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The Impact of Reverse Cross-Border Mergers and Acquisitions in Emerging Countries on the Division Position in the Global Value Chain: A Systematic Framework of the Third Country Effect

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Abstract: The purpose of this paper is to build a systematic framework of the spatial spillover effects of host country heterogeneity, and to illustrate the impact of the third country effect of reverse cross-border mergers and acquisitions in emerging countries on the division position in the global value chain. We develop a composite index to measure the gap in the global value chain position, and use the ADB-MRIO database in UIBE GVC from 2010 to 2019 to conduct an empirical test, which includes 27 sample countries. The spatial modeling results suggest that both the third country effect of reverse cross-border mergers and acquisitions and the direct effect of forward cross-border mergers and acquisitions are conducive to narrowing the gap in the division position in the global value chain of China, as well as the host country. Therefore, reverse cross-border mergers and acquisitions should develop the export platform based cross-border mergers and acquisitions, while forward cross-border mergers and acquisitions are suitable for choosing the destination countries directly. An interesting insight shown by the spatial and temporal heterogeneity test is that the narrowing effect of cross-border mergers and acquisitions on the gap in the division position varies with time and space. There is also a trend of increasing convergence and spatial differentiation, and the change of this spatial spillover effect may be closely related to the bilateral relations between countries. The model of the third country effect with spatial heterogeneity affirms the spatial impact of host country heterogeneity, and provides empirical evidence for cross-border mergers and acquisitions based on export platforms.

Keywords: reverse cross-border mergers and acquisitions; division position; economic system; third country effect; emerging countries

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1. Introduction

Multinational corporations play an increasingly important role in the global value chain and promote the sustainable development of the open economy. In contrast to the traditional internationalization model, these corporations are involved in a large number of transactions in which emerging multinational corporations acquire developed economies [1]. Reverse cross-border (M&As) based on knowledge seeking have become a popular topic in international business research [2]. Cross-border M&As in the Chinese context have shifted from traditional resource and financial industries to high-tech and high value-added knowledge-intensive industries [3]. Reverse cross-border M&As are different compared to traditional M&As [4]. For example, most types of M&As follow the pattern of a weak enterprise merging with a strong enterprise or, more poetically, a snake swallowing an elephant [5,6]. Developing new knowledge resources in developed countries via M&As can transfer knowledge back to the parent company to create synergies [7], making M&As a strategic springboard for expanding overseas and adopting new, more advanced technologies through the process, allowing them to quickly catch up or even

overtake others in their sector, which plays an important role in enterprise innovation and the sustainable development of China's open economy [8].

As the primary practice of outward foreign direct investment (OFDI), cross-border M&As are an important bridge for direct participation in global value chains to establish inter-country value chain linkages, as well as an important means of improving their division position in the global value chain [9]. Integration into global value chains (GVCs) provides opportunities for economic development, but the extent and nature of these opportunities differ across countries [10]. The current research focuses on the bilateral relationship framework from the perspective of the spatial relationship between countries, and the interdependence of the global value chain reflects the interaction between countries in the geographical space through the supply and demand spillover mechanism of the supply chain. The OFDI of the host country may depend on the foreign direct investment (FDI) of neighboring countries, however this spatial interdependence has been largely ignored by the FDI literature [11]. The neighboring regions of a host country have an impact on the factor market and product supply and demand of the host country, and affect the investment environment of the host country with different spatial weights; that is, there is a third country effect [12]. Meanwhile, the failure to consider space spillover effects may lead to biased parameter estimations of the determinants of bilateral foreign direct investment [13]. To avoid the above errors, when considering the spillover effect of international direct investment in the third country, we must begin by understanding the geographical space and introducing the spatial interrelationship into OFDI decisions.

The literature on the third country effect mainly focuses on the discussion of the third country effect of complex FDI or the relevance of spatial linkages between different host countries [14–16]. Most of the literature supports the third country effect of FDI, however, the heterogeneity of the home and host countries and their relationship determine the "crowding out" or complementary effect. FDI stock in neighboring areas of the host country will cause FDI agglomeration, and the purpose of foreign investment is to sell products to a third country. Third countries of vertical composite FDIs largely show complementary effects [17]. Experience has shown that there is a competitive substitution effect among European countries that attract FDI from American enterprises, which has export platform motivation, and the third country effect has become a decisive factor in attracting FDI [12]. Chinese studies have also affirmed that OFDI in countries involved in the Belt and Road Initiative has a significant crowding-out effect in the third country, while China's FDI in developed countries as a whole has not shown this effect [18,19]. FDI evidence in Vietnam shows that the distance between domestic and foreign enterprises affects the spatial spillover effect of productivity; as the distance between enterprises increases, the productivity spillover effect decreases. However, in the short term, the presence of foreign companies will produce positive backward, negative forward, and horizontal spillover effects [20].

Some literature has questioned the third country effect of the host country and suggested that the spatial spillover effect of FDI between regions does not exist. For example, China's OFDI in 61 countries from 1993 to 2008 tended to be a complex model, but did not show the third country effect. Moreover, high-level economic integration was not conducive to China's OFDI level, and political risks in the host country had a negative impact on OFDI while cultural distance and market size had a positive impact [21]. Similar literature, such as Driffield (2006), identified the externalities and spatial spillover effects of interregional FDI, and found that the spillover effects of FDI on enterprise productivity existed in local industries, and that FDI has no interregional spillovers [22].

Prior research on the third country effect of foreign direct investment has been affirmed by most literatures, which highlights that the type of foreign direct investment is an important factor that affects the third country effect—that is, the complementary effect or the substitution crowding-out effect, thus affecting the geographical investment decisions of FDI. A few literatures have not captured the third country effect, owing to micro-factors such as the distance between domestic and foreign companies [16], cultural distance [19],

and upstream and downstream knowledge transfer [23]. Extant research focuses more on export-platform FDI, which highlights that the third country effect is one of the decisive factors to attract FDI. However, the above research has not observed that the third country effect may be related to the host country heterogeneity, which means that the difference between the home country and the host country is the macro gap manifestation between the two companies. Our system framework therefore explores the third country effect as an antecedent of the host country heterogeneity.

In addition, although the current reverse cross-border M&As have attracted scholars' attention, the third country effect of cross-border M&As is rarely discussed in the literature, especially the impact of the third country effect of different types, namely, reverse cross-border M&As and forward cross-border M&As, on the division position in the global value chain. The purpose of this paper is to build a system framework of the third country effect of host country heterogeneity, to capture the third country effect of the reverse cross-border M&As in emerging markets, so as to clarify the spatial spillover effects of different types of cross-border M&As, and to provide a basis for the geographical investment decisions of cross-border mergers and acquisitions under the three-country framework.

These findings contribute to the existing literature in several aspects. First, this is a pioneering effort to provide a systematic framework for spatial spillover effects in the host country heterogeneity based on the division position; we examine the third country effect of both reverse cross-border M&As and forward cross-border M&As, aiming to reveal their impact on the division position in the global value chain. The regression results indicate the empirical evidence for the export platform based cross-border M&As, which expand the export platform based OFDI literature. Moreover, the host country source of spatial effects and the type of cross-border M&As can explain the arguments regarding the third country effect existence in OFDI. Second, to remove the overestimation error in resource-rich countries on the division position, and by employing the value chain participation rate to the correct global value chain position index, we develop a composite index to measure the gap in the relative division position between a country and other trading countries, which has improved reliability. Third, unlike the WIOD database, we use the ADB-MRIO database in UIBE GVC which covers 17 Asian and Oceanian countries to reflect the status of emerging markets' participation in the global value chain, which expands the literature on emerging countries' participation in global economic links. Fourth, by employing the Mean Observation Ordinary Least Squares (MO-OLS) estimation method, the spatial heterogeneity is used to further confirm the spatial impact of heterogeneity in host countries, and supplement the literature on the third country effect of OFDI.

The remainder of this article is structured as follows: the next section presents our literature review and research hypotheses; the third section describes the exploratory spatial correlation analysis carried out of the division position in the global value chain; the fourth section builds a spatial econometric model and methods; the fifth section presents an analysis of the empirical results; the sixth section presents the results of a further test of the spatial and temporal heterogeneity; and the final section presents the implications of our findings and our conclusion.

2. Review and Research Hypothesis

2.1. The Direct Impact of Cross-Border M&As in Emerging Countries on the Division Position in Global Value Chains

Cross-border M&As are an important way to enhance an enterprise's division position in the global value chain [24]. As latecomers or new participants, the transnational corporations of emerging countries establish links with the leaders of developed countries through M&As, obtaining valuable resources through the influence of the leverage effect, and building their own competitive advantage via interactive learning [25]. Although they lack ownership advantages such as brand recognition or technology, these new participants may establish non-technical comparative ownership advantages through the pull effect, resource acquisition, and the technological spillover effect of the internationalization process.

Empirical evidence showed that, compared with traditional transnational enterprises in developed countries, transnational corporations in China and India have a complementary combination of relative ownership advantages [26]—that is, country-specific advantages based on differences in industry factor endowments and enterprise-specific advantages based on capacity structure. Through the internalization or interaction between enterprises and country-specific advantages, corporations are able to integrate technology, organizational structures, and management resources at both national and company levels, and obtain the privileges, resources, and low-cost labor pool of the high growth market. These specific advantages have helped China and India's transnational corporations improve their division position in the value chain, and establish their comparative ownership advantages through internalization [27,28]. Chinese companies have acquired British Time Electric Dynex through the merger and integration of industrialization technology innovation to achieve so-called "late superiority" [29].

Technology spillover is an important mechanism for cross-border M&As to affect an organization's position in the global value chain. Overseas cross-border M&As can significantly improve the division position in a home country's global value chain. Technology effect and human capital improvements are important ways that cross-border M&As can rise in their global value chain position [30]. They can significantly narrow the gap or even result in common progress between the global value chain positions of home countries and their destination/host countries. In technology-intensive industries, FDI has the greatest impact on the position in the global value chain, with the most obvious technological spillover effect [31]. Direct knowledge transfer from the target company to the acquirer can result in technology synergy [32]. However, knowledge distance is an obstacle to the absorption of knowledge in the global value chain. The absorptive capacity of enterprises is the result of the interaction between absorptive resource and development (R&D) and the cognitive distance of voluntary and involuntary knowledge spillovers [33]. The distance between home and host countries will have a negative impact on cross-border M&A performance [34], while high knowledge distance will affect the acquisition and internalization of technological knowledge in the value chain cooperation of enterprises, and hinder the improvement of enterprises' innovation capability [35]. At the same time, developed countries, as the core areas of technology and regions with large market potential, have high-quality labor pools, but while they can obtain economic externalities such as infrastructure and support policies [36], the high costs and relatively fierce market competition in these regions tends to have a crowding-out effect on low productivity enterprises [37]. Whether an enterprise can obtain benefits higher than the market costs depends on the two effects of agglomeration externality and competition crowding. That is to say, in the process of expanding internationally, transnational corporations face the negative impact of the liability of foreignness [38]. New participants need to invest substantial amounts when they are unfamiliar with the political and economic systems of the host country to obtain effective market information [39].

Cross-border M&As in emerging markets are shown to obtain strategic resources through a space springboard, and to improve their technological innovation capability and value chain division position through the international linkage mechanism, the localized learning effect, and the internalized technology spillover effect. However, if reverse cross-border M&As choose core areas such as developed countries, there may be barriers to technology distance absorption and a crowding-out effect in large markets and, in the short term, they may face limited technological spillovers and a greater liability of foreignness. When cross-border M&As occur in the direction of a developing country or other marginal areas, the liability of foreignness is relatively small, which is conducive to integrating heterogeneous market knowledge, and the sharing of technical knowledge with other local countries may promote their technological progress and division position. Therefore, this paper proposes the following hypothesis:

Hypothesis 1 (H1). *Cross-border M&As in emerging countries are conducive to narrowing the gap between the home country and the host country in their division positions in the global value chain, but the direct effect is more likely to occur in the host country with a low-value chain.*

2.2. Third Country Effect of Cross-Border M&As on the Division Position in the Global Value Chain

There is limited literature on the third country effect of cross-border M&As, and existing research has focused primarily on the third country effect of OFDI, namely spatial externality. The core-periphery theory of new economic geography attributes spatial externalities to the forward and backward correlation effects between the supply and demand of intermediate goods, namely the local market amplification effect, the price index effect, and the market-crowding effect [40]. These first two have a spatial agglomeration effect, while the latter produces a crowding-out effect of spatial dispersion. Whether the spatial spillover effect is positive or negative depends on the comprehensive influence of the complementary effect, the competitive effect, and the substitution effect of spatial proximity. If the third country located near the host country and the host country itself both play the role of demander or supplier in the value chain together, they will collectively squeeze the home country market to form a competitive relationship, and the third country effect becomes characterized by a crowding-out or substitution effect [41,42]. If the third country and host country have upstream and downstream relationships in the value chain, however, there is a gradient difference in their division position in the value chain, and the third-party effect is complementary [43,44], making it conducive to improved performance.

Empirical research showed that in China's FDI, third countries play an increasingly important role in China's OFDI in the host country [18]. China's OFDI in the host country significantly enhances China's value chain relevance with the host country, as well as its value chain division position relative to the host country. At the same time, the value chain construction effect and the value chain division position improvement effect generated by OFDI generates a space spillover effect, and this will be more significant in the Belt and Road Initiative regions [9]. OFDI among emerging economies is complementary [45], which is often expressed as export-platform OFDI [46]. Reverse cross-border M&As have the characteristics of technology knowledge sharing and knowledge transfer, which may produce both complementary effects and learning effects through the forward and backward linkages of intermediate products between neighboring countries. This in turn will lead to positive spatial spillovers in the upstream and downstream links between the host country and the neighboring third countries' value chains [12,15,47]. Based on this, this paper proposes the following:

Hypothesis 2 (H2). *The cross-border M&As in emerging countries to neighboring countries of the host country may narrow the division position gap between the emerging country and the host country, but this third country effect may occur in the host country with a high-value chain.*

The Figure 1 showed the systematic framework of the third country effect.

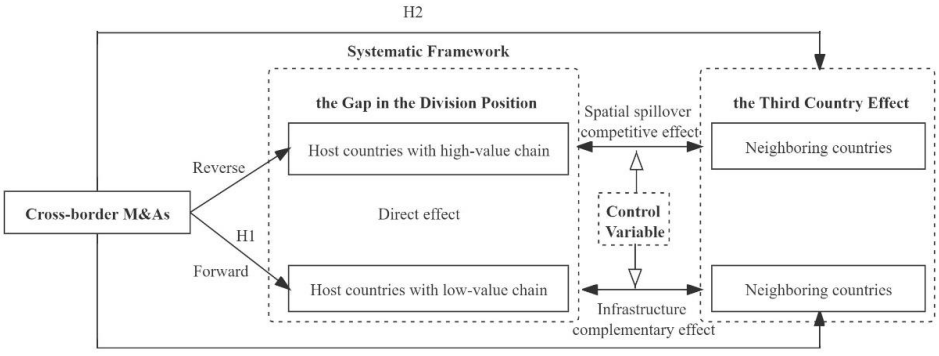


Figure 1. Systematic framework of the third country effect.

3. Exploratory Spatial Correlation Analysis of the Division Position in the Global Value Chain

3.1. Evolution Characteristics of the Global Spatial Correlation Pattern

In this paper, Geoda software was used to calculate Moran's I index and Geary's C index of the international division position gap from 2010 to 2019 by using a country distance matrix and an adjacency matrix to capture the spatial autocorrelations of international division positions between countries; the results are shown in Table 1. The data shows that the two types of spatial weight matrix indexes were significantly positively correlated, with the largest in 2016, and decreasing in 2018 and 2019. Meanwhile, the Geary C index value is significantly less than 1, indicating that there is a significant spatial interaction between the international division position gap among countries. After 2016, the spatial dependency relationship decreased, with the lowest occurring in 2019, which may be related to the impact of the economic decoupling between the United States and China.

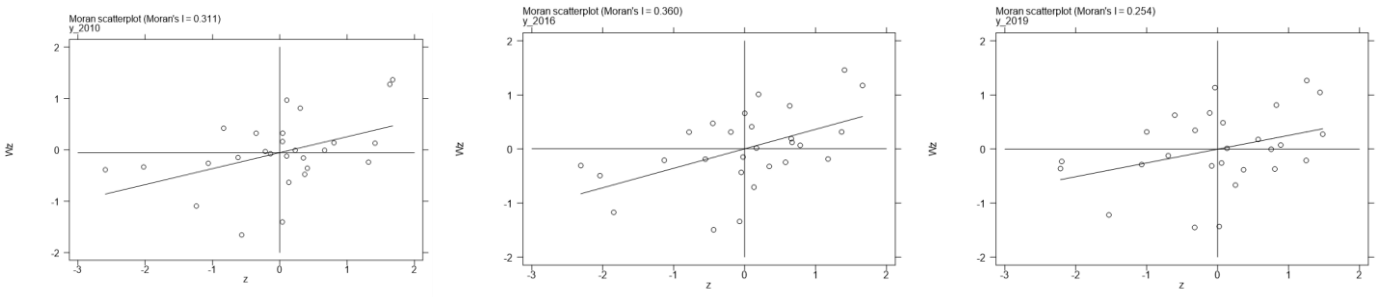
Table 1. Spatial correlation analysis for relative division position gap.

Year	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Moran's I	0.31 *	0.32 *	0.34 **	0.32 *	0.32 *	0.36 **	0.36 **	0.34 **	0.27 *	0.25 *
Geary's C	0.68 **	0.67 **	0.65 **	0.67 **	0.67 **	0.63 **	0.64 **	0.67 *	0.75 *	0.77 *

Notes: * Indicates significance at the 10% level. ** Indicates significance at the 5% level.

3.2. Evolution Characteristics of the Local Spatial Correlation Pattern

Scatter maps are drawn of the local Moran's I of the geographical distances of cross-border M&As in 2010, 2016, and 2019, as seen in Figure 2. The figure shows that the gap between a country's division position and its neighboring countries were characterized as "high-high" and "low-low" agglomerations (i.e., the linear slope is positive). Scatter points in the first and third quadrants are relatively concentrated. After 2016, they shifted from the first quadrant to the second and fourth quadrants, indicating a positive spatial correlation between the international division position of many countries. However, the spatial dependence weakened with time, and the agglomeration shifted from "high-high" to either "low-high" or "high-low".

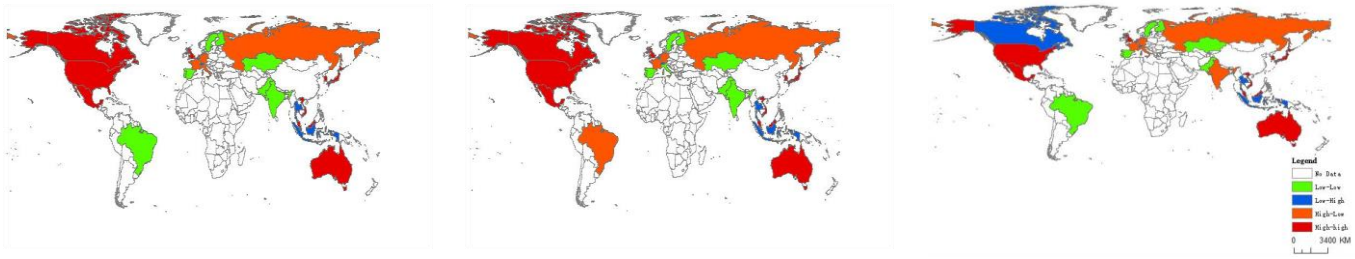


(**2010**) (**2016**) (**2019**)

Figure 2. Local Moran's I scatterplots for the division position.

To visualize the spatial distribution and evolution of the "high-high" and "low-low" agglomerations of the international division position gap between countries, the spatial distribution evolution maps in 2015, 2017, and 2019 are drawn, as shown in Figure 3. In 2017, the number of "high-high" cluster countries is the largest, as they expand from Mexico, the United States, Nordic, and Western European countries to the surrounding areas, while the number of "low-low" cluster countries expand from Eastern Europe and South Asia to their surrounding countries, and the spatial spillover effect becomes increasingly stronger over time. Countries with negative spatial correlations are distributed mainly in Eastern Europe, Africa, and Southeast Asia, which indicates that the division position among these countries is quite different. In 2019, the "high-high" agglomeration in North and South

America decreased significantly, while the "low-high" agglomeration increased, and the spatial dependence of "high-high" agglomeration weakened.



(**2015**) (**2017**) (**2019**)

Figure 3. Spatial distribution evolution with "high-high" and "low-low" agglomerations.

4. Discussion

4.1. Identification and Selection for Spatial Metrological Models

According to the test method of Elhorst (2014), this paper conducts the LM test for the existence of spatial effects, the LR test and Wald test for the selection of spatial models, and the Hausman test for fixed effects. Both the global Moran index and the local Moran index above indicate that there are positive and significant spatial spillover effects in the gap of the international division position. In order to further test whether the spatial lag model (SAR) or the spatial error model (SEM) is more suitable than the non-spatial effect model, the LM test and Robust LM test are conducted first. The results suggest that both types of models pass the test at the 1% level of confidence, indicating that the spatial effect model is more suitable than the ordinary model. Secondly, the LR test and Wald test are conducted to determine whether the spatial Dubin model (SDM) degenerated into the spatial lag model (SAR) and the spatial error model (SEM). The results suggest that the LR test rejects the SDM model degenerated into the SAR and SEM models at the 5% level. Therefore, the SDM spatial model is selected in this paper. The fixed effect Hausman test of the SDM model shows that the original hypothesis was accepted at the level of 1%; that is, the random effect is suitable. Based on the above spatial model identification and test, this paper selects the spatial Dubin model (SDM) with random effects for the spatial econometric results analysis, and the spatial weight matrix of economic geography to affirm the robustness.

As LeSage and Pace (2009) pointed out, the spatial Dubin model contains endogenous and exogenous variables of spatial lag [48], which is a suitable framework to capture different types of spatial spillover effects [49]. Not only can it ensure unbiased estimations of model coefficients, but it also avoids imposing restrictions on the scale of potential spatial spillover effects in advance [50]. To investigate the spatial effect differences among the overall sample, as well as specifically on reverse cross-border M&As and forward cross-border M&As, the following spatial panel model was constructed:

$$Gvc\_po_{it} = \rho \sum_{j=1}^{N} w_{ij} GVC\_po_{jt} + \beta_0 Dum_{merge_{it}} + \theta_0 \sum_{j=1}^{N} w_{ij} lnmerge_{it} + \sum_{j=1}^{N} w_{ij} X_{it} + \mu_i + \varphi_t + \varepsilon_{it} \quad (1)$$

In Formula (1), i and j indicate different countries, respectively, t indicates time, and the explained variable is the gap of the division position between countries (*Gvc_po*), which is obtained by referring to the measurement methods of the global value chain position index proposed by Koopman et al. (2010), and using the actual amount of export trade to corrected formula [51] (see the variable measurement for details). ρ denotes the spatial autocorrelation regression coefficient, which indicates the impact of the international division position of the neighboring countries of a country's international division position. If the coefficient is positive, this indicates that the division position of the neighboring countries promotes China's international division position, and vice versa. θ_0 denotes the spatial lag coefficient of cross-border M&As, which indicates the impact of China's

cross-border M&As to the host country's neighboring countries on the gap in the division position. If the coefficient is positive, indicating that cross-border M&As in the neighboring countries may expand the gap in the division position of China as well as the host country, this may help to narrow the gap in the international division position. The core explanatory variable is China's cross-border M&As investment level (*lnMerge*). *Dum_merge* denotes the dummy variable of cross-border M&As, and it takes the value 1 when cross-border M&As are in host countries with a high-value chain (i.e., reverse cross-border M&As) and takes the value 0 otherwise (i.e., forward cross-border M&As). X_{it} denotes the control variable and is the random error term of the model, and μ_i and ψ_t denote the fixed effects in space and time, respectively. $\sum_{j=1}^{N} w_{ij}$ denotes the spatial weight matrix, which is the N-order symmetric matrix. In this paper, the geographic matrix is adopted, and the reciprocal square of the distance is used as the geographic weight matrix element to reflect the closeness of the two spatial units, where $w_{ij} = w_{ji}$, d_{ij} denotes the geographic distance between the country i and country j, where country i refers to China. The spatial geographic matrix is standardized by the eigenvalue, and the proportion between the elements of w_{ij} remain unchanged before and after standardization, while the inverse distance matrix can avoid the loss of economic interpretation due to distance attenuation [52]. The national distance data come from the CPE II database in France. The geographic straight-line distance is calculated according to the longitude and latitude of the capitals of the various countries. The values are calculated as follows:

$$w_{\mathrm{ij}} = \begin{cases} \frac{1}{d_{ij}^2} & i \neq j \\ 0 & i = j \end{cases}$$

The spatial weight matrix is expressed as the following diagonal matrix in the equation:

$$\sum_{j=1}^{N} w_{ij} = \begin{bmatrix} 0 & \cdots & \frac{1}{d_{1N}^2} \\ \vdots & \ddots & \vdots \\ \frac{1}{d_{N1}^2} & \cdots & 0 \end{bmatrix}$$

In Formula (1), the spatial weight matrix element w_{ij} is adjusted according to the total sample, reverse cross-border M&As (i.e., host countries with a high-value chain), and forward cross-border M&As (i.e., host countries with a low-value chain). ρ denotes the endogenous spatial interaction effect, reflecting the spatial dependence between the explained variables, and the positive sign is expected to produce a positive spatial spillover effect. θ_0 denotes the exogenous spatial interaction effect, reflecting the spatial dependence of the explained variable on the explanatory variable, and the expected sign is negative; it would help narrow the gap in the division positions in the global value chain.

4.2. Data Sources

The data of the division position in the global value chain was taken largely from the Asia Development Bank (ADB-MRIO) database in UIBE GVC (2010–2019) (RIGVC UIBE (2010–2019), UIBE GVC Index (Research Institute for Global Value Chains, University of International Business and Economics), http://rigvc.uibe.edu.cn/english/D_E/database_database/index.htm, accessed on 20 October 2022), unlike the World Input-Output Database (WIOD) (covers 43 countries), which includes 62 countries or regions and covers 17 Asian and Oceanian countries, such as Bangladesh, Malaysia, the Philippines, Thailand, and so on, which can better reflect reverse cross-border M&As. China's cross-border M&As flows are taken from the Zephyr database, which is screened to extract the cross-border M&As transaction records of Chinese enterprises between 2010 and 2019. Information regarding the completed M&A projects in transaction status is retained, and matched with the flush database. A total of 35 countries and regions with tax havens or missing data are excluded, including Taiwan, China Hong Kong, Mongolia, Cyprus, Greece, and Kyrgyzstan. Ultimately, the relevant data of 27 countries from between 2010 and 2019

is retained, with 270 observed values. All other control variable data are taken from the World Bank database.

4.3. Variable Measurement

The Interpreted Variable. The gap in the division position (*Gvc_po*) is measured by the relative position index of the global value chain. Koopman et al. (2010) proposed the global value chain position index (see Formula (2)) via the method of decomposing gross exports into value-added trade to measure the value chain division position of a country sector level in the global value chain. The global value chain position index refers to the logarithmic ratio of a country-sector's use of intermediate goods in the exports of other countries to its use of imported intermediate goods in domestic production. If the country-sector lies in the upstream of the supply chain, this indicates that the country-sector mainly provides intermediate products and has a relatively high position in the international division position. If it lies in the downstream, the country-sector largely invests in intermediate products, and its position in the international division position is relatively low. However, this method may overestimate the value chain position of countries with rich resources that participate in the global value chain with primary products, or countries with low participation in the value chain that mainly provide intermediate products. Moreover, two countries may have the same global value chain position index in a specific sector, but their participation in the global value chain is very different. To this end, Koopman et al. (2010) proposed the global value chain participation index (see Formula (3)), and suggest that the two indicators need to be used at the same time to fully describe a country's participation in the global value chain.

This paper is based on the calculation formula of Koopman's country-sector level and Dai Xiang and Song Jie (2020)'s transformation of the country-sector level into a bilateral position index of the country-country level. We employ the participation rate of the value chain (that is, the ratio of one country's participation to that of all countries, see Formula (4)) as the weight to correct the global value chain position index, and build the relative division position index of the global value chain based on the participation rate of the global value chain, as shown in Formula (5). This corrected method is internally consistent with Koopman et al.'s (2010) idea of the comprehensive evaluation of double indicators, which remove the overestimating error of the division position by providing raw materials for countries with rich resource endowments. It also objectively measures the relative position difference between a country and its trading partners in the division position in the global value chain from the bilateral perspective of countries, and simplifies the indicators.

In order to test the credibility of this evaluation index, we compare the measurement results of this index to the relevant literature, such as the global value chain length calculation method of Wang et al. (2017) [53], using the WIOD database, and 86.4% of the results of the countries' division position are consistent with the new evaluation index, so the inconsistent part may come from different databases. (In order to test the scientificity and accuracy of the corrected method, this paper compares the evaluation results with the value chain length measurement method (Wang et al., 2017), which uses the 2014 WIOD database to evaluate the division position of China's global value chain, and the coincidence rate has changed from 52% to 86.4% after the revision. The inconsistency may be due to using the different databases, and the WIOD database covers 43 economies, including only six countries or regions.)

$$GVC\_Po_{ij}{}^{*} = \ln\left(1 + \frac{IV_{ij}}{E_{ij}}\right) - \ln\left(1 + \frac{FV_{ij}}{E_{ij}}\right) \tag{2}$$

$$GVC\_Pa_{ij}^{*} = \frac{IV_{ij}}{E_{ij}} + \frac{FV_{ij}}{E_{ij}} \tag{3}$$

$$GVC\_Pa_{ij} = \left(\frac{IV_{ij}}{E_j} + \frac{FV_{ij}}{E_j}\right) / \sum_i \left(\frac{IV_{ij}}{E_j} + \frac{FV_{ij}}{E_j}\right) * 100\% \quad (4)$$

$$GVC\_Po_{ij} = \ln\left[\left(1 + \frac{IV_{ij}}{E_j}\right) * GVC\_Pa_{ij}\right] - \ln\left(1 + \frac{FV_{ij}}{E_j}\right) \quad (5)$$

Formula (2), *GVC_Poij* is the corrected division position index in the global value chain, which indicates a gap in the division position between country *i* and country *j*. *Ej* indicates the gross exports of country *j*, *IVij* indicates the indirect added value exported by country *j* to country i and then re-exported by country *i*, and *FVij* represents the added value from country *i* included in the exports of country *j*. Here, country *j* indicates China and country i indicates the host country. When $GVC\_Poij > 0$, this indicates that the host country has a higher position in the division position compared to China; that is, it lies upstream in the global value chain. The greater the gap, the higher the host country's division position in the global value chain as compared to China. In other words, China's position in the GVC division is low. When $GVC\_Poij < 0$, this indicates that the host country has a lower position in the division position compared to China, meaning it lies in the downstream. The host country with a high-value chain is denoted by *Gvc_po_h*, and *Gvc_po_l* for the host country with a low-value chain.

Core Explanatory Variables. Cross-border M&As (*lnMerge*) are measured by China's cross-border M&As flows to the host country, reflecting the level of China's cross-border M&As investment in different host countries. Cross-border M&As are conducive to narrowing the gap in the international division position of China as well as the host country, and the expected coefficient sign was negative.

Control Variables. The technology R&D (*Tec*) in the host country is measured by the proportion of the host country's R&D investment in gross domestic product (GDP). The higher the host country's R&D level, the more difficult it is for a country with a large technology gap to absorb knowledge, and the expected sign was positive. The market potential in the host country (*Gdp_ra*) is measured by the proportion of the economic growth scale in the host country according to the GDP. The larger the market potential, the stronger the market scale effect may be, which is more conducive to raising the international division position, whereby the expected sign was positive. The natural resource endowment (*lnRes*) in the host country is measured by using the ratio of the rent of natural resources in the host country to the GDP. The higher the rent of the natural resources in the host country, the greater the value of using those resources. The consideration of natural resources in a host country is conducive to improving China's international division position with respect to the host country, and the expected sign was negative. The host country's transportation infrastructure (*lnTele*) uses the proportion of the number of mobile phones owned per 100 people in the host country to the GDP. The more developed the host country's transportation infrastructure, the lower the transportation and transaction costs, and the more conducive this is to improving the host country's operating efficiency; the expected sign was negative. The host country's market openness (*Open*) is measured by using the proportion of the host country's exports and imports in GDP. The higher the host country's market openness, the more conducive it was to reducing transaction costs and attracting cross-border M&A investment; the expected sign was negative. To avoid heteroscedasticity, the relevant variables are logarithmized. Specific variable measurements and database sources are shown in Table 2.

4.4. Descriptive Statistics

Table 3 reports the descriptive statistical results for the main variables, including the mean, standard deviation, minimum value, maximum value, and number of sample observations. Among them, the mean value of the explained variables is positive, indicating that China's international division position is lower than average (China is used as the zero benchmark), and that the standard deviation of host countries with a low-value chain is greater than that of countries with a high-value chain. The standard deviation of the control

variable of the host country's natural resource endowment is large, and the data show a skewed distribution, which is addressed logarithmically. All other variables conform to the normal distribution.

Table 2. Variable measurement and data source.

Variable	Variable Meaning	Variable Description	Data Sources
Gvc_po	China's division position gap to the host country	Based on the difference of the value chain division position index of the bilateral relationship between countries	ADB-MRIO database in UIBE GVC
lnMerge	Investment level of cross-border M&A	China's cross-border M&A flow to the host country	Zephyr Database
Tec	Technology R&D level of the host country	Ratio of R&D investment in the host country to GDP	World Bank Database
Gdp_ra	Market development potential of host country	Ratio of market growth scale of host country to GDP	World Bank Database
lnRes	Abundance of natural resources in the host country	Ratio of natural resource rent to GDP in host country	World Bank Database
Open	Market openness of the host country	Ratio of exports and imports of host countries to GDP	World Bank Database
lnTele	Infrastructure level of host country	Ratio of mobile phones per 100 people in the host country to GDP	World Bank Database

Table 3. Descriptive statistical analysis for main variables.

Variables	Mean	Standard Deviation	Minimum	Maximum	Observation
Gvc_po	0.297	1.022	−2.298	2.076	270
Gvc_po_h	0.821	0.575	−0.022	2.076	190
Gvc_po_l	−0.947	0.732	−2.298	0.001	80
lnMerge	6.386	3.021	0	12.99	270
Tec	1.680	1.139	−1.077	4.553	270
Gdp_ra	2.783	2.325	−4.057	14.53	270
lnRes	2.837	4.650	0.0017	27.19	270
Open	0.878	0.656	0.228	3.791	270
lnTele	4.763	0.226	4.012	5.227	270

4.5. Correlation Analysis

Table 4 shows the Pearson's correlation coefficients of the main variables. The core explanatory variable cross-border M&As is positively related to the gap in the international division position, and the sign is not as expected and possibly related to host country heterogeneity. In control variables, the technological R&D in the host country is positively related to the gap in the international division position, in line with expectations, whereas the correlation of the market size is not significant, which is inconsistent with our expectations. The correlation coefficients' sign of the other variable, such as the market openness, the natural resources, and the infrastructure, are in line with our expectations.

Table 4. Correlation analysis for population samples of main variables.

	Gvc_po	***lnMerge***	***Tec***	***Gdp_ratio***	***Res***	***Open***	***lnTele***
Gvc_po	1						
lnMerge	0.188 ***	1					
Tec	0.416 ***	0.178 ***	1				
Gdp_ra	0.053	−0.209 ***	−0.352 ***	1			
lnRes	−0.133 **	−0.194 ***	−0.490 ***	0.343 ***	1		
Open	0.110 *	−0.137 **	0.0930	0.248 ***	−0.106 *	1	
lnTele	0.112 *	0.0510	0.192 ***	−0.103 *	0.232 ***	0.340 ***	1

Notes: * Indicates significance at the 10% level. ** Indicates significance at the 5% level. *** Indicates significance at the 1% level.

5. Analysis of Empirical Results

5.1. Model Estimation and Empirical Analysis

Model 1 to 3 of Table 5 show the regression results of the spatial Dubin model of the overall sample, the host countries with a high-value chain, and the host countries with a low-value chain, respectively. After considering the heterogeneity of the host countries, the goodness of fit of the model has significantly improved from 0.033 to 0.467 (host countries with a high-value chain) and 0.189 (host countries with a low-value chain). The regression results show that the gap in the division position in the global value chain has a positive and significant spatial spillover effect. The overall sample spatial lag coefficient passes the test of a 10% confidence level ($\rho = 0.128$, $p < 0.1$), indicating that the division position raised 12.8% for every 1% increase of neighboring countries to a country's international division position, and for low-value chain host countries to 33.1%, whereas this was less pronounced in high-value chain countries.

Table 5. Estimation results for spatial Dubin model.

Independent Variable	(1) Total Sample	(2) Host Country with High Division of Labor Status	(3) Host Country with Low Division of Labor Status
ρ	0.128 *	0.017	0.331 ***
	(1.91)	(0.20)	(4.24)
lnMerge	−0.008	−0.004	−0.011 *
	(−0.19)	(−0.68)	(−1.90)
lnTec	0.087 **	0.287 ***	−0.006
	(2.01)	(4.85)	(−0.130)
lnGdp_ra	0.016 **	0.012 *	0.027 ***
	(2.443)	(1.71)	(3.05)
lnRes	0.009	−0.021 **	0.032 ***
	(1.21)	(−1.98)	(4.23)
lnOpen	0.617 ***	0.303 ***	0.163
	(5.24)	(2.66)	(0.41)
lnTele	0.161	−0.142	0.691 ***
	(1.39)	(−1.15)	(4.36)
$W \times$ *lnMerge*	−0.012 **	−0.014 **	−0.004
	(−2.09)	(−2.08)	(−0.59)
$W \times$ *lnTec*	−0.029	0.050	−0.047
	(−0.48)	(0.56)	(−1.01)
$W \times$ *lnGdp_ra*	−0.001	0.007	−0.01
	(−0.15)	(−0.15)	(−1.10)
$W \times$ *lnRes*	0.015	0.019	−0.008
	(1.18)	(1.24)	(−0.92)
$W \times$ *lnOpen*	−0.243	−0.10	0.508
	(−1.56)	(−0.69)	(1.16)
$W \times$ *lnTele*	0.441 ***	0.432 **	0.001
	(2.64)	(2.39)	(0.01)
sigma2_e	0.019 ***	0.018 ***	0.0090 ***
	(10.98)	(8.89)	(5.60)
N	270	190	80
R^2	0.033	0.467	0.189

Notes: * Indicates significance at the 10% level. ** Indicates significance at the 5% level. *** Indicates significance at the 1% level.

The direct effect of cross-border M&As on both the overall sample and the host countries with a high-value chain has an insignificant negative impact on the gap in the division position, but under the 10% level of the host countries with a low-value chain, cross-border M&As were conducive to narrowing the gap ($\rho = -0.011$, $p < 0.1$). This indicates that China's reverse cross-border M&As are unable directly to narrow the gap between the host countries with a high-value chain and China in the division position,

but forward cross-border M&As are conducive to narrowing the gap between the host countries with a low-value chain as well as China. Based on this, we believe that forward cross-border M&As can promote the division position in host countries with a low-value chain. Thus, Hypothesis H1 was verified.

The third country effect confirms that the spatial spillover effect of cross-border M&As in the overall sample as well as in the host country with a high-value chain has a significant negative impact on the division position gap at the 5% level ($\theta_0 = -0.012$, $p < 0.05$). This indicates that the gap narrows by 1.2% for every 1% increase of cross-border M&As in the neighboring countries to China's division position with the host country, and the narrowing effect is greater in the host country with a high-value chain ($\theta_0 = -0.014$, $p < 0.05$), whereas it was not sensitive in the host country with a low-value chain. Data show that the spatial spillover effect of reverse cross-border M&As is conducive to narrowing the gap between China and the host country of a high-value chain, which demonstrates the competition effect of cross-border M&As in the host country with a high-value chain as well as the neighboring countries. These findings support Hypothesis H2.

Among the control variables in the overall sample, technological distance, market potential, and market openness significantly promote the division position. The technological distance and market openness of the host countries especially played a greater role in promoting high-value chain host countries, but were insignificant in low-value chain host countries. The market potential is positive and significant in both host countries, and the impact effect is greater in host countries with a low-value chain. The natural resources and infrastructure in the host country negatively impact the division position in high-value chain host countries, but positively impact the division position in low-value chain host countries. In general, technological distance, market potential, and market opening are important factors for raising the division position in a host country with a high-value chain, while market potential, natural resources, and infrastructure are vital factors for promoting the division position in a host country with a low-value chain. The spatial spillover effect shows that only infrastructure has a positive spatial spillover effect in the overall sample and high-value chain host countries.

The estimated parameters using the SDM model are unable to directly reflect the intensity of the spatial spillover effect, and as such, when there is a spatial autocorrelation term, the parameter estimates of the variables cannot represent the full effect of the explanatory variables on the explained variables, only the direction and results of the effects. This must be determined on the basis of estimation, so as to obtain the influence of the explanatory variables of the host country on the explained variables (i.e., direct effect) and the influence of the explanatory variables of the neighboring countries on the explained variables (i.e., indirect effect), which is then calculated by partial derivative method [53]. This method is used to calculate the output direct effect, spatial spillover effect, and total effect, as shown in Table A1.

Table A1 (see Appendix A Table A1) reports the estimated results of the direct effects, spatial spillover effects, and total effects of cross-border M&As in the overall sample, as well as in the sample of host countries with a high-value chain and host countries with a low-value chain. The spatial spillover effect of cross-border M&As are negative and significant in Columns one to six of host countries with overall samples and a high-value chain, which one standard deviation increase in the third country effect of reverse cross-border M&As (SD = 0.575, refer Table 3) may narrow the gap in the division position by 0.8% ($\frac{\partial \text{gap}}{\partial \text{v\_merge}} = -0.014 \times 0.575 = -0.008$). In addition, the direct effect of cross-border M&As has a negative and significant impact on the gap in the division position in low-value chain host countries in Columns seven to nine, and one standard deviation increase of cross-border M&As (SD = 0.732, refer Table 3) can raise the host division position in the host country with a low-value chain by 1% ($\frac{\partial \text{gap}}{\partial \text{v\_merge}} = -0.014 \times 0.732 = -0.01$). In general, the impact of China's cross-border M&As on the gap in the division positions is heterogeneous in the host country, which suggests that reverse cross-border M&As should first look for the neighboring countries of the host countries with a high-value chain, and carry out export

platform based cross-border M&As. On the other hand, forward cross-border M&As are suitable for choosing the destination countries to achieve the common rise in the division position with the host country with a low-value chain.

5.2. Robustness Test Based on Weight Matrix of Economic Distance

This paper constructs the economic geography spatial weight matrix using the method of economic geography spatial composite matrix for robustness test. The geographical matrix represents the interdependence and correlation between spatial units, but the global value chain is a systematic economic dependence of countries' participation in global activities, which is closely related to many other non-geographical proximity factors. For reference, we employ the spatial composite weight matrix method of Li, Tan, and Bai (2017) [54], build a spatial weight matrix of economic geography distance, and examine the geographical and economic spatial correlation between countries to further confirm the spatial dependence in the international division position. The specific composite weight matrix W2 is expressed as:

$$W_2 = W_d \mathrm{diag}(\overline{Y}_1/\overline{Y}, \overline{Y}_2/\overline{Y}, \ldots\ldots, \overline{Y}_n/\overline{Y},)$$

where W_d is the spatial geographic weight matrix, $\overline{Y}_i = 1/(t_1 - t_0 + 1)\sum_{t_0}^{t_1} Y_{it}$ is the average GDP per capita of the i country during the study period, $\overline{Y} = \frac{1}{n(t_1 - t_0 + 1)\sum_{i=1}^{n}\sum_{t_0}^{t_1} Y_{it}}$ is the average value of total per capita GDP of sample countries in the study period, and t denotes time.

The robustness test results of the SDM model of the spatial composite weight matrix of economic geography is reported in Table 6. The regression results show that the coefficient sign and significance level do not change; that is, the spatial spillover effect of the international division position and cross-border M&As are significantly stable at the 5% confidence levels. Thus, the conclusions are deemed to be robust and reliable.

Table 6. Robustness test for SDM model based on composite matrix of economic geography.

	(1) Total Sample	(2) Host Country with High Division of Labor Status	(3) Host Country with Low Division of Labor Status
ρ	0.113 *	−0.064	0.332 ***
	(1.73)	(−0.74)	(4.28)
lnMerge	0.001	−0.002	−0.011 *
	(0.04)	(−0.47)	(−2.22)
lnTec	0.080 *	0.284 ***	−0.005
	(1.87)	(4.80)	(−0.13)
lnGdp_ra	0.013 **	0.012	0.027 ***
	(2.08)	(1.58)	(3.09)
lnRes	0.004	−0.025 *	0.032 ***
	(0.43)	(−2.35)	(4.22)
lnOpen	0.625 ***	0.347 ***	0.21
	(5.44)	(2.93)	(0.54)
lnTele	0.219 **	−0.103	0.685 ***
	(1.97)	(−0.85)	(4.32)
$W \times$ *lnMerge*	−0.013 *	−0.013 **	−0.004
	(−2.39)	(−1.96)	(−0.60)
$W \times$ *lnTec*	−0.036	0.071	−0.042
	(−0.56)	(0.71)	(−0.94)
$W \times$ *lnGdp_ra*	0.009	−0.004	−0.01
	(1.02)	(−0.33)	(−1.02)
$W \times$ *lnRes*	0.019	0.013	−0.008
	(1.61)	(0.84)	(−0.96)

Table 6. *Cont.*

	(1) Total Sample	(2) Host Country with High Division of Labor Status	(3) Host Country with Low Division of Labor Status
$W \times lnOpen$	−0.25	−0.106	0.498
	(−1.62)	(−0.55)	(1.17)
$W \times lnTele$	0.491 ***	0.117	−0.005
	(2.98)	(0.62)	(−0.03)
sigma2_e	0.019 ***	0.018 ***	0.009 ***
	(10.98)	(8.84)	(5.61)
N	270	190	80
R^2	0.02	0.479	0.224

Notes: * Indicates significance at the 10% level. ** Indicates significance at the 5% level. *** Indicates significance at the 1% level.

6. Spatial and Temporal Heterogeneity Analysis

To intuitively depict the time-varying relationship of the third country effect of cross-border M&As on gaps in the international division position, a sensitivity analysis diagram of the space-time evolution of the international division position from 2010 to 2019 is drawn, as shown in Figure 4. The impact of China's cross-border M&As in host countries on the gap in the international division position varies with time and space, with 2012, 2015, and 2017 as the main inflection points, and these changes are closely related to the impact of international trade protection on the global economy.

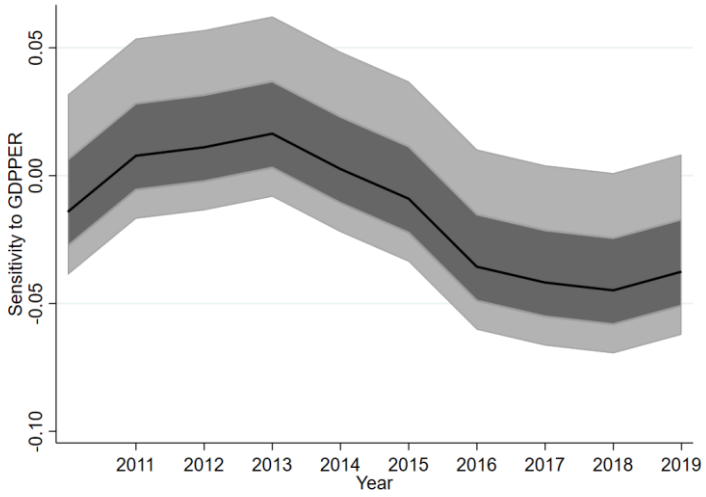
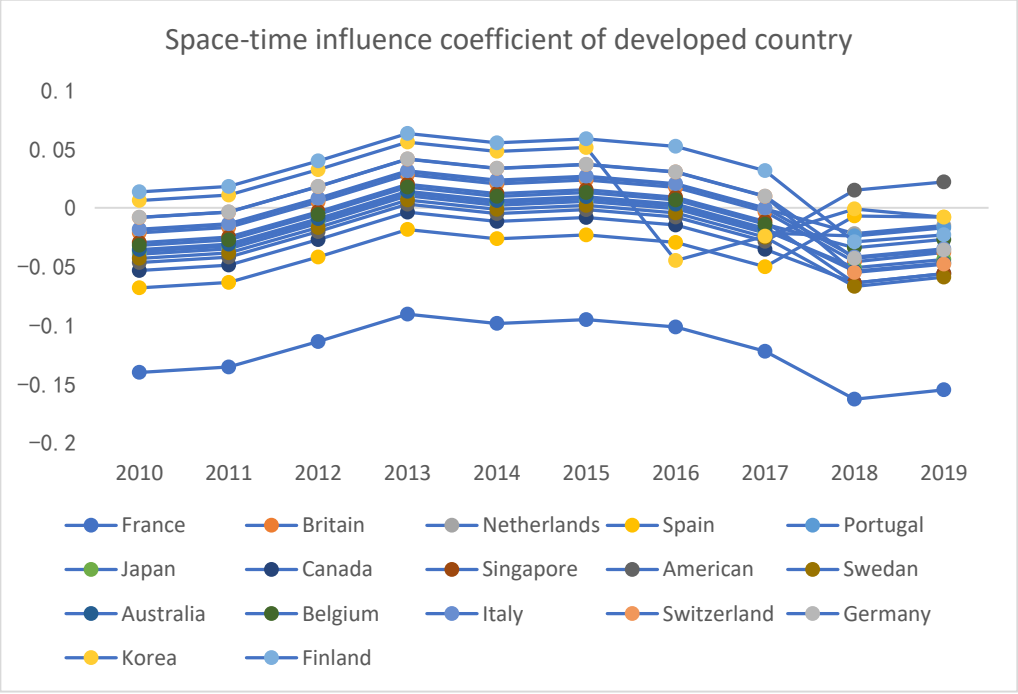


Figure 4. Sensitivity analysis of the impact of M&As on the division position.

Using the Mean Observation Ordinary Least Squares (MO-OLS) estimation method (Keane & Neal, 2020), which estimate panel-data models with unit and time fixed-effects in both intercepts and slopes in large panels, we calculate the impact coefficient of China's cross-border M&As with different host countries on the gap in the international division positions, and rank it in ascending order (the negative sign indicates that it is conductive to narrow the gap between the host country and China in the division position. The greater the coefficient, the more obvious the narrowing effect; while the positive sign indicates that cross-border M&As are beneficial to improve the host country's division position. The greater the coefficient, the stronger the improvement effect on the host country's division position), as shown in Table A2 (see Appendix A Table A2).

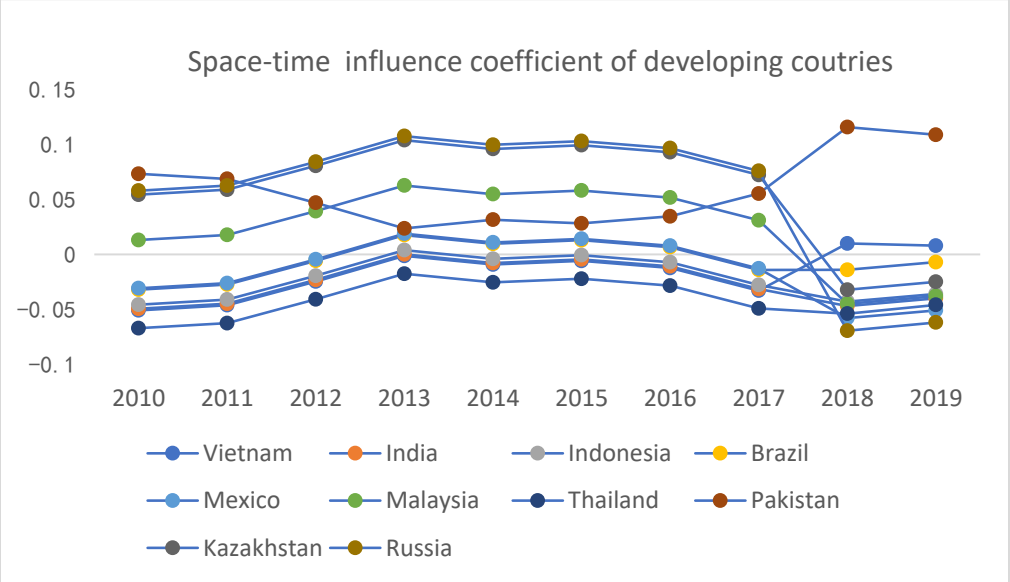
A broken line chart of the impact coefficients of the developed and developing countries is drawn, as shown in Figure 5a,b. An interesting insight shown by the spatial and temporal heterogeneity test is that the narrowing effect of reverse cross-border M&As on the gap of division position varies with time and space, and there is a trend of increasing

convergence and spatial differentiation. The figure shows that the narrowing effect on the international division positions gap of China's cross-border M&As in different host countries has gradually increased, but after 2017, the narrowing effect has converged and shown discrete differentiation. In developed countries, the narrowing effect of the gap between host countries and China in the international division position weaken after hitting the lowest point in 2018. Among them, the United States and Spain rise significantly after hitting the inflection point in 2017, and the United States has an impact on the gap in China's division position shift from a narrowing effect to an expanding effect in 2018 (that is, the impact coefficient changes from negative to positive). We attribute this finding to the conflict and "decoupling" between China's economic and trade relations with the United States. In addition, we also find that France always has the largest narrowing effect, while South Korea and Finland have larger narrowing effects than ever in 2016 and 2017. This shift may be related to the reconstruction and transfer of global value chain relations (see Figure 5a). In developing countries, the impact on the gap of most host countries to China is differentiated after hitting an inflection point in 2017. First of all, China's cross-border M&As with Pakistan have always promoted the country's international division position, especially in 2017. Secondly, the promotion effect on the division position of Russia, Kazakhstan, and Malaysia shifts into the narrowing effect on China's international division position gap in 2017. Finally, Vietnam's narrowing effect on China's division position gap decreases in 2017 but expands in 2018, indicating that Vietnam's competition substitution effect on China's intermediate products may be enhanced. However, China's cross-border M&As demonstrate an interactive active effect on other developing countries such as Brazil, Indonesia, Thailand, Mexico, and India in terms of the international division position (see Figure 5b). The results of spatiotemporal heterogeneity analysis are consistent with the empirical facts, which further verify the above conclusions.



(**a**)

Figure 5. *Cont.*



(**b**)

Figure 5. (**a**) Spatial and temporal impact factors for cross-border M&As in developed countries. (**b**) Spatial and temporal impact factors for cross-border M&As in emerging countries.

7. Conclusions and Implication

7.1. Conclusions

To capture the third country effect of the impact of reverse cross-border M&As in emerging countries on the division position in the global value chain, and decide how to choose the host country to enhance sustainable competitive advantage of enterprises, we introduce spatial effects into the systematic framework of the impact of cross-border M&As on the division position in the global value chain. Using the ADB-MRIO database in UIBE GVC from 2010 to 2019, we employ the spatial panel SDM model as well as the spatial weight matrix of geographical to estimate the model. In addition, the economic geography composite matrix is used to confirm the robustness.

This study expands the literature on the division position in the global value chain in cross-border M&As in terms of the third country effect framework, comprehensively describing empirical facts of multilateral correlation of global value chains with intermediate trade as the main mode, which not only produces empirical evidence for the export platform based cross-border M&As in emerging countries, but also illustrates how to make spatial decisions based on host country heterogeneity to upgrade the division position and sustainable international competitiveness in the global value chain. In addition, to remove the overestimation error in resource-rich countries on the division position, we develop a composite index to measure the gap in the division position between one country and other trading countries. Moreover, unlike the WIOD database, this paper uses the ADB-MRIO database in UIBE GVC, which covers 17 Asian countries, providing new evidence for emerging countries' participation in global economic links.

The specific conclusions of this paper are as follows: First of all, we show that the division position in the global value chain of a country as well as neighboring countries has a positive spatial spillover effect; that is, they present a complementary effect on the division position. The division position raises 12.8% for every 1% increase of neighboring countries to a country's division position, and 33.1%, in low-value chain countries, which is less pronounced in high-value chain countries. Second, it is the direct effect of forward cross-border M&As rather than reverse cross-border M&As that is conducive to narrowing the division position gap between China and the host country. We attribute these findings to the fact that forward cross-border M&As tend to choose developing countries or emerging markets, in which the natural resource endowment effect and market complementary effect

are conducive to narrowing the gap in the division position. However reverse cross-border M&As are mostly prone to developed countries with higher technology levels, which are constrained by the multiple impacts of the larger market competition effect in the core area, the limited knowledge transfer effect, and the liability of foreignness, which restrict China's rise in the division position in the global value chain. Third, the third country effect of reverse cross-border M&As is conducive to narrowing the division position gap between China and host countries, which indicates a competitive effect of cross-border M&As. However, the third country effect of forward cross-border M&As was not captured in our findings; it may be that there is no significant knowledge flow and transfer due to the small gap in technology level between countries, which also shows that the framework of the third country effect considering the host country heterogeneity is of great significance for comprehensively investigating the performance of the foreign direct investment caused by the spatial dependence between the countries. We suggest that reverse cross-border M&As should develop the export platform based cross-border M&As rather than forward cross-border M&As, whereby the study partly confirmed the effectiveness and conditions of export platform based OFDI. Fourth, the decomposition of spatial effects demonstrates that reverse- and forward cross-border M&As have the same impact on the rising of the international division position, whereas their spatial sources are different. Therefore, from a macro perspective, host country heterogeneity is crucial to achieve the goal of cross-border M&As. In addition, an interesting insight is shown by the spatial and temporal heterogeneity test, which is that the narrowing effect of cross-border M&As on the gap in the division position varies with time and space, and reveals a trend of increasing convergence and spatial differentiation. Moreover, their spatial dependence effect is closely related to the bilateral trade between countries.

7.2. Implications

Based on the findings, this paper conveys some policy implications. First, cross-border M&As in emerging markets should optimize the spatial layout of the host country in combination with its strategic objectives, and select an appropriate host country according to its division position in the global chain in order to boost the position as well as sustainable competitive advantage of enterprises. For reverse cross-border M&As, priority should be given to neighboring countries of the host country with a high-value chain to carry out export platform-based cross-border M&As, while forward cross-border M&As should choose their destination country directly, rather than with the consideration of third countries. However, from the perspective of long-term evolution, the impact of cross-border M&As on the rising of the division position has a spatial spillover effect of mutual promotion among countries, which indicates that cross-border M&As in emerging countries are conducive to achieving common progress in the division position in the global value chain between the countries and host countries. The research results indicate that actively developing multilateral economic and trade relations, and strengthening the upstream and downstream of supply chains and cooperation among countries, are conducive to achieving win-win development rather than crowding out or replacing.

There is, however, a limitation to this paper, which is that although the ADB-MRIO database of 62 countries/regions is used, which includes the data of 17 Asian and Oceanian countries, due to the large number of missing values for many countries, only 27 countries are ultimately selected for cross-border M&A analysis, which include only 12 Asian countries. Although representative to a certain extent, the sample size of 270 is relatively small. Therefore, the generality of the research conclusions still needs robustness testing with more sample sizes. Future research should increase the sample size and extend the window of time examined, and employ dynamic spatial panels to further confirm the robustness.

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Appendix A

Table A1. Effect decomposition of spatial Dubin model.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Explanatory Variable	**Gvc_po**			**Gvc_po_h**			**Gvc_po_l**		
	Direct Effect	**Indirect Effect**	**Total Effect**	**Direct Effect**	**Indirect Effect**	**Total Effect**	**Direct Effect**	**Indirect Effect**	**Total Effect**
lnmerge	−0.001	−0.013 **	−0.015 **	−0.004	−0.014 **	−0.017 **	−0.014 **	−0.009	−0.023 **
	(−0.31)	(−2.11)	(−2.03)	(−0.66)	(−2.04)	(−2.34)	(−2.27)	(−1.34)	(−2.46)
Tec	0.084 *	−0.018	0.066	0.284 ***	0.057	0.341 ***	−0.023	−0.057	−0.079
	(1.92)	(−0.27)	(0.82)	(4.75)	(0.64)	(3.04)	(−0.48)	(−1.00)	(−0.90)
Gdp_ra	0.015 **	0.001	0.016	0.012	0.008	0.020 **	0.026 ***	−0.001	0.025 **
	(2.37)	(0.12)	(1.58)	(1.61)	(0.74)	(1.78)	(2.99)	(−0.12)	(1.88)
Res	0.010	0.017	0.028 **	−0.021 *	0.018	−0.002	0.033 ***	0.003	0.036 ***
	(1.31)	(1.28)	(2.08)	(−1.87)	(1.12)	(−0.14)	(3.99)	(0.323)	(2.53)
Open	0.613 ***	−0.177	0.436 ***	0.306 ***	−0.093	0.213	0.35	0.671	1.021 **
	(5.10)	(−1.07)	(2.28)	(2.59)	(−0.64)	(1.25)	(0.97)	(1.59)	(2.21)
lnTele	0.187	0.501 ***	0.688 ***	−0.136	0.427 ***	0.291	0.769 ***	0.269	−1.039 **
	(1.57)	(2.88)	(3.21)	(−1.07)	(2.47)	(1.4)	(4.02)	(1.31)	(2.92)
N	270	270	270	190	190	190	80	80	80

Notes: * Indicates significance at the 10% level. ** Indicates significance at the 5% level. *** Indicates significance at the 1% level.

Table A2. Temporal and spatial heterogeneity coefficients.

Host Country	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**
France	−0.1402	−0.1356	−0.1139	−0.0906	−0.0985	−0.0952	−0.1015	−0.1222	−0.163	−0.155
Britain	−0.0213	−0.0167	0.005	0.0283	0.0204	0.0237	0.0174	−0.0033	−0.046	−0.038
Netherlands	−0.0189	−0.0143	0.0074	0.0307	0.0228	0.0261	0.0198	−0.0009	−0.022	−0.015
Spain	−0.0682	−0.0636	−0.0419	−0.0185	−0.0264	−0.0231	−0.0295	−0.0502	−0.007	−0.008
Portugal	−0.0395	−0.0349	−0.0132	0.0102	0.0022	0.0055	−0.0008	−0.0215	−0.024	−0.017
Japan	−0.0372	−0.0326	−0.0109	0.0125	0.0045	0.0078	0.0015	−0.0192	−0.051	−0.044
Canada	−0.0534	−0.0488	−0.0271	−0.0037	−0.0116	−0.0083	−0.0147	−0.0354	−0.064	−0.056
Singapore	−0.0297	−0.025	−0.0034	0.02	0.0121	0.0154	0.009	−0.0117	−0.064	−0.056
Vietnam	−0.051	−0.0463	−0.0247	−0.0013	−0.0092	−0.0059	−0.0123	−0.033	0.010	0.008
India	−0.0495	−0.0449	−0.0232	0.0001	−0.0078	−0.0045	−0.0108	−0.0315	−0.047	−0.04
America	−0.0466	−0.042	−0.0203	0.0031	−0.0049	−0.0016	−0.0079	−0.0286	0.015	0.022
Indonesia	−0.0458	−0.0411	−0.0195	0.0039	−0.004	−0.0007	−0.0071	−0.0278	−0.043	−0.036
Sweden	−0.0431	−0.0384	−0.0168	0.0066	−0.0013	0.002	−0.0044	−0.0251	−0.067	−0.059
Australia	−0.0356	−0.031	−0.0093	0.014	0.0061	0.0094	0.0031	−0.0176	−0.054	−0.047
Brazil	−0.0321	−0.0274	−0.0058	0.0176	0.0097	0.013	0.0066	−0.0141	−0.014	−0.007
Belgium	−0.032	−0.0274	−0.0057	0.0176	0.0097	0.013	0.0067	−0.014	−0.034	−0.027
Mexico	−0.0308	−0.0262	−0.0045	0.0189	0.0109	0.0142	0.0079	−0.0128	−0.058	−0.051
Italy	−0.0182	−0.0136	0.0081	0.0315	0.0236	0.0269	0.0205	−0.0002	−0.042	−0.035
Switzerland	−0.0083	−0.0037	0.018	0.0414	0.0335	0.0368	0.0304	0.0097	−0.055	−0.048
Germany	−0.0081	−0.0035	0.0182	0.0416	0.0337	0.037	0.0306	0.0099	−0.043	−0.036
Korea	0.0062	0.0108	0.0325	0.0559	0.048	0.0513	−0.0449	−0.0242	−0.001	−0.008
Finland	0.0136	0.0182	0.0399	0.0633	0.0553	0.0587	0.0523	0.0316	−0.029	−0.023
Malaysia	0.0131	0.0178	0.0394	0.0628	0.0549	0.0582	0.0518	0.0311	−0.045	−0.038

Table A2. *Cont.*

Host Country	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Thailand	−0.0672	−0.0626	−0.0409	−0.0176	−0.0255	−0.0222	−0.0285	−0.0492	−0.054	−0.046
Pakistan	0.0734	0.0688	0.0471	0.0237	0.0316	0.0283	0.0347	0.0554	0.116	0.109
Kazakhstan	0.0544	0.059	0.0807	0.1041	0.0961	0.0995	0.0931	0.0724	−0.0322	−0.025
Russia	0.0581	0.0627	0.0844	0.1078	0.0999	0.1032	0.0968	0.0761	−0.0695	−0.062

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