Influence of Intellectual Property Policies on China’s International Service Trade

Guihang Guo¹,², Ning Liao¹ & Chuyao Guo³

¹ School of English for International Business, Guangdong University of Foreign Studies, Guangzhou, China
² South China Business College, Guangdong University of Foreign Studies, Guangzhou, China
³ Faculty of Business Administration, The Chinese University of Hong Kong, Hong Kong, China

Correspondence: Guo Guihang, School of English for International Business, Guangdong University of Foreign Studies, No.2 Baiyundadaobei, Guangzhou 510420, P. R. China. Tel: 86-203-620-7158.

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Abstract

With the development of scientific and technological revolution, the service trade has played an increasingly important role in global trade. After the economic crisis in 2008, the trend of trade protectionism has arisen and the phenomenon of anti-globalization has appeared. As the largest emerging economy in the world, China should actively participate in global trade and promote the development of its service trade. Strengthening the protection of intellectual property rights can promote transnational trade. This paper aims to verify the influence and mechanism of intellectual property rights protection on China’s export of service trade. The ordinary least square regression model was adopted to collect data related to the development of China’s service trade and intellectual property protection in the period between 2007 to 2019 from databases including the National Bureau of Statistics of China. Based on the empirical analysis, we reached the following two conclusions: (1) There is no significant relationship between overall service trade and intellectual property protection. (2) Intellectual property protection plays a positive role in promoting manufacturing service industry, construction service industry and the charge of using intellectual property.

Keywords: service trade, intellectual property protection, globalization

1. Introduction

The service trade contains multinational trade for intangible goods such as legal, engineering, computer and telecommunications services as well as other professional services. Accompanied with the third industrial revolution, this new form of trade has played an increasingly important role in the international trade as a result of globalization. The worldwide financial crisis in 2007-2008 caused huge loss to different sectors of international trade. In order to recover from the damage and to support their economies by protecting the domestic market from foreign competition, some developed countries began to implement protectionist policies. Facing the wave of protectionist in an economic downturn, it is urgent for China to find a method to encourage the international trade. The idea to improve the service trade is consistent with the developing strategy of China.

From the industrial structure, the service trade mainly exists in the department which demands a certain level of technology and knowledge capital. As the guarantee of contract execution, the formal institutional environment of the destination country can reduce the market transaction cost. At the same time, higher quality system can reduce contract friction, decrease enterprise export risk and then encourage enterprises to increase export (Yu, 2016). Intellectual property rights are legal rights that provide creators protection for original works, inventions or the appearance of products, artistic works and scientific developments. Thus, the protection for intellectual property seems to be an important method to motivate the service trade.

There are many ways to encourage the development of intellectual property. Governments try to impose new regulations related to intellectual property. In addition to the policy implemented by government such as protection regulation and quota, many international agreements involved in intellectual property protection have been achieved by international organization these years. Lin (2021) confirmed that the regional service agreement has positive effect on international service export. For example, Regional Comprehensive Economic Partnership (RCEP) treats intellectual property as an investment made by investor corporations, allowing private
investment disputes to be raised against the host country. This paper aims to verify whether the protection of intellectual property can promote China’s international service trade.

2. Literature Review

In recent literature, the motivator of the growth of international trade is comprehensively discussed. The volume of international trade is mainly decided by sets of factors including political factors and social factors. Researchers have examined the relationship between policy and trade. They have even further explored what kind of policy has a stronger driving force for international trade. Qi (2021) has proposed and confirmed that the service trade restriction policy of the destination has a significant influence on the export scale in China in her latest research.

In terms of the function of infrastructure, Changkyu (2010) examined that the internet facilitates an increase in the service trade with others by a pooled ordinary least squares regression, a fixed-effect model, and a panel GMM. Scholars also discuss the system of international service trade and Cross-border tourism and found that they are positively related (Zhang et al., 2012). Chen (2020) attempted to consider the factor of international service trade from the perspective of social science. He evaluated the degree of a common language between couples of countries through a qualitative method and examined the power of common culture in the process of international the service trade.

Based on the bilateral relationship between trade and intellectual property, it is reasonable to speculate that intellectual property impacts significantly in the service trade area. Most researchers regarded the protection institution as a moderating factor of the innovative capacity. Zhang and Yang (2016) included intellectual property as the threshold in the discussion of the relationship between foreign direct investment and the service trade. Using the panel data from 66 countries, they proved the effects of foreign direct investment varied in terms of the protection of intellectual property. Sun (2014) examined the different effects of intellectual property protection on labor concentrated industry, capital concentrated industry and knowledge concentrated industry based on the trade data in China over 14 years.

3. Theoretical Foundation and Hypothesis Development

Through literature review, the interaction between intellectual property protection and the service trade is briefly sorted out. However, it is still necessary to deduce the path of action relationship and scientifically clarify its mechanism. Therefore, based on the existing research results of scholars, this paper interpreted the mechanism from the following effects and put forward corresponding hypotheses based on the mechanism.

There are three kinds of effects of intellectual property protection, including market expansion effect, market power effect and technology spillover effect. From the theories set up by Maskus (2000), the effects of intellectual property protection contain two aspects, direct and indirect. From the direct influence, the mechanism includes the market expansion effect and market power effect. The indirect one is the technology spillover effect.

3.1 The Direct Influence: Market Expansion Effect and Market Power Effect

The market expansion effect and market power effect have an opposite influence on international trade. While the export country enhances intellectual property protection, local companies would be prevented from simply imitating the technology of foreign goods with patents. It increases the uniqueness of goods from import companies and then raises the demand for import goods. Finally, intellectual protection stimulates import and has positive influence on international trade.

On the contrary, under the condition of the market power effect, when the property has been well-protected, the company who owns the patent becomes monopolistic in its area. So the company would increase the export price due to its irreplaceability. While the price increases, both the demand from international trade partners and domestic customer decreases. Two systems mentioned above happen at the same time and we should consider the synthetical effect.

3.2 The Indirect Influence: Technology Spillover Effect

Helpman (1993) is the first one to do a theoretical analysis based on the “endogenous- innovation-driven” growth model and concluded that international trade may produce international technological spillovers. The technology spillover effect is an indirect effect of intellectual property protection. It indicates that the development of technology can be influenced by countries that have advanced technology through some economic factors. An example is the effect of foreign direct investment. Foreign direct investment is one of the main ways for developing countries to acquire advanced foreign technology.
Similarly, intellectual property protection is an efficient way for developed countries to appeal to foreign advanced technology. A comprehensive intellectual property policy provides a good environment for companies to exchange intangible goods and speeds up the flow of new technology. So developed countries are likely to sell goods related to high technology under the condition of high intellectual property protection. At the same time, developing countries are also promoted to imitate and innovate to raise their level of technology. With a higher level of innovative ability, more goods will be produced and the service trade which is tightly related to intellectual property will be strengthened.

3.3 Research Hypotheses

Based on the three effects mentioned above, we can deduce the path of the influence from intellectual property protection on the service trade.

There are three ways of the effect. Firstly, based on the market expansion and market power effects, good intellectual property protection creates a good environment for international trade. Cross-border companies become more willing to transfer their goods with high technology in the market of the host country. Secondly, the protection strains simply imitation and thus encourages domestic enterprises to invest in technological exploration to build an irreplaceable position in the market in the fierce competition with foreign countries. According to the market spillover effect, China can also adopt advanced technology transferred from the trade as an emerging market economy. The progress in technology indicates more production in the service trade. Thirdly, considering the different demands for technology capacity of different industries, the efficiency of the mechanism is different.

Hence, we propose the following two hypotheses.

H1: Intellectual property protection can significantly improve the service trade in China.

H2: The significance of the effect of intellectual property protection varies in different kinds of industries.

4. Method

4.1 Model Design

We use the gravity model built by Chen (2021) as basic model, which is always adopted to explain international trade flow patterns. Using Helpman’s (1993) research as reference and considering the economic situation in China, this paper use gross domestic population, population and international export trade in China in the model. The regression model is specifically set as follows:

\[
\ln(\text{extrade}) = \beta_0 + \beta_1 \text{ipr}_t + \beta_2 \ln\text{pergdps}_t + \beta_3 \ln\text{pop}_t + \epsilon_t
\]

In this equation, \(t\) represents the year of data; intellectual property protection denotes the variable of the index of intellectual property protection level. \(\text{pergdps}\) and \(\text{pop}\) are control variables in the model, respectively denotes the economic developing countries in the year, the scale of population, the distance with the host country, the foreign direct investment. \(\epsilon_t\) is a normally distributed error term with zero mean and constant variance.

4.2 Sample Selection

Considering the availability and timeliness, this paper selected the data from China between 2007 and 2019 for research sample. We collected the volume of the service trade from the United Nation Conference on Trade and Development and matched it with the industry classification standards of Cao and Liao (2014), merged and eliminated some industries which lacks data, and finally sorted out 7 kinds of service trade. The sample period covers 13 years during which the financial crisis took place and presented its influence on international trade. There is also a change in the developing strategy of the Chinese government. Core variables are divided into
explanatory variables and explained variables. Explanatory variables are the volume of total service trade and the amount of 7 main categories of the service trade. Those categories cover 70% volume of the service trade, so it can well present the relationship between intellectual property and the service trade. The explained variable is the index of intellectual property protection.

4.3 Data Resource
The examination is based on the trade and economic data of China collected from databases including World Trade Organization, United Nation Conference on Trade and Development, National Bureau of statistics of China and World Economic Forum.

4.4 Variable Definitions
4.4.1 Lncom, Lnmanu, Lntrans, Lncons, Lninsur, Lnfin, Lnpro, Lntele
These are explained variables represented by the volume of export of the service trade and seven categories of the service trade including manufacturing, transport and travel, construction, insurance, finance, charges for the use of intellectual property and telecommunications, computer and information services. The volume of total service trade flow and that of 7 categories are drawn from United Nation Conference on Trade and Development. To avoid that the amount may affect the validity of the test, all of them are logarithm. Due to the difference in the service trade, we supposed that the effects of intellectual property also vary.

4.4.2 Ipr
Ipr represents the index of intellectual property protection, which is based on the index counted by World Economic Forum. In existing research, there are three methods to measure the level of intellectual property protection. The first one is using the G-P index founded by Ginarte and Park (1997). The second one is the intellectual property protection index published by World Economic Forum. The third method is using the number of patents to denote intellectual property protectionability. Considering availability of data, we choose the second approach for the measurement of intellectual property protection level.

4.4.3 Pergdp, Pop
Pergdp indicates the value of gross domestic production (dollars per person); pop represents the volume of population. These variables are examined to have positive effects on international trade by existing researches, and are commonly used in the gravity model. Generally, they are positively related to the volume of trade. The gross domestic production always means a higher capacity of production, which creates more goods supplies for the trade. A larger population also provides more human capital for the production process. So both factors are positively related to the service trade. Those data are gathered from the website of National Bureau of Statistics of China.

5. Data Analysis
5.1 Descriptive Statistics
In this study, we examine the relationship between the service trade and intellectual property protection. We use 2007-2019 outward service trade data of China. Table 1 presents the description for all of variables used in this study.

Table 1. Descriptive statistics

<table>
<thead>
<tr>
<th>Variable</th>
<th>Obs</th>
<th>Mean</th>
<th>Std. Dev.</th>
<th>Min</th>
<th>Max</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lncom</td>
<td>13</td>
<td>12.588</td>
<td>.271</td>
<td>12.107</td>
<td>13.024</td>
</tr>
<tr>
<td>Lnmanu</td>
<td>13</td>
<td>9.991</td>
<td>.123</td>
<td>9.802</td>
<td>10.186</td>
</tr>
<tr>
<td>Lntrans</td>
<td>13</td>
<td>11.281</td>
<td>.096</td>
<td>11.055</td>
<td>11.4</td>
</tr>
<tr>
<td>Lncons</td>
<td>13</td>
<td>9.552</td>
<td>.455</td>
<td>8.59</td>
<td>10.239</td>
</tr>
<tr>
<td>Lninsur</td>
<td>13</td>
<td>7.988</td>
<td>.571</td>
<td>6.807</td>
<td>8.512</td>
</tr>
<tr>
<td>Lnfin</td>
<td>13</td>
<td>7.346</td>
<td>1.057</td>
<td>5.438</td>
<td>8.419</td>
</tr>
<tr>
<td>Lnpro</td>
<td>13</td>
<td>7.06</td>
<td>.965</td>
<td>5.838</td>
<td>8.801</td>
</tr>
<tr>
<td>Lntele</td>
<td>13</td>
<td>9.762</td>
<td>.693</td>
<td>8.616</td>
<td>10.893</td>
</tr>
<tr>
<td>Ipr</td>
<td>13</td>
<td>3.99</td>
<td>.374</td>
<td>3.241</td>
<td>4.499</td>
</tr>
<tr>
<td>Lngdp</td>
<td>13</td>
<td>15.533</td>
<td>.617</td>
<td>14.486</td>
<td>16.234</td>
</tr>
<tr>
<td>Lnpop</td>
<td>13</td>
<td>11.825</td>
<td>.022</td>
<td>11.792</td>
<td>11.857</td>
</tr>
</tbody>
</table>
To avoid the possible effect of number of the trade scale on data analysis, we use the common log of the data of the service trade, the amount of gross domestic production, and population to represent those variables. From the standard deviation of those variables, the lnfin has the largest deviation of 1.057, which means that the volume of financial service fluctuated most wildly in the given period. In contrast, the transport and travel service appeared to be more stable compared with other commercial service.

In terms of intellectual property protection, the minimum index in 13 years is 3.241 in 2007 and the maximum one is 4.499 in 2019. From Figure 2 based on the intellectual property protection index of the past 13 years, we can find that the intellectual property protection index in China grew quickly after 2007 and reached at around 4 in 2010. Although the index experienced small fluctuations then, it still turned to increase in 2016. Intellectual property protection index remained steady after it reached 4.5 in 2017. It can be found that the level of domestic intellectual property protection environment has been improved in China over the past 13 years.

5.2 Empirical Results

The correlation between the variables used in this study has been presented in Table 2.

Table 2. Matrix of correlations

<table>
<thead>
<tr>
<th>Variables</th>
<th>(1)</th>
<th>(2)</th>
<th>(3)</th>
<th>(4)</th>
<th>(5)</th>
<th>(6)</th>
<th>(7)</th>
<th>(8)</th>
<th>(9)</th>
<th>(10)</th>
<th>(11)</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1) Incom</td>
<td>1.000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(2) lnmanu</td>
<td>-0.249</td>
<td>1.000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(3) lntrans</td>
<td>0.555</td>
<td>0.424</td>
<td>1.000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(4) lncons</td>
<td>0.915</td>
<td>-0.186</td>
<td>0.388</td>
<td>1.000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(5) lninsur</td>
<td>0.915</td>
<td>-0.209</td>
<td>0.615</td>
<td>0.774</td>
<td>1.000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(6) lnfin</td>
<td>0.891</td>
<td>-0.257</td>
<td>0.604</td>
<td>0.754</td>
<td>0.930</td>
<td>1.000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(7) lnpro</td>
<td>0.880</td>
<td>-0.373</td>
<td>0.286</td>
<td>0.899</td>
<td>0.677</td>
<td>0.697</td>
<td>1.000</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(8) lntele</td>
<td>0.983</td>
<td>-0.363</td>
<td>0.464</td>
<td>0.887</td>
<td>0.911</td>
<td>0.879</td>
<td>0.890</td>
<td>1.000</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(9) ipr</td>
<td>0.862</td>
<td>-0.192</td>
<td>0.297</td>
<td>0.923</td>
<td>0.768</td>
<td>0.780</td>
<td>0.890</td>
<td>0.858</td>
<td>1.000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(10) lngdp</td>
<td>0.948</td>
<td>-0.417</td>
<td>0.461</td>
<td>0.838</td>
<td>0.952</td>
<td>0.937</td>
<td>0.817</td>
<td>0.969</td>
<td>0.841</td>
<td>1.000</td>
<td></td>
</tr>
<tr>
<td>(11) lnpop</td>
<td>0.949</td>
<td>-0.499</td>
<td>0.378</td>
<td>0.847</td>
<td>0.905</td>
<td>0.897</td>
<td>0.874</td>
<td>0.981</td>
<td>0.845</td>
<td>0.987</td>
<td>1.000</td>
</tr>
</tbody>
</table>

It shows that except for lnmanu, most of variables are positively related to Incom. At the same time, lnmanu is negatively related to other variables except for lntrans. Both the coefficients of gross domestic production and population are positively correlated with the intellectual property protection index. Higher GDP presents a more prosperous economy, and companies are more willing to improve their innovative ability and become more competitive in international the service trade market. Similarly, the development of the service trade still relies on human capital.

Table 3 presents the empirical results of the estimated model for the ordinary least square test.
The service trade in China still remains at a fundamental stage with low efficiency. Analyzing the transfer of technology patents. Among all kinds of service trade, manufacture, construction, and the charge for use of intellectual property are affected by the level of intellectual property protection.

Although the volume of total service trade is not significantly influenced by intellectual property protection, the result of the study, we can conclude that H1 is partly accepted and H2 is accepted.

The coefficients between the charge of intellectual property and the intellectual property protection index are most significant at the level of 1%. It indicates that a better environment for intellectual property protection motivates the service export involved in the transfer of the technology patents. Among all kinds of service trade, the manufacture-related service, construction, and charges related to intellectual property are examined to be positively correlated with the intellectual property protection index.

It can be found from Columns (2) and (4) that manufacture-related services and construction are closely related to the intellectual property protection index at the level of 10% and 5%. Both two industries are supported by skillful workers. It can be explained that when the manufacturing industry is transformed and upgraded, the requirement for human capital has been higher than before. International employers wish to hire workers who have received good education and can take a more professional job. When the administration pays more attention to the intellectual property, enterprises are likely to train their workers and provide more human capital for the international market. The rest of the industries do not show a significant result in the table. Through analyzing the result of the study, we can conclude that H1 is partly accepted and H2 is accepted.

Although the volume of total service trade is not significantly influenced by intellectual property protection, some service industries are still affected by it when we examined the industries separately. Among the 7 kinds of the service trade, manufacture, manufacture, construction, and the charge for use of intellectual property are affected by the level of intellectual property protection.

5.3 Robustness Test

In order to examine the accuracy of the finding, we employed the lagging method. We delayed the variables including intellectual property protection, lngdp, lnpop for a year. The results of the ordinary least square test are presented below.

<table>
<thead>
<tr>
<th>Table 4. Robustness test</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1)</td>
</tr>
<tr>
<td>------</td>
</tr>
<tr>
<td>lncom</td>
</tr>
<tr>
<td>iatr</td>
</tr>
<tr>
<td>lngdp</td>
</tr>
<tr>
<td>_cons</td>
</tr>
<tr>
<td>Observations</td>
</tr>
<tr>
<td>R-squared</td>
</tr>
</tbody>
</table>

Standard errors are in parentheses. *** p<.01, ** p<.05, * p<.1.
From Table 4, we can see that the policies on intellectual property protection were still positively related to any kinds of commercial services. The coefficient of commercial service trade is significant at the level of 95%. The property for manufacture-related services was also motivated by intellectual property protection. The coefficients of transport and construction were not significant as before, while the figure for telecom became quite significant at the level of 99%. Although there is a small difference in the significance of parameters when joining the lagging items, the influence direction kept the same with the original exam. Thus, this study is reliable and valid.

6. Implications

Based on the above empirical results, we propose some suggestions to facilitate the service trade and to help the structural transformation of the Chinese economy.

6.1 As for the Domestic Protection of Intellectual Property

The swift growth of the service trade can push the government to perfect the intellectual property related law. This can increase the efficiency of administration and enhance relevant knowledge of intellectual protection. The Chinese government ought to perfect the legislative system of intellectual property, optimize the channels of applying for intellectual property and enhance the enforcement of administrative laws. The administration should pay enough attention to increasing the independent innovation capacity. They should improve the motivation system for staff and establish the recognition for a brand. In the future, with the growing importance attached to the intellectual property, only by improving the output of the investment in research and development can a company keep competitive in the global market.

Based on the variation of the effects on industries, we found that manufacturing, construction and charge of usage of intellectual property were influenced most significantly by the intellectual property protection policies. Considering the volume of those industries, we should pay more attention to the manufacturing and construction departments.

In terms of the manufacturing industry, some policies have been implemented in the past. The Ministry of Industry has promised to strengthen basic research and applied basic research disciplines, to speed up the key technology research. Two directions can be adopted in the protection of intellectual property. On one hand, the government should study and explore mechanisms to support rapid and centralized patent reviews in key manufacturing sectors. In this way, we can enhance the development of industrial enterprises’ intellectual property capabilities, and boost the research on major issues concerning intellectual property. On the other hand, we should encourage relevant colleges and universities to participate in the pilot project of “empowering” scientific research achievements. At the same time, we can establish docking and liaison mechanisms between local industries, and build specialized institutions for technology transfer.

When it comes to the construction industry, the absence of intellectual property would cause unfairness in the industry. There are some different ideas about intellectual property protection in the construction industry. Firstly, different protection strategies should be implemented for different types of intellectual property rights. Secondly, corporations should adjust the training structure of intellectual property talents to increase the proportion of practical and compound intellectual property talents. Thirdly, managers should adopt a rational selection of intellectual property management mode to enhance commercial value.

6.2 As for the International Agreements

Another key point for raising the level of intellectual property protection is encouraging the companies to participate in the global innovation chain configuration. Intellectual property protection achieved by agreements on the basis of an international organization or bilateral diplomatic relationship also makes difference.

Attention has been paid to the relationship between Trade-Related Aspects of Intellectual Property Rights (TRIPS) and foreign direct investment (FDI), which testify that TRIPS has stimulated a sharp increase in intellectual property protection. The international protection of intellectual property should be thought of from the perspective of both international competition as well as the allocation of the benefits (Deng, 2021). Based on the data of China and Association of Southeast Asian Nations (ASEAN), Chen et al. (2021) builds the direct impact mechanism and regulatory effect mechanism to demonstrate the relationship between intellectual property protection in destination countries and export trade of the exporting countries. The Regional Comprehensive Economic Partnership (RCEP), initiated by ASEAN, has made comprehensive rules to drive coordination through creating and utilizing the intellectual property. China joined the RCEP last year. Initiative organizations should also take into consideration the gap in economic level and structure among the member countries to guarantee the effectiveness of the agreements.
7. Conclusion

The protection of intellectual property has gradually become a major consideration when the service trade relies more on innovative ability and patents. On the basis of the previous research on intellectual property and international agreements, this paper examines the effect that intellectual property has on China’s outward service trade. We conclude that the protection policies have a positive effect on the construction, manufacturing, charge for the use of intellectual property in the service trade and that the motivating effect varies among different industries. Among all the industries, the charge for using intellectual property is influenced most significantly at the level of 1%.

Due to the availability of data, this paper only uses the data from 2007 to 2019. While the covid-19 caused a huge change in the structure of the global economy and brought fluctuations in international trade, recent data may present a better result that is closer to our life. Also, future tests can further explore the moderating variable of the effects of intellectual property protection. Although this paper discovered the difference among different kinds of services, it did not find out the mechanism of the difference. Further research can explore the possible reasons for these differences.

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