



The Impact of Trade Agreements on Exports in the Context of Big Data

Japanese Digital Products as An Example

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Abstract. The importance of data in the era of big data has given birth to new forms of digital trade, and cross-border data flow is also an important issue in economic digital trade agreements. Based on the digital product export data from 2011 to 2021, this paper empirically tests the impact of the digital trade agreement between Japan and the sample countries and its depth level on Japan's digital product exports by using STATA data analysis software. The study found that the existence of a digital trade agreement between Japan and the sample countries would significantly promote the export of digital products, but the depth level had a weak inhibitory effect on the export of digital products. This shows that in the construction of digital trade rules, the different demands of "defensive" countries and "offensive" countries for digital trade rules should be considered, and seek common ground while reserving differences, so that the high-level digital trade rules constructed can better promote the development of digital trade.

Keywords: digital trade rules; digital product export; data flow; depth level of clause

1 Introduction

With the development of the Internet and the rise of "5G", the world has entered the era of digital economy, data has gradually become a new factor of production driving social development, and digital trade has become a stage product of productivity development. There is no uniform international standard for the connotation of digital trade. In 2013 ^[1], the U.S. International Trade Commission (USITC) took the lead in defining the concept of digital trade, and then in 2014 ^[2], 2017 ^[3], USITC expanded the connotation of digital trade; For developing countries represented by China, in 2019, the China Academy of Information and Communications Technology elaborated on the

connotation of digital trade in the white paper on digital development ^[4], it is believed that digital trade includes the digitization of trade methods and the digitization of trade objects, of which the digitization of trade objects is mainly based on data and products and trade in the form of data. In the new stage of informatization, the new trend of integration of "digitalization", "networking" and "intelligence" and the large-scale aggregation of data resources have laid a solid foundation for the development of digital trade.

2 Data gives birth to the digital economy and promotes the development of digital trade

Digital trade has gradually become a new engine driving global economic growth, which has reduced the cost of world trade, improved trade efficiency ^[5]. But at the same time, the development of digital trade has also brought new regulatory challenges to governments. For example, whether to allow the free flow of data across borders and the localization of computer information. The healthy development of digital trade requires a new international order to regulate, while the achievements of the WTO in related fields are still fragmented ^[6], which has spawned a series of regional digital trade agreements.

As the world's third economy, Japan's digital trade development is not as good as that of China and the United States, however, Japan fully recognizes the importance of participating in the governance of the global digital economy, actively participates in the establishment of a digital trade rules order, with CPTPP¹ as its predecessor, followed by RCEP. The signing of RCEP is a major attempt by Japan in the digital economy market in East Asia, and it also breaks the hegemonism of the United States and Europe in the formulation of digital trade rules ^[7]. Therefore, this article will discuss whether the regional digital trade rules are conducive to the development of digital trade in Japan from the perspective of regional digital trade agreements dominated by Japan.

3 Empirical analysis

3.1 Model construction

Based on the text of regional digital trade agreements, this paper uses the panel data from 2011 to 2021 to analyze the impact of digital trade rules on the export of digital products², and builds the following empirical model based on the trade gravity model:

$$\ln Trade_{ijt} = \beta_0 + \beta_1 RTA_{ijt}^{if} + \beta_2 RTA_{ijt}^{depth} + \beta_3 \ln GDP_{jt} + \beta_4 \ln |PGDP_{ijt}| + \beta_5 \ln |DIST_{ijt}| + \beta_6 \text{colony}_{ijt} + \beta_7 X_{ijt} + \varepsilon_{ijt}$$

¹ Since the United States withdrew from CPTPP in 2017, the agreement was renamed TPP.

² The sample countries are China, South Korea, Australia and other 12 countries with digital trade agreements with Japan.

Among them, i, j, t represent the exporting country, importing country and year respectively, ε_{ijt} is a random disturbance term.

3.2 Variable selection

1.Explained variable. Trade, the export value of digital products. Data from the UNCTAD database.³

2. Explanatory variables. (1) *Main explanatory variables.* ① Whether there are related digital trade agreements among economies, RTA_{ijt}^{if} . This value is a virtual variable. ② Depth of digital trade rules, RTA_{ijt}^{depth} . (2) *Control variables.* ① Gross domestic product of the importing country, GDP_{jt} . ② The absolute value of the difference in GDP per capita among economies, $PGDP_{ijt}$. ③ Differences in digital infrastructure among economies, $deICT_{ijt}$. ④ Differences in higher education level among economies, $deEDU_{ijt}$. ⑤ Geographical distance between importing economies and Japan, $DIST_{ijt}$.

3.3 Variable data pre-analysis

In this paper, we first use STATA data analysis software to depict scatter plots and regression straight lines of Japan's digital product exports and core explanatory variables, so as to prejudge the relationship between the core explanatory variables and the explanatory variables, and thus obtain Fig. 1 and 2.

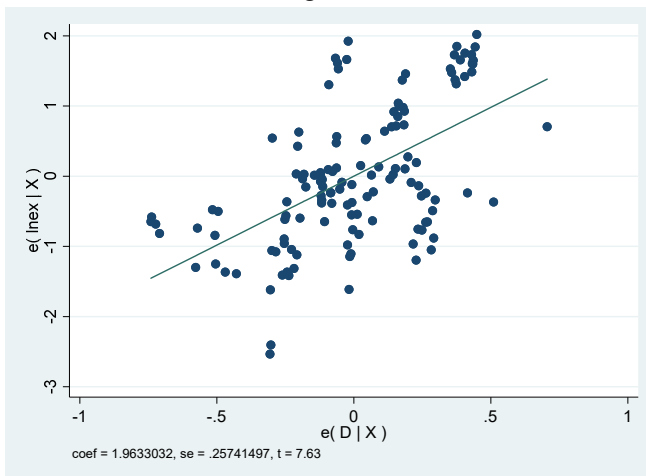


Fig. 1. Partial correlation between RTA_{ijt}^{if} and exports of digital products[self-painted]

³ Due to the availability of data, this paper excludes codes with obvious data defects such as HS844312, 8469, 9009, 852510, 852520, 852530~852549.

From the scatter plot in Figure 1 and the direction of the regression line, it can be seen that the relationship between the existence of relevant digital trade agreements between economies and Japan's digital trade exports is positively correlated, and there is a strong correlation between the two.

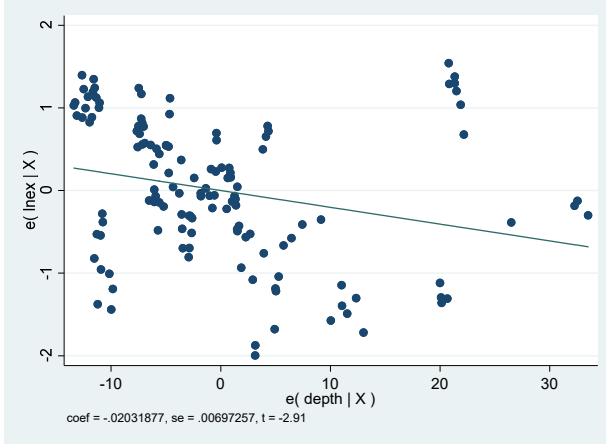


Fig. 2. Partial correlation between RTAijtdepth and the export value of digital products[self-painted]

From the scatter plot and regression straight line in Figure 2, it can be seen that there is a negative correlation between the text depth of digital trade agreements signed between economies and the export value of digital products, but the negative correlation between the two is weak.

3.4 Benchmark regression result

With STATA data analysis software, in this paper, OLS regression and PPML regression are carried out at the same time, and the results produced by the two methods are compared and analyzed (as shown in Table 1). It can be seen from column (1) in Table 1 that all variables in OLS regression results are significant. The core explanatory variable, RTA_{ijt}^{if} , is significantly positive, with a coefficient of 1.9633, indicating that the existence of digital trade agreements among economies has a great impact on the export of related digital products, and Japan is more inclined to export digital products to partner countries that have digital trade agreements with itself. Another core explanatory variable, RTA_{ijt}^{depth} , although the depth level of digital trade agreement is significant, its sign is negative, contrary to the expected one; However, under the condition that the coefficient is only -0.0203, the article reasonably thinks that among the sample countries studied, because the sample countries are mostly underdeveloped countries such as the Philippines, Vietnam, Indonesia, etc., their attitudes towards digital trade rules are still relatively conservative, and they tend to "defend" rather than attack, which is quite different from Japan's demands in the field of digital trade rules. Therefore, the depth of digital trade rules signed by both sides cannot promote bilateral cooperation.

For other explanatory variables, the expected symbols of GDP of importing countries and the difference of GDP per capita among economies are in line with expectations. The difference of digital infrastructure (deICT_{ijt}) is significantly negative, which indicates that the big difference of digital infrastructure among economies will be an obstacle to the development of digital trade. However, the difference of higher education level (deEDU_{ijt}) is significantly positive, which indicates that in the digital economy era, the role of human capital is not as important as that of traditional trade.

Table 1. Benchmark regression results[self-painted]

variable	OLS regression	PPML regression
	$\ln\text{Trade}_{ijt}$	$\ln\text{Trade}_{ijt}$
	(1)	(2)
$\ln\text{GDP}_{jt}$	1.0179***	0.0511***
$\ln\text{PGDP}_{ijt}$	-0.3435**	-0.0158**
$\ln\text{deICT}_{ijt}$	-1.3101***	-0.0663***
$\ln\text{deEDU}_{ijt}$	0.3679***	0.0162***
$\ln\text{DIST}_{ijt}$	-3.1398***	-0.1480***
colony_{ijt}	-3.2140***	-0.1558***
$\text{RTA}_{ijt}^{\text{if}}$	1.9633***	0.1006***
$\text{RTA}_{ijt}^{\text{depth}}$	-0.0203***	-0.0010**

Note: ***, ** and * respectively indicate that the variables are significant at the levels of 1%, 5% and 10%.

The results of PPML regression are shown in column (2) in Table 1. It is not difficult to find that all variables in PPML regression results are also significant, and the expected symbols are the same as those in OLS regression results, with little difference in coefficients among variables, which proves that OLS regression results have certain robustness.

4 Conclusions and policy recommendations

According to the digital trade agreements signed between Japan and other economies, this paper calculates the depth level of related agreements, constructs an extended gravity model, and empirically tests the existence of digital trade agreements among economies and the influence of depth level on digital product exports based on the data of Japan's digital product exports to relevant sample countries from 2011 to 2021. It is found that the existence of relevant digital trade agreements between Japan and relevant sample countries will greatly promote the export of Japanese digital products. However, the influence of the depth level of relevant agreements on the export of digital products may be influenced by the acceptance of digital trade rules by sample countries. For underdeveloped countries, they tend to protect their own digital trade development, and they tend to "defend" rather than "attack", while developed countries tend to "attack" or "dominate" when participating in the construction of digital trade rules, which makes

them different in their demands on digital trade rules, which may inhibit underdeveloped countries and developed countries to some extent.

In view of the above conclusions, the article suggests that in the era of digital economy, digitalization has become an irreversible trend, and the United States and Europe have exerted great influence in the formulation of global digital trade rules. Both China and Japan should actively participate in the construction of global digital trade rules, seeking common ground while reserving differences, and the development trend of digital transformation is inevitable. We should seize the opportunity bravely, take RCEP as the starting point, strengthen mutual cooperation in the field of digital trade supervision, and create a good environment for the development of our own digital trade.

References

1. THE UNITED STATES INTERNATIONAL TRADE COMMISSION(USITC).Digital Trade in the U.S. and Global Economies, Part 1[R].USITC Publication, 2013:5-20.
2. THE UNITED STATES INTERNATIONAL TRADE COMMISSION(USITC).Digital Trade in the U.S. and Global Economies, Part 2[R].USITC Publication,2014:10-25.
3. THE UNITED STATES INTERNATIONAL TRADE COMMISSION(USITC).Global Digital Trade 1:Market Opportunities and Key Foreign Trade Restrictions[R].USITC Publication, 2017:32-34.
4. CAICT. White Paper on the Development and Impact of Digital Trade (2019)[R]. Beijing: China Institute of Information and Communication, 2019.
5. DUVAL Y, UTOKTHAM C,KRAVCHENKO A. Impact of Implementation of Digital Trade Facilitation on Trade Costs[R].ARTNE T Working Paper Series,2018.
6. GAO H. "Digital or Trade? The Contrasting Approaches of China and U.S. to Digital Trade" [J]. Journal of Inter-national Economic Law,2018,21(2):297-321.
7. Shi Jinfang, Sui Xiao. A Study on the Motivation and Path of Japanese Digital Trade Rules [J]. Modern Japanese Economy, 2022,41(04):69-81.

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