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Global Value Chain Activities in Host Country and Foreign Subsidiary Performance: The Role of Local Knowledge, Entry Model Strategies

Zhaohui Zhang, Zhicheng Peng*

School of Economics and Management, Shanghai Polytechnic University, Shanghai, China

*zhicheng0909@163.com

Abstract

This paper explores the extent to which the performance of foreign subsidiaries is affected by country, sector and company factors, using the company level panel of more than 61,000 foreign subsidiaries in 103 economies. We found evidence that the increase of GVC participation and GVC position of host countries improved the financial performance of foreign subsidiaries. This shows that the more active the host country is in the global value chain activities, the greater the market potential, so that foreign companies can obtain higher returns. The study also found that this positive return was also affected by the differences in local knowledge and entry mode strategies of foreign subsidiaries. In addition, this paper also conducted a variety of robustness tests and discussed the endogenous problem. Our findings support the basic principles of international production and division of labor and advocate that a country should participate more in global production in order to attract foreign investment.

Keywords

Host Country Global Value Chain; Foreign Subsidiary Performance; Local Knowledge; Entry Mode.

1. Introduction

In the past few decades, the process of economic globalization has been advancing, international production and division of labor have been gradually fragmented, and production links often require the participation of multiple countries or regions. As Krugman and others have pointed out, economic integration means that "goods are produced in multiple stages at multiple locations, adding a little value at each stage"[1]. The global value chain has greatly reshaped the world economic and trade pattern and the global specialized network structure. At present, more than two-thirds of Global trade is driven by global value chains[2][3].

With the gradual reduction of trade barriers, the company network has spread across national boundaries and along the global value chain. From product design to sales to consumers, all intermediate production stages can be sorted according to endowment advantages and scattered in multiple industries in multiple countries. Therefore, the vigorous development of transnational corporations has promoted the formation of global production chains, and they are also the organizers and key participants of global value chain activities.

According to the world development report issued by the world bank, transnational corporations account for less than 15% of the total number of trading enterprises, but almost 80% of the total global trade[4]. Through the export of cross-border capital, technology and management, transnational corporations cooperate with labor and other production factors in the host country to form a transnational division of production, which is one of the main ways of global value chain activities[5]. As an important participant and organizer of economic globalization, the operation of transnational corporations will have a profound impact on the

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decision-making of foreign direct investment in various countries, and will affect the benefits gained by countries in participating in the international division of production. So, in the global value chain activities, what factors affect the performance of multinational companies or what factors affect the performance of their foreign subsidiaries?

In order to solve the above problems, based on the existing literature research, this paper establishes the global value chain transmission mechanism, and uses the panel data fixed effect model for empirical analysis. To test how the degree of participation in the host country's global value chain and the status of division of labor affect the performance of foreign subsidiaries through the value chain. Our results can withstand a series of robustness tests, and the endogenous problem is discussed.

The contribution of this paper mainly includes the following three points: first, from the perspective of industry level, this paper discusses whether different countries (or regions) participation in the global value chain and division of labor position have radiation effects on multinational enterprises in this industry. Second, this paper extends the research dimension to the global perspective. At present, most of the existing literatures discuss the impact of the relevant indicators of the global value chain of a single country on the company, and do not rise to the level of foreign subsidiaries. Third, this paper also discusses the impact of entry mode and local experience on this study, and makes further empirical analysis.

2. Literature Review

2.1. Measurement and Related Research of Global Value Chain

The theoretical research of global value chain originated from the global commodity chain (GCC) proposed by Gereffi, and further developed its own theory and proposed the global value chain (GVC)[6][7]. In the following years, the concept of global value chain has been extended to an important driving force of World Trade and international division of production, emphasizing that cross-border flow of production factors promotes the economic growth of countries or regions.

On this basis, Kaplinsky and Morris will research into each segment of the manufacturing chain, and believe that the complete global value chain should include R&D and design, production, sales and after-sales service[8].With the improvement of trade data among countries (regions), scholars at home and abroad began to try to quantify the relevant indexes of the global value chain from the perspective of economics. The measurement of global value chain in the early literature starts from the input-output model of a single country, and uses vertical specialization (VS) and its vertical specialization index (VSS) to measure the accounting problem of the added value of intermediate products in international trade[9]. On this basis, scholars used this method to calculate the GVC embedding degree of intermediate products and final products, and further improved the measurement method[10][11].Since then, some scholars have proposed domestic value added (DVA) for export on the basis of their research, VAX (value added exports) and other concepts analyze a country's global value chain related indexes from the perspective of export value added[12][13]. In 2014, Koopman, Wang, and Wei first provided a unified framework to decompose a country's total exports into four categories. They are: domestic value added absorbed by foreign countries in export; Domestic added value initially exported but eventually returned home; Foreign added value used in the production of export products of one country and eventually absorbed by other countries; Added value generated by multiple cross-border trade in intermediate products[14].

On this basis, Wang Z and other scholars proposed an input-output model of Multi Country and multi sector GN x GN in 2017, which disassembled the productive activities of a country in the global division of labor according to the two dimensions of added value and final product production, and proposed that the global value chain production activities of a country should

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be divided into four categories according to the number of cross-border production and production purpose: the "pure domestic value chain activities" that are completely produced at home and meet domestic demand; "Traditional trade value chain activities" that are completely produced at home and export the final products abroad; "Simple global value chain activities" in which the added value of intermediate products produced domestically is used to meet the final demand of importing countries and "complex global value chain activities" in which the imported countries are used to meet the demand of intermediate products for reexport production. The concepts and calculation methods of "global value chain participation" and "global value chain production length" are put forward, which makes the measurement of a country's production activities in the global value chain more intuitive and accurate[15][16].

In addition, on the basis of previous studies, Timon Bohn proposed a bilateral GDP-GNI model, which aims to measure the value-added activities of countries (or regions) in the global value chain from the perspective of national income[17].

2.2. Research on the Relationship between Global Value Chain and the Performance of Foreign Subsidiaries

The host country environment plays a crucial role in the success of foreign subsidiaries[18]. The environmental factors of the host country can be assessed from multiple dimensions, including the level of economic development, R&D capacity, institutional environment, economic policy and cultural distance[19]. In terms of institutional environment, institutional distance has a significant negative impact on the performance of foreign subsidiaries of multinational enterprises. Because of the expansion of institutional distance, foreign subsidiaries' demand for high-quality employees has increased, increasing the average employee cost. The parent company's overseas investment experience, pioneer industry experience and the establishment of joint ventures with the host country's enterprises help to mitigate the negative impact of institutional distance, and the host country's market size and resource endowment promote the increase of foreign subsidiaries' profits[20]. In terms of knowledge learning and technology transfer, scholars generally believe that intangible assets such as knowledge and technology owned by the parent company can be transferred to foreign subsidiaries to promote their business development. On the contrary, after learning new knowledge and technology in the host country, foreign subsidiaries can transfer these host country specific technologies back to the parent company. In addition, when the absorptive capacity of foreign subsidiaries and mutual trust with the parent company are higher, the impact of the parent company's knowledge on the subsidiary's performance will be further increased[21].

In the previous literature, most scholars' research on global value chain and foreign subsidiaries mainly focused on how to obtain profit growth from participating in global value chain activities. Intangible assets are often an important evaluation factor in the study of the operation of multinational companies. In the global value chain activities, knowledge and technology will spread along the value chain. The global value chain promotes the spread of knowledge and technology and the formation of industrial agglomeration[22]. In terms of enterprise management, some scholars have proposed that as multinational enterprises become more efficient and experienced in global value chain activities, they will span more stages, which is accompanied by the increase of input procurement, production value-added, fixed costs and profits[23]. Some scholars have also used empirical analysis methods to prove that multinational enterprises' participation in global value chain activities can obtain higher profits, and conform to the "smile curve", especially in the early and late stages of the task to produce higher added value, which may be due to higher knowledge intensity[24][25].

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3. Hypothesis Development

3.1. Impact of Host Country Participation in Global Value Chain

On the one hand, foreign subsidiaries located in the country are more likely to use the import of intermediate products to obtain the advanced technology included in it, and improve the imitation efficiency through technology spillover, obtain technology accumulation, improve their own technology level, so as to obtain higher value-added profits[26].

On the other hand, the higher the participation of the host country in the global value chain, the higher the overall business environment, information transparency and industry standards of the industry in the host country[15]. This is conducive to the formation of industrial chain synergy, so that foreign subsidiaries can better rely on the perfect industrial chain, obtain the latest industry cutting-edge trends and establish their own international supply chain, give better play to their comparative advantages and stimulate the growth of profits.

Hypothesis 1: the host country's participation in the global value chain has an incentive mechanism for the operating performance of overseas subsidiaries. The higher the host country's participation in the global value chain, the more likely the local overseas subsidiaries will benefit.

3.2. The Effect of the Location of the Host Country's Division of Labor in the Global Value Chain

Based on the existing literature research, the higher the division of labor status of the host country in the global value chain, the stronger its technological ability and innovation ability[16]. This usually means that the country can undertake more complex and high-end production activities in the global division of labor, such as R&D, design and other high value-added links[27].

On the one hand, the higher the status of the host country's division of labor in the global value chain, to some extent, reflects the country's leading ability in the value chain, which enables local foreign subsidiaries to obtain more opportunities for technology extension, enable them to better integrate upstream and downstream resources, promote the value chain position of foreign subsidiaries, improve the operating efficiency of foreign subsidiaries, and accelerate the profit growth of the company's operation[28][29].

On the other hand, the improvement of the division of labor in the global value chain shows that the host country has closer economic ties with other countries, and is more likely to obtain high-quality resources, technology and talent elements through opening to the outside world. It also means that the host country has a better industrial competition environment and a complete supply chain, enabling local foreign subsidiaries to obtain advanced production technology, management experience and market insight, so as to improve their own supply chain management capabilities.

Hypothesis 2: the higher the division status of the host country in the global value chain (the closer to the upstream), the more likely the local overseas subsidiaries will benefit.

3.3. Regional Effect

On the one hand, according to Hofstede's cultural dimension theory, subsidiaries with the same cultural background may face less resistance when entering the host country's market. Then in the global value chain activities, the same cultural background may promote the operation and management, learning advanced technology, business communication and other links of foreign subsidiaries in the host country.

On the other hand, in global value chain activities, when the home country and the host country are on the same continent, it is less difficult for foreign subsidiaries to understand the market and culture of the host country, and the coordination and transaction costs are also less. In

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addition, some scholars pointed out that there may be a regional effect in the process of technology transfer, which is similar to the institutional and cultural environment, which makes it easier for foreign companies to absorb the technology of local companies[30][31].

Hypothesis 3: when the parent company chooses to establish subsidiaries with the host country on the same continent, its overseas subsidiaries can benefit more from the global value chain activities of the host country.

3.4. Role of Local Experience

On the one hand, the establishment of joint ventures with local enterprises in the host country can allow both parties to share the costs and risks of the project, especially in capital intensive activities, the formation of resource sharing is particularly important[20]. The overseas subsidiaries can combine the capital, technology and business capabilities of all parties, enhance the competitiveness of enterprises, and realize complementary advantages and optimal combination. This synergy provides leverage for the joint venture and increases the benefits of the joint venture to the participants[32].

On the other hand, in the global value chain activities, the establishment of joint ventures jointly funded by local enterprises in the host country helps to reduce the threshold of entering difficult markets and countries, and is also conducive to obtaining important local resources and production bases, which is crucial for overseas expansion. In addition, the joint venture may obtain tax relief benefits or other preferential benefits, which has a positive effect on reducing operating costs and increasing profitability.

Hypothesis 4: when the parent company expands overseas, the entry mode of establishing joint ventures with local enterprises can benefit more from the global value chain activities of the host country.

4. Data and Variables

4.1. Data

The data sets we use in our analysis are ORBIS global enterprise database and UIBE global value chain database. The former is an international data set that provides detailed accounting and financial information. It provides the name and location of the shareholder company, which enables us to find the match between the parent company of the multinational company and its subsidiaries in the foreign market; The latter is calculated by UIBE-GVC research institute according to the accounting method proposed by Wang Z and other scholars in NBER for the global value chain participation and division status of major global economies by industry category[15][16]. The time coverage of our dataset is 2010-2021. The specific data download and sorting steps are as follows:

1)Through the holding information of global multinational enterprises provided by ORBIS database, establish the connection relationship between parent company and subsidiaries, and screen out foreign subsidiaries from the association between parent company and subsidiaries. In addition, we can judge whether the parent company's entry mode for overseas expansion is greenfield investment or joint venture with local enterprises based on the proportion of shares held by the parent company in its subsidiaries.

2) Download the financial data and business information of global multinational enterprises through the Orbis database, and then use Stata statistical software to sort out the basic data. We excluded enterprises that did not report any industry, number of employees, operating income and age from the research sample. After the above data collation process, we have created a very large associated data set, including about 61000 foreign subsidiaries from 103 countries from 2010 to 2021.

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3)Then the four digit code of the industry to which the enterprise belongs and the data of the host country's global value chain are merged. Since ADB's core code for industry classification uses the industry classification of WIOD2013 version, which is not consistent with the four-industry code at the enterprise level (the enterprise level industry code provided by ORBIS is NACE2, NAICS2022, US SIC, etc.), this paper establishes the corresponding relationship between the NACE2 code and ADB's industry code classification. After consolidation, the research sample contains a total of 35 industry categories.

4) Through the economies to which the parent company and subsidiaries belong, we have merged the previously processed enterprise data with the data at the national level. We merged the parent-child relationship association data from ORBIS database with the world development index (WDI) of the world bank, which enables us to retrieve variables at the national level.

4.2. Key Variables

Dependent variables:$ROA_{it}$is the return on assets of subsidiary i.The return on assets of a company is defined as the profit rate that the company can create by using funds and loans in a certain period of time, which is widely used to measure the financial profitability of the company[33]. In the robustness test, we chose ROE as a substitute variable for ROA.

Independent variable: As for the measurement of the host country's global value chain index, we retrieved data from the UIBE global value chain database and selected two indicators, $GVCparticipation_{ct}$ and $GVCposition_{ct}$, to measure the host country's participation in the global division of production. The host country global value chain indicators used in this paper are calculated as follows:

GVC participation which indicates that in a certain sector of a country, the greater the relative value of GVC participation, the more active the global value chain production activities of the industry, and the higher the participation of its international production division. Where GVCP_f represents the global value chain participation based on forward linkages, and GVCP_b represents the global value chain participation based on backward linkages[15][16].

$$GVC_participation = \ln(1 + \mathrm{GVCP_f}) - \ln(1 + \mathrm{GVCP_b})$$

GVC position which indicates that in a certain sector of a country, the greater the relative value of GVC position, the closer the industry is to the upstream link, the higher its position in the value chain, and the greater the trade added value it obtains. Where PLv_GVC represents the production length of value chain based on forward decomposition, and PLy_GVC represents the production length of value chain based on backward decomposition[16].

$$GVC_position = \frac{PLv_GVC}{PLy_GVC}$$

Control variables:control variables at the national level this paper selects the host country's economic growth rate, the host country's per capita GDP, the proportion of the host country's exports in GDP and the host country's political environment; Taking the enterprise age, number of employees, capital intensity, per capita sales and other indicators as the control variables at the enterprise level.

4.3. Econometric Model

In the empirical research method, this paper adopts the fixed effect regression model. This paper analyzes the impact of the host country's participation in the global value chain and

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division of labor status on the operating performance of local overseas subsidiaries from a global perspective. Individual and time fixed effects are added to the model. At the individual level of the enterprise, clustering is carried out to avoid the problem of autocorrelation within the group. The empirical model of this paper is as follows:

$$ROA_{it} = \beta_0 + \beta_1 GVC_participation_{ct} + \beta_2 GVC_position_{ct} + \beta_3 lnCapital_{it} + \beta_4 lnSales\ per\ worker_{it} + \beta_5 lnAge_{it} + \beta_6 lnEmployee_{it} + \beta_7 lnGDP\ per\ capita_{ct} + \beta_8 GDPG_{ct} + \beta_9 Export_{ct} + \beta_{10} Political\ stability_{ct} + y_t + a_c + \varepsilon_{cit}$$

Of which, ROA is the operating performance of overseas subsidiaries, GVC participation is the host country's participation in the global value chain, and GVC position is the host country's division status in the global value chain. i, c and t are the company individual, country and time respectively. $y_t$is the time fixed effect, a_c is the individual fixed effect, and ε_{cit} is the random disturbance term.

4.4. Descriptive Statistics

Table 1 gives the descriptive statistics of all key variables used in the analysis, including about 365,523observations in the data sample. The average ROA of these foreign subsidiaries is 0.084, the average roe is 0.188, and the average number of employees of the foreign subsidiaries is 303. On average, they have nearly 22 years of work experience in the host country, the average sales revenue of each employee is 735000 US dollars, and the average total capital is about 13.4 million US dollars.

Table 1. Descriptive statistics

Variable	Obs	Mean	SD
ROA	365523	0.084	0.123
ROE	365523	0.188	0.285
GVC participation	365523	0.059	0.105
GVC position	365523	0.983	0.106
Number of employees	365523	303.667	2997.343
Capital(US$ 000 000)	365523	13.389	186.021
Age	365523	22.761	17.613
Sales per worker(US$ 000 000)	365523	0.735	6.238
Political stability	365523	0.520	0.388
Gdp_g	365523	0.021	0.038
Export of gdp	365523	0.467	0.195
Gdp_p	365523	30204.738	16035.464
Same continent	365523	0.891	0.312
Entry mode	365523	0.728	0.445

In addition, 89.1% of the parent affiliated observation of these foreign subsidiaries are in the same continent. For the variables measuring the ownership structure of foreign subsidiaries, we found that 72.8% of the 365,523 observations were wholly-owned foreign subsidiaries, and

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the rest were joint ventures.From the perspective of control variables at the national level, the average annual growth rate of the host country's GDP is about 2%, the proportion of exports to GDP is about 46%, the average per capita GDP of the host country is $30204, and the institutional quality of the host country is about 0.52.

In Table 2, we display the variance inflation factor (VIF) values of the key variables included in the analysis. The VIF values of all variables used in the analysis are within the range of [0,5], with an average VIF of approximately 1.43, indicating that there is no significant multicollinearity issue among the variables in the model.

Table 2. VIF values

Variable	VIF	1/VIF
GVC participation	1.060	0.948
GVC position	1.110	0.897
lnNumberofemployees	1.530	0.652
lnCapital	1.630	0.614
lnAge	1.190	0.842
lnSales per worker	1.300	0.767
Political stability	2.050	0.488
Gdp g	1.090	0.916
Export of gdp	1.500	0.668
lnGdp_p	1.880	0.531
Mean	VIF	1.430

5. Empirical Results

5.1. Basis Regression

The benchmark regression results of the impact of the host country's participation in the global value chain and division of labor status on the performance of foreign subsidiaries are shown in Table 3. (1) Column shows the regression results without any fixed effect, and the regression coefficients of the independent variables (GVC participation and GVC position) are significantly positive at the 1% level. This shows that the improvement of the host country's participation in the global value chain and the status of division of labor has a positive impact on the operation of local foreign subsidiaries. (2) Column shows that after we add the individual fixed effect and the time fixed effect and adopt the clustering standard error at the individual level, the significance of the regression coefficient is also significantly positive at the 1% level, and the regression coefficient has not changed significantly, and the R square after model adjustment has increased from 7% to 56%.

Specifically, the performance of foreign subsidiaries will increase by 0.025 for every 1 increase in the host country's participation in the global value chain, indicating that the increase in the host country's participation in the global value chain promotes the improvement of the operating performance of foreign subsidiaries, and the relevant results support hypothesis 1. The performance of foreign subsidiaries will increase by 0.023 when the division of labor status of the host country's global value chain increases by 1, indicating that the improvement of the division of labor status of the host country's global value chain promotes the improvement of

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the operating performance of foreign subsidiaries, and the relevant results support hypothesis 2.

Table 3. GVC and foreign subsidiary profitability

	(1)	(2)
	Model1	Model2
GVC participation	0.058***	0.025***
	(0.002)	(0.007)
GVC position	0.028***	0.023***
	(0.002)	(0.008)
lnNumberofemployees	0.007***	0.023***
	(0.000)	(0.001)
lnCapital	-0.011***	-0.008***
	(0.000)	(0.001)
lnAge	0.006***	-0.020***
	(0.000)	(0.002)
lnSales per worker	0.016***	0.054***
	(0.000)	(0.001)
Political stability	0.009***	0.005***
	(0.001)	(0.002)
Gdp_g	0.184***	0.074***
	(0.005)	(0.010)
Export of gdp	0.009***	0.080***
	(0.001)	(0.010)
lnGdp_p	-0.027***	-0.028***
	(0.000)	(0.004)
Constant	0.212***	-0.296***
	(0.005)	(0.043)
Subsidiary fixed effects	No	Yes
Year fixed effects	No	Yes
cluster	No	Yes
No. observation	365523	365523
F statistics	2756.528	263.258
Adjusted R-squared	0.070	0.560

Notes: Significance levels: *: 0.10; **: 0.05; ***: 0.01.

In Table 4, (1) the reference regression including all observations is listed; (2) The table shows the observations of the parent company and foreign subsidiaries on the same continent; (3) The table shows the observations of parent companies and foreign subsidiaries on different continents. From the regression results, when the parent company and foreign subsidiaries are on the same continent, the higher the participation and division of labor status of the host

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country in the global value chain can still have a positive impact on the performance of local foreign subsidiaries, and it is still significant at the significance level of 1%. However, when the parent company and the foreign subsidiary are located in different continents, the significance of the above promotion effect will decline or even not significantly. This result can support hypothesis 3.

Table 4. GVC and foreign subsidiary profitability- role of local experience

	(1)	(2)	(3)
	All	Same Continent	Different Continent
GVC participation	0.025***	0.022***	0.037*
	(0.007)	(0.008)	(0.022)
GVC position	0.023***	0.023***	0.009
	(0.008)	(0.008)	(0.021)
lnNumberofemployees	0.023***	0.023***	0.028***
	(0.001)	(0.001)	(0.003)
lnCapital	-0.008***	-0.009***	-0.006***
	(0.001)	(0.001)	(0.002)
lnAge	-0.020***	-0.022***	-0.005
	(0.002)	(0.002)	(0.005)
lnSales per worker	0.054***	0.055***	0.047***
	(0.001)	(0.001)	(0.002)
Political stability	0.005***	0.005***	0.001
	(0.002)	(0.002)	(0.004)
Gdp_g	0.074***	0.074***	0.048
	(0.010)	(0.011)	(0.032)
Export of gdp	0.080***	0.072***	0.111***
	(0.010)	(0.011)	(0.037)
lnGdp_p	-0.028***	-0.028***	-0.014
	(0.004)	(0.004)	(0.011)
Constant	-0.296***	-0.293***	-0.460***
	(0.043)	(0.047)	(0.127)
Subsidiary fixed effects	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes
cluster	Yes	Yes	Yes
No. observation	365523	325513	39964
F statistics	263.258	220.317	44.632
Adjusted R-squared	0.560	0.557	0.582

Notes: Significance levels: *: 0.10; **: 0.05; ***: 0.01.

In Table 5, (1) the reference regression including all observations is listed; (2) The list shows that the parent company chooses the entry mode of Greenland investment, that is, the foreign

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subsidiary is a wholly-owned enterprise under the parent company; (3) The list shows the entry mode that the parent company chooses to jointly invest with local enterprises in the host country to establish foreign subsidiaries. From the regression results, when the entry mode is to establish a joint venture with a local company, the independent variable has a stronger impact on the dependent variable (β=0.041>0.025>0.017), and the result is more significant (P<0.01). When the entry mode is green space investment, the independent variable will still have the above influence on the dependent variable, but the influence coefficient becomes smaller, and the significance decreases or even is not significant. In addition, we found an interesting phenomenon. After classifying the enterprises in the research sample according to the entry mode, joint ventures accounted for 27% of all foreign enterprises, but the impact coefficient increased instead of decreased, which showed that joint ventures were more strongly affected in the impact utility proposed in this paper. This result can support hypothesis 4.

Table 5. The role of foreign market entry mode on the GVC effect

	(1)	(2)	(3)
	All	WOS	Joint Venture
GVC participation	0.025***	0.017*	0.041***
	(0.007)	(0.009)	(0.013)
GVC position	0.023***	0.015	0.039***
	(0.008)	(0.009)	(0.014)
lnNumberofemployees	0.023***	0.022***	0.028***
	(0.001)	(0.001)	(0.002)
lnCapital	-0.008***	-0.008***	-0.010***
	(0.001)	(0.001)	(0.001)
lnAge	-0.020***	-0.021***	-0.018***
	(0.002)	(0.002)	(0.004)
lnSales per worker	0.054***	0.054***	0.054***
	(0.001)	(0.001)	(0.002)
Political stability	0.005***	0.002	0.010***
	(0.002)	(0.002)	(0.003)
Gdp_g	0.074***	0.069***	0.084***
	(0.010)	(0.012)	(0.019)
Export of gdp	0.080***	0.088***	0.059***
	(0.010)	(0.013)	(0.019)
lnGdp_p	-0.028***	-0.027***	-0.030***
	(0.004)	(0.005)	(0.007)
Constant	-0.296***	-0.299***	-0.291***
	(0.043)	(0.052)	(0.077)
Subsidiary fixed effects	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes
cluster	Yes	Yes	Yes
No. observation	365523	266118	99405
F statistics	263.258	192.632	74.046
Adjusted R-squared	0.560	0.550	0.587

Notes: Significance levels: *: 0.10; **: 0.05; ***: 0.01.

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5.2. Endogeneity Test and Robustness Test

5.2.1. Endogeneity Test

In order to solve the endogenous problem caused by the potential causal relationship between the host country's participation in the global value chain and the location of division of labor and the performance of foreign subsidiaries, this paper uses the instrumental variable method for econometric estimation. On the one hand, the international investment activities brought by foreign subsidiaries may promote the number of local participation in the international division of labor and increase the participation of the region in the global value chain; On the other hand, the production and operation of foreign subsidiaries in the host country can transfer the advanced technology brought by their home country to the host country, resulting in reverse technology transfer effect, which has a positive impact on the production capacity and R&D technology progress of local enterprises, so as to enhance the division position in the global value chain of the host country[34].

Table 6. Endogenous test

	(1)	(2)	(3)
	GVC participation	GVC position	ROA
l_GVC participation	0.529***	-0.024***	
	(0.005)	(0.003)	
l_GVC position	0.005*	0.474***	
	(0.003)	(0.004)	
hhi	0.602**	-0.887**	
	(0.255)	(0.391)	
GVC participation			0.031**
			(0.016)
GVC position			0.071***
			(0.018)
Obs	275575	275575	275575
F	4672.513	4672.513	181.804
R^2			0.060
Kleibergen—Papp rk LM			3530.475 [0.000]
Kleibergen—Papp Wald rk F			4672.513 {13.43}
Hansen J statistic			0.278 [0.60]

Notes: (1) Significance levels: *: 0.10; **: 0.05; ***: 0.01. (2){ } is the cut-off value at the 10% level of the Stock-Yogo test. (3) [ ] is the P-value corresponding to the instrumental variable test.

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In order to alleviate this problem, this paper refers to the practice of Fernandes and other scholars, and uses instrumental variable method (IV) for regression analysis[35]. This paper takes the participation of global value chain, the lag term of global value chain division(l_GVC participation, l_GVC position) and industry intensity (HHI) as the current tool variables. The model has passed the unidentifiable test, weak instrumental variable test and Hansen over identification test. The regression results are shown in columns (1) and (2) of table 6. The first stage regression results are shown in columns (3) of table 6. At the same time, we also reported the results of LM Test and C-D Wald F test, which showed that there was neither weak nor excessive identification of instrumental variables. This indicates that the tool variable is valid. Comparing the empirical results of using instrumental variables to mitigate endogeneity with the baseline regression results, it can be seen that after considering the endogeneity problem, GVC participation and GVC position still have a significant positive impact on the coordination of the performance of foreign subsidiaries at the levels of 5% and 1%. This further verifies the reliability of the fixed effect model regression results, indicating that the results are not affected by endogenous.

5.2.2. Robustness Test

Table 7. Robustness test

	(1)	(2)	(3)
	Model1	Model2	Model3
GVC participation	0.025***	0.047***	0.018**
	(0.007)	(0.017)	(0.007)
GVC position	0.023***	0.033*	0.023***
	(0.008)	(0.018)	(0.008)
lnNumberofemployees	0.023***	0.055***	0.021***
	(0.001)	(0.002)	(0.001)
lnCapital	-0.008***	-0.031***	-0.008***
	(0.001)	(0.002)	(0.001)
lnAge	-0.020***	-0.131***	-0.019***
	(0.002)	(0.005)	(0.002)
lnSales per worker	0.054***	0.131***	0.051***
	(0.001)	(0.003)	(0.001)
Political stability	0.005***	0.011***	0.007***
	(0.002)	(0.004)	(0.002)
Gdp_g	0.074***	0.209***	0.028*
	(0.010)	(0.025)	(0.016)
Export of gdp	0.080***	0.149***	0.079***
	(0.010)	(0.024)	(0.011)
lnGdp_p	-0.028***	-0.026***	-0.032***
	(0.004)	(0.009)	(0.004)
Constant	-0.296***	-0.745***	-0.216***
	(0.043)	(0.100)	(0.047)
Subsidiary fixed effects	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes
cluster	Yes	Yes	Yes
No. observation	365523	365523	316556
F statistics	263.258	332.449	222.487
Adjusted R-squared	0.560	0.480	0.566

Notes: Significance levels: *: 0.10; **: 0.05; ***: 0.01.

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In order to verify the robustness of the benchmark regression results, this paper will conduct the following robustness tests: first, replace the dependent variable with roe. The test results are shown in column (2) of table 7. The regression coefficients of the host country's participation in the global value chain and the division of labor in the global value chain on the performance of overseas subsidiaries are significantly positive at the levels of 1% and 10%. Secondly, delete the year of special cases to avoid the impact of emergencies on the regression model. For example, excluding 2010 affected by the global financial crisis in 2008, and 2020 affected by the new crown epidemic. The test results are shown in column (3) of table 7. The regression coefficients of the host country's participation in the global value chain and the division of labor in the global value chain on the performance of overseas subsidiaries are significantly positive at the levels of 5% and 1%. These results are consistent with the benchmark regression results in column (1) of table 7, which indicates that the results are reliable.

6. Conclusion

The purpose of this study is to explore the relationship between the division of labor status and degree of participation of the host country in the global value chain and the operating performance of local overseas subsidiaries. In terms of research methods, this paper uses the fixed effect panel regression model to conduct in-depth analysis of the above hypotheses. The results show that the increase of host country's GVC participation and the improvement of host country's GVC position both improve the financial performance (ROA) of foreign subsidiaries. Moreover, this positive return is also affected by the differences in local knowledge and entry mode strategies of foreign subsidiaries. These results provide an important basis for us to deeply understand how the host country market affects the operating performance of foreign subsidiaries.

Theoretically, this paper discusses the impact of global value chain activities on enterprises in the industry from the industry level. From the perspective of industry level, this paper discusses whether different countries (or regions) 'participation in the global value chain and division of labor position have radiation effects on multinational enterprises in the industry. In addition, this paper extends the research dimension to the global perspective. At present, most of the existing literatures discuss the impact of the relevant indicators of the global value chain of a single country on the company, and do not rise to the level of overseas subsidiaries. Therefore, based on the existing literature, this paper expands the research design to the level of the host country and overseas subsidiaries, and discusses whether the host country's global value chain activities and the level of its participation in the international division of production have an impact on the local overseas subsidiaries. This study provides a new perspective and ideas for the further development of foreign subsidiary management theory.

Nevertheless, this paper still has the following limitations. First, this paper does not discuss in depth whether the participation and division of labor status of the host country in the global value chain will also have an impact on the peer sister companies of foreign subsidiaries, as well as the possible transmission effect. Second, although this paper discusses the impact of the same continent of parent company and subsidiary company on the above effect from the perspective of local experience, it does not start from the perspective of cultural distance. Third, this paper does not introduce the differences between the development level of enterprise digital economy and the development level of national digital economy into the analysis model. Based on the above discussion, combined with the rapid development of high and new technologies such as artificial intelligence, metauniverse, blockchain and Internet of things in the world, it is suggested to further deepen the research and practical exploration in digital economy and digital technology.

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