independent variables suggests that multicollinearity is not a major concern, as confirmed by the variance of inflation factor (VIF) below 5 (Hair et al., 1998).

Hypothesis 1 predicted that foreign equity has an inverted U-curved impact on firms' innovation performance. Consistent with this assertion, the coefficient of foreeq ( $b=0.473$ ,  $p<0.01$ ) is positive and significant and the coefficient of foreeq<sup>2</sup> ( $b=-0.041$ ,  $p<0.01$ ) is negative and significant (Model 1), so hypothesis 1 receives support. Hypothesis 2 dealt with the direct effect of exporting on a firm's innovation performance. The results show that exporting positively affects nplag (model 1,  $b=0.088$ ,  $p<0.01$ ), in support of hypothesis 2.

In Hypothesis 3a & 4a, we assess the moderating role of state ownership/innovation capability on the effects of foreign equity. As model 2 shows, neither the first-order interaction between stateown and foreeq nor their second-order interaction relates to nplag is significant, which indicates that H3a is not supported. It shows that during the foreign capital absorbing process, the characteristics of state-owned firms, such as institutional protection and privileges have less significant effects. Model 3 shows that the first-order interaction between appatent and foreeq positively ( $b=0.093$ ,  $p<0.1$ ) affects nplag, whereas the second-order interaction negatively ( $b=-0.044$ ,  $p<0.1$ ) relates to nplag, which preliminarily indicates that state ownership strengthens the positive effects of foreign equity on innovation performance (Aiken & West, 1991), in support of H4a.

Hypothesis 3b predicted that state ownership would strengthen the positive effect of exporting on innovation performance. Model 2 shows that there is a positive significant interaction between exporting and stateown on nplag ( $b=0.031$ ,  $p<0.05$ ), thereby supporting Hypothesis 3b. To evaluate Hypothesis 4b, we tested the interaction effects of exporting and appatent on npv. The interaction effect is not significant, which does not support H4b. It indicates that the moderating effect of innovation capability on the exporting--innovation relationship is not significant. It can be explained that: this study focuses on small and medium-sized enterprises (SMEs). For those small firms, they generally have less power and strengths (in another word, less capabilities), and always need to

Table 1: Correlations Matrix and Reliability

	Mean	Std. Dev.	1	2	3	4	5	6	7	8	9	10	11
1.age	12.161	3.000											
2.industry1	0.685	0.465	-0.052***										
3.industry2	0.114	0.317	0.007	-0.527***									
4.industry3	0.199	0.399	0.052***	-0.732***	-0.155***								
5.totasset	815012	7840454	-0.026***	-0.001	0.003	-0.016**							
6.rdexpense	25564.38	123321.9	-0.003	-0.019***	-0.026***	0.048***	0.153***						
7.foreeq	23687.64	256799.9	-0.018**	0.025***	0.003	-0.029***	0.138***	0.069***					
8.exporting	20042.91	181132.3	-0.014**	0.058***	-0.030***	-0.042***	0.073***	0.142***	0.282***				
9.nplag	197478	1565965	-0.015*	0.075***	-0.044***	-0.052***	0.260***	0.420***	0.184***	0.350***			
10.stateown	0.184	0.388	0.047***	-0.093***	0.053***	0.067***	0.105***	0.102***	-0.025***	-0.019**	0.061***		
11.appatent	6.422	32.017	0.014*	0.018**	-0.041***	0.009	0.101***	0.270***	0.021***	0.131***	0.245***	0.096***	

\* $p < 0.1$ ; \*\* $p < 0.05$ ; \*\*\* $p < 0.01$

learn more from the exporting markets. Thus, the effect of innovation capability in that process tend to be less significant.

To gain more insight into the interaction effects of Hypothesis 3, we follow Aiken and West's (1991) procedure to decompose the interactive terms. Specifically, we conduct simple slope tests and plot the relationships in Figure 2&3. In the tests, we split the stateown variable into two groups --- non-state (stateown=0) and state (stateown=1), and split the appatent variable into two groups --- low (the mean) and high (one standard deviation above the mean) --- and estimate the effects of foreeq/exporting on nplag for both levels. As we show in Figure 2, when the firm is state-owned, exporting has a stronger positive effect on nplag, in support of Hypothesis 3b. As we show in Figure 3, when appatent is high, foreeq has a stronger positive effect on nplag on the left side of the turning pointing, in support of H4a.

*Table 2: Impact of Foreign Equity and Exporting on Innovation Performance*

	Model 1	Model 2	Model 3
	nplag	nplag	nplag
<b>Control Variables</b>			
age	-0.012*	0.009	-0.012*
	(-1.71)	(1.28)	(-1.78)
industry1	-0.004	-0.007	-0.002
	(-0.19)	(-0.26)	(-0.11)
industry2	0.0003	-0.001	0.0001
	(0.02)	(-0.05)	(0.01)
industry3	-0.004	-0.005	-0.004
	(-0.20)	(-0.26)	(-0.24)
totasset	0.611***	0.618***	0.574***
	(12.99)	(12.57)	(12.10)
rdexpense	0.037***	0.045***	0.032***
	(4.01)	(4.47)	(3.48)
<b>Independent Variables</b>			
foreeq	0.473***	0.454***	0.381***
	(19.17)	(11.63)	(14.49)
foreeq <sup>2</sup>	-0.041***	-0.034**	-0.036***
	(-23.11)	(-2.27)	(-19.16)
exporting	0.088***	0.099***	0.087***
	(10.47)	(9.97)	(9.65)
<b>Moderating Effects</b>			
stateown		0.007	
		(0.55)	
foreeq*state		-0.077	

		(-1.15)	
foreeq <sup>2</sup> *state		0.018	
		(0.58)	
export*state		0.031**	
		(2.33)	
appatent			0.052***
			(9.22)
foreeq*pat			0.093***
			(6.07)
foreeq <sup>2</sup> *pat			-0.044***
			(-10.32)
export*pat			-0.002
			(-1.03)
_cons	0.053***	0.053***	0.043***
	(14.77)	(8.84)	(11.77)
R <sup>2</sup>	0.106	0.112	0.125
F	115.5	78.49	96.35
Hausman	0.000	0.000	0.000

t statistics in parentheses

\* p < 0.1, \*\* p < 0.05, \*\*\* p < 0.01

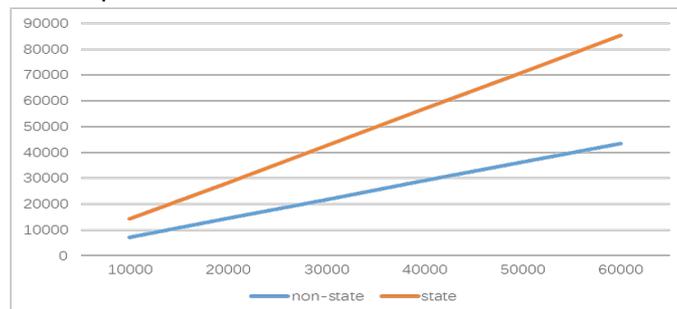


Figure 2 The Moderating Effect of State Ownership on the Effect of Exporting

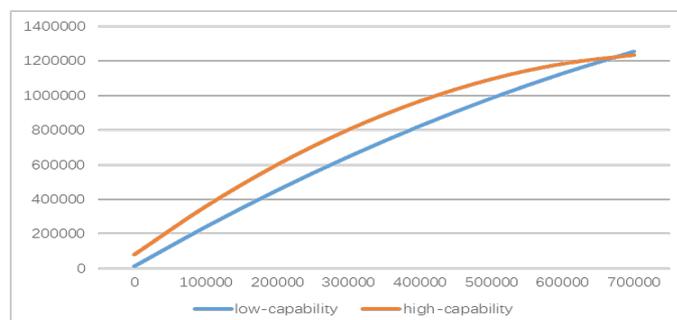


Figure 3 The Moderating Effect of Innovation Capability on the Effect of Foreign Equity

## **CONCLUSION AND DISCUSSION**

Our goal has been to contribute to the ongoing effort to better understand the resources and knowledge advantage of globally engaged firms, which can lead them to better innovation. Using the innovation data of high-growth firms in China, this study hopes to examine how the innovation of those Chinese high-growth firms is affected by two different types of global engagement, i.e. absorbing foreign equity (inward FDI) and exporting. We argue that foreign equity has an inverted U-shaped impact on firms' innovation performance, while exporting positively affects innovation. We also propose that the impacts of global engagement should depend on the institutional origins of firms; specifically, state-owned firms and non-state firms should fit with different types of internationalization activities. Moreover, the benefit that firms can generate from foreign equity should depend further on firms' own innovation capabilities. Next, we discuss our results.

### **Theoretical contributions**

#### *Foreign equity/exporting and firm innovation*

First, our study finds different influence mechanisms of two types of global engagement on firms' innovation, and we provide an integrated framework for analyzing them, which is an extension of existing research. The existing literature tends to explain how the certain internationalization activity influences innovation, for example, the effects of exporting, outsourcing or foreign direct investments (FDI) (Choi et al., 2012; Helpman et al., 2004; Luong et al., 2017). Researchers believe that firms could obtain advanced technologies, market information and management skills via global engagement and thereby improve their innovation (Huang & Zhang, 2017). However, these studies do not provide an integrated framework for contrastive analysis of the impacts of different means of engagements, which leaves a critical research gap. As we show in Table 2, foreign equity has an inverted U-shaped impact on firms' innovation performance, while exporting positively affects innovation. The results highlight the importance of different types of global engagement to firm innovation, yet in different ways.

For foreign equity, our result is not consistent with previous internationalization innovation studies suggesting foreign equity linearly positively influences the domestic firms' innovation (Choi et al., 2011; Luong et al., 2017). We find empirical evidence that foreign equity has an inverted U-shaped impact on firms' innovation. On the one hand, foreign owners provide domestic firms with

advanced technologies and managerial knowledge (Choi et al., 2011). They also encourage domestic partners to invest more in technology development and help them stay in a better position to access advanced foreign innovation resources than firms with private investors. However, we should not ignore the cost of knowledge integration, as the growing foreign equity brings about undue exotic resources and knowledge (Corredoira & McDermott, 2014). And there are also possibilities that native owners will see their foreign partners as threats (Luong et al., 2017), and thus inhibit the development of foreign equity on the strength of their local advantages.

Furthermore, theory and existing empirical work tell us that there is a strong relationship between exporting and firms' productivity (Criscuolo et al., 2010; Makri et al., 2017), but a less explored aspect of firms' performance and exporting is how exporters benefit from foreign competition in export markets and as a result improve their domestic innovation (Girma et al., 2008). In this study, we empirically highlight the importance of "learn-by-exporting" effect and the "market discipline" caused by the export markets (Wakelin, 1998).

#### *The moderating effect of state ownership*

In addition to examining the direct effects of global engagement, the article also contributes to answering the question, "Under what conditions do internationalization generate more innovation performance?"

First, this study constructs a contingency model by confirming empirically that focal firms' institutional origins greatly moderate firms' exporting process. While previous work has discussed the huge profits and the acquisition of advanced organizational resources (Chen et al., 2016; Huang & Zhang, 2017), only a few studies examined the effect of firms' institutional origin (i.e. state-owned vs. non-state firms) on the benefits of resources acquisition and the efficient use of earnings. In fact, efficient use of earnings and effective acquisition of resources through exporting requires great regulatory pressures and firms' own resource bases. Because SOEs typically inherit abundant political, financial, and physical resources from their state-owned predecessors (Musacchio & Lazzarini, 2014), and always enjoy privileges granted by the government, this relative resource advantage allows them to minimize the extent of knowledge adaptation required of the firms (Chen et al., 2016) and enhance the "learn-by-exporting" effect. In addition, as the main vehicles for implementing governments' innovation plan, the strong regulatory pressures force SOEs to efficiently use their export earnings to invest in innovation (Zhou et al., 2017).

This study also adds to the literature on state ownership. Existing literatures highlight state-owned firms' formal structures and strong bargaining power (Chen et al., 2016; Choi et al., 2012). They argue that state-owned firms can benefit more from absorbing foreign equity and collaborating with foreign owners because of their strong political connection through their institutional origin (Zhou et al., 2017). In contrast, in this study, the results show that for those small and young firms that our study focuses on, during the foreign capital absorbing process, state ownership has less significant effects. That may be because those firms are too small and weak to compete on the international markets, and the only needs for them are to use those foreign investments to survive, and to learn more from their foreign partners. As a result, the bargaining power that is mainly used for controlling their partners through the collaboration process would be useless for them.

#### *The moderating effect of innovation capability*

This study also constructs another contingency model for the whole theory framework by suggesting that internationalization innovation research should delve more deeply into firms own characteristics and their effects on firms' internationalization process, such as their innovation capabilities, which we find significantly moderate the effect of foreign equity. While researchers have claimed a direct relationship between innovation capability and innovation performance (Zhou & Li, 2012; Cohen & Levinthal, 1990; Schilke, 2014), we argue instead for its moderating effects. We find evidence that a firm with higher level of innovation capabilities always has superior absorptive capacity, which encourages receptivity to external resources (Zhou & Wu, 2009). Besides, they always have greater development potential (Silvestre & Neto, 2014), thereby being more attractive to foreign owners. Hence, our study adds firms' heterogeneity into the global engagement framework, which extends previous research on internationalization innovation

#### **Managerial Implications**

Our findings offer some important implications for managers and policymakers, who must understand the benefits and the costs of different means of global engagement. Our results suggest that investments to participating in internationalization activities, such as absorbing foreign equity and exporting, are strategically justified in many firm environments. As noted, global engagement removes barriers to resources exchange, and reduces firm-level barriers to cross-border information flows (Luong et al., 2017; Oxelheim &

Randøy, 2003). Hence, managers need to pay more attention to global engagement and be more active in establishing international relationships to generate a competitive advantage and better innovation performance.

On the other hand, although we find that foreign equity is beneficial for firm innovation, and conventional wisdom also states that it is desirable to form an alliance with a foreign partner, our results suggest that the equation actually is much more complex. Absorbing foreign equity or collaborating with a foreign owner may, in some circumstances, such as when foreign equity moves from minority to more, hurt innovation performance. As a result, firms should pay attention to the turning point, and control for the level of foreign equity.

Moreover, our results also show that state ownership and innovation capability have different but important moderating effects on the relationship between global engagement and innovation performance. Managers, therefore, should pay more attention to those factors. For instance, for a state-owned firm, it should take advantage of its political connection, and use its unique resources as leverage for better acquisition of foreign technologies and knowledge.

### **Limitations and Further Research**

This study has several limitations, some of which suggest important avenues for future research. First, although this dataset includes a broad range of high-growth firms representing a variety of industries, it is limited to only one country and only 3 years, and therefore, care should be exercised in generalizing the results. Future studies may scrutinize this study's findings in another setting, possibly incorporating a greater number of industries, localities, and/or time periods in order to ensure even higher levels of variance of environmental dynamism in the dataset. In addition, we are aware of the limitation in interpreting our results due to the choice of dependent variable. We only use one measure, which is a firm's new products value, to capture a firm's innovation performance. It is likely that managers try to grow the company and expand their production at the expense of shareholders and employees, and thus the firms are not healthy financially. Third, we posit that global engagement can provide resources and capabilities benefits, as well as motivational concerns, but we do not explicitly test this argument. Further research should delineate this mechanism and assess possible mediating effects, such as firms' resource bases. Also, for the moderator, we focus only on the role of state ownership, yet ownership structures are quite complex in China, including SOEs and collective, cooperative, shareholding, and private firms. As Xu, Lu, and Gu (2014) showed,

collective firms mix the features of SOEs and private firms (Xu et al., 2014). Further research could examine the differences and similarities among different types of firms.

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