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Study of the Impact of Trade Conflicts on Technological Innovation

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Abstract: This thesis utilizes cross-country panel data from Global Trade Alert and WTO databases, and adopts principal component analysis and dynamic panel system GMM estimation to conduct empirical research on the impact of trade conflicts on technological innovation. The results of the study show that trade conflicts are conducive to the improvement of the efficiency of technological innovation in each country, and the specific mechanism is that trade conflicts cause enterprises to lose their inherent market advantages and form the elimination system of the last-stage enterprises within the market to force them to carry out technological upgrading. As China is in a critical transition period from high-speed development to high-quality development, this thesis provides policy advice on how to improve China's technological innovation capacity through the implementation of trade policy.

Keywords: GMM estimation method; Principal component analysis method; Technological innovation; Trade conflict.

1. Introduction

Since entering the 21st century, the world economy has been developing rapidly, and the speed of development has far exceeded the previous speed, and the global trade cooperation has developed from horizontal cooperation to vertical development. International trade has also developed rapidly in this context. The occurrence of the new crown epidemic has spawned the era of epidemics. Trade protectionism forces have also risen, which will have a certain negative impact on international trade at the enterprise, industry and national levels.

The most prominent manifestation of trade protectionism is trade conflict, on the other hand, trade agreement is a concept relative to trade conflict. Trade protectionism mostly creates trade conflicts by enacting tariffs and other measures to protect national trade. Multilateral cooperation initiatives led by China, such as the Shanghai Cooperation Organization (SCO), the New Silk Road Economic Belt (NSREB) and the 21st Century Maritime Silk Road (MSR), are promoting more quality trade. These initiatives are contributing to the creation of more high-quality trade agreements that aim to create a more stable trading environment. Nevertheless, the role of trade agreements remains limited, and the current international trade landscape is characterized by increased trade conflict. According to the Global Trade Alert website, from January 1, 2020 to November 13, 2021 alone, a total of 1,380 international events occurred and resulted in 868 policy or regulatory changes. According to the statistics, as of June 2021, the number of regional trade agreements signed or in force globally has reached 349, and this number is constantly increasing. It can be seen that the stability of trade relations is gradually becoming a prominent content of international trade, and the study of trade conflicts has certain practical significance.

China's "14th Five-Year Plan" pointed out that the development of the new era, in addition to adhere to the innovation-driven development, but also to have a combination of imported and going out development. The new development pattern that needs to be constructed under the requirements of the new era is to take the domestic macro-cyclic development as the main body, and the domestic and international double-cyclic development to promote each other.2022 government work report pointed out that the innovation-driven development strategy should continue to deepen the implementation, and make efforts to cultivate the "specialization, specialization and new enterprises". According to the World Intellectual Property Organization (WIPO) data, China's patent applications accounted for the highest percentage in the world in 2019. This shows that China's goal of improving its independent innovation capacity to occupy a favorable position in international trade competition is gradually being realized. Currently, China has become one of the most innovative and promising companies, countries or regions. Although the total number of patent applications and authorizations in China has a trend of substantial rise, the main part still relies on the growth of utility model patents to pull, and the growth part in terms of speed, the growth of utility model patents is faster. In the proportion of patent structure, invention patents and design patents are relatively low, and the development speed is also slow. The stability of utility model patents is low, easy to submit applications, commercialization, but not conducive to the long-term development of China's technological innovation, the reason is that the number of utility model patents is too easy to form a "utility model patent utility trap". Utility model patents pay more attention to practical aspects, but a country's technological development resources are limited, too many utility model patents will squeeze the development space of invention patents and design patents. Moreover, in terms of transformation, utility model patents are not conducive to the transformation of achievements, thus hindering the development of China's overall patent structure and quality and falling into the "utility model patent use trap" (Mao Hao et al., 2018)[1]. Hard programs to promote technological innovation (including technology policy) can no longer stimulate the improvement of the overall level of technological innovation, so it is of great practical significance to explore the influencing factors of technological innovation.

2. Literature Review

2.1. Trade conflict

Trade conflicts are essentially the result of countries demanding that other countries implement trade policies in their favor or imposing trade restrictions or even trade bans on other countries in order to serve their own interests. Trade conflicts generally involve more than trade and are accompanied by a disparity in national power. When a country's productivity exceeds expectations, it may increase its own productivity at the expense of others, leading to trade friction.

Most of the existing literature on trade conflict focuses on the distribution of national interests, product export issues, and so on. Qin Donghai and He Fan (2007) argue that there is a large trade deficit between China and the United States, and the United States is very likely to reduce the trade deficit in order to trigger a trade conflict between China and the United States[2]. Yang Peiqiang and Zhang Xingquan (2014) start from the trade friction precedence between China and the United States, and use the panel data at the level of U.S. firms to explore the impact of the implementation of trade protection policies on the prices of export products of China and the United States[3]. By raising tariffs, the U.S. increases the cost of products for every firm that enters the U.S. market, and this increase in cost raises the price of U.S. imports. The increase in the price of foreign products, the price of domestic products relative to foreign products will be lower, domestic consumers will choose the relative price of the enterprise products, that is, the U.S. domestic enterprise products. As a result, U.S. firms' products benefit from tariff protection, and China's exports are impeded by tariffs and become less profitable. Anti-dumping trade protection measures are beneficial to the overall productivity of the industry because they allow domestic firms to increase their profits, expand their market reach, and have more opportunities to improve their productivity. However, anti-dumping trade protection measures are not conducive to the further improvement of higher productivity enterprises. Enterprises with higher productivity generally develop into international enterprises, which are involved in exports and naturally need access to foreign markets. Foreign countries, as a result of receiving anti-dumping trade protection measures, will respond in a certain way by setting up some tariff measures, etc., which will not be conducive to the export of higher productivity firms in the country where the anti-dumping trade protection measures are applied.

Nguyen and Ezaki (2005) analyzed the impact of regional economic integration on Vietnam in terms of growth, poverty reduction and income distribution, using the GTAP database version 6.0 and the Vietnam Living Standards Survey to correlate the globe and construct a computable general equilibrium model (CGE model)[4]. In analyzing the impact of choices made by Vietnam in different economic integrations, the paper constructs five scenarios including ASEAN Free Trade Area (AFTA), China-ASEAN Free Trade Area (CAFTA), possible formation of East Asian Economic Community (EAEC), APEC trade liberalization and global multilateral trade liberalization. The findings show that multilateral liberalization reduces the scope of possible trade diversion, the elimination of tariffs from trading partners all increase market access for Vietnam, and regional integration thereby increases the welfare level of the Vietnamese state and also improves income distribution. Household consumption and income in the Vietnamese state increased significantly and benefited the poor and rural groups more than the rich.Handley (2014) found through his study that firms export with full consideration of trade policy uncertainty and take trade policy uncertainty as one of the risks to be considered[5]. When there is trade policy uncertainty, enterprises will reconsider whether to enter the country's market, adjust the market strategy, delay or cancel the entry into the new international market to reduce the possible losses caused by the risk; enterprises will make adjustments to the investment program after planning through certain expectations, and trade policy uncertainty may reduce the investability of the enterprise, and the enterprise will choose an alternative country to invest in, in order to reduce the possible losses caused by the risk losses; trade policy uncertainty will increase the cost of enterprises' response to tariffs, thus reducing the speed of enterprises' response to tariffs, and unfavorable tariffs have a certain impact on enterprises. Cui Lianbiao et al. (2021) used a global multi-regional CGE model to assess the impact of China's cessation of imports of U.S. agricultural products, and found that China's cessation of imports of U.S. agricultural products is more conducive to China's advantageous position in the U.S.-China trade friction, and at the same time, China's diversification of imports can promote China's "One Belt, One Road" initiative, which is beneficial to China's long-term trade development[6].At the same time, China's import diversification can promote the process of China's "Belt and Road" initiative, which is favorable to China's long-term trade development.

Trade barriers are a kind of trade conflict, and trade barriers are divided into tariff barriers and non-tariff barriers. Tariff barriers, through certain policy measures, are unfavorable for foreign enterprises to enter the country's market, and thus unfavorable for technological spillovers. Zhao Wenxia and Liu Honggui (2020) study the impact of trade barriers based on the product quality of China's enterprises' exports from the perspective of enterprise-industry-country-time level micro-panel data[7]. The results of the study show that the effects of tariff barriers on product-producing firms can vary. As far as high-quality production enterprises are concerned, such enterprises tend to occupy a certain advantage in market competition and have a certain price dominance. When tariff barriers are implemented, high-quality production enterprises are able to increase the price of the product, the increase in trade costs into the price of the product, in order to reduce the decline in profits. In terms of low-quality production enterprises, tariff barriers often play a discouraging effect, rather than incentives. Low-quality production products tend to have lower product quality, more competitors in the market, and lack in technological innovation. When tariff barriers have an effect, low-quality production products enterprises will further reduce prices, do not choose technological innovation to reduce production costs, so as not to get rid of low-quality production product line. Naturally, tariff barriers will produce a certain screening effect, high-quality product manufacturers to increase investment in R & D, will further improve product quality, the formation of technological resource advantage, and thus be able to continue to expand the scale of exports; low-quality product manufacturers will be due to the rising cost of production and choose to exit the international market. As a result, export enterprises will form a stronger survival of the fittest due to the existence of tariff

barriers, and under this exogenous impact, a certain mechanism will be generated, i.e., low-quality product enterprises will withdraw from the market, while high-quality product enterprises will expand the market scale due to their own continuous upgrading and further expansion of market advantages, which will ultimately be manifested in the improvement of the overall level of the market. Shi Bingzhan (2014) utilized Chinese customs microdata to measure the quality heterogeneity of Chinese enterprises' export products for the first time[8]. The results of the study show that high-quality product firms have a longer time to export, which ultimately leads to the exit of low-quality firms from the market. Foreign-funded firms tend to have higher product quality, and Chinese firms are developing, and the entry of many new firms will pull down the industry level of product quality. Therefore, the product quality upgrading effect, export stability, duration and breadth of local enterprises are inferior to foreign enterprises.

Li et al. (2014) found that NTBs, due to the role of forcing technological innovation, make enterprises increase R&D investment, which is conducive to the improvement of a country's technological innovation level[9]. Dai KuiZhao and Fang JieWei (2019) collected the panel data of Chinese manufacturing industry in 25 subsectors from 2000 to 2015, and the study analyzed and found that the enhancement and increase of export trade barriers are conducive to the enhancement of the technological complexity of China's manufacturing exports[10]. Mechanisms for deepening export margins, increasing outward foreign direct investment and other ways to deepen export margins refers to the fact that enterprises with higher production efficiency tend to be able to have a dominant position in the market, and thus tend to export abroad and seek a larger market. With the export of these enterprises, the scale of domestic exports has also been expanded, but unlike earlier, there are more trade barriers, which will lead to the elimination of end-stream enterprises, and ultimately the share of the products of export enterprises with higher technology will be improved, and ultimately increase the technical complexity of China's manufacturing exports. The OFDI pathway means that trade barriers will lead to OFDI by exporting enterprises, because OFDI can bypass the restrictions of trade barriers. And OFDI has a reverse technology spillover effect, which enhances the technological complexity of China's manufacturing exports.

2.2. Technological innovation

Schumpeter first systematically elaborated and analyzed the theory of innovation in The Theory of Economic Development, in which he argued that entrepreneurs are the innovators, the leaders of how to allocate resources for invention and creation. Innovation is actually the new production function, which is the reorganization of the enterprise in order to obtain more economic profits, using new production factors or production conditions in the production and operation process. Fu Jiaji, a scholar in China, believes that technological innovation is the entrepreneur's efforts to seize potential profit opportunities in the market, to obtain business benefits as the goal, as a way to continuously update the organization of production conditions and factors, to establish a more efficient, more effective, lower cost production and operation system, to promote new products, new production (process) methods, to develop new markets, to obtain new raw materials or semi-finished products, finished products supply sources, or to establish a new enterprise Organization, including technology, organization, business, finance and a series of activities of the integrated process.

A large number of scholars have conducted relevant studies on the influencing factors of technological innovation. Yang Fei et al. (2018) used the growth accounting method and stochastic frontier analysis (SFA) to measure the total factor productivity of China and the United States, and concluded that the technology gap between China and the United States is shrinking from the total factor productivity of China and the United States, and concluded that the shrinking of the technology gap between China and the United States will affect the U.S. trade policy with China by influencing the interaction between the trade deficit and the political donations through the use of the protection pending model to conduct the research[11]. It is plausible that the U.S. is trying to curb China's high-tech development from a strategic perspective, and China should promote domestic reforms, unleash the potential of economic growth, improve industrial policies, enhance its independent innovation capability, and upgrade its position in the global value chain and the degree of export diversification in order to cope with the U.S.-China trade friction. Xiang Weimin et al. (2021) established panel data based on a sample of 763 listed companies in the GEM from 2009-2019, and conducted an empirical study using ordinary multiple linear regression models and multiple moderated regression models, which showed that both the proportion of venture capital holdings and the government's innovation subsidies have a positive effect on technological innovation, and that the degree of market competition can influence technological innovation by means of The results of the study show that the proportion of venture capital ownership and government innovation subsidies have a positive effect on technological innovation, and that the degree of market competition can affect technological innovation through venture capital, i.e., the greater the degree of market competition, the greater the impact of venture capital on enterprise innovation[12]. Gang Cuicui et al. (2021) selected Chinese urban local records and the Dictionary of Chinese Dialects and other literature to measure provincial linguistic and cultural diversity, from which the measure of linguistic and cultural diversity indicators was selected, and technological innovation was also divided into two stages based on the two-phase global value chain perspective, namely, the R&D stage of technological innovation and the transformation of achievements[13]. Linguistic diversity has an inverted U-shaped non-linear effect on utility model, invention patent and appearance invention patent in the R&D stage, while in the transformation stage, it has a significant inhibitory effect on the output and absorption contracts of technological innovations as well as the related transaction value, but with the upgrading of the regional industrial structure and the enlargement of the market transaction scale, this inhibitory effect will be gradually weakened.

Export trade enterprises can through the "competition e ffect" and "export learning effect" to carry out technologi cal learning, so as to improve their own level of technolo gical innovation, Coe and Helpman (1995) using bilateral import shares to foreign R & D stock construction, the fi rst study shows that a country's R & D stock is not only the most important, but also the most important, the most important, the most important[14]. The first study shows that a country's total factor productivity depends not only on its own total factor productivity, but also on the total

factor productivity of its trading partners, i.e., there is a certain technology spillover effect. With the further opening of the economy, the technology spillover effect of foreign R&D will be more obvious. According to some estimates of the TFP of R&D capital stock, it is shown that in large countries, the elasticity of domestic R&D capital stock is greater than that of foreign R&D capital stock, while in most small countries, the elasticity of foreign R&D capital stock is greater. Xu and Lian and Luan Yongyu (2005) that the export trade not only has the import trade technology contagion effect, demonstration effect, and compared with the import trade, the export trade has a more significant stem secondary school effect, competition effect and industrial linkage effect[15]. The importing sector can learn from the introduction of foreign advanced technology and instruments, and thus improve the level of technological innovation. However, the export sector through the domestic enterprise industry association, produce industrial linkage effect, by the international market competition pressure of the contagion effect than the simple introduction of technology, advanced equipment, etc. on the domestic technical progress and industrial structure adjustment has more far-reaching impact. Zou Wuying et al. (2008) used China's 1986-2004 provincial panel data to empirically test the impact of export trade on China's regional technological innovation[16]. The results of the study show that export trade has a role in promoting regional technological innovation, and the degree of influence is deepening. However, because of the unbalanced local development, the scale of regional export trade varies. As a result, the degree of influence of export trade on the level of technological innovation in the eastern, central and western regions also varies, generally showing a stronger influence in the eastern region, followed by the central region, and a weaker influence in the western region.Govindaraju et al. (2013), controlling for the premise of enterprise heterogeneity and using enterprise-level data, explored the relationship between product and process innovations and government support, organizational innovation and export intensity relationships[17]. The findings suggest that export trade is conducive to stimulating firms' product and process innovation. This is because it is intrinsic to firms that they have to be innovative in order to trade internationally, and large firms tend to be more innovative than small firms. Wang Hui et al. (2017) explore the impact of foreign trade on technological innovation. The results of the study show that the impact of foreign trade on the efficiency of industrial technological innovation has significant regional variability[18].

2.3. Literature Review

First, most of the existing literature from the policy, FDI, OFDI and other perspectives on technological innovation influencing factors for research, technology spillover effect is mostly analyzed from the perspective of international trade and other perspectives, and the impact of trade conflict on technological innovation research is relatively lack of. Secondly, the non-tariff barriers in trade conflicts have a certain degree of innovativeness in the study of the role of non-tariff barriers in trade conflicts in forcing technological innovation. Third, trade conflict is a kind of dynamic trade behavior, and the study of the impact of trade conflict on technological innovation is a dynamic research perspective, which is more novel. Finally, this program studies the impact of trade conflict on technological innovation, which broadens the perspective of existing research and enriches the study of trade conflict and technological innovation.

3. Mechanism Analysis

As a result of the deepening of the international division of labor, trade cooperation is no longer a simple import and export, but more of a competition between trade policies. First, the stability of trade relations affects the spillover of advanced technology and the learning process of advanced technology, but trade conflicts have a certain stimulating effect on technological innovation, forcing enterprises to carry out technological innovation on the basis of the loss of market advantages. Second, as enterprises export, the scale of the country's domestic exports is also expanded, but unlike earlier, when trade barriers increase, it leads to the elimination of end-of-the-line enterprises and the formation of the end-of-the-line enterprise elimination system. The products of all exporting enterprises with higher technology will survive and develop in the market, and their share will be increased, which will ultimately help to improve the level of technological innovation in the country's industry. Third, OFDI pathway, OFDI pathway refers to the trade barriers will lead to export enterprises to foreign direct investment, because OFDI can bypass the restrictions of trade barriers. And OFDI has a reverse technology spillover effect, thus enhancing the technological innovation efficiency of the country's industry.

4. Empirical Testing

The manuscript should include a conclusion. In this section, summarize what was described in your paper. Future directions may also be included in this section. Authors are strongly encouraged not to reference multiple figures or tables in the conclusion; these should be referenced in the body of the paper.

4.1. Description of variables and data sources

4.1.1. Explained Variables

The explanatory variable is the number of patent applications by residents of the sample countries. This paper collects ten-year data from 2008-2017 of 18 countries counted by WTO, which are China, India, Indonesia, Japan, Saudi Arabia, Turkey, South Africa, Britain, Germany, France, Italy, Russian Federation, Argentina, Brazil, Mexico, Canada, the United States, and Australia.

4.1.2. Core Explanatory Variables

The core explanatory variable is the number of trade conflicts in the sample countries. This paper collects the number of conflicts in the above 18 countries that implemented jurisdiction in that country at the time of each year's statistics in the period 2008-2017, as counted by Global Trade Alert (Global Trade Alert).

4.1.3. Control Variables

Some of the variables selected for this paper that can influence the market and therefore technological innovation are population (in millions), labor force population (in persons), GDP (in current local currency) (in billions of local currency), Gross National Income (in current US dollars) per capita (in US dollars per capita), general government revenues (in % of GDP), and the current account balance.

See Table 1 for descriptive statistics of the variables.

4.2. Regression to basics

See equation for the regression equation underlying trade conflict on technological innovation.

$$lnpatent_{it}=\beta_0+\beta_1 gta_{it}+\beta_2 X_{it}+country_i+year_t+\varepsilon_{it}$$

Table 1. Three Scheme comparing

Variable type	variable name	Observations	Mean	Standard deviation	Standard deviation	Maximum value
Explained Variables	Pap	180	70108.723	148940.81	288	817037
Explanatory Variables	Gta	180	1827.767	2733.889	5	16846
Control Variables	Pop	180	239.338	389.497	21.476	1390.08
	Lfp	180	11501.939	19184.11	896.612	77640.66
	GDP	180	557970.25	2203529.9	1002.756	13589826
	PGNP	180	25230.355	19018.933	1000	65870
	Ggi	180	33.156	9.171	14.053	56.482
	Cab	180	-0.251	5.007	-8.873	25.456

Where i stands for the ith country and t stands for the tth year. The explanatory variable is Pap which is the number of resident patent applications, the core explanatory variable is Gta which is the number of trade conflicts, the control variables are population(Pop), labor force population(Lfp), gross domestic product(GDP), gross national income per capita (PGNP), general government income (Ggi), current account balance(Cab), and ε is the error disturbance term.

Due to the strong correlation between the control variables, principal component analysis is chosen to downscale the data, thus making the estimation results more stable.

A high degree of overlapping information between variables can have an impact on regression estimation, for example, in the case of population and labor force population, there tends to be a certain positive proportionality. The larger the population, i.e., the larger the population base, the more sources of labor force population will become available, and thus countries with larger populations tend to have more labor force. China and India have the largest populations in the world, so in modern world trade, the main direction of trade between China and India is the export of processed products, i.e., industries that require more labor. Therefore, in data collection, there is often a situation where several variables are highly correlated with each other. The simplest method is principal component analysis, which is a method to reduce the number of data variables, while ensuring that the processed data can retain the information of the original data.

See Table 2 for the matrix of correlation coefficients between control variables.

The results after performing principal component analysis are presented in Table 3.

Table 2. Matrix of correlation coefficients of control variables

(obs=180)						
	Pop	Lfp	GDP	PGNP	Ggi	Cab
Pop	1					
Lfp	0.993	1				
GDP	0.617	0.628	1			
PGNP	-0.596	-0.534	-0.502	1		
Ggi	-0.560	-0.532	-0.705	0.756	1	
Cab	-0.0122	-0.00620	-0.0778	0.0760	0.275	1

Table 3. Principal component analysis results

(obs=180)				
principal component	eigenvalue	difference	variance contribution	Cumulative variance contribution
1	3.582	2.463	0.597	0.597
2	1.118	0.418	0.186	0.783
3	0.700	0.226	0.117	0.900
4	0.474	0.351	0.0789	0.979
Indicators	Component 1	Component 2	Component 3	Component 4
Pop	0.474	0.181	0.459	-0.127
Lfp	0.465	0.203	0.502	-0.0288
GDP	0.428	-0.145	-0.291	0.706
PGNP	-0.420	0.138	0.395	0.672
Ggi	-0.444	0.315	0.403	-0.104
Cab	-0.0501	0.887	-0.365	-0.150

From the matrix of correlation coefficients of control variables in Table 2, it can be seen that the correlation coefficient between the two variables of labor force population and population is high, reaching 0.993, which indicates that the degree of correlation between the two variables is very high; followed by the correlation coefficient between the per capita Gross National Income (GNI) and the General Government Revenue (GGR), which is relatively high, with a specific value of 0.756, which indicates that there exists a certain degree of correlation between the two variables. Overall, there is a certain degree of correlation between the variables. Therefore, the selection of principal component analysis can reduce the correlation between variables to a certain extent, and reduce the data dimension, so that the dynamic panel system GMM estimation method is more effective.

As can be seen from the results of principal component analysis in Table 3 (principal components 5 and 6 are not analyzed as principal components and have been deleted), there are two principal components with eigenvalues greater than 1, but the cumulative variance contribution rate needs to be accumulated to the fourth principal component in order to be represented as a whole, so four principal components are selected for the next step of estimation. Principal component 1 can better represent the demographic factors, principal component 2 can better represent the balance of payments situation, principal component 3 can better represent the degree of social harmony in the country, and principal component 4 can better represent the domestic economic development situation.

The dynamic panel system GMM estimation of the explanatory variable, the number of resident patent applications, and the explanatory variables, the number of trade conflicts and principal components 1-4, is obtained in Table 4.

Table 4. GMM estimation results for dynamic panel systems

Number of resident patent applications	Coef.	St.Err.	t-value	p-value	[95% Conf	Interval]	Sig
Number of trade conflicts	0.0000887	0.0000245	3.62	0.000	0	0	***
Principal Component 1	0.226	0.047	4.83	0.000	0.134	0.317	***
Principal Component 2	0.754	0.077	9.81	0.000	0.603	0.905	***
Principal Component 3	1.442	0.122	11.78	0.000	1.202	1.682	***
Principal Component 4	1.034	0.141	7.34	0.000	0.758	1.31	***
C	8.976	0.093	96.31	0.000	8.793	9.158	***
Mean dependent var		9.138		SD dependent var		2.047	
R-squared		0.794		Number of obs		180	
Chi-square		1568.134		Prob > chi2		0.000	

Note: *, * * and * * indicate significant at the level of 10%, 5% and 1% respectively, and t value is in brackets, the same below.

As can be seen from Table 4, the core explanatory variable, the number of trade conflicts, is highly significant with all four principal components, indicating that the number of trade conflicts and demographic factors, balance of payments situation, the degree of national social harmony, and the domestic economic development situation are all conducive to technological innovation. The coefficient of the core explanatory variable, the number of trade conflicts, is positive, which means that the more trade conflicts a country has, the higher the level of technological innovation in a country, which may be due to the fact that more trade conflicts increase the instability of the international market, which promotes the survival of the fittest and the survival of the fittest in the market, and thus promotes the innovation of the enterprise and the country, which creates the phenomenon of forcing the innovation. The regression coefficient of principal component 1 is 0.2206, which is significantly positive, indicating that the demographic environment affects technological innovation, and the larger the population, the larger the proportion of labor force population, the higher the level of technological innovation in the country. This may be due to the increase in the population base, accompanied by an increase in the level of education, the formation of a good talent market, the competition in the talent market is conducive to the cultivation of high-end talent, which promotes the increase in the level of technological innovation in a country. The regression coefficient of principal component 2 is 0.754, which is significantly positive, indicating that the balance of payments situation affects technological innovation, and the more general government revenues a country has, and the higher the current account balance, the more favorable it is for technological innovation. This may be due to the fact that when the country has a surplus of fiscal expenditure, it can strongly support the internationalization of SMEs, including policy support, financial support and so on, and because of the positive international market, enterprises are willing to increase investment in technology cultivation, which will improve the level of technological innovation in a country. The regression coefficient of principal component 3 is 1.442, which is significantly positive, indicating that the degree of social harmony in a country affects the level of technological innovation, and that when the general government revenue of a country increases in tandem with the population, the level of technological innovation can be increased in tandem. This may be due to the fact that with the increase of general government income and population, the society is relatively more harmonious, which improves the basic conditions for the stability of the market environment, which is conducive to the increase of technological innovation level. The regression coefficient of principal component 4 is 1.034, which is significantly positive, indicating that the better the domestic economic development situation, the more

favorable the level of technological innovation. This may be because the domestic economic environment is good, so that the domestic market tends to be stable, people's income is stable, so they are more inclined to consume, the more consumption, the more funds for enterprise activities, the higher the disposable funds, so they are willing to invest a large amount of money in research and development of new technologies; at the national level, the state is able to promote the technological innovation of individuals and enterprises through the input of innovation policies, so as to increase the level of technological innovation in the country.

4.3. Robustness check

Table 5 shows the results of the Hausmann test.

From the test results, it can be seen that the dynamic panel system GMM estimation is more robust, and the core explanatory variable, the number of trade conflicts, is more significant with the four control variables, principal component 1, principal component 2, principal component 3, and principal component 4, which means that it passes the Hausman test and the dynamic panel system GMM model estimation is a valid estimation.

Table 5. Hausmann test results

	Pap
Gta	0.0000887*
	(2.46)
Principal Component 1	0.226***
	(5.34)
Principal Component 2	0.754***
	(10.69)
Principal Component 3	1.442***
	(14.03)
Principal Component 4	1.034***
	(10.26)
_cons	8.976***
	(93.87)
N	180

5. Conclusions and Implications

A country's capacity for technological innovation is susceptible to the effects of a country's trade conflicts in international markets, and such effects are positive for technological innovation. Trade barriers are categorized into tariff barriers and non-tariff barriers. Non-tariff trade barriers can have a negative effect on trade between two countries or on multinational trade, but they can play a role in promoting technological innovation. Trade conflicts force a country to improve its competitiveness, thus forcing technological innovation. Second, as enterprises export, the country's domestic export scale has also been expanded, but unlike earlier, when trade barriers increase, it will lead to the elimination of end-of-the-line enterprises, forming the end-of-the-line enterprise elimination system. All export enterprises with higher technology products will survive and develop in the market, and their share will be increased, which will ultimately help to improve the level of technological innovation in the country's industry. Third, OFDI pathway, OFDI pathway refers to the trade barriers will lead to export enterprises to OFDI, because OFDI can bypass the restrictions of trade barriers. And OFDI has a reverse technology spillover effect, thus enhancing the technological innovation efficiency of the country's industry.

Trade conflict will have a certain effect on a country's technological innovation capacity, but at the same time affected by population, labor force population, gross domestic product, gross national income per capita, general government revenue, and current account balance. Through the empirical test analysis, it is found that population, labor force population, gross domestic product, per capita gross national trade income, general government income, and current account balance have a positive impact on technological innovation, and each country needs to formulate appropriate trade policies based on its own national conditions to cope with the new situation of evolving trade.

In the context of the change in the status of international trade, the arrival of the post epidemic era aggravated the expansion of trade protectionism, and China's development has entered a new stage, the study of the impact of trade conflicts on technological innovation is of great practical significance. Although China has encountered a trade bottleneck, it is both a challenge and an opportunity. Trade conflicts are conducive to the realization of China's transformation from high-speed development to high-quality development, and China should actively respond to trade conflicts and formulate trade policies to lay the foundation for its long-term development.

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