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The Impact of Capital Investment on The Internationalization of Chinese Firms - Moderating Effect of Covid-19 Pandemic

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Abstract

This paper investigates whether an increase in capital investment by Chinese firms affects their level of internationalization. And COVID-19 is used as a moderating variable to investigate whether the effect of capital expenditure on the internationalization level of Chinese firms changes. This paper uses the panel data of 630 manufacturing listed companies in China from 2012-2021, and adopts the theory of economies of scale and black swan theory. And this paper applies econometric methods for empirical analysis, using least squares (OLS), random effects and fixed effects regression models. Robustness tests were also conducted. Our results show that (1) firms with high capital expenditures are more capable of internationalization than those with low capital expenditures, and this result verifies the applicability of the economy of scale theory; (2) the positive effect of capital expenditures on firm internationalization is significantly smaller after using COVID-19 as a moderating variable, and this result verifies the applicability of the black swan theory.

Keywords: Internationalization, Capital Investment, COVID-19, Economies of Scale, Black Swan Theory.

Introduction

Internationalization is a strategy to secure long-term survival, growth, and competitive advantage (Xu et al., 2017a). According to Cavusgil & Knight (2015), firms prefer to pursue an exporting strategy in the early stages of internationalization. However, due to the complexity of international markets, the costs of competing could outweigh its benefits and hurt a company's future profits (Geringer et al., 2000). While some companies engage in export markets and have a competitive advantage, others are incapable (Cui et al., 2011) of benefiting from additional revenue from expanded market coverage and customer reach (Zhou et al., 2007).

China opened a golden decade of rapid economic growth after joining the World Trade Organization (WTO) in 2001 (Wu & Yu, 2022). According to the National Bureau of Statistics, as shown in Figure 1, China’s average annual Gross Domestic Product (GDP) growth rate reached 10.69% from 2002 to 2011. However, the GDP is expected to deteriorate when the growth rate is reduced to around 6% in 2014 (Wei et al., 2017). Export is a primary factor that significantly impacts GDP growth (Cui et al., 2011). Surprisingly, the export growth rate turned negative for the first time in 2015, which never happened after the global financial crisis in 2008.

Chinese enterprises enter foreign markets to overcome domestic market limitations (Yang et al., 2022). These firms initially depended on the low-price advantage brought by cheap labor to compete in the international market (Li, 2011). Thus, low-value-add products and low-price competition were the initial strategies for gaining foreign market share (Ouyang et al., 2015). However, labor cost in China has been rising rapidly in recent years, eroding the country’s comparative advantage in the global market (Golley & Song, 2011). Moreover, the ability to draw in a sizable amount of foreign direct investment is also based on the country’s abundant and seemingly limitless labor supply, which disappears due to rising labor costs (Huang et al., 2021). Consequently, some manufacturers, such as Nike and Samsung, have moved from China to Southeast Asia countries that provide lower labor costs. Therefore, China needs to modernize its industrial structure and strengthen its comparative advantage in the capital- and skill-intensive industries to deal with rising labor costs (Huang et al., 2021).

In the economic system, manufacturing firms substitute capital resources for labor to produce goods and services (Wadley, 2021). Investment in technology increases resource usage efficiency and creates sustainable competitiveness for enterprises (Hall, 2011), while innovation improves the quality of raw materials, bringing out advantages (Grant, 1991). Moreover, raising consumer satisfaction with better products is necessary to grow future revenues (Liao et al., 2016). Thus, analyzing the relationship between capital investment and internationalization is possibly one of the significant areas of interest within economic-based studies.

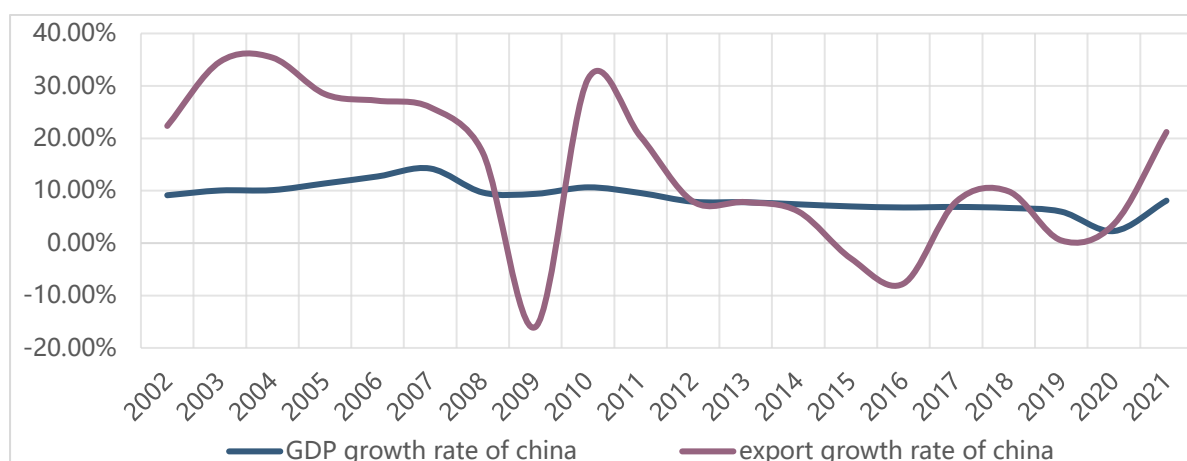


Figure 1: GDP and Export Growth Rate of China (Source: CSMAR)

This figure presents the yearly time series of the GDP and export growth rates from the China Statistics Bureau over the period 2002–2021.

Following the magnitude of its cross-border trade and the depth of its industry coverage in the global supply chain, China was known as the World's Factory (Wei et al., 2017). Unfortunately, the global spread of COVID-19 in early 2020 and today has significantly impacted the global economy. The pandemic has severely impacted the global economy's supply and demand (Gruszczynski, 2020). The transportation restrictions during COVID-19 have interrupted supply chains and resulted in supply shortages, delays or lags in procurement, and increased prices of imported raw materials (Boughton et al., 2021). The export barrier and geographical isolation also caused a global trade collapse that exceeded the 2008 financial crisis and resulted in a break and reconfiguration of the global supply chain (Baldwin et al., 2020). The dramatic drop in global trade increased pressure on countries primarily reliant on international trade (Fernandes, 2020). According to data published by the United Nations Conference on Trade and Development (UNCTAD) and the World Trade Organization (WTO), global foreign direct investment decreased by 35% from about \$1.5 trillion in 2019 to \$1 trillion in 2020. At the same time, world merchandise exports also reduced by 8%, and services trade contracted by 21%.

In this study, we examine the effect of capital investment on corporate internationalization for publicly listed companies in China. The significant increase in wages for workers in China since the early 2000s provides a unique setting to study whether capital investment can affect internationalization when low labor cost is no longer a competitive advantage for Chinese firms. In this context, this study will further explore whether the impact of capital investment on corporate internationalization is moderated under the impact of the COVID-19 pandemic.

Literature Review and Hypothesis Development

Buckley (2002) pointed out that the development of internationalization is one of the major research areas in international business. Research into international business has a long history, and scholars have categorized the studies according to different theoretical basis. Research into international business has a long history. At the country level, the analyses of international business emerged during the 18th century with the theory of absolute advantage, suggesting countries specializing in producing and exporting goods that they can produce more efficiently than other countries (Smith, 1776). Similarly, Ricardo (1817) argues that a country can gain an international trade advantage by focusing on producing goods that yield the lowest opportunity costs than other countries. According to the Heckscher–Ohlin model, a country exports products that use relatively abundant and cheap factors of production and import products that use relatively scarce factors in the country (Heckscher, 1919; Ohlin, 1935). It was argued that most of the international trade occurred between countries with comparable levels of industrialization (Leontief, 1953). In the 1960s, demand conditions (Burenstam, 1961) and other technology gap theories explained national trade patterns (Vernon, 1992), suggesting more trading between countries with similar demand structures. According to the Product Life Cycle Theory, the product's components and labor are sourced from its country of origin at the early stage. However, the production place will be shifted if the products are accepted in global markets (Vernon, 1992).

While the above theories have been used to explain internationalization at the country level, a few theoretical studies have been generated around internationalization's influencing factors at the firm level. Hymer (1960) uses firm-specific advantages to explain that a direct

foreign investor enjoys a monopolistic or proprietary advantage over domestic enterprises. There is empirical evidence that multinational corporations tend to concentrate production in low-wage countries (Hanson et al., 2005). Foreign investors are more competitive through advanced technology, product diversification, substantial minimum capital requirements, scale economies, and superior skills (Lall, 1980). Although these economic theories can provide some information about the internationalization of organizations, their emphasis on international trade does not provide sufficient information to comprehend the evolution of businesses (Porter, 1990). Since the mid-1970s, scholars have examined the stages of internationalization based on the behavioral theory of enterprises. While the previously outlined internationalization theories emphasize external aspects, the behavioral theory focuses on the firm's internal variables, particularly the learning-based processes (Benito & Gripsrud, 1995).

The "Uppsala Internationalization Model" is one of the most frequently employed models to describe how businesses progressively expand their presence in international markets (Johanson & Vahlne, 1977; SIJABAT, 2018). According to Forsgren (1989), the Uppsala model is only applicable during the initial phases of the internationalization process, when knowledge and resources are essential. The Updated Uppsala model combined with the network model (Johanson & Vahlne, 1990) proposes that the corporation should not be studied as an autonomous but as a network component. The network theory (Johanson & Mattsson, 1988) became a fundamental theory of corporate internationalization to describe a dynamic and cumulative learning process and to construct trust and commitment.

In contrast, the born-global companies did not enter international trade gradually (Johanson & Vahlne, 1977). According to Knight and Cavusgil (2004), innovation, research and development, knowledge acquisition, and ability utilization are critical in the placement of born global for international success. A firm can use internationalization to secure long-term survival, growth, and competitive advantage (Xu et al., 2017b). According to Nobre (2011), innovation is a primary source of customer advantages and value creation. As a critical source of competitive advantage, innovation resource is usually recognized as the most crucial aspect of a company's continued existence and effectiveness (Chatzoglou & Chatzoudes, 2018; Kirbach & Schmiedeberg, 2008). Innovation enables firms to avoid damaging price, advertising, and promotion rivalry (Mendi & Costamagna, 2017).

The pursuit of economies of scale, proprietary technology, and privileged access to raw materials are sources of cost advantages (Grant, 1991). A competitive advantage leads to a larger market share and income and generates the demand and load required to benefit from economies of scale and lower unit costs (Cullinane & Khanna, 2000). A firm can reduce its operational expenses or the average manufacturing cost when its volume increases (Petsko, 2012). Long-term economies of scale arise from lower per-unit fixed costs for transportation (Beccalli et al., 2015; Skovsgaard & Jacobsen, 2017). International expansion might also increase economies of scale arising from tangible assets (Tallman & Li, 1996). Evidence suggests that an international customer base can increase firm revenue and reduce the average production cost following a larger production scale (Kyläheiko et al., 2011). It has been reported that an increased capacity from more considerable capital investment leads to expansion toward international markets (Child & Rodrigues, 2005).

Following the economies-of-scale argument, significant capital investment should induce firms to enter foreign markets, suggesting that the relationship between capital investment and the degree of internationalization should be positive. Thus, this study proposes the following hypothesis:

Hypothesis 1. Capital investment has a positive impact on the internationalization of firms in China.

Global supply chains, production, and commercial services have temporarily ceased or significantly slowed due to COVID-19 (Sharma et al., 2020). The pandemic resulted in supply shortages, procurement delays or lags, and increased prices for imported raw materials (Boughton et al., 2021). The transportation and import-export operations were suspended during the shutdown (Kumar & Singh, 2021). Unexpected events, like the COVID-19 pandemic, are sometimes described as “Black Swan” events because they have a low likelihood of happening but have the potential to disrupt a supply chain seriously (Weber, 2021). In discussing the socioeconomic effects of the pandemic on the global economy, Nicola et al. (2020) claim that the COVID-19 pandemic has had a “Black Swan” effect on the service industry due to social exclusion, self-isolation, and lockdown measures.

Given the fact that the pandemic disrupts export activities and considering the extant empirical evidence for the positive effects of capital investment on internationalization, we formulate the following hypothesis:

Hypothesis 2. The positive impact of capital investments on the company’s internationalization level is narrowed by COVID-19.

Data and Methodology

Sample

The initial sample of this study includes 13,953 firm-year observations from all publicly listed non-ST (special treatment) and non-financial firms in China over seven years from 2015 to 2021. The samples without complete data during COVID-19 are excluded to examine the impact of the pandemic. Then, the final sample size was reduced to 5,873 firm-year. The datasets were organized as strongly balanced panel data from 2015 to 2021. Several specification checks were performed. The ratio of the market value of equity to the book value of equity (MBV) variable comes from WIND, and other financial data variables come from CSMAR.

Dependent Variables

Prior research has focused on the ratio of the firm’s foreign sales to total sales (FSTS) (Capar & Kotabe, 2003) and the ratio of the firm’s foreign assets to total assets as proxies for the firm’s internationalization (Gomes & Ramaswamy, 1999). Both measurements represent a different aspect of the firm’s internationalization. According to Cavusgil & Knight (2015), firms prefer to pursue an exporting strategy in the early stages of internationalization, whereas they start holding foreign assets in the latter stages. As a result, this study uses the firm’s ratio of foreign sales relative to overall sales as a proxy for the firm’s level of internationalization.

Independent Variable

The capital investment of Chinese firms is the independent variable in this study. This study uses CAPEXTA, which is the ratio of capital investment to one-period delayed total assets, to proxy the capital investment level of Chinese firms (Custódio & Metzger, 2014). High CAPEXTA means a high growth rate of capital investment.

The Effect of COVID-19

To test whether the effect of capital investment on internationalization is asymmetric during COVID-19, we split the sample into two subsamples based on before and during the COVID-19 pandemic.

Control Variables

According to the study by Vithessonthi (2017), this study includes a substantial number of firm-level control variables to account for firm-specific traits that could influence the firm's internationalization and to allay endogenous concerns raised by variables that were omitted but could have an impact on the levels of internationalization: firm size (LNTA), leverage (LEV), the fixed asset ratio (PPETA), the market-to-book ratio (MBV), the gross profit margin (GPM), firm performance (ROA), operating risk (RISK), sales growth (SGROWTH), GDP growth, exchange rate, real interest rate, and industry.

Firm size (LNTA) is computed as the natural logarithm of total assets in millions of RMB (Michael et al., 2001). Size factors significantly influence the selection of an internationalization model (Zapletalová, 2015). Leverage (LEV) is the ratio of total debt to total assets (Singh & Faircloth, 2005). Controlling for leverage considers the reality that highly leveraged firms are susceptible to greater financial limitations that may restrict their ability to take on risk and access overseas markets (Aivazian et al., 2005). The fixed asset ratio (PPETA) is the ratio of net fixed assets to total assets (Cen et al., 2017). High fixed asset levels increase the likelihood that firms will face increased pressure to grow their customer bases to maximize their capital investment (Christopher & Ryals, 1999).

Firms are more ready to expand both locally and abroad when they have stronger investment prospects (Azman-Saini et al., 2010). Therefore, to proxy investment possibilities for organizations, this study uses the market-to-book ratio (MBV), which is calculated as the ratio of the market value of common equity to the book value of common equity (M. Chen et al., 2005). To proxy competitiveness in the product market, this study uses the gross profit margin (GPM), which is calculated as the ratio of gross profits to total sales (Edwards, 2016). High gross profit margin firms may be more cost-effective producers or operate in less competitive product markets. In contrast, low-profit margin firms may be less cost-effective producers or operate in more competitive product markets (Abor, 2007). By controlling for ROA, the likelihood of more resource-rich firms entering foreign markets is addressed. ROA is calculated as the ratio of EBIT to total assets (Yiu et al., 2021). The five-year rolling standard deviation of ROA, which measures the uncertainty of profitability, is known as operating risk (RISK) (Yiu et al., 2021). Firm risks refer to profit volatility (Ruefli et al., 1999; Merriman & Nam, 2015). This study uses the sales growth variable (SGROWTH), which is computed as the first difference in the natural logarithm of total sales, to adjust for this impact since firms with strong sales growth rates are more likely to capitalize on their goods in international markets (Vithessonthi, 2017). This study includes the GGROWTH (GDP growth), EXRATE (exchange

rate), and RLRATE (real interest rate) from the databank of the world bank. Macroeconomic factors, such as GDP growth, exchange rates, and real interest rate, are essential in influencing foreign direct investment and internationalization (Froot & Stein, 1991; Méon & Sekkat, 2012). This study controls these effects. Firms operating in industries with high growth opportunities are more likely to try to expand their revenue bases (Andersson, 2004) because internationalization is one of the expansion strategies.

Empirical Methodology

This study begins the investigation by examining whether capital investment significantly affects internationalization levels. All continuous variables were winsorized at 1% (top and bottom) to mitigate the effects of outliers. First, the model was regressed as a pooled ordinary least square (pooled OLS), assuming neither cross-sectional nor period differences. Next, to decide between a random effects regression and a simple OLS regression, the Breusch-Pagan Lagrange Multiplier (LM) test was used to verify that variances across entities were zero (no panel effect). The null hypothesis was rejected, concluding that the random effects model was preferable. Following prior studies (Qizam & Fong, 2019), this study performed a fixed effect model with least squares dummy variable (LSDV) regression (OLS with a set of year-dummies and industry dummies) to notice the year effect and industry effect more distinctly. It was then running the Hausman test on the panel data to decide between random and fixed effect models, the null hypothesis was rejected. The results suggested that the fixed effects model was more appropriate (Greene, 2005).

The following baseline model is used to test whether capital investment induces firms to expand into international markets:

$$\begin{aligned} \text{INTER}_{i,t} = & \alpha + \beta_1 \text{CAPEXTA}_{i,t-1} + \beta_2 \text{LNNTA} + \beta_3 \text{LEV} + \beta_4 \text{PPETA} + \beta_5 \text{MBV} + \beta_6 \text{GPM} + \beta_7 \text{ROA} \\ & + \beta_8 \text{RISK} + \beta_9 \text{SGROWTH} + \beta_{10} \text{GGROWTH} + \beta_{11} \text{EXRATE} + \beta_{12} \text{RLRATE} \\ & + \lambda_i \text{Industry effects} + \gamma_t \text{Year effects} + \varepsilon_{f,i,t} \end{aligned}$$

Equation 1

Where $\text{INTER}_{f,i,t}$ is a measure of internationalization for firm f in the industry i at time t . For the measurement of the firm's internationalization, this study uses the ratio of foreign sales to total sales. The ratio of capital investment to one-period lagged total assets for firm f in an industry i at time t is $\text{CAPEXTA}_{f,i,t}$, which is used to calculate the firm's capital investment. The industry-fixed effect (λ_i) in the model specification is used to control for unobservable industry-specific and time-invariant heterogeneity. The period-fixed effect (γ_t) in the model specification is used to control for unobservable time-variant common shocks to all sampled firms. The Breusch-Pagan test was executed in the linear regression model to identify any potential heteroskedasticity issues, and the null hypothesis of homoscedasticity was rejected. Therefore, the estimation commands specify Eicker-White heteroskedastic-consistent standard errors to overcome heteroskedasticity, and robust standard errors are reported (Lam et al., 2013).

Empirical Results and Discussion

Descriptive Statistics

Table 1 summarizes the statistics for the sample of 5,873 firm-year over the period observed from 2015 to 2021, including maximum, minimum, mean, and standard deviation

values of all dependent, independent, and control variables. The mean of FSTS is 23% with a standard deviation of 22.4%, the mean of CAPEXTA is 5% with a standard deviation of 5.2%, and the mean of PPETA is 21.3%, suggesting that the average Chinese firm does not have a large capital investment during the sampled period that might limit future development (Vithessonthi, 2017).

Table 2 reports the correlation coefficients of the major variables for the final sample of 5,873 observations. The correlation between CAPEXTA and FSTS is 0.103, and the positive effect of CAPEXTA on FSTS is significant. Interestingly, the negative relationship between GPM and FSTS indicates that the companies with the lower gross profit margin have more foreign sales. This situation implies that companies need to reduce the profit margin to compete in international markets that are very competitive. In Table 3, column (5) reports the variance inflation factor (VIF) outcomes ranging from 1.12 to 1.83 with a mean of 1.43, thus implying no multicollinearity issues in the model.

Empirical Tests and Discussion of the Impact of Capital Investment on Internationalization

Table 3 shows the results of the empirical analysis. Column (3) reports that the independent and control variables in the regression equation account for 18% of the variation in FSTS. Column (3), CAPEXTA has a significant positive effect on FSTS, which means the capital investment of Chinese listed firms has a significant positive effect on the degree of internationalization, and hence, Hypothesis 1 is supported.

Concerning the FSTS-related control variable impacts, column (3) shows a negative correlation between firm size and FSTS, implying that smaller firms prefer to enter foreign markets than larger companies. It is argued that smaller companies are more flexible in entering new markets (Zapletalová, 2015). Moreover, internationalization increases the firm risk (Gulamhussen et al., 2014) and the firm must incur more expenses for internationalization (Chang & Rhee, 2011). Besides, businesses that expand internationally may have challenges with coordination and oversight (Boeh & Beamish, 2012) and higher liability of foreignness (J. Johanson & Vahlne, 2009; Zaheer, 1995). As a result, larger companies in China may prefer stability over risk and thus not enter overseas markets. Column (3) also shows a negative relationship between leverage and FSTS, indicating that companies with higher debt ratios are unwilling to venture into foreign markets to avoid the risk of bankruptcy (L. Chen & Zhao, 2007) because international markets exacerbate corporate risks (Kwok & Reeb, 2000).

Interestingly, the negative relationship between GPM and FSTS indicates that the companies with the lower gross profit margin have more foreign sales. Most of China's exports are low-value-added goods. Therefore, many Chinese firms will decrease firm profit to be the main approach to winning foreign markets (Ouyang et al., 2015). In contrast, PPETA has a positive effect on FSTS, it is well understood that investment in machinery and equipment can reduce average production cost (Cheng, 1991) and become more competitive in foreign markets.

COVID-19 as moderator of the relationship between capital investment and internationalization

To test whether the effect of capital investment on internationalization is asymmetric during COVID-19, we split the sample into two subsamples based on before and during the

COVID-19 pandemic. This study separately estimates Equation 1 where the dependent variable is foreign sales before and during the COVID-19 pandemic. This study divides the sample into two sectors: one before COVID-19 in 2015 to 2019, and one during COVID-19 in 2020 and 2021.

Table 4 shows the panel regression results of foreign sales for both subsamples. Columns (1) and (3) use the pooled OLS regression, while columns (2) and (4) are controlled for industry and year effects. Columns (2) and (4) show that CAPEXTA positively affects foreign sales. However, the β coefficient in column (4) is 0.459, is smaller than 0.526 in column (2), indicating that COVID-19 harms the relationship between capital investment and foreign sales. Therefore, Hypothesis 2 is supported.

In column (4), RISK is positively associated with foreign sales, indicating that firms with more uncertain profitability increased foreign sales during the COVID-19 pandemic. All other control variables are not associated with foreign sales for the subsamples during the COVID-19 pandemic. The results imply that the COVID-19 pandemic has mitigated the effects of firm size, leverage, and fixed assets on foreign sales.

As a robustness test to ensure the reliability of the conclusions, the subsamples before the COVID-19 pandemic are replaced by 2018 and 2019 to match with the period during the pandemic. Table 5 reports the regression results of pooled OLS and fixed effects (FE). In column (4), CAPEXTA has a significant effect on FSTS. However, the β coefficient of 0.459 during the pandemic is smaller larger than the β coefficient of 0.696 in column (2). The result is consistent that COVID-19 negatively moderates the relationship between capital investment and internationalization.

Conclusion

This study examines the hypothesis that capital investment affects the degree of internationalization for Chinese firms. In the analysis, this study gathers data on 13,953 firm-year observations from all publicly listed non-ST (special treatment) and non-financial firms in China from 2015 to 2021. The potential heteroskedasticity issues, sample selection biases, and other potential econometric issues are addressed in the study.

Internationalization is a strategy for many companies to survive and grow. This study uses foreign sales to measure the degree of internationalization and control for firm characteristics, including firm size, leverage, fixed assets, market-to-book ratio, gross profit margin, firm performance, operating risk, sales growth, as well as macroeconomic variables such as GDP growth, exchange rate, and real interest rate. The results of regression procedures show that capital investment positively impacts foreign sales. Based on the economies of scale theory, Chinese firms can make capital investments to increase production efficiency and product quality to enhance international competitiveness.

China took measures to control the spread of COVID-19, such as lockdowns, home quarantine, and production shutdowns, which inevitably reduced international trade with other countries worldwide. Therefore, this study further examines the effect of the COVID-19 pandemic to separate the effects of capital investment on internationalization. The results suggest that the pandemic moderates the relationship between capital investment on firm

internationalization. This study finds that capital investment increases firm internationalization at a smaller size during the pandemic. Overall, in assessing the impact of capital investment on firm internationalization, it is also important to account for the effects of supply chain interruption during the COVID-19 period. However, the risk of global outbreaks is expected to decline when moving toward normalizing country economies. As a result, the impact of COVID-19 on the relationship between capital investment and internationalization may change in the coming years, which requires further study.

This study contributes to firm internationalization research in three ways. First, it revisits the relationship between capital investment and the internationalization of Chinese firms, demonstrating the feasibility of the theory of economies of scale. Secondly, the empirical results support the need for Chinese firms to strengthen their comparative advantage in the capital- and skill-intensive industries to deal with rising labor costs. Thirdly, the findings highlight the importance of evaluating the impact of the COVID-19 pandemic, a “Black Swan” event that results in supply shortages, procurement delays, and increased prices for imported raw materials. For practitioners, the analysis reinforced the argument that capital investment presents opportunities for businesses to embrace at least some aspects of internationalization. This could be an effective corporate strategy to secure long-term survival and emerge from the crisis more resilient.

Table 1
Descriptive statistics

VARIABLES	(1) N	(2) mean	(3) sd	(4) min	(5) max
TA(billion RMB)	5,873	23.510	93.821	0.219	2,388.249
FSTS	5,873	0.230	0.224	0.001	0.936
CAPEXTA	5,873	0.050	0.052	0.001	0.294
LNTA	5,873	3.851	0.541	2.838	5.491
LEV	5,873	0.452	0.190	0.079	0.900
PPETA	5,873	0.213	0.141	0.005	0.633
MBV	5,873	3.792	3.380	0.706	21.44
GPM	5,873	0.257	0.153	0.007	0.798
ROA	5,873	0.032	0.068	-0.265	0.210
RISK	5,873	0.036	0.040	0.002	0.227
SGROWTH	5,873	0.005	0.012	-0.031	0.053
GGROWTH (%)	5,873	6.381	1.606	2.620	8.100
EXRATE (%)	5,873	6.672	0.227	6.376	6.976
RLRATE (%)	5,873	2.147	1.676	-0.021	4.353

Notes: This table reports summary statistics for key variables for a sample of 5,873 company-year observations for the period 2015-2021. Financial firms and ST firms are excluded from the sample. TA is the total assets in billion RMB. FSTS is the ratio of foreign sales to total sales (in %). CAPEXTA is equal to the ratio of capital expenditures to one-period lagged total assets (in %). LNTA is the natural logarithm of actual total assets in millions of RMB. LEV is the ratio of total debt to total assets (in %). PPETA is the ratio of fixed assets to total assets (in %). MBV

is the ratio of market to book. Gross Profit Margin (GPM) is the ratio of gross profit to total sales (in %). ROA is the ratio of EBIT to total assets (in %). RISK is the five-year moving standard deviation of ROA. Sales growth rate (SGROWTH) is calculated as the first difference of the natural logarithm of actual total sales (in %). GDP growth rate (GGROWTH), exchange rate (EXRATE), and real interest rate (RLRATE) are three variables that may affect internationalization at the macro level (in %). The unit of total assets is million RMB. The mean, standard deviation, maximum and minimum values are shown for each variable.

Table 2
Correlation Matrix

	FST S	CAP EXT A	LNT A	LEV	PPE TA	MB V	GP M	ROA	RISK	SGR OW TH	GGR OW TH	EXR ATE	RL RA TE
FSTS	1												
CAP EXT A	0.10 3** *	1											
LNT A	- 0.09 5** *	0.12 2** *	1										
LEV	- 0.05 8** *	- 0.00 400	0.45 8** *	1									
PPE TA	0.05 5** *	0.24 7** *	0.02 8**	0.04 7**	1								
MBV	0.00 300	0.08 0** *	- 0.26 9** *	- 0.00 900	- 0.09 3** *	1							
GP M	- 0.05 4** *	0.05 4** *	- 0.14 1** *	- 0.42 7** *	- 0.19 1** *	0.18 7** *	1						
ROA	- 0.02 7**	0.19 5** *	0.10 9** *	- 0.30 8** *	- 0.04 7** *	0.17 9** *	0.3 66**	1					
RISK	0.02 10	- 0.09 1** *	- 0.21 8** *	0.02 3* *	- 0.04 3** *	0.13 8** *	0.0 190	- 0.34	1				

SGR	-	0.23	0.07	-	-	0.13	0.1	0.35	-	1			
OW	0.00	2**	1**	0.03	0.05	7**	18*	3**	0.12				
TH	300	*	*	6**	4**	*	**	*	3**				
				*	*				*				
GGR	-	0.03	-	-	0.00	0.06	0.0	0.02	-	0.14	1		
OW	0.00	3**	0.03	0.01	500	9**	030	7**	0.04	2**			
TH	100		2**	90		*	0		1**	*			
									*				
EXR	0.01	-	-	-	0.01	-	0.0	-	-	-	0.03	1	
ATE	00	0.01	0.01	0.01	40	0.13	32*	0.03	0.03	0.04	5**		
		10	80	40		9**	*	0**	7**	6**	*		
						*			*	*			
RLR	0.00	0.00	-	-	0.04	0.18	0.0	-	-	-	-	0.1	1
ATE	500	500	0.07	0.02	7**	5**	040	0.01	0.01	0.16	0.50	86*	
			8**	7**	*	*	0	40	50	3**	4**	**	
			*							*	*		

This table reports the correlation coefficients between key variables for a sample of 5,873 company-year observations covering the period 2015-2021. FSTS is the ratio of foreign sales to total sales (in %). CAPEXTA is equal to the ratio of capital expenditures to one-period lagged total assets (in %). LNTA is the natural logarithm of actual total assets in millions of RMB. LEV is the ratio of total debt to total assets (in %). PPETA is the ratio of fixed assets to total assets (in %). MBV is the ratio of market to book. Gross Profit Margin (GPM) is the ratio of gross profit to total sales (in %). ROA is the ratio of EBIT to total assets (in %). RISK is the five-year moving standard deviation of ROA. Sales growth rate (SGROWTH) is calculated as the first difference of the natural logarithm of actual total sales (in %). GDP growth rate (GGROWTH), exchange rate (EXRATE), and real interest rate (RLRATE) are three variables that may affect internationalization at the macro level (in %). *, ** and *** represent statistical significance at the 10%, 5% and 1% levels, respectively.

Table 3
The effect of capital investment on internationalization.

Full samples	(1)	(2)	(3)	(4)
Variables	OLS	RE	FE	VIF
CAPEXTA	0.532*** (8.08)	0.031 (0.93)	0.513*** (8.13)	1.18
LNTA	-0.039*** (-5.71)	-0.012 (-1.40)	-0.037*** (-5.20)	1.66
LEV	-0.071*** (-3.52)	0.018 (1.07)	-0.054*** (-2.75)	1.83
PPETA	0.019 (0.85)	0.042* (1.96)	0.075*** (3.00)	1.14
MBV	-0.000 (-0.39)	0.001 (1.13)	-0.000 (-0.32)	1.47
GPM	-0.130*** (-5.70)	0.064*** (2.88)	-0.092*** (-3.29)	1.43
ROA	-0.062	-0.060**	-0.005	1.74

	(-1.05)	(-2.04)	(-0.09)	
RISK	0.046	-0.078	0.107	1.25
	(0.52)	(-1.60)	(1.15)	
SGROWTH	-0.135	-0.493***	-0.106	1.25
	(-0.45)	(-4.26)	(-0.37)	
GGROWTH	-0.002	-0.000	-0.002	1.48
	(-0.91)	(-0.46)	(-0.92)	
EXRATE	0.013	0.008	0.020	1.12
	(0.93)	(1.42)	(1.18)	
RLRATE	-0.002	-0.001	-0.003	1.63
	(-0.88)	(-1.06)	(-0.93)	
Constant	0.351***	0.195***	0.146	
	(3.75)	(3.85)	(1.30)	
Observations	5,873	5,873	5,873	
R-squared	0.031		0.180	
Number of code		839		
industry FE			YES	
Year FE			YES	
Hausman				
p-value				
Mean VIF				1.43

Note : This table presents panel OLS regressions of internationalization (FSTS) in column (2) and random effects regressions in column (3). Fixed effects regressions are presented in column (4). The variance inflation coefficients are presented in column (5). The dependent variable is FSTS, measured as the ratio of foreign sales to total sales (in %). CAPEXTA is equal to the ratio of capital expenditures to one-period lagged total assets (in %). Firm and year fixed effects are included in all regressions. Robust standard errors grouped at the firm level are reported in parentheses. Please see Table 1 for other variable definitions. *, ** and *** represent statistical significance at the 10%, 5% and 1% levels, respectively. All observations from 2015-2021.

Table 4

Model Panel Regression Results (Two groups with the different sample size before and after covid19)

Samples (Years)	2015-2019		2020-2021	
	(1)	(2)	(3)	(4)
Variables	OLS	FE	OLS	FE
CAPEXTA	0.522*** (6.77)	0.526*** (7.13)	0.506*** (4.11)	0.459*** (3.71)
LNTA	-0.046*** (-5.28)	-0.048*** (-5.41)	-0.023* (-1.90)	-0.013 (-1.06)
LEV	-0.072*** (-2.95)	-0.050** (-2.08)	-0.062* (-1.65)	-0.055 (-1.47)
PPETA	0.027 (1.01)	0.088*** (2.86)	0.003 (0.08)	0.038 (0.84)
MBV	0.001 (0.44)	-0.000 (-0.07)	-0.002 (-1.37)	-0.002 (-0.87)
GPM	-0.159*** (-5.95)	-0.118*** (-3.65)	-0.059 (-1.31)	-0.032 (-0.58)
ROA	-0.060 (-0.86)	0.020 (0.29)	-0.081 (-0.74)	-0.065 (-0.63)
RISK	-0.067 (-0.57)	0.023 (0.18)	0.190 (1.28)	0.263* (1.79)
SGROWTH	-0.109 (-0.32)	-0.172 (-0.51)	0.019 (0.03)	0.107 (0.19)
GGROWTH	-0.209 (-1.10)	-0.155 (-0.29)	-0.001 (-0.50)	-0.001 (-0.48)
EXRATE	-0.115 (-0.92)	-0.081 (-0.21)	-	
RLRATE	0.005 (0.65)	0.003 (0.16)	-	
Constant	2.630 (1.25)	1.905 (0.31)	0.343*** (6.75)	0.130** (2.45)
Observations	4,185	4,185	1,674	1,674
R-squared	0.037	0.191	0.021	0.181
industry FE		YES		YES
Year FE		YES		YES

Note :This table presents panel OLS regressions of internationalization (FSTS) in column (2) and fixed effects regressions in column (3). The observations in column (2) and column (3) are regressions from 2015 to 2019, before the occurrence of covid19. The panel OLS regression for internationalization (FSTS) is presented in column (4), and the fixed effects regression is presented in column (5). The observations in column (4) and column (5) are from 2020 to

2021, the regression results after covid19 occurs. Both firm and year fixed effects are included in the fixed effects regressions. Robust standard errors grouped at the firm level are reported in parentheses. *, **, and *** represent statistically significant at the 10%, 5%, and 1% levels, respectively.

Table 5

Model Panel Regression Results (Two groups with the similar sample size before and after covid19)

Samples (Years)	2018-2019		2020-2021	
	(1)	(2)	(3)	(4)
Variables	OLS	FE	OLS	FE
CAPEXTA	0.632*** (4.53)	0.696*** (5.05)	0.506*** (4.11)	0.459*** (3.71)
LNTA	-0.048*** (-3.85)	-0.050*** (-3.81)	-0.023* (-1.90)	-0.013 (-1.06)
LEV	-0.030 (-0.84)	-0.009 (-0.24)	-0.062* (-1.65)	-0.055 (-1.47)
PPETA	0.004 (0.09)	0.051 (1.05)	0.003 (0.08)	0.038 (0.84)
MBV	-0.003 (-0.80)	-0.005 (-1.45)	-0.002 (-1.37)	-0.002 (-0.87)
GPM	-0.089** (-2.24)	-0.052 (-1.04)	-0.059 (-1.31)	-0.032 (-0.58)
ROA	0.047 (0.52)	0.120 (1.32)	-0.081 (-0.74)	-0.065 (-0.63)
RISK	-0.076 (-0.49)	0.094 (0.56)	0.190 (1.28)	0.263* (1.79)
SGROWTH	-0.231 (-0.34)	-0.220 (-0.32)	0.019 (0.03)	0.107 (0.19)
GGROWTH	-	-0.156 (-0.30)	-0.001 (-0.50)	-0.001 (-0.48)
EXRATE	-		-	
RLRATE	0.001 (0.19)		-	
Constant	0.431*** (8.46)	1.345 (0.38)	0.343*** (6.75)	0.130** (2.45)
Observations	1,678	1,678	1,674	1,674
R-squared	0.030	0.191	0.021	0.181
industry FE		YES		YES
Year FE		YES		YES

Note :This table presents panel OLS regressions of internationalization (FSTS) in column (2) and fixed effects regressions in column (3). The observations in column (2) and column (3) are

regressions from 2018 to 2019, before the occurrence of covid19. The panel OLS regression for internationalization (FSTS) is presented in column (4), and the fixed effects regression is presented in column (5). The observations in column (4) and column (5) are from 2020 to 2021, the regression results after covid19 occurs. Both firm and year fixed effects are included in the fixed effects regressions. Robust standard errors grouped at the firm level are reported in parentheses. *, **, and *** represent statistically significant at the 10%, 5%, and 1% levels, respectively.

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