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What Factors Motivate Foreign Countries to Initiate an Antidumping Investigation against China?

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Abstract: This paper used the data of antidumping investigations against China from 1990 to 2014, and established a Negative Binomial Regression Model to make an empirical analysis on the factors affecting foreign countries imposing antidumping investigations against China. The purpose of this paper is to design a hypothesis framework by factors including macroeconomic pressure factors, pattern change factors, strategic factors and Chinese policy factors, and analyze the effect of Chinese international trade policy and foreign investment policy on building capability to reduce the antidumping investigations initiated by foreign countries. The result of empirical model shows that when the macroeconomic circumstance of foreign countries were worse, they would tend to initiate more antidumping investigations against China; when foreign countries imported more Chinese products or exported less products to China, they would launch more antidumping filings against China; the traditional and new antidumping policy users would initiate more antidumping investigations against China than any other foreign countries, and the global antidumping contagion is the reason for the growth of the number of antidumping cases on China; furthermore, China's initiating antidumping policy against foreign countries as an international trade policy is useless, but the usage of foreign investment policy to attract more foreign direct investment from foreign countries into China can help reduce the number of antidumping investigations initiated by foreign countries against China, and this result showed that foreign investment policy could be a well remedy and coordination when the international trade policy of China lost its effect.

Keywords: Antidumping; Chinese trade policy; Macroeconomic factors; Foreign direct investment

1. Introduction

Antidumping (AD) Investigation had been thought to be an international trade policy to maintain the fair international trade activities before 1980s, the users of AD investigations and other trade remedy measures were confined to only a few countries such as United States, Canada and Australia¹, and developing countries accounted for a negligible share in global AD cases. However, after the establishment of WTO in 1995, more and more countries started to impose AD investigations on imported products, especially the developing countries. Although some developed countries have used AD for more than a century, there has been a dramatic growth in AD filings in recent years both in terms of the number of countries as well as the number of products involved (Blonigen & Prusa, 2008).

According to the statistics of Global Antidumping Database (GAD)², from 1978 to 1994, only 18 countries initiated 2223 AD investigations against 71 different countries or regions; but, from 1995 to 2014, over 43 countries initiated 4769 AD investigations against 78 countries or regions. What's interesting is, if we separate the time period by 2000 (Figure 1), we can find that, before 2000, developed countries initiated most parts of the world AD investigations (65.3%), while after 2000, developing countries replaced developed countries and became the active users (67.4%)³. With more and more countries' joining in "World AD club", the AD investigation had been no longer a policy tool to combat the unfair trade activities. It is simply another form of protectionism (Blonigen & Prusa, 2003).

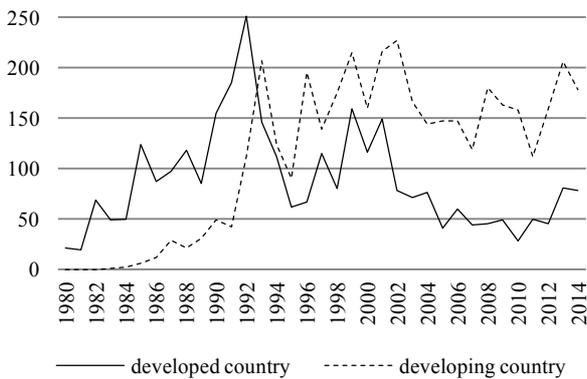


Figure 1 World AD investigation initiated by developed and developing countries

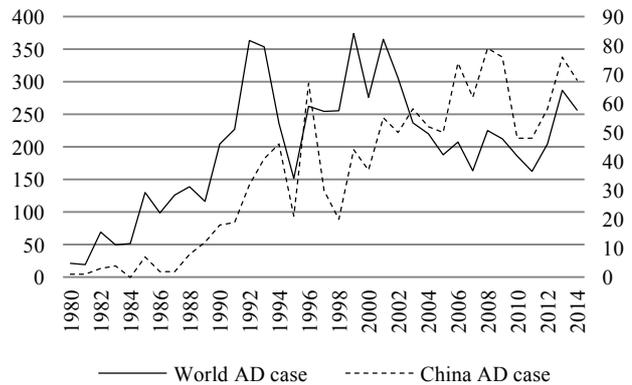


Figure 2. Number of world AD investigation cases and AD cases against China

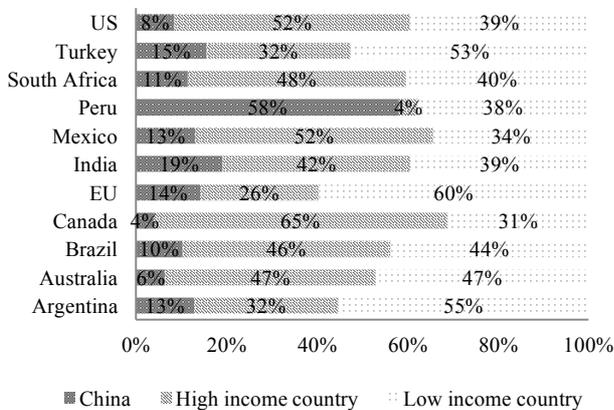


Figure 3. AD filing by targeted countries (1978-2000)

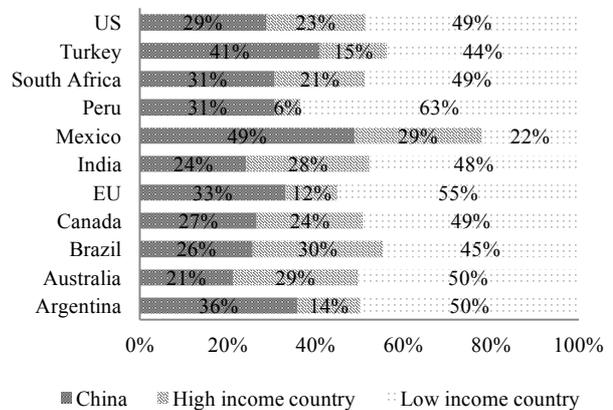


Figure 4. AD filing by targeted countries (2000-2014)

China is one of the countries that are most suffering from global AD investigations, especially after 2001. Figure 2 gives us a picture that when the world annual AD investigations were in decline after 2001, the annual AD investigations against China still increased. Moreover, figure3 and figure4 show a comparison on AD filings by targeted countries before and after 2001, we can find that the proportion of China as a targeted country in total AD investigations initiated by listed countries has a huge increase after 2001. From 1978 to 2014, both developed and developing countries (Figure 2) have initiated 1269 (891 after 2001) AD investigations against China, accounting for 18.1% of world total amount of AD investigations, which means every five AD filings in the past, one was targeted at China. Though, previous studies had found that China should have the credible threat to reduce the AD investigations from foreign countries by initiating its own AD investigations against these countries (Wang & Xie, 2009; Yang, 2009), the fact is that after 2008 global financial crisis, China rapidly reduced its AD investigations against foreign countries rather than increased⁴. Why China initiated less AD investigations instead of more if it would be useful to deter the AD investigations from foreign countries? Moreover, the result of recent studies didn't reach same conclusion. Some thought the foreign exchange rate could have a significant effect on foreign countries initiating AD investigations against China (Wang & Xie, 2009; Yang & Yu, 2013), but some didn't (Wang & Zhang, 2009; Bao, 2011). Some thought other macroeconomic factors such as gross output and inflation, should have more significant impact than exchange rate (Xie, 2006; Shen, 2007; Xie & Zhou, 2011).

This paper is to use the AD investigations data of 26 different countries or regions from 1990 to 2014 to analyze what affects foreign countries initiating AD investigations against China, and at the same time to introduce the effect of Chinese foreign investment policy and international trade policy into the model and discuss how the coordination of Chinese multi-policy affects foreign countries initiating AD investigations against China which was barely discussed before.

2. Literature review

2.1 Common research on what affects one country initiating AD investigations against another

Finger, Hall and Nelson (1982) is a seminal study for most literatures in this field, they established a fundamental framework which was expanded to both theoretical and empirical side. Feinberg (1989) is one of the earliest empirical studies about the determinants affecting AD filings, the study used Tobit maximum likelihood estimation to examine the influence of exchange rate on the AD filings with the data of United States and its 4 major trade partners (Japan, Brazil, Mexico and Korea), and found exchange rate is a significant negative determining factors. However, Knetter & Prusa (2003) enlarged the coverage of macroeconomic factors in general, and examined the filings pattern of 4 major AD users in the world during 1980 to 1998. The result showed that both real GDP and exchange rate have statistically significant impact on AD investigations, but what's surprising was that exchange rate is a positive determining factor. So the conclusion was opposite to Feinberg (1989). Furthermore, the conclusion of Knetter & Prusa (2003) was verified by many other following studies (Sadni-Jallab et al., 2005; Blonigen, 2005、2006; Irwin, 2005; Niels & Francois, 2006). With the coverage of factors being increased, more macroeconomic factors had been added into the estimation model. A common result of these studies was that if a country stay in bad macroeconomic circumstance, it would tend to initiate more AD investigations against other countries (Knetter & Prusa, 2003; Aggarwal, 2004; Blonigen, 2005; Feinberg, 2005; Mah et al., 2006; Vandebussche &

Zanardi, 2008; Bown & Crowley, 2013).

Besides the macroeconomic factors, some studies aimed at the pattern factors, Feinberg & Reynolds (2007) found the change of tariff pattern affecting the use of AD actions in some countries, especially after fulfilling its promise of cutting off the tariff level in Uruguay Round Agreement. The logic relationship between the change of tariff pattern and the use of AD actions is that these countries treated AD actions as the substitute of tariff and built it to be a new international trade barrier. Blonigen & Bown (2003), Deardorff & Stern (2005), Irwin (2005), Mah et al. (2006) thought the change of import and export trade pattern could be another important pattern factors. And some other studies showed a country would seek to use more AD actions against other countries to protect domestic R&D and innovation pattern (Miyagiwa et al., 2016; Kao & Peng, 2016).

Furthermore, some studies suggested the strategic factors have impact on the use of AD investigations as well. Usually, the strategic factors correlated with AD retaliation have two different ways of effect. One way is retaliation effect. Prusa & Skeath (2001) examined worldwide AD investigations from 1980 to 1998, and found the evidence consistent with 'tit-for-tat' retaliatory AD actions. These apparent examples of retaliation and the increasing use of AD investigations have raised substantial concern that AD activity may ultimately reverse much of the free trade gains from the GATT rounds⁵. However, many other studies found that AD investigation as a retaliation strategy can be considered as a retaliation threat to eventually dampen the worldwide AD activities (Blonigen & Bown, 2003; Prusa & Skeath, 2004; Feinberg & Reynolds, 2007; Moore & Zanardi, 2011). Another way of effect is contagion effect, because the AD investigation could create trade deflection. If dumping activities encounter with the AD actions, the dumping trade flow would be deflected from those countries that had initiated AD actions to some other countries, and finally generate many more AD actions from those other countries (Bown & Crowley, 2006). And this result has been verified by Feinberg & Reynolds (2007) and Moore & Zanardi (2011). So, the strategic factors may have totally opposite impact on one country's using AD investigation against another, which brings an uncertainty to the study.

2.2 Specific research on what affects foreign countries initiating AD investigations against China

In recent years, many Chinese studies began to focus on what affects foreign countries initiating AD investigations against China, though most of them focused on the AD activities between United States and China. Xie (2006), Shen (2007), and Feng et al. (2008) are some earliest studies on the factors affecting US using AD investigations against China, and their results showed macroeconomic factors is the most important factors causing US imposing AD investigations against China, which means when the economic status of US in decrease, it would initiate more AD investigations against China. While Li & Wang (2008) and Wang (2008) thought the political power of US should be the crucial determinant affecting US initiating investigations against China. Pan (2008) collected the data from 13 countries which initiated most part of the global AD investigations against China, the study found the economic development status significantly affected the AD investigations initiated by these 13 countries, and the growth of Chinese export and devaluation of RMB would cause even more AD investigations from these foreign countries. Wang & Xie (2009) used the AD data of 16 different countries and firstly completed a comprehensive study on the factors affecting foreign countries imposing AD investigations against China. The result responded Li & Wang (2008a, 2008b) and highly emphasized the discrimination of AD investigations from US against China. Bao (2011, 2012) verified this result and found not only US, but also other developed and developing countries

did have political bias when using AD investigations against China. The following studies went back to the AD issues between US and China, and the common result was that not only the factors of US, but also the factors of China itself could affect US initiating AD investigations against China (Lin & He, 2012; Yang et al., 2012; Xie & Huang, 2014).

In summary, the existing literatures of determinations which affect foreign countries initiating AD investigations against China are mostly based on the AD filings between a specific country (especially US) and China, the comprehensive studies were still very few. Although Wang & Xie (2009) and Bao (2011, 2012) made a comprehensive study on the factors determining foreign countries imposing AD investigations against China, the circumstance which these studies (before 2008) under is strongly different from nowadays, and these studies didn't consider the effect of Chinese policy tool itself either. So, after 2008 global financial crisis, does the effect of determinants affecting foreign countries initiating AD investigations against China remain unchanged? Why China reduced using AD investigation against foreign countries if it as an international trade policy tool could restrict the AD investigation from foreign countries? Could China use its own policy tools to effectively reduce the AD filings from foreign countries against China? This paper is going to answer these questions.

3. Empirical model and theoretical framework

3.1 Sample selection

Based on the data of global AD investigations against China and the availability with the data of other factors, this paper selected 26 different countries or regions from 1990 to 2014 as the statistical sample⁶. The AD investigations initiated by these 26 countries accounted for 97.2% of global AD investigations against China during 1990 to 2014. Furthermore, these 26 countries were also the major AD users of the world and initiated 91.4% of global AD investigations during the same period.⁷

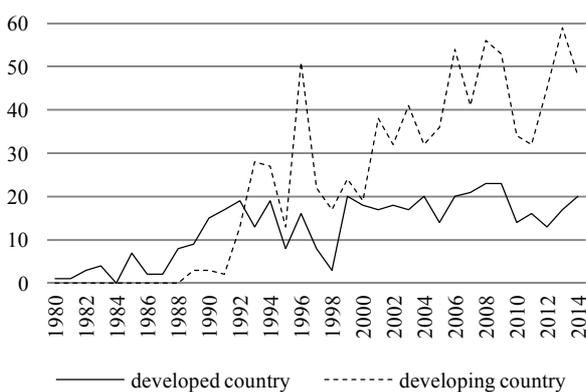


Figure 5. AD investigation against China initiated by developed and developing countries

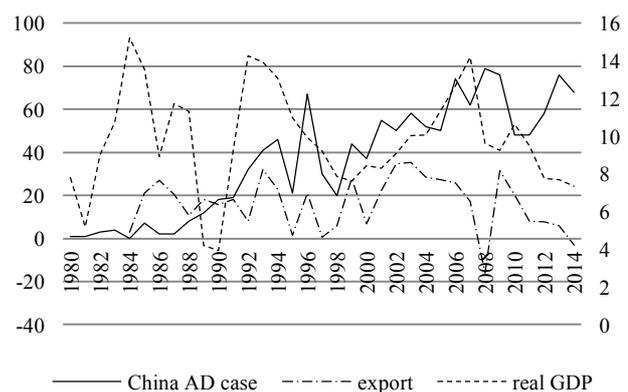


Figure 6. AD investigation against China, China export growth rate and real GDP growth rate

We think the study on these countries that initiated AD investigations against China in a major way can entirely explain what determinants lead foreign countries using AD investigations and how these determinants affect. Figure 5 and 6 gives us a difference of AD investigations initiated by developed and developing countries and a brief relationship between AD filings and some economic indicators.

3.2 Theoretical framework

According to the existed literatures, we can classify the determinants which affect foreign countries initiating AD investigations against China into 3 main factors: macroeconomic pressure factor, pattern change factor, and strategy (retaliation action or threat) factor. Furthermore, we will consider the coordinated usage of policies from Chinese prospective. Our hypotheses are as follows.

3.2.1 Macroeconomic pressure factors

Domestic macroeconomic conditions of foreign countries: If the macroeconomic environment is sluggish, any competitive import from China could give further downward pressure on the macroeconomic conditions and worsen it.

Hypothesis 1. Low level of domestic macroeconomic activities affects the AD investigations initiated against China positively. Countries that are undergoing recessionary environment tend to use more AD filings.

The empirical model includes $RGDP_{it}$ and $INFL_{it}$ to test this above hypothesis. $RGDP_{it}$ means the real GDP growth rate of country i at year t . If the real GDP growth rate of domestic country decreases or stays at a low level, the domestic producers will be hard to be competitive against import products. Therefore, the domestic producers will pressurize the government to provide proper protection on the domestic industry. The probability of judging foreign countries' doing unfair trade will be increased. $INFL_{it}$ means the real inflation rate of country i at year t . If the inflation rate of domestic country is high, the manufacturing cost of domestic products will be high, that means the relative price of foreign products will be low. The relative low price of foreign products couple with the appeal of domestic producers could make the government emotionally compel the argument that the foreign countries are behaving dumping.

Hypothesis 2. Fluctuation in exchange rate affects the AD investigations against China. A weaker Chinese currency value could bring more AD investigations from foreign countries.

The empirical model includes RXC_{it} to test this hypothesis. RXC_{it} means the real exchange rate of the currency of country i to Chinese RMB at year t . Considering the case of a foreign producer servicing the domestic market, we suppose the foreign producer responds a real depreciation in its home currency (e.g. Chinese producer responding a weak value of RMB). When the Chinese RMB weakens, the cost price of Chinese products would fall, the normal response of Chinese producer is to lower the price of products servicing the Chinese market as well as the domestic market. And this would be expected to reduce the profit of domestic producers in the same industry, and probably made the domestic government judge the injury from Chinese products on this industry, then initiated the AD investigations against China.

Hypothesis 3. The number of AD investigations against China is related to import and export trade conditions. The higher percentage of Chinese products in total import linked the more AD investigations initiated by a foreign country against China. A high percentage of products exported to Chinese market made a negative effect on the AD investigations against China.

The empirical model includes IMP_{it} and EXP_{it} to test this hypothesis. IMP_{it} means the percentage of products imported from China in the total import of country i at year t . AD filings is highly related to international trade activities. The higher the value of IMP_{it} means the more import products from China, and it would push great competition pressure on the domestic producers, then came the AD investigations. EXP_{it} means the percentage of products exported to China in the total export of country i at year t . The high percentage of products exported to China means

China is a very important market to country i , if country i initiated too much AD investigations against China, it might bring the retaliation from China, and eventually did harm to the export. So, if the China is an important export market to a foreign country, then it will tend to use less AD investigations against China.

3.2.2 Pattern change factors

AD investigation is a policy tool under the World Trade Organization framework, and during last three decades, the global trade pattern and structure has changed a lot, especially the rising of Chinese economy and trade. Since the AD investigation is a product under the trade pattern, the change of pattern could affect the usage of it.

Hypothesis 4. The role change in global AD user pattern affects the foreign countries initiating AD investigations against China.

The official AD case statistics started from 1978, during the first several years, only few countries could use AD investigations against others. After the establishment of GATT/WTO, more and more countries joined in this world trade system and obeyed the common pattern with cutting off the trade barrier. But many countries still need domestic industry protection, especially the developing countries. Therefore, AD investigations gradually became the substitute of tariff which had been cut off. After more and more countries joined in “AD users club”, we found the role change in AD user pattern, so we use three dummy variables to describe this change and test the above hypothesis. $ADclub_{it}$ means country i joined in global AD users club or not at year t , if joined, we have 1, if not, we have 0. $OLDuser_i$ means whether country i is a traditional AD user or not. While $NEWuser_i$ means whether country i is a new AD user or not. We use the ratio of country i initiating AD against other countries to AD initiated by other countries against country i as the standard to determine whether country i is a traditional AD user or a new AD user. And we use 2000 as a separate time line. If the ratio is larger than 1 before and after 2000, then country i is a traditional AD user, the value of $OLDuser_i$ is 1. If the ratio is less than 1 before 2000 but larger than 1 after 2000, then country i is a new AD user, the value of $NEWuser_i$ is 1. And in any other situation, country i is neither a traditional AD user nor a new AD user, the value of both $OLDuser_i$ and $NEWuser_i$ is 0.⁸

Hypothesis 5. The events that made global trade pattern change affects the foreign countries initiating AD investigations against China.

During 1990 to 2014, three important events changed global trade pattern a lot, that are WTO establishment in 1995, China’s entry into WTO in 2000 and global financial crisis in 2008. We use three dummy variables, $dummy95$, $dummy01$, and $dummy08$ to test this hypothesis. WTO deals with regulation of international trade between participating countries by providing a framework for negotiating trade agreements and dispute resolutions. The establishment of WTO enforces the participating country to adhere to WTO agreements and the new global trade pattern created by each other. WTO exactly provided a new pattern for every participant and affected the way of settling with the international trade dispute. We thought the pattern change brought by WTO also affects the AD filings usage. China’s entry into WTO is the most important event for China after its open and reform policy. Entry into WTO gave China a whole change on its trade and industry pattern including tariff reductions, market openness and industrial restructuring, and help China join in the multilateral global trade system, which strongly changed the global manufacturing system and international trade pattern. We though China’s entry into WTO is an important determinant on affecting foreign countries initiating AD investigations against China. 2008 global financial crisis gave a huge shock

on both economy and international trade around world, and the trade activities highly determine the use of AD investigations. We value *dummy95* as 0 before 1995 and as 1 after 1995, we value *dummy01* as 0 before 2001 and as 1 after 2001, and we value *dummy08* as 0 before 2008 and as 1 after 2008. Since the first two events were well expected before their happening, and the last event went along with the economic performance simultaneously, we do not consider the time lag when valuing the dummy variables.

3.2.3 Strategy factors

Some studies argued that an important motive for initiating AD investigations is retaliation (Finger, 1981; Prusa & Skeath, 2002; Blonigen & Bown, 2003). Furthermore, the AD retaliation can be regarded as a strategy of domestic country after being investigated by foreign countries, and AD retaliation could make AD investigations expand around world.

Hypothesis 6. A large number of AD investigations are initiated by those countries who have been victims by such initiation in the past. And the AD investigations could contaminate one country by one country.

The empirical model includes $BEinvest_{it}$ and $HASinit_{it}$ to test the above hypothesis. $BEinvest_{it}$ means the number of AD cases of country i being investigated by the other countries (except China) at year $t-1$. This variable is expected that the number of AD cases filed against country i in the past influence its decisions to initiate AD investigations at year t , and it suggests if country i was a victim by AD initiation in the past, it tend to initiate large number of AD investigations as retaliation, and our model would test the degree of this retaliation effect on China. $HASinit_{it}$ means the number of AD cases initiated by country i at year t . This variable suggests that the AD investigation is a contagion action from one country to another. We use it to find the how much of this contagion would affect China.

3.2.4 Chinese policy factors

In our model, we try to find the effect of Chinese policy factors on whether China can build capability by using multiple policies on its side to pose a threat or give a restrict on the AD investigations initiated by foreign countries.

Hypothesis 7. China can build a credible threat to discourage the use of AD investigations against it from foreign countries by using its own policy tools.

The empirical model include $CHNinit_{it}$, $OPEN_{it}$ and FDI_{it} to test the above hypothesis. $CHNinit_{it}$ means the AD investigation initiated by China against country i at year $t-1$. This variable is designed as an international trade policy China can use to build a retaliation threat on the foreign countries and eventually reduce the use of AD investigations from them. $OPEN_{it}$ is a dummy variable means whether Chinese government allow country i to invest in China at year t . While FDI_{it} means the volume of foreign direct investment from country i flow into China at year t . Unlike most countries around the world, China is a closed-door country before 1978. And after the 1978's open and reform policy, China did not wholly open every department to every country in the world. The China' open is a gradual process, especially on its introduction of foreign investment. China used its foreign investment policy carefully and countries were allowed one after one by the Chinese government to make investment in China. So the combination of variable $CHNinit_{it}$ and FDI_{it} is designed to test whether the China's foreign investment policy can and how much it can help to discourage the use of AD investigations from foreign countries. Because we thought that when the foreign direct investment of country i flowed into China and build a joint on the manufacturing and exporting of products, if country i initiated AD investigations these products, it

might hurt its own companies' interest, which would bring more caution to country i on deciding to initiate AD investigations against China.

3.2.5 Other control variables

$DIST_i$ means the geographic distance between country i and China. Usually, when two countries are neighbor countries, they tend to have more international trade activities than if they are non-neighbor countries. More trade activities might bring higher probability of trade disputes that could cause AD investigations. Moreover $DIST_i$ is a fixed variable which is independent with the time, so it has fixed and control effect when being introduced into empirical model.

3.3 Empirical Model and Methodology

3.3.1 Empirical Model and Data Resource

We can summarize the factors that affect foreign countries initiating AD investigations against China in 3 different ways: macroeconomic pressure factors, pattern change factors and strategic factors. Moreover, we add the Chinese policy factors in the model to completely test the hypothesis we have listed above. So the empirical model of this paper is,

$$ADinitiation_{it} = \alpha_0 + \alpha' \cdot macro + \beta' \cdot regulation + \gamma' \cdot strategy + \delta' \cdot CHNpolicy + \theta' \cdot control + \varepsilon$$

The dependent variable $ADinitiation_{it}$ means the number of AD investigations initiated by country i against China at year t . The independent variables $macro$, $regulation$, $strategy$, $CHNpolicy$ and $control$ means macroeconomic pressure factors, pattern change factors, strategic factors, Chinese policy factors and control variables respectively. We input every detailed variable into the 4 different ways of factors, and the detailed variables have been listed in following TABLE 1 to test these seven hypotheses of our paper.

TABLE 1. Variable of Empirical Model and Data Resource

Variables	Meaning of the Variables	Expectation	Data Resource
$ADinitiation_{it}$	The number of AD investigations initiated by country i against China at year t	/	World Bank Global Antidumping Database (http://econ.worldbank.org/ttbd/gad/)
$ADclub_{it}$	Whether country i can start using AD investigations at year t	+	
$OLDuser_i$	Whether country i is a traditional AD user	+	
$NEWuser_i$	Whether country i is a new AD user	+	
$BEinvest_{it}$	The number of AD investigations initiated by all the other countries (except China) against country i at year $t-1$	+	
$HASinit_{it}$	The number of AD investigations initiated by country i at year $t-1$	+	
$CHNinit_{it}$	The number of AD investigations initiated by China against country i at year $t-1$	-	
$RGDPr_{it}$	The real GDP growth rate of country i at year t	-	US Department of Agriculture Economic Research Service (http://www.ers.usda.gov/)
$RXCr_{it}$	The real exchange rate of the currency of country i to Chinese RMB at year t	+	
$INFLr_{it}$	The real inflation rate of country i at year t	+	
$IMPos_{it}$	The percentage of products imported from China in the total import of country i at year t	+	UNCOMTRADE (http://comtrade.un.org/db/)
$EXPdp_{it}$	The percentage of products exported to China in the total export of country i at year t	-	
$OPEN_{it}$	Whether Chinese government allow country i to invest in China	-	China Foreign Economic Statistical

	at year t		Yearbook 1978-2015
FDI_{it}	The volume of foreign direct investment from country i flow into China at year t	-	
$DIST_i$	The bilateral geographic distance between China and country i	?	CEPII Database
$dummy95$	$t < 1995$, value 0; $t \geq 1995$, value 1	?	/
$dummy01$	$t < 2001$, value 0; $t \geq 2001$, value 1	?	
$dummy08$	$t < 2008$, value 0; $t \geq 2008$, value 1	?	

Note: $ADinitiation_{it}$ is the dependent variable and all the other variables are independent variables. $IMPos_{it}$ and $EXPdp_{it}$ were calculated by bilateral trade data from UNCOMTRADE database. For the GAD data collected EU28 as a whole on AD cases, so we keep EU28 as a whole in every variable's data collection. The main problem is that there has no available bilateral trade data between European Union and any other country in UNCOMTRADE data, but has available bilateral trade data between every European country and other countries, so we collect the bilateral trade data of every member in EU28 separately, and aggregate them together when calculating value of variables. $BEinvest_{it}$, $HASinit_{it}$ and $CHNinit_{it}$ were calculated by annual AD case data from GAD database. The rest variables' data were directly collected from data resources.

3.3.2 Empirical methodology

For testing the above empirical model, we would use a count of the total number of AD investigations initiated by a specific country against China in a given year. The value of dependent variable $ADinitiation_{it}$ varies from zero to several for these specific countries. Since that, the dependent variable is a non-negative discrete variable, we should use count model for estimation. The Poisson Regression Model is usually used for such kind of data. The distribution of Poisson Regression takes the following form.

$$P(Y_i = y_i | x_i) = \frac{e^{-\lambda_i} \lambda_i^{y_i}}{y_i!} \quad (1)$$

Where $\lambda_i = p(x_i, \varphi)$, and every y_i in Y_i is determined by the Poisson distribution of λ_i .

Typically, the Poisson Regression Model is given by

$$\lambda_i = \text{Var}(y_i | x_i, \varphi) \equiv E(y_i | x_i, \varphi) \quad (2)$$

Then, we can have the following equation

$$E(y_i | x_i, \varphi) = p(x_i, \varphi) = e^{x_i' \varphi} = \exp(\varphi_0 + \varphi_1 x_1 + \varphi_2 x_2 + \dots + \varphi_n x_n) \quad (3)$$

And we take log on both sides of the equation

$$\text{Log}[E(y_i | x_i, \varphi)] = \varphi_0 + \varphi_1 x_1 + \varphi_2 x_2 + \dots + \varphi_n x_n \quad (4)$$

The Poisson maximum likelihood estimation is consistent and efficient provided the mean is equal to the variance, which is demonstrated by Equation (2), but the dependent variable of this paper could not meet this requirement.⁹ A common alternative for Poisson Regression Model is Negative Binomial Regression Model which allow for over dispersion where the value of the variance of observed variable is larger than the value of the mean. It is derived by generalizing the Poisson Regression Model by introducing an unobserved effect variable v_i to make the Equation (4) as follow

$$\text{Log}[E(y_i | x_i' \varphi, v_i)] = \varphi_0 + \varphi_1 x_1 + \varphi_2 x_2 + \dots + \varphi_n x_n + \ln v_i \quad (5)$$

So the Negative Binomial Model takes the form

$$P(Y_i = y_i | x_i, v_i) = \frac{e^{(-\lambda_i v_i)} (\lambda_i v_i)^{y_i}}{y_i!} \quad (6)$$

Where $\lambda_i = p(x_i, \varphi)$, and the Negative Binomial distribution has mean λ and variance $\lambda + 1/\theta$.

But, we launched testing by estimating the Poisson Regression Model. The goodness of statistics provided by the Poisson Regression Model estimation suggested us that we could reject the data were Poisson distribution at the 1% level due to the problem of over dispersion of the data we mentioned before. So clearly, the Negative Binomial Regression Model could be more appropriate than Poisson Model for our analysis.

4. Empirical Results

Based on Negative Binomial Regression Model, this paper used the AD filings data of 26 different countries or regions from 1990 to 2014 to test the seven hypotheses set in our theoretical framework. As the duration of the variable series is longer than that of many other studies, we firstly used the LLC unit root test to check how stationary the series are. The unit root test results showed the variable series are stationary.¹⁰

Usually, the fixed effect method and the random effect method were employed to Negative Binomial Model when treating the panel datasets. In argument of these two methods, we often use Hausman test to differentiate between fixed effect and random effect. During the work on empirical model, we separate four different stages in introducing variables, and we kept the control variables in the model through all four stages. TABLE 2 reports the empirical results of our paper. We used Hausman test in four stages model respectively, and finally we select the random effect method to be employed in our model. The four stages model were designed to check main four different kinds of determining factors and test seven hypotheses of our theoretical framework.

TABLE 2. Empirical results

Variables		Stage 1	Stage 2	Stage 3	Stage 4
<i>RXC_{it}</i>	Macroeconomic pressure factors	0.091** (0.039)	0.056* (0.041)	0.058* (0.038)	0.014 (0.046)
<i>RGDP_{it}</i>		-0.887 (1.434)	-0.635 (1.422)	-0.689 (1.390)	-0.718 (1.387)
<i>INFL_{it}</i>		0.147*** (0.049)	0.091** (0.049)	0.044 (0.045)	0.007 (0.072)
<i>IMPos_{it}</i>		3.779* (2.167)	3.551* (2.649)	6.404** (2.825)	6.448** (2.851)
<i>EXPd_{it}</i>		-0.082* (0.051)	-0.103** (0.051)	-0.099** (0.050)	-0.110** (0.051)
<i>ADclub_{it}</i>	Pattern change factors		0.009 (0.021)	0.003 (0.021)	0.004 (0.021)
<i>OLDuser_i</i>			1.821*** (0.349)	1.563*** (0.340)	1.612*** (0.370)
<i>NEWuser_i</i>			1.619*** (0.358)	1.631*** (0.344)	1.647*** (0.371)
<i>BEinvest_{it}</i>	Strategic factors			0.004 (0.004)	0.003 (0.005)
<i>HASinit_{it}</i>				0.016*** (0.003)	0.016*** (0.003)
<i>CHNinit_{it}</i>	Chinese policy factors			-1.744 (1.324)	-2.065 (1.341)
<i>OPEN_{it}</i>					0.020 (0.330)
<i>lnFDI_{it}</i>					-0.432** (0.217)
<i>lnDIST_i</i>	Control variable	-0.062 (0.039)	-0.061 (0.039)	-0.046 (0.036)	-0.043 (0.036)
<i>dummy95</i>		0.245 (0.208)	0.206 (0.208)	0.192 (0.201)	0.053 (0.214)
<i>dummy01</i>		0.223 (0.175)	0.282 (0.174)	0.295* (0.165)	0.348** (0.169)
<i>dummy08</i>		-0.111 (0.171)	-0.186 (0.171)	-0.155 (0.167)	-0.173 (0.167)
<i>log likelihood</i>		-921.33	-903.99	-885.15	-882.48
<i>number of obs</i>		650	650	650	650

Note: We use random effect method in the regression of all 4 stages model, ***, **, * represents the 1%, 5% and 10% statistical significance level of different variables.

The results of Stage 1 which was used to test the effect of macroeconomic pressure factors individually, that meant to test the Hypothesis 1 to 3 as a whole. Basically, the results of the empirical model match with our expectation in the theoretical framework. When the macroeconomic condition of a foreign country is worse, it will tend to initiate more AD investigations against China. First of all, the effect of variable $RGDP_{it}$ is negative and the effect of variable $INFL_{it}$ is positive, which means when the foreign country's growth rate of real GDP decrease or the inflation rate increase, it will cause more AD filings against China. However, the effect of $RGDP_{it}$ is statistically insignificant. Secondly, the effect of RXC_{it} is significantly positive on 5% statistical level, which means if the real exchange rate of foreign currency to Chinese RMB is higher, that is the value of Chinese RMB is weaker, it will cause more AD investigations from foreign countries. Thirdly, the variable $IMPos_{it}$ is significantly positive on 10% statistical level related to the dependent variable $ADinitiation_{it}$, which means if the products imported from China account more for the domestic demand of foreign country, it will make foreign countries initiate more AD investigations against China. Finally, the variable $EXPdp_{it}$ is significantly negative on 10% statistical level related to $ADinitiation_{it}$, which means when the products of foreign country exported more on Chinese market, it will reduce foreign country using AD investigations against China. The model of Stage 1 tested the macroeconomic pressure factors alone, and the results basically meet our expectation.

The model of Stage 2 introduced pattern change factors into the model on the basic of Stage 1 and tested Hypothesis 4 and 5. The result on pattern change factors of empirical model are as expected, while the significance and the effect of macroeconomic pressure factors almost stay still, by the way. The effect of $ADclub_{it}$ is positive, but is not statistically significant, which means when a foreign country joined in "AD users club", it would not significantly increase its AD investigations against China. The effect of $OLDuser_i$ and $NEWuser_i$ is significantly positive on 1% statistical level, which means the traditional AD users and the new AD users will initiated more AD investigations against China than any other countries in our sample. Moreover, the dummy variable of $dummy95$ is insignificantly positive related to dependent variable, which means the establishment of WTO and the global trade pattern change it brought will not cause more AD investigations pressure on China. However, Wang & Xie (2009) and Bao (2011) found foreign countries have discrimination on initiating AD investigations against China, our study found this discrimination does not come from the WTO or global pattern change, it comes from the role pattern of traditional AD users and new AD users.

The model of Stage 3 combines strategic factors with Stage 1 and Stage 2 and furtherly tested Hypothesis 6. Although the effect of $BEinvest_{it}$ and $HASinit_{it}$ is as expected, but the effect of $BEinvest_{it}$ is statistically insignificant. This means that the retaliation effect of a foreign country after being used AD investigations by other countries (except China) will not concentrate on China. But this retaliation effect might be more likely a "tit for tat" retaliation, which means a country will aim its AD retaliation on those countries that have used AD investigations against it before. This result also means that the AD retaliation effect of foreign countries will not have discrimination against China. However, the effect of variable $HASinit_{it}$ is significantly positive on 1% statistical level, which means the effect of global AD contagion is concentrated on China, and significantly increases the AD investigations from foreign countries against China. Moreover, the global AD investigation would increase because of the retaliation AD investigations after being used AD investigations, but the global AD investigation would also decrease because of the threat capacity

built by potential retaliation AD investigations. So we introduced $CHNinit_{it}$ into the model of Stage 3. The first purpose is to test whether Chinese AD investigations against foreign countries could build its retaliation capacity to reduce the AD investigations from these foreign countries. The second purpose is to test the effectiveness of Chinese AD investigations as an important international trade policy tool. The result of $CHNinit_{it}$ is insignificantly negative, which means Chinese AD investigation as an international trade policy could not significantly build a credible threat to reduce the AD investigations imposed by foreign countries against China.

The result of Stage 4 demonstrated the entire empirical model of our paper, and the model tested all factors we designed in our theoretical framework. After introducing all the factors into the empirical model, we found the statistical significance of macroeconomic pressure factors changed. The variable $IMPos_{it}$ and $EXPdp_{it}$ remain their significance, some of other macroeconomic pressure factors lost their significance. The coefficient and significance of pattern change factors did not change a lot, and the coefficient value of $NEWuser_i$ is larger than that of $OLDuser_i$, this means in the same situation, the new AD users would tend to use more AD investigations than the traditional AD users. The result of strategic factors did not change any more, and their meaning stay the same with that in Stage 3. In the model of Stage 4, we focus on the effect of Chinese policy factors in particular, we also have a comparison with Stage 3 on the effect of Chinese international trade policy. The variable FDI_{it} is negative related to dependent variable on 5% statistical significant level, which means China's using foreign investment policy to attract more FDI is no doubt attributed to reduce the number of AD investigations initiated by foreign countries against China. Moreover, the introduction of the variables of Chinese foreign investment policy increased the coefficient value of $CHNinit_{it}$, which means the coordination of Chinese policy tools would enhance the effectiveness of Chinese international trade policy, although it failed to change the significance of $CHNinit_{it}$.

Last but not least, in the model of Stage 4, the significance of dummy variable $dummy01$ changes from insignificantly positive to significantly positive on 5% statistical level. This means comparing with other events, China's entry into WTO in 2001 attribute more to increase the number of AD investigations initiated by foreign countries against China. The dummy variable $dummy08$ is insignificantly negative related to the dependent variable. We thought it is because the global financial crisis in 2008 strongly reduced the international trade activities which cause the negative effect on the number of AD investigations. The effect of control variable $DIST_i$ is negative but statistically insignificant, which means the China's neighbor countries would initiate more AD investigations than non-neighbor countries, although this difference is not significant.

5. Conclusion

Antidumping has increasingly become a global economic phenomena and a popular form of protectionism in the past decades, and is now extensively used by both developed countries and developing countries engaging in international market. The surge in AD investigations against China is raised by foreign countries in the middle of 1990s when the number of AD filings and the intensity of AD use sharply expanded among almost all industrial categories, and lasts for nearly 20 years. This paper designs four major factors and examines how these factors influence the initiation of AD investigations from foreign countries against China. Our empirical work used panel data on AD investigations from 26 different countries or regions during 1990 to 2014. The study of this paper is

to test the 7 theoretical hypotheses we built and examine the role of macroeconomic pressure factors, pattern change factors and strategic factors in general, while the role of Chinese policy factors in particular.

The empirical evidence we presented in this paper has important implications and supports the seven hypotheses of our theoretical framework. First, the macroeconomic indicator is individually no doubt playing a strong role in determining the AD filings initiated by foreign countries against China. By examining the bilateral AD filings between China and foreign country, we find when macroeconomic situation of a foreign country is in decline, the AD filings against China will be increased. This result reinforces the viewpoint that the jurisdiction for AD investigation is more political than economic, it aimed more at the domestic macroeconomic trend than “unfairly traded” import. Clearly, the AD investigations now go beyond punishing unfair international trade practices and stay contrary to the original spirit of AD rules, which gives us a further doubt on the fairness of the WTO’s AD law and the abuses of AD rules around world. We think the problem is not WTO’s establishing the system of AD rules but WTO’s governing the abuse of AD rules so far, currently it needs reform.

Second, the empirical evidence suggests that when Chinese products account too much for the total import trade of a foreign country, it will increase the AD filings against China, while if China become an important export destination for the products from a foreign country, it will decrease the AD investigations against China. So, this evidence implicates that if China can change its role in global trade market by releasing its domestic consuming ability and shifting from a global seller to a global buyer, then it might help China stay away from the unstoppable AD investigations.

Third, it suggests that once the WTO was fully enforced, the use of AD investigations spread among the almost all developing countries and some developed countries not only because of the greater international trade liberalization but also due to the fact that more and more countries would like to build AD ability to counter the AD use against them. This has chain effect on the initiation of AD investigations around world and leads to AD contagion. Our empirical evidence implicates that these AD investigations created by chain effect cause the growth of AD filings against China. Moreover, the traditional AD users and new AD users will initiate more AD investigations against China than other foreign countries, which bring the view of AD discrimination.

Fourth, as an important international trade policy tool, China’s AD measure could not effectively build a credible threat to reduce the AD investigations initiated by foreign countries against it. However, China could adopt proper foreign investment policy by attracting more FDI to help decrease the AD filings used by foreign countries effectively. Moreover, the combination of multi-policy can help trade policy to intense its effectiveness. This implicates that China should reconsider its AD measure’s effect and pay more attention on the design of multi-policy tool to effectively solve with the AD problem on global scope.

1 From 1948 to 1978, the amount of global antidumping investigations is 1329, which means average 42 per year. (Zanardi, 2004, 2006)

2 World Bank Global Antidumping Database, Bown, Chad P. (2015), <http://econ.worldbank.org/ttbd/gad/>.

3 Using World Development Indicators (WDI, <http://data.worldbank.org/products/wdi>) data to recognize developed and developing countries from Global Antidumping Database.

4 From 2008 to 2014, China faced 453 AD investigations from foreign countries or regions, ranked world No.1 AD target country, but China just initiated 71 AD investigations against foreign countries, which is just the half of the amount during 2001 to 2007 (140 AD investigations against foreign countries).

5 Galloway et al. (1999) report that the collective US welfare cost of US antidumping and countervailing duties are substantial enough to rank second only to the effects of the Multi-fiber Arrangement in terms of most costly US trade protection programs.

6 These 26 countries or regions are Argentina, Australia, Brazil, Canada, Chile, Colombia, Egypt, European Union, India, Indonesia, Japan, Malaysia, Mexico, New Zealand, Peru, Philippines, Russia, South Africa, South Korea, Thailand, Turkey, Ukraine, Uruguay, United States, Venezuela, and Vietnam.

7 From 1990 to 2014, these 26 countries or regions initiated 1194 AD investigations against China, while the total amount of global AD investigations against China was 1228 at the same period. Moreover, these 26 countries or regions initiated 5643 AD investigations from 1990 to 2014, at the same time the world AD investigations was 6173.

8 As determined by this ratio, we separate Australia, Canada, European Union, Mexico, South Africa and United States as traditional AD users. And we separate Argentina, Brazil, India and Turkey as new AD users.

9 We used Stata 13 to test the mean and the variance of dependent variable $AD_{initiation_{it}}$, and found the value of mean is 1.98, and the value of variance is 10.18, so the variance is larger than mean empirically.

10 The variable $IMPos_{it}$, $EXPdp_{it}$ could not conduct LLC test because of the missing data of Russia, Ukraine and Vietnam on bilateral trade in 1990. We have to use the bilateral trade data of 1991 and 1992 to estimate the value of the data in 1990 and get an approximate value to make the variables to be stationary.

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