Is Revealed Comparative Advantage the Curse to Chinese Products Suffering from US Antidumping Actions?*

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Abstract: Is the revealed comparative advantage (RCA) the curse to Chinese products suffering from US antidumping (AD) actions? This paper carries out studies by sampling 97 products involved in US AD cases against China and 395 kinds of 10-digit products uninvolved in cases. The findings are that: (1) Statistical analysis of case-involved samples indicates that the US AD actions against China mostly focus on Chinese products possessing strong RCA in the US market; inflicted by US AD actions, 35 case-involved Chinese products still maintain strong RCA, whereas 27 ones lose the advantage in the US market. (2) After extending the samples by introducing 395 kinds of products uninvolved in AD cases, two estimation methods verify that the impacts of all factors influencing the probability of US AD actions against China become smaller, showing that the bias in selecting samples is avoided. Relatively, the US trade deficit with China accrued through Chinese products is the most important determinant and the direct reason for the award of industry injury and the issuing of AD orders by the US International Trade Commission (ITC). RCA is only one of the influencing factors but not the curse to Chinese products suffering from US AD actions. Other influencing factors include slower industrial production growth and rising unemployment in the US. The US subprime crisis is another important influencing factor.

Key words: revealed comparative advantage, Chinese products, US antidumping actions
JEL Classifications: F13, F14, P33

1. About the Question and Literature Review

Along with foreign trade development, China has fully participated in the world trade labor-division chains with its RCA in labor-intensive production of miscellaneous products, raw materials, machinery and transport equipment as well as resource-consuming and technology-mature industrial manufacturing. The US, however, does not exploit such advantage in high-tech exports to China due to its export control policy, which exacerbates its trade deficit with China (Shen Guobing, 2007a). US huge trade deficit plus slower domestic economic growth and rising unemployment leads to the prevalence of trade protectionism. According to the WTO statistics, the US initiated altogether 107 AD investigations and imposed 90 AD measures against China (the mainland, the same hereinafter) from 1995 to 2011, accounting for

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12.5% and 14.3% of all WTO members' AD investigations and measures against China, respectively, and 23.4% and 29.5% of all US AD investigations and measures against foreign countries, respectively. Is RCA the curse to Chinese products suffering from US AD actions then? The answer concerns where China's foreign trade to go: sticking to the RCA of manufacturing or trying another way.

Current literatures about the factors influencing US AD actions against China focus on two studies. **First is the study on macro factors influencing US AD actions.** Mah (2000) verifies that there is a one-way causality from trade balance to growth rate of the percentage of affirmative antidumping decisions in the US. Knetter and Prusa (2003) point out that a slump in economic activity in the importing country makes it more likely domestic firms perform poorly which may facilitate a finding of material injury. Irwin (2005) verifies that the direct determinants of the annual number of US AD cases include the unemployment rate, the exchange rate, import penetration and the change in the Antidumping Act and its competent authority in 1984. **Second is the study on macro factors influencing US AD actions against China**. Xie Jianguo (2006) argue that economic factors are main causes of US AD actions against China. The fluctuation in the US industrial output and the US trade deficit with China significantly increase the frequency of US AD investigations. Besides, the worsening China-US political relationship changes into intensified trade frictions. Shen Guobing (2007b) classifies macro determinants of US AD actions against China into three categories. First are endogenous economic factors like the US industrial production growth rate and the unemployment rate; second are exogenous economic factors like trade pressure from China, exchange rate pressure on the US dollar and China's AD retaliations; third are institutional factors like the change in the US Antidumping Act and the potential change in China's non-market economic status.

There are also studies about the correlation between RCA and US AD actions against China. Krugman (2001) argues that the scale economy and product differentiation lead to international division of labor and trade. Due to the differences in factor endowments and scale economy, the RCA of like products varies across countries. As a result, importing countries tend to file antidumping petitions on grounds of injury of the industry concerned for purpose of protecting the domestic industry. Jiang and Ellinger (2003) believe that as China's exports grow rapidly, its low-price advantage apparently threats less-competitive enterprises of importing countries. As a response to such threats, the US embraces the AD strategy to protect its domestic industries and prevent Chinese products from occupying the market. Bown and McCulloch (2005) argue that US industries filing AD petitions have a lower RCA index than those which do no file. Therefore, US industries which have lost or are losing the RCA are more likely to file AD petitions against China. However, USITC (2007) points out that US suitors should be domestic manufacturers, producers, wholesalers and associations of like products, or the coalition of rivalries of imported products. They should represent at least 25 percent of the market share in the industry concerned, and supporters of the accusation should make up over 50 percent of domestic producers or workers. Theoretically, Chinese products which possess strong RCA will crowd out US like products and trigger AD frictions between two countries.

In this paper, the author examines the RCA situation of 97 case-involved products of US AD actions against China and introduces 395 kinds of 10-digit trade products uninvolved in AD cases to explore if RCA is the curse to Chinese products suffering from US AD actions. The rest of this paper is organized as follows. Section 2 examines the RCA situation of 97 case-involved products. Section 3 and section 4 explore the impact of the RCA on US AD actions against Chinese products with the linear probability model and the GMM model. Section 5 presents conclusions and policy implications.

2. RCA Situation of Products Involved in US AD Actions against China

We use the RCA Index to measure the revealed comparative advantage of Chinese products involved in US AD actions. Theoretically, the bigger the RCA Index is, the more competitive the product is in the US market; if it accrues US trade deficit with China, it can easily trigger US AD actions against China. We will verify it by calculating the RCA Index of case-involved Chinese products. Balassa (1965, 1989) originally proposed the RCA Index:

$$R_{ij} = \frac{X_{ij}}{X_{nj}} / \frac{X_{it}}{X_{nt}} \qquad (1)$$

There, X_{ij} denotes export of product *j* from country *i*, and X_{nj} denotes aggregate exports of product *j* from ten industrial countries; X_{it} and X_{nt} respectively denotes all exports from country *i* at a particular time *t* and the aggregation of all exports from ten industrial countries. Benedictis and Tamberi (2001) established the RCA Index of a product exported from a particular sector in a particular country versus the world's like products as follows:

$$BI_t = \frac{X_{cs} / X_{ws}}{X_c / X_w} \qquad (2)$$

BI_t refers to the ratio between the export share of sector *s* of a country to the world total and the country's export share to the world total in year *t* ($0 < BI < \frac{X_w}{X_c}$). If $1 < BI < \frac{X_w}{X_c}$, it means the exports of sector *s* possess RCA, otherwise they have revealed disadvantages. Based on the method proposed by Balassa (1965, 1989), Benedictis and Tamberi (2001), and referring to Shen Guobing (2007c) method, the author establishes the RCA Index of Chinese product *j* involved in US AD actions versus the world's like product in the US market as follows:

$$RCA_{CAj} = \frac{X_{CAj} / X_{WAj}}{X_{CA} / X_{WA}} \qquad (3)$$

There, X_{CAj} stands for the export of Chinese product *j* to the US, or the US import of product *j* from China; X_{WAj} stands for the export of product *j* from the world to the US, or the US import of product *j* from the world; X_{CA} stands for China's export to the US or US import from China; X_{WA} stands for the world's export to the US, or the US import from the world. This RCA Index measures Chinese product *j*'s RCA, namely the export competitiveness versus the world's like product in the US market.

Considering re-export leads to great statistical discrepancy in the trade data between China and the US, and US AD actions against Chinese products are decided dependent on trade data of the country of origin for US imports, we replace the data of China's exports to the US with the data of the country of origin for US imports. According to the criteria of demarcation for RCA defined by Japan External Trade Organization (JETRO), when $RCA_{CAj} > 1.25$, Chinese product *j* possesses strong RCA and export competitiveness in the US market, while the local like products are being crowded out. When $0.8 < RCA_{CAj} < 1.25$, the product has moderate RCA. When $RCA_{CAj} < 0.8$, the product is at a disadvantage with little export competiveness, so the local like products are not crowded out. To avoid the impact of the change in US antidumping policies against Chinese products happening around the establishment of World Trade Organization in 1995, we choose 97 cases of US AD actions against Chinese products occurring during 1996-2009 as samples. We calculate their RCA Indices using Formula (3). The RCA Index reflects both the export competitiveness of Chinese product *j* and the pressure it brings to the US market. The trade data of samples comes from the US ITC database. Their RCA Indices are not presented here due to limited space. From the calculation result, we arrive at the following findings:

(1) Most Chinese products possess strong RCA in the year they suffered from US AD actions, although some products are at a disadvantage. Out of 97 cases, the RCA Indices of 70 cases are no less than 1.25 in that year, showing they possess strong RCA in the US market in the year they suffered from US AD actions, and they cause the pressure to local like products. The Indices of 8 cases are between 0.8 and 1.25, indicating that they possess moderate RCA. The Indices of other 19 cases are less than 0.8 in the year they suffered from US AD actions, indicating that they are at a disadvantage and produce no "crowd-out" effects to local like products, but they are still sued by the US. As per the RCA from strong to weak, all cases fall into three categories including "strong RCA", "moderate RCA" and "revealed disadvantages" which accounts for 72.2%, 8.2% and 19.6%, respectively (see Figure 1). To conclude, US AD actions against China mainly focuses on the filed products which possess strong RCA in the US market.

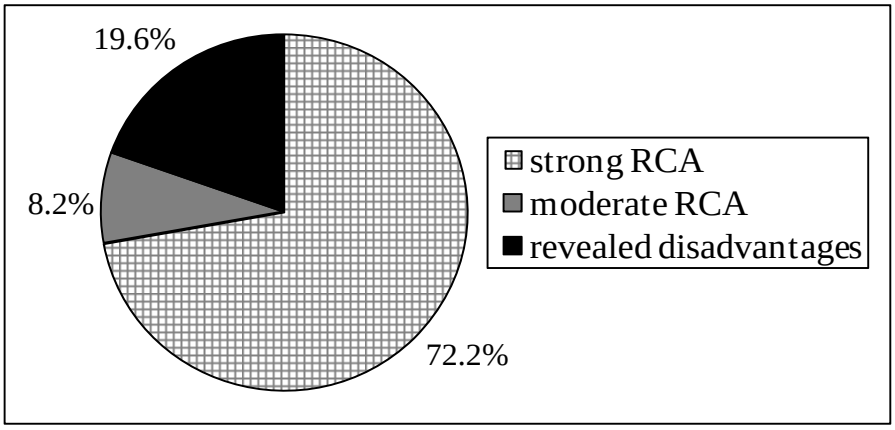

Figure 1: RCA shares of the filed products of 97 cases of US AD actions against China

(2) After suffering from US AD actions, 35 kinds of Chinese products still maintain their strong RCA in the US market in most years, including melamine tableware, brake drum and rotor, crawfish tail meat, aspirin, indigo dye, paint brush, sodium citrate, foundry coke, folding metal tables and chairs, blast furnace coke, non-forged cast-iron pipe, steel fence post, malleable cast iron pipe fitting, fluorescent whitening agent (two AD cases), polythene bag, ironing table, wooden bedroom furniture, trolley, chlorinated isocyanurates, diamond saw blade, lined paper, steel nail, laminated woven sacks, wire hangers, light weight thermal paper, raw flexible magnets, uncovered innerspring units, steel threaded rod, air-conditioner cut-off valve, kitchen appliance shelving and racks, metal mesh, woven electric blankets, magnesia carbon brick and seamless refined copper pipe and tube.

(3) The RCA performance of Chinese products varies after suffering from US AD actions. Specifically, there are three categories. First, RCA of 10 kinds of products first declines and then is restored to the original high level, including mushroom in brine, windshields, circular welded non-alloy-steel tube, oil country tubular goods (filed in 2002), saccharin, circular welded carbon steel line pipe, canvas, polyester, ATMP scale inhibitor, corrosion and scale and inhibitor. Second, 9 kinds of products possess moderate RCA in the US market, including the coil roofing nail, apple juice concentrate, steel wire rope, folding gift boxes, color television set, off-the-road tyre, small-diameter graphite electrode, grassland maintenance equipment and standard steel fasteners. Third, 27 kinds of products lose RCA in the US market, including persulfate, honey, pure magnesium, ferrovanadium, poval, barium carbonate, refined aluminum oxide, tetrahydrofurfuryl alcohol, electrolytic manganese dioxide, carbazole violet pigment, magnesium metal, carbon alloy steel wire rod, activated carbon (two cases), sodium hexametaphoshpate, circular welded carbon steel pipe, light-walled rectangular pipe and tube, electrolytic manganese dioxide, circular welded stainless-steel compression tube, circular welded carbon steel line pipe, citrate salts, oil country tubular goods (filed in 2009), pre-stressed concrete strand, steel grating, narrow woven ribbons, seamless carbon steel line pipe, sodium potassium and phosphorus salt.

(4) Sixteen kinds of products are at a disadvantage in the US market in most years, but still suffer from US AD actions, including cut-to-length carbon steel plate, creatine monohydrate, cold-rolled carbonsteel, twisted steel, counter scanner, hot-rolled carbon steel, steel beam,

cold-rolled steel, ball bearing, frozen and canned warm-water shrimp, crepe paper, tissue sheets, coated paper (two cases), PET thin films and sodium nitrite.

As indicated by sample analysis, US AD actions against China mainly focus on the filed products possessing strong RCA in the US market. After suffering from US AD actions, 35 kinds of products still maintain strong RCA, but 27 ones lose it. Sixteen products are at a disadvantage in the US market but are still sued by the US. All these indicate that although US AD actions against Chinese products cannot fundamentally cripple the strong RCA of China's exports, it has caused negative destruction effects to some exports to the US. Moreover, the analysis indicates that US AD actions against China do not depend on whether China's exports to the US have strong RCA.

3. Analysis of US AD Actions against Chinese Products and RCA with the Linear Probability Model

According to statistical analysis of 97 cases, US AD actions against China mainly focus on the products possessing strong RCA in the US market, is RCA the curse to them then? Obviously, we cannot give an affirmative answer now as there is a bias for only sampling 97 cases. To avoid the impact of this bias when examining the impact of RCA on US AD actions against Chinese products, we introduce 395 kinds of 10-digit major trade products uninvolved in US AD actions against China[*], and take other major influencing factors as the control variables.

3.1. Selection of Variables and Data Sources

Dependent variable: US AD actions against China include AD investigations and AD measures. If no AD measures are taken against product *j*, the US will initiate AD investigation against it. As per the AD rules of the US, a sunset review of AD orders being executed will be made every five years. However, the US importers, Chinese producers and exporters do not actively participate in the sunset reviews of Chinese products. As a result, most US AD measures against Chinese products remain in force. Therefore, we take AD_{jt} as the dummy variable of US AD investigation (or measure) against Chinese product *j* in year *t*. If there exists AD action, its value will be 1, otherwise it will be 0[†]. Information about AD investigations and AD decisions on 97 Chinese products comes from the global antidumping database. To avoid the bias for only sampling case-involved products, we extend samples by introducing 395 kinds of 10-digit major trade products uninvolved in AD cases.

[*] Major trade products selected to extend samples are products the US imports from China with a volume of above USD 0.1 billion and which account for 76.2% of US imports from China in 2010. Those whose data of most years is missed are excluded.

[†] The value will be 1 both when the US imposes AD measures and initiates AD investigations against Chinese product *j*, which is designed to differ from the products without suffering from US AD actions in the same period. More importantly, even if no AD measures are taken against product *j*, the US will initiate AD investigation against it as well. The sunset review made every five years is a powerful evidence. Therefore, it is appropriate to assign a value of 1 during the continuance of US AD measures against Chinese product *j*.

The key explanatory variable is the RCA of Chinese products involved and uninvolved in AD cases. Theoretically, the bigger the Index is, the stronger RCA the product possesses in the US market, the more "crowd-out" effects it causes to local like products, and the more likelihood of triggering US AD action there is. The variable RCA_{jt} denotes the RCA of product *j* in the US market in year *t*, and its expected sign is positive. The RCA Indices of these products are calculated with the ITC database.

Main control variables include the US-China trade balance in product *j*, the US domestic macro-economic pressure and the US subprime crisis breaking out in 2007. First, the US always initiates AD actions against China by right of the dominant advantage of its trade deficit, so we should introduce its trade balance with China in product *j*. The variable TB_{jt} denotes such trade balance (exports minus imports) in year *t*, in billion US dollars. It can be positive or negative. The smaller the trade balance is (negative), the more US trade deficit with China accrued through product *j*, which constitutes a direct replacement of US similar products. Accordingly, US ITC is more likely to initiate AD actions against Chinese products on the grounds of the industrial injury to US like products. The expected sign is negative. The data of US trade balance with China comes from the US ITC database. To facilitate cross-year comparison, we use the data of real trade balance for econometric analysis. Second, the US domestic macro-economic pressure can also cause AD actions against Chinese products. Referring to Shen Guobing (2007b), the US domestic macro-economic pressure is measured by the US industrial production growth rate (IPR_t) and the US unemployment rate (UER_t), in percentage, which come from the database of IFS. Slower industrial production growth and rising unemployment in the US might trigger US AD actions against China. The expected impact of the former and latter is negative and positive, respectively. Third, considering the impact of the US subprime crisis on its AD actions against China, we add the dummy variable Dum_t into the model to control the impact and to replace the dummy variable of "time". The value after occurrence of the subprime crisis in 2007 is assigned 1, and the value before that is 0; the expected sign is positive.

3.2. Model Constructing and Empirical Analysis

Considering the dependent variable is a binary variable (value is 0 or 1), we choose the linear probability model (LPM), [*] and use panel data to estimate the impacts of independent variables on the probability of US AD action against Chinese product *j*. Given the heteroscedasticity, we use the cross-section weighted PCSE method to estimate. The linear probability panel data model of US AD actions against Chinese product *j* during 1996-2010 can be established as follows:

[*] As a robustness check, we also use a binary choice model to do regression test after the estimation by the LPM, and find that the regression result is basically consistent with that of the LPM model.

$$P(Y_{jt}=1|X)=\alpha_0+\alpha_1 RCA_{jt}+\alpha_2 TB_{jt}+\alpha_3 IPR_t+\alpha_4 UER_t+\alpha_5 Dum_t+b_j+u_{jt} \quad (4)$$

Here, we set $AD_{jt}=P(Y_{jt}=1|X)$. If the US initiates AD actions against Chinese product *j* (including investigations and measures), then AD_{jt}=1, otherwise its value is 0. *X* stands for all independent variables. For the dependent variable AD_{jt} and independent variables such as RCA_{jt}, TB_{jt}, IPR_t, UER_t and Dum_t, please refer to "3.1. Selection of Variables and Data Sources". α_0 is a constant item, $\alpha_1,\alpha_2,\alpha_3,\alpha_4,\alpha_5$ refer to the coefficients of variables, b_j refers to unobserved individual effects and u_{jt} refers to the stochastic error.

According to Wooldridge (2006), assuming other variables do not change, the change in a certain independent variable X_i will cause a change in the probability of US AD actions against Chinese product *j*. It can be described as follows:

$$\Delta AD_{jt}=\Delta P(Y_{jt}=1|X)=\alpha_i \Delta X_i \quad (5)$$

First, we do the redundant fixed effects test of the model through the likelihood-ratio test. The result shows that the simple OLS regression is rejected, so it is appropriate to use the fixed-effects method for case-involved samples and extended samples. Given fixed-effects estimation has significant positive first-order autocorrelation, we can include the first-order lag dependent variable $AD_{j,t-1}$ into the model as a control variable to reflect the dynamic impact. As pointed out by White and Jones (2000), the US Congress requires ITC to consider the original award of industry injury before making the AD decision. Second, theoretically, the RCA of Chinese product *j* in the US market and the US trade balance with China in product *j* will affect the dependent variable, and vice versa. Therefore, to avoid the problem of endogeneity, we use the one-period lag RCA and trade balance for regression. As the RCA of Chinese product *j* and the US trade balance with China in product *j* have a high multicollinearity with their one-period lag items, it is appropriate to use their one-period lag items instead. Meanwhile, the multicollinearity test between $AD_{j,t-1}$ and $RCA_{j,t-1}$ and $TB_{j,t-1}$ verifies that there is no multicollinearity among them. Finally, as indicated by Hausman test, the fixed-effects estimation is more appropriate than the random-effects estimation. Based on the above, we estimate the LPM by the cross-section weighted PCSE method of fixed-effects estimation. Estimation results of two samples are presented in Table 1.

As shown in Table 1, after extending samples, the impact of the US unemployment rate becomes insignificant; the coefficient signs of other variables do not change, and there is little change in the significance. However, their impacts on the dependent variable all decrease significantly, showing that extending samples overcomes the bias for only sampling case-involved products. As indicated by the last two columns of Table 1, all independent variables selected exert statistically significant impacts on the probability of US AD actions against Chinese products except the US unemployment rate.

Table 1: LPM Estimation Results of Main Factors Influencing the Probability of US AD Actions against Chinese Products (AD_{jt})

Dependent variable AD_{jt}	Case-involved samples				Extended samples			
Independent variable	Coef.	P-value	Coef.	P-value	Coef.	P-value	Coef.	P-value
constant (C)	0.0276	0.3586	0.0190	0.4434	0.0110	0.1484	0.0058	0.4443
$AD_{j,t-1}$	0.7037***	0.0000	0.6984***	0.0000	0.7106***	0.0000	0.7139***	0.0000
RCA_{jt}	0.0236***	0.0000			0.0022**	0.0396		
$RCA_{j,t-1}$			0.0226***	0.0000			0.0030***	0.0031
TB_{jt}	−0.0619*	0.0506			−0.0329*	0.0599		
$TB_{j,t-1}$			−0.1058***	0.0007			−0.0430**	0.0101
IPR_t	−0.0055***	0.0002	−0.0041***	0.0009	−0.0016***	0.0001	−0.0015***	0.0003
UER_t	0.0080*	0.0967	0.0092**	0.0220	0.0003	0.8287	0.0006	0.6333
Dum_t	0.0978***	0.0000	0.0868***	0.0000	0.0139***	0.0024	0.0116**	0.0142
Individual effects	Yes		Yes		Yes		Yes	
Adjusted R^2	0.8219		0.8367		0.7504		0.7555	
num. of obs.	1239		1238		6755		6715	

Source: referring to "3.1. Selection of Variables and Data Sources."

Note: ***, ** and * respectively denotes significance at the statistical level of 1%, 5% and 10%.

At the 99% confidence level, the RCA of Chinese product *j* ($RCA_{j,t-1}$) has statistically significant positive impact as expected. If other conditions would be the same, the probability of US AD actions against Chinese products will increase with rise of the RCA of Chinese products. Specifically, when the RCA increases by one unit in the previous period, the probability will increase by 0.003. In view of this, the RCA of Chinese product is one of the influencing factors leading to US AD actions against China.

At the 95% confidence level, the US trade balance with China in product *j* ($TB_{j,t-1}$) has statistically significant negative impact as expected. Assuming that other conditions would be the same, the probability of US AD actions against Chinese products will increase with drop of the US trade balance in the previous period. Specifically, when the US trade balance with China in product *j* falls by one billion US dollars in the previous period, the probability will increase by 0.043. That is, the larger the US trade deficit with China in product *j* is, the more the likelihood of triggering US AD action there is, due to the direct replacement of US comparable products. Blonigen and Bown (2003) point out that due to standard 'weak' practices for defining dumping, the US Commerce Department rules affirmative on dumping almost every time. Thus, the government AD decision in the US is almost solely determined by the US ITC injury test.

Therefore, the US trade deficit with China accrued through product *j* becomes the most important factor determining if ITC rules Chinese products cause industry injury to US like products and then issues AD orders. It is the direct reason for US AD actions against China.

At the 99% confidence level, the US industrial production growth rate (IPR_t) has statistically significant negative impact as expected. Assuming that other conditions would be unchanged, the probability of US AD action against Chinese product *j* will increase with drop of IPR_t. Specifically, when IPR_t falls by one percentage point, the probability will increase by 0.0015. Thus, the drop of the US industrial production growth rate which causes domestic macro-economic pressure is another influencing factor in the US AD actions against China. Moreover, the dummy variable of the US subprime crisis (Dum_t) has significant positive impact as expected at the confidence level of 95%. Assuming that other conditions would not change, the probability of US AD action against Chinese product *j* will increase by 0.0116 upon outbreak of the US subprime crisis in 2007. Therefore, the subprime crisis is another important influencing factor in the US AD actions against Chinese products. Besides, although the impact of the US unemployment rate (UER_t) is statistically insignificant, it matches the expected sign, implying that a rising unemployment rate in the US will also push up the probability of US AD actions against Chinese products.

4. **Analysis of US AD Actions against Chinese Products and RCA by the GMM Method**

Given the potential endogeneity of the lagged dependent variable and explanatory variables, we further estimate this model by the GMM method of first differences as a robustness check of the above empirical results. Estimation by the GMM method not only effectively controls the endogeneity of variables but also eliminates the possible impacts of the individual's fixed-effect terms, so it can capture more reliable results than the fixed-effects method. Its shortcoming is that the estimation result is directly affected depending on instrumental variables selected. Theoretically, $AD_{j,t-1}$, *RCA* and *TB* are endogenous variables, *IPR* and *UER* are predetermined variables, and *Dum* is an exogenous variable. Here, instrumental variables introduced for the model of case-involved samples include endogenous variables lagged for two to four periods, predetermined variables lagged for one to three periods and the exogenous variable; instrumental variables for the model of extended samples include endogenous variables lagged for two to three periods, predetermined variables lagged for one to two periods and the exogenous variable. The estimation results are shown in Table 2.

Table 2: GMM Estimation Results of Factors Influencing the Probability of US AD Actions against Chinese Products (AD_{jt})

Dependent variable AD_{jt}	Case-involved samples				Extended samples			
Independent variable	Coef.	Standard error	T-value	P-value	Coef.	Standard error	T-value	P-value

$AD_{j,t-1}$	0.6563***	0.0001	9540.4	0.0000	0.3514***	0.0195	18.0566	0.0000
RCA_{jt}	0.0050***	0.0000	369.0	0.0000	0.0025***	0.0006	4.0328	0.0001
TB_{jt}	−0.0464***	0.0001	−649.3	0.0000	−0.0514***	0.0089	−5.8011	0.0000
IPR_t	−0.0088***	0.0000	−2311.5	0.0000	−0.0006***	0.0001	−6.8351	0.0000
UER_t	0.0057***	0.0000	331.1	0.0000	0.0020***	0.0005	4.3834	0.0000
Dum_t	0.0857***	0.0004	236.7	0.0000	0.0176***	0.0041	4.2738	0.0000
J-statistic	97.1923				83.9237			
Instrument rank	96				80			
Sargan test	0.28				0.20			
num. of obs.	1142				6263			

Source: the same as Table 1. Estimation method: the Panel GMM method of first differences.

Note: ***, ** and * respectively denotes significance at the statistical level of 1%, 5% and 10%.

As per the GMM estimation results, independent variables selected have statistical significance at the 99% confidence level under both sample models, and the signs of estimation coefficients of independent variables for the two samples are the same. The validity of over-identifying restriction of all estimation results in Table 2 is verified through Sargan test. The null hypothesis of the test is that over-identifying restriction of instrumental variables is valid. Based on J statistics of Sargan test and the instrument variable rank used for GMM estimation, we can attain the P-value of Sargan test under two sample models as 0.28 and 0.20, respectively, showing the Sargan test accepts the null hypothesis. Therefore, instrumental variables set in the models are valid. To avoid potential spurious regression during the estimation of the dynamic panel data model, we then do the unit root test of the residual error of the estimation. The result indicates that the residual error is stationary, so the GMM method is valid. After extending samples, the impacts of all variables on the dependent variable become smaller except the US trade balance with China in product *j*, showing that the extended samples overcome the bias for only sampling case-involved products.

Our findings from estimation by the GMM method after extending samples are as follows: (1) the dependent variable has high correlation with the previous period, so using a dynamic panel data model can better portray the dynamic impact; (2) Assuming that other conditions would not change, when the RCA of Chinese product *j* increases by one unit, the probability of US AD action against Chinese product *j* will increase by 0.0025, so the RCA of Chinese product *j* is one of the factors causing US AD action against China; (3) If other conditions do not change, when the US trade balance with China in product *j* decreases by one billion US dollars, the probability will increase by 0.0514. The figure indicates that the deteriorating US trade balance with China in product *j* is the most important factor determining if ITC rules Chinese products cause industry injury to US like products and then issues AD orders; (4) If other conditions do not change, when the US industrial production growth rate falls by one percentage point, the probability will increase by 0.0006, so the industrial production growth rate is another factor in the US AD actions against Chinese products; (5) If other conditions do not change, when the US

unemployment rate rises by one percentage point, the probability will increase by 0.002, implying that the US unemployment rate is also an influencing factor in the US AD actions against Chinese products; (6) If other variables do not change, the probability of US AD action against Chinese product *j* will increase by 0.0176 after outbreak of the US subprime crisis, so the subprime crisis is one of the important influencing factors as well.

In comparison, the PCSE method and the GMM method lead to basically the same estimation results. After extending samples, both methods verify that the impacts of all factors influencing the probability of US AD actions against Chinese products decrease significantly, which means the bias for only sampling case-involved products is overcome. The US trade deficit with China accrued through Chinese product *j* is the most important factor determining if ITC decides Chinese products cause industry injury to US like products and then issues AD orders and is the direct reason for US AD actions against China. The RCA of Chinese product *j* is one of the influencing factors but not the curse to Chinese products suffering from US AD actions. Meanwhile, slower industrial production growth and rising unemployment that lead to domestic macro-economic pressure in the US are another two factors in the US AD actions against Chinese products. The US subprime crisis is also another important influencing factor.

5. Conclusions and Policy Implications

By sampling 97 case-involved Chinese products and 395 kinds of major trade products uninvolved in AD cases, this paper explores if RCA is the curse to Chinese products suffering from US AD actions. Conclusions and policy implications are as follows:

(1) As indicated by statistical analysis of case-involved samples, US AD actions against China mainly focus on the products possessing strong RCA in the US market at the initiating AD year. After suffering from US AD actions, 35 case-involved Chinese products still maintain strong RCA, but 27 ones lose the advantage in the US market. Sixteen products are at a disadvantage in the US market but are still sued by the US. All these indicate that although US AD actions cannot fundamentally cripple the strong RCA of China's exports, it has caused negative destruction effects on some products' exports to the US. Moreover, the US AD actions against China do not depend on whether China's exports to the US have strong RCA. Based on these, China can adopt a foreign trade policy through which exports pull imports and imports promote exports, and can adjust the current foreign trade structure and trade destination based on the RCA of China's industries and products so as to recapture the market share lost during the US AD actions.

(2) After extending samples, the GMM method and the PCSE method lead to basically the same estimation results. Both methods verify that the impacts of all factors influencing the probability of US AD actions against Chinese products decrease significantly, thus avoiding the bias for only sampling case-involved products. The US trade deficit with China in product *j* is the most important factor determining if ITC makes the award of industry injury and then issues

AD orders, and is also the direct reason for US AD actions against China. The RCA of Chinese products is one of the influencing factors but not the curse to Chinese products suffering from US AD actions. Meanwhile, the slower industrial production growth and the rising unemployment that result in domestic macro-economic pressure in the US are another two influencing factors. The US subprime crisis is also another important influencing factor.

Given trade complementarities and huge trade deficit between China and the US, it is natural to see AD frictions between the two countries. China will still face a large number of antidumping cases. China's Ministry of Commerce, industry association and enterprises need establish an institutionalized system of responding to AD petitions or initiating AD petitions. After ascertaining that the RCA is not the curse to Chinese products suffering from US AD actions, we advocate China should maintain its RCA-based foreign trade development strategy by employing its resources and factor endowments and developing labor and resource-intensive and technical-mature manufacturing industries in more provinces. Meanwhile, China should improve its foreign trade competitiveness through the scale economy and the technical innovation in some developed provinces and cities. Again, it is much more important for China to implement the industrial ladder-transfer strategy from the coastal to the inner provinces, and to participate actively in the international division of labor to upgrade its competitive advantage.

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