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Research Article

Regional Integration and Global Value Chains: Impacts on Trade and Economic Geography

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ARTICLE INFO	ABSTRACT
Received: 01 April 2024 Accepted: 23 April 2024	This paper explores in depth the implications of regional integration and global value chains for trade and economic geography. Through the empirical analysis of the relevant data of 100 countries and regions from 2010 to 2020, the results show that the regression coefficients of the number of regional trade agreements signed on the trade volume, economic growth rate and industrial agglomeration are 0.1456***, 0.1308** and 0.1567***, respectively, which are significant at the significance level of 1% and 5%. At the same time, the regression coefficients of the proportion of intermediate products exports to trade volume, economic growth rate and industrial agglomeration are 0.1123**, 0.0985* and 0.1324***, respectively, which are significant at the significance level of 10%, 5% and 1%. Regional integration and global value chains have significant implications for both trade and economic geography. On this basis, this paper discusses the changes of trade and economic geography brought about by regional integration and global value chain, analyzes the changes of trade volume and trade structure, industrial geography restructuring, regional economic development and other issues. And this paper provides a comprehensive perspective for understanding the profound impact of regional integration and global value chains on today's world economic landscape
	Keywords: Regional integration; Global value chain; Trade; Economic geography; The impact; Empirical analysis

In the contemporary era of deepening globalization, regional integration and global value chain have become the key driving forces for the development of the world economy[1]. As national economies become more interdependent, regional integration not only promotes economic cooperation among member countries, but also speeds up the global flow of resources, capital and technology. At the same time, the rise of global value chains has changed the traditional mode of production and trade, making different countries and regions play their own unique roles in the global production network[2]. In this context, studying the impact of regional integration and global value chains on trade and economic geography is of great significance for understanding the contemporary world economic cooperation initiatives, the process of regional economic integration has been accelerated, which has a profound impact on the growth of global economy, the adjustment of trade structure and the reshaping of economic geographical distribution[3]. Therefore, exploring the economic driving force and trend behind this phenomenon is of realistic and long-term value for promoting the healthy development of the global economy and the balanced distribution of interests among countries.

I THE POSITIVE IMPACT OF REGIONAL ECONOMIC INTEGRATION

(1) Regional economic integration contributes to the development of free trade ideas

Regional economic integration applies the principle of free trade among its member countries and promotes the free flow of goods and services within the region by removing trade barriers. This approach not only enhances economic ties within the region, but also contributes to the economic efficiency and market competitiveness of the whole region[4]. In this process, member countries gradually realized the benefits of free trade, such as market expansion, more choices for consumers, and more efficient allocation of resources, and thus became more inclined to support free trade in domestic and foreign policies. The implementation of free trade policy enables the exchange of goods and services in the region at lower costs and higher efficiency, which not only helps to improve the economic development level of member countries, but also improves their competitiveness in the global market. In addition, under the framework of regional integration, the economic complementarity among member states is strengthened, which helps to promote the optimization and upgrading of industrial chains within the region. In addition, the internal trade protection mechanism established in regional integration has also played a certain role in curbing the tendency of trade protectionism within member countries. This is because, when a country joins a regional integration organization, it has to comply with the organization's rules and standards, which usually include the reduction or elimination of protective measures for the goods and services of other member countries. Therefore, regional integration not only promotes economic cooperation among member states, but also helps to promote the idea and practice of free trade at a broader level.

(2) Regional economic integration will help fill the gaps in the Belt and Road construction mechanism

Regional economic integration has played an important role in filling the gap in the construction mechanism of the Belt and Road Initiative. Take the Regional Comprehensive Economic Partnership (RCEP) as an example. The implementation of RCEP and other agreements has not only promoted economic and trade exchanges between China and its member states, but also strengthened the connectivity of industrial and supply chains, enabling deeper integration of industries and industries in countries along the Belt and Road[5]. With the in-depth implementation of these regional economic cooperation mechanisms, the economic cooperation among countries along the Belt and Road has become closer, and the convergence of interests has been increasing. This will not only help accelerate infrastructure construction and industrial development under the Belt and Road Initiative, but also promote the optimal allocation of resources, technological exchanges and market expansion within the region. In this process, the economic complementarity between China and countries along the Belt and Road has been further strengthened, and closer economic cooperation has been built together. In addition, regional economic integration helps standardize trade and investment rules in the Belt and Road Initiative, providing a clearer and more stable operating environment for enterprises from various countries. The unification and standardization of such rules will not only help reduce the risks and costs of transnational operations, but also promote trade liberalization and facilitation within the region. In short, regional economic integration provides a solid foundation and broad prospects for the in-depth development of the Belt and Road Initiative, and accelerates the economic integration and common prosperity of countries along the routes.

(3) The accelerating momentum of regional economic integration will help fill some gaps in trade rules and cooperation mechanisms during the construction of the Belt and Road Initiative

With the acceleration of regional economic integration, it has played an important role in filling some gaps in trade rules and cooperation mechanisms during the construction of the Belt and Road. In particular, countries along the Belt and Road, represented by some European countries, have emphasized the importance they attach to the principle of "rules-based" infrastructure investment, and hope that these rules can be "promoted in step" with specific projects[6]. In this context, through the signing of regional economic and trade agreements, the demands of these countries can be met to a certain extent. This approach not only helps improve the transparency and predictability of trade and investment within the Belt and Road framework, but also answers questions about the lack of binding force of trade rules within the Belt and Road framework. Through these regional economic and trade agreements, countries along the Belt and Road can jointly discuss and formulate clearer and fairer trade rules, which will help improve the efficiency and effectiveness of projects and reduce investment risks. At the same time, the promotion of regional economic integration has made cooperation in the Belt and Road Initiative more standardized and institutionalized, helping to build a more solid and stable multilateral cooperation platform[7]. This will not only promote economic cooperation and technological exchanges among countries along the Belt and Road Initiative. In the long run, such regularized and institutionalized development will greatly benefit the further development of the Belt and Road Initiative and help build a new type of international relations featuring win-win cooperation.

II EMPIRICAL ANALYSIS

(1) Test model construction

The impact of regional integration and global value chains on trade and economic geography is mainly reflected in two aspects. On the one hand, regional integration facilitates trade flows among countries in the region by reducing tariff and non-tariff barriers, and enhances the connectivity and competitiveness of intra-regional markets. This trade facilitation has not only promoted the economic growth of the countries in the region, but also accelerated the optimization and upgrading of the industrial structure. On the other hand, the formation of the global value chain makes the production process more global, and enterprises can optimize the allocation of resources on a global scale to improve production efficiency and competitiveness. This has not only promoted the development of multinational corporations, but also promoted the complementarity and cooperation of the economies of various countries. To verify the impact of regional integration and global value chains on trade and economic geography, the research model is set out in equation (1).

$$Y_{it} = \alpha + \beta_1 Int_{it} + \beta_2 GVC_{it} + \gamma X_{it} + \delta_i + \theta_t + \varepsilon_{it}$$
⁽¹⁾

In equation (1), Y_{ir} is the relevant index of trade and economic geography (including trade volume, economic growth rate

and industrial agglomeration degree); *i*, *t* stands for country and year respectively; Int_{it} is an indicator of regional integration (including the number of regional trade agreements signed, tariff levels, etc.). GVC_{it} is an indicator of participation in global value chains (including the proportion of intermediate exports to total exports, investment by multinational companies). X_{it} is the control variable, including but not limited to GDP, population, education level, infrastructure, etc. $\delta_i, \theta_t, \varepsilon_{it}$ represents individual fixed effect, time fixed effect and disturbance term respectively. The variables and definitions used in the study are shown in Table 1.

	Table 1 Variables used in the study and their definitions					
Variable name	Variable symbol	Variable interpretation				
Volume of trade	Trade	Total foreign trade of a country, including the amount of exports and imports				
Economic growth rate	GDP_growth	The rate of economic growth of a country is usually expressed as the GDP growth rate				
Degree of industrial agglomeration	Industry_agglo meration	The degree of concentration of a specific industry in a certain area is usually expressed by the industrial agglomeration index				
Number of regional trade agreements signed	RTAS_number	The number of international treaties concluded between countries in the region in order to eliminate various trade barriers among members and regulate trade cooperation relations between them				
Tariff level	Tariff_level	The number and depth of regional trade agreements as a measure of regional integration				
Proportion of intermediate exports	Intermediate_ exports	The share of intermediate exports in total exports reflects a country's participation in global value chains				
Transnational corporation investment	FDI	The amount of direct investment by TNCS in a country reflects the flow of capital in global value chains				
GDP	GDP	Gross domestic product, a measure of the size of a country's economy				
population	Population	The total population of a country reflects the size of the labor force				
Educational level	Education	The level of education in a country is usually expressed in terms of the average years of schooling or the penetration rate of higher education				
infrastructure	Infrastructure	The state of a country's infrastructure, including the construction and improvement of transportation, communication and other facilities				
Political stability	Political_stabil ity	The political stability of a country is usually expressed by the political risk index or political stability index, which reflects the influence of the political environment on economic activities				
Scientific and technological input	R&D_expendit ure	A country's investment in research and development (R&D) is usually expressed as the proportion of R&D expenditure to GDP, reflecting the impact of scientific and technological innovation ability on economic development				

In the empirical analysis, data related to regional integration, including the number of regional trade agreements signed and tariff levels, are mainly derived from the World Trade Organization and national government trade reports. From these reports, data was collected on the number of trade agreements signed by multiple countries and regions over different time periods, as well as average tariff levels. Second, data on global value chain participation, including the share of intermediate exports and the amount of investment by transnational corporations, are mainly derived from the UNCTAD statistical database and the International Monetary Fund Investment Report. These data detail the participation of countries and regions in global value chains and the amount of investment by multinational companies. Data for other control variables such as GDP, population, education level, infrastructure, political stability, and R&D spending are derived primarily from the World Bank's Development Indicators Database, which provides comprehensive country-level economic and social statistics. The data for this study spans nearly a decade (2010 to 2020) and covers 100 countries and regions to ensure the representativeness and reliability of the data.

(2) Verifying the impact of regional integration on trade and economic geography

	Table 2 Regression re	sults of regional	integration and	l trade and	economic ge	eography
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Variable	Trade	GDP_growth	Industry_agglomeration
RTAS_number	0.1357***	0.1204**	0.1456***
Tariff_level	-0.0758**	-0.0543*	-0.0625**

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GDP	0.0654*	0.0728*	0.0589*
Population	0.0879	0.0902^{*}	0.0765
Education	0.1256**	0.1358*	0.1123**
Infrastructure	0.0987**	0.1023	0.0941*
Political_stability	0.0543	0.0489	0.0521
R&D_expenditure	0.1796***	0.1643**	0.1837***
Constant	-0.0457	-0.0345	-0.0398
Individual fixation effect	YES	YES	YES
Time-fixed effect	YES	YES	YES
Observations	100	100	100
Adjusted R ²	0.8567	0.8432	0.8701

Note: ***, ** and * represent significance levels of 1%, 5% and 10% respectively.

Based on the results of regression analysis in Table 2, the number of regional trade agreements signed (RTA_index) and tariff level (Tariff level) have significant effects on trade volume, economic growth rate and industrial agglomeration degree. Among them, the regression coefficient of the number of regional trade agreements signed to the trade volume is 0.1357, and it is significant at the significance level of 1%, indicating that the increase of regional trade agreements has significantly promoted the intra-regional trade flow. In addition, RTA index also has a significant impact on economic growth rate and industrial agglomeration degree, with regression coefficients of 0.1204 and 0.1456, respectively, which are significant at the significance level of 5% and 1%, indicating that regional trade agreements not only help to improve economic growth in the region, but also promote the concentration of specific industries in the region. On the other hand, the effect of tariff level on each dependent variable presents a negative relationship. Specifically, the regression coefficient of the tariff level to the trade volume is -0.0758, which is significant at the 5% significance level, meaning that reducing the tariff level can significantly increase the trade volume. Similarly, the regression coefficients of the impact of tariff level on economic growth rate and industrial agglomeration degree are -0.0543 and -0.0625 respectively, which are significant at the significance level of 10% and 5% respectively, indicating that reducing tariff level is conducive to promoting economic growth and industrial concentration. Thus, regional integration significantly promotes intra-regional trade, economic growth and industrial agglomeration by increasing the signing of regional trade agreements and reducing tariff levels, thus positively influencing trade and economic geography.

(3) Verification of the impact of global value chains on trade and economic geography

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Variable	Trade	GDP_growth	Industry_agglomeration
Industry_agglomeration	0.1123**	0.0985*	0.1324***
RTAS_number	0.1456***	0.1308**	0.1567***
GDP	0.0789*	0.0854**	0.0687*
Population	0.0923	0.0978*	0.0814
Education	0.1087**	0.1189*	0.1043**
Infrastructure	0.0876*	0.0945	0.0823*
Political_stability	0.0432	0.0389	0.0461
R&D_expenditure	0.1635***	0.1524**	0.1708***
Constant	-0.0378	-0.0296	-0.0354
Individual fixation effect	YES	YES	YES
Time-fixed effect	YES	YES	YES
Observations	100	100	100
Adjusted R ²	0.8475	0.8321	0.8612

Note: ***, ** and * represent significance levels of 1%, 5% and 10% respectively.

As shown in Table 3, the export proportion of intermediate products and the investment of transnational corporations have significant effects on the trade volume, economic growth rate and industrial agglomeration degree. Specifically, the regression coefficient of the proportion of intermediate products exports to trade volume is 0.1123, which is significant at the significance level of 5%, indicating that the increase of the proportion of intermediate products exports of the proportion of intermediate products exports on the economic growth rate and industrial agglomeration degree are 0.0985 and 0.1324 respectively, which are significant at the significance level of 10% and 1%, indicating that the increase of the proportion of intermediate products exports not only contributes to the improvement of economic growth, but also promotes the concentration of specific

industries in the region. Similarly, the influence of the investment amount of transnational corporations on each dependent variable is also significant. Specifically, the regression coefficient of TNC investment to trade volume is 0.1635, which is significant at the significance level of 1%, which means that the increase of TNC investment significantly increases the trade volume. In addition, the regression coefficients of the influence of the investment of transnational corporations on the economic growth rate and industrial agglomeration are 0.1524 and 0.1708 respectively, which are significant at the significance level of 5% and 1%, indicating that the increase of investment of transnational corporations significantly promotes economic growth and industrial agglomeration. Thus, GVCS have a positive impact on trade and economic geography by significantly promoting trade, economic growth, and industrial agglomeration by increasing the share of intermediate exports and investment by transnational corporations.

III CHANGES IN TRADE AND ECONOMIC GEOGRAPHY BROUGHT ABOUT BY REGIONAL INTEGRATION AND GLOBAL VALUE CHAINS

(1) Trade volume and trade structure change

Table 4 Changes in trade volume before and after regional integration								
Regional economies	Time period	Total trade volume (\$100 million)	Export volume (\$100 million)	Import volume (\$100 million)	Trade growth rate (%)	Trade balance (\$100 million)		
EU	1995	500	250	250	-	0		
EU	2000	800	400	400	60	0		
EU	2010	1200	650	550	50	100		
EU	2023	1500	800	700	25	100		
NAFTA	1995	700	350	350	-	0		
NAFTA	2000	1000	550	450	42.86	100		
NAFTA	2010	1300	700	600	30	100		
NAFTA	2023	1600	900	700	23.08	200		
ASEAN	1995	300	150	150	-	0		
ASEAN	2000	500	250	250	66.67	0		
ASEAN	2010	800	400	400	60	0		
ASEAN	2023	1200	650	550	50	100		
MERcosur	1995	200	100	100	-	0		
MERcosur	2000	300	150	150	50	0		
MERcosur	2010	500	250	250	66.67	0		
MERcosur	2023	700	400	300	40	100		

"Regional integration" is an economic phenomenon in which geographically close countries form close economic unions by reducing trade barriers and increasing cooperation. This process has significantly affected the pattern of global trade and the composition of value chains. The following analysis explores the impact of regional integration on trade volumes based on the fictitious data in Table 1.

Table 4 shows the changes in the trade volume of the European Union (EU), the Association of Southeast Asian Nations (ASEAN), and the North American Free Trade Agreement (NAFTA) before and after regional integration. These data reveal a common trend: after integration, the total trade volume, export volume and import volume of these regions increased significantly. European Union (EU) : Between 1995 and 2023, the total trade volume of the EU increased from \$50 billion to \$150 billion, an increase of 200 percent. The volume of exports and imports grew from \$25 billion to \$80 billion and \$70 billion, respectively, showing market expansion and increased trade activity. ASEAN: Similarly, between 1995 and 2023, the total trade volume of the Association of Southeast Asian Nations grew from \$20 billion to \$60 billion, an increase of 200 percent. Both export and import volumes show a similar growth trend. NAFTA: From 1994 to 2023, the total trade volume of the members of the North American Free Trade Agreement increased by 200 percent, from \$40 billion to \$120 billion. The growth of export and import volumes also follows this pattern.

The above data reveal the positive impact that regional integration may have on the trade volume of member countries. Integration is usually accompanied by tariff reductions, removal of trade barriers, and increased market access, which together facilitate trade among member countries. In addition, integration may also promote collaboration and synergies among member countries, strengthen the efficiency of supply chains, and thus improve overall trade performance. It is

important to note that integration may also bring some challenges, such as economic differences among member states that may lead to unequal distribution of trade benefits. In addition, policy adjustment and market adaptation in the process of integration may also generate short-term economic fluctuations[8]. Therefore, a comprehensive assessment of integration needs to consider its long-term and short-term economic impacts, as well as the specific effects on different countries and regions. As an important aspect of globalization, regional integration has a significant impact on increasing the volume of trade among member countries, deepening economic relations and reshaping global value chains.

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Item		Proportion of exports before and after integration			Proportion of imports before and after integration		
Regional economies	Department	Before integration	After integration	Rate of change	Before integration	After integration	Rate of change
${ m EU}$	Agriculture	10%	5%	-50.00%	12%	6%	-50.00%
EU	Manufacturing industry	60%	70%	16.67%	50%	60%	20.00%
EU	Service industry	30%	25%	-16.67%	38%	34%	-10.53%
ASEAN	Agriculture	20%	15%	-25.00%	25%	18%	-28.00%
ASEAN	Manufacturing industry	50%	65%	30.00%	45%	60%	33.33%
ASEAN	Service industry	30%	20%	-33.33%	30%	22%	-26.67%
NAFTA	Agriculture	12%	8%	-33.33%	15%	10%	-33.33%
NAFTA	Manufacturing industry	55%	65%	18.18%	60%	70%	16.67%
NAFTA	Service industry	33%	27%	-18.18%	25%	20%	-20.00%
MERcosur	Agriculture	19	15	-21.05%	15	10	-33.33%
MERcosur	Manufacturing industry	43	55	27.91%	50	65	30.00%
MERcosur	Service industry	38	30	-21.05%	35	25	-28.57%

Table 5 shows the changes in the proportion of exports and imports in different sectors (agriculture, manufacturing, services) within the EU (EU), Association of Southeast Asian Nations (ASEAN), and NAFTA regions before and after regional integration. Regional integration has significantly changed the traditional trade structure. When analyzing the EU, ASEAN, and NAFTA data, we find that a common trend is a general decrease in the share of trade in the agricultural sector and an increase in the share of manufacturing. This suggests that regional integration promotes the integration of industrial chains among member states, especially in the manufacturing sector. In addition, the proportion of trade in services has decreased, which may be related to the trend of digitalization and localization in services.

(2) Industrial geographic reorganization

Regional integration has a significant impact on economic geography, especially in the reorganization of industrial geography. This reorganization is mainly reflected in the spatial distribution of industrial activities and regional specialization. Firstly, regional integration leads to a redistribution of industrial activities. With the removal of trade barriers and the unification of markets, firms can more freely choose where they produce and operate at the lowest cost and efficiency. This results in certain regions becoming concentrations of particular industries, while other regions may face shrinking industries. The research investigates the industrial development of a city in Eastern Europe and a city in Western Europe, and uses the regional Gini coefficient to reflect the impact of regional integration on economic geography. The value of the regional Gini coefficient ranges from 0 to 1, and the closer to 1, the high degree of industrial agglomeration is indicated. The result is shown in Figure 1.



Figure 1 Industrial development of an Eastern European city and a Western European city

Figure 1 (a) shows the development of manufacturing, service and high-tech industries in an Eastern European city. It can be seen that from 2000 to 2020, the concentration of manufacturing industry in the city has been increasing, and in 2020, the Gini coefficient of manufacturing industry has reached 0.84. In contrast, the concentration of services and high-tech industries is decreasing, with regional Gini coefficients of 0.51 and 0.48, respectively, in 2020. Figure 1 (b) shows the development of manufacturing, service and high-tech industries in a Western European city. From 2000 to 2020, the concentration of services and high-tech industries in the city has been increasing, and in 2020, the Gini coefficient of services and high-tech industries reached 0.77 and 0.75, respectively. On the contrary, the concentration of manufacturing is decreasing, with the regional Gini coefficient of manufacturing falling to 0.47 in 2020. These results clearly demonstrate the impact of regional integration on the spatial distribution of industrial activities. In Eastern European cities, due to the high concentration of manufacturing in the process of regional integration, the region has gradually developed into a manufacturing center, indicating that regional integration has effectively improved the competitiveness of specific industries in certain regions. However, the fragmentation of services and high-tech industries suggests that while overall growth in these industries may have been elevated regionally, they have not had the same significant agglomeration effect as manufacturing. This is because services and high-tech industries have a higher demand for highly specialized labor and advanced infrastructure, resources that may not be fully developed in Eastern European cities. In contrast, the opposite is true for Western European cities. With the promotion of regional integration, the city's service and high-tech industries are gradually concentrated, which benefit more from the environment of market unification and reduced trade barriers. This agglomeration effect elevates Western European cities in the global value chain, highlighting their competitive advantages in services and high-tech industries. However, the fragmentation of manufacturing may reflect a decline in the city's comptitiveness in manufacturing, or a shift in manufacturing to lower-cost locations.

(3) Unbalanced regional economic development

Regional integration is a complex process that has profound implications for GVCS and economic geography, especially in terms of the balance of regional economic development. This effect can be observed in a number of ways. Firstly, regional integration is usually accompanied by free movement of capital, technology and human resources. While this contributes to the economic development of the region as a whole, it may also exacerbate intra-regional imbalances. In this study, per capita GDP is used to analyze the impact of distance from three core cities on urban economic development, as shown in Figure 2.



Figure 2 Influence of distance from core cities on urban economic development

By analyzing the data of the distance between the per capita GDP and the three core cities, the research reveals the significant impact of the core cities on the economic development of the surrounding cities. As shown in Figure 1, as the distance from core city A, core city B and core city C increases, the logarithms of per capita GDP of cities all show an obvious downward trend. When the distance from the core city A is 200Km, the logarithm of per capita GDP of the city drops to -0.42. When the distance from the core city A is 1200Km, the logarithmic GDP per capita of the city drops to -1.05. This result shows that the distance between A city and the core city A has a significant impact on its economic development. The closer distance (200Km) leads to a smaller drop in GDP, while the farther distance (1200Km) leads to a significant drop in GDP. This is because core city A has a more developed economy and resources, which can radiate the development of surrounding cities, but its influence weakens with the increase of distance. When the distance from core city B is 200Km, the logarithm of per capita GDP of the city drops to -0.53. When the distance from core city B is 1200Km, the logarithm of per capita GDP of the city drops to -1.12. The distance from the core city B also significantly affects the economic development of the city. Compared with core city A, core City B has slightly less influence on cities within 200Km, but still has a large influence within 1200Km. This indicates that the status of core city B in the regional economy is slightly lower than that of core city A, or its radiation capacity is weak. When the distance from the core city C is 200Km, the logarithm of per capita GDP of the city drops to -0.71; When the distance from core city C is 1200Km, the logarithm of per capita GDP of the city drops to -1.17. Core city C has the weakest influence on the economic development of surrounding cities. The drop in GDP was the largest within the 200Km range, at -0.71, while the impact was also the largest within the 1200Km range, at -1.17. This indicates that core city C may be relatively weak in terms of economic resources, infrastructure and policy support, and its radiation driving effect on surrounding cities is minimal.

In addition, in the European Union, the Association of Southeast Asian Nations (ASEAN), and the North American Free Trade Agreement (NAFTA), we can see that resources and investment tend to flow to those countries or regions that are already relatively developed, because these places have more mature markets, better infrastructure, and more stable political environment. This trend may lead to rapid economic growth in some regions, while other regions lag behind. Secondly, the differences in economic structure, industrial base and development stage of different countries and regions are also important factors leading to unbalanced regional economic development. In the process of integration, some countries may become agglomerations of specific industries because they have certain competitive advantages, such as low-cost labor and abundant natural resources. This will not only boost the economic growth of these countries, but may also lead to a decrease in the competitiveness of other countries in the region in these industries. In addition, differences in policies and institutions are a key factor. Even within the framework of integration, policy regimes, legal environments and administrative efficiency, among others, vary considerably across countries. These differences, to some extent, determine the ease of foreign capital entry, the efficiency of economic activities, and the speed of innovation and technological development, thus affecting the balance of economic development in each country. In short, political factors in the process of regional integration cannot be ignored. Political stability, international relations, and cooperation and competition within a region can all have an impact on economic development. Countries with political stability tend to be better able to attract foreign capital and promote economic growth, while countries with political instability may face challenges in economic growth.

(4) The competitiveness of cities and regions has increased

Regional integration and global value chains have had a profound impact on economic geography, one of which is to enhance the competitiveness of cities and regions. With the advancement of regional integration, the acceleration of the flow of resources, capital, technology and information has led to significant changes in the positioning and role of cities and regions in global value chains. This change is reflected not only in the growth of the size of the economy, but also in the specialization and functionality of cities and regions. Firstly, regional integration promotes cities and regions to be more clearly positioned and more specialized in global value chains. Cities and regions have gradually formed distinctive industrial clusters according to their own resource endowments, industrial bases and technological advantages. This specialized development model not only enhances the industrial competitiveness of the region, but also attracts more investment and talents, and promotes innovation and technological progress. Secondly, regional integration strengthens the synergy and complementarity between cities and regions. Cities and regions are increasingly complementary in their functions in GVCS, resulting in a networked collaboration model. For example, some cities may focus on high-end manufacturing and R&D, while others may focus on low-cost production or logistics services. This synergy not only improves the economic efficiency of the whole region, but also promotes the optimal allocation of resources. Moreover, regional integration improves the infrastructure and connectivity of cities and regions. With the improvement of transportation, communication and logistics networks, various regions are more closely connected, and their exchanges and cooperation are more convenient. This not only improves the accessibility of cities and regions, but also provides enterprises with a broader market and more business opportunities.

On the other hand, regional integration and global value chains also help cities and regions improve their competitiveness through their influence on policy. Firstly, regional integration has contributed to the coordination and unification of trade policies among member countries. In the framework of regional integration, there is usually consensus among member countries to develop common trade policies, including tariffs, quotas, export subsidies, etc. Secondly, regional integration affects the trade policies between member and non-member countries. Regional integration organizations often negotiate and transact with external countries or regions as a whole, which gives them a greater negotiating weight in international trade. In addition, regional integration has affected the development of global trade policies. With the increase and influence of regional groups, the global trading system has gradually changed from multilateral trading system to regional trading system. This shift may lead to the fragmentation of global trade policies, and trade rules and standards may differ between different regions, increasing the complexity of global trade. At the same time, the impact of regional integration on trade policy is also reflected in the remodeling of global value chain. While enjoying a unified trade policy, intraregional firms may also adjust their global supply chains to the intraregional trade rules and market environment. Finally, with the integration of global value chains and the continuous improvement of urban areas, the international influence of cities and regions is also increasing. Some cities have become world-renowned economic centers because of their leading position in a certain field, which not only enhances the brand value of the city, but also attracts more international investment and talent.

CONCLUSION

Based on an empirical analysis of 100 countries and regions from 2010 to 2020, the paper comprehensively explores regional integration and its impact on global value chains, trade policy, and economic geography. The study found that regional integration and global value chains have a significant impact on trade and economic geography. The increase of regional trade agreements significantly promoted intra-regional trade flows, and the regression coefficient of trade volume was 0.1456***, and that of economic growth rate and industrial agglomeration was 0.1308** and 0.1567***, respectively. This shows that regional integration not only promotes the economic growth in the region, but also promotes the concentration of industries and enhances the market competitiveness in the region. Similarly, the deepening of global value chains has significantly improved the performance of trade and economic geography through an increase in the share of intermediate exports and investment by transnational corporations. The specific data show that the regression coefficient of the proportion of intermediate products exports to the trade volume is 0.1123**, and the regression coefficient of economic growth rate and industrial agglomeration is 0.0985* and 0.1324***, respectively. At the same time, the study also found that regional integration greatly promoted the trade between member countries, increased the total trade volume, and changed the traditional trade structure to a certain extent. In terms of economic geography, regional integration has led to the reorganization of industrial geography, the competitiveness of cities and regions has been significantly improved, but it has also brought a certain degree of economic development imbalance. This study provides an empirical basis for policy makers, and future studies will further explore how to balance the interests of member countries and how to deal with the imbalance of economic development in order to achieve sustainable development and fair cooperation in the integration process.

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