




# Price Effects of the United States (US) Antidumping Investigations in a Non-Market Economy Case: Vietnam's Shrimp Exports to the US

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## ABSTRACT

This article investigates the impact of the US antidumping investigations on the prices received by Vietnamese shrimp exporters. Vietnamese shrimp was the target of an antidumping petition filed in 2003 and Vietnam was treated as a non-market economy country. The estimates indicate that, after the final determination, Vietnamese exporters increased their prices by much more than 100% of the antidumping duties in an attempt to eliminate future duties. In addition, no evidence was found for a significant difference in the exchange rate pass-through of affected products. This result differs from the cases of the market economy examined in previous studies.

## KEYWORDS

Antidumping duty; exchange rate pass-through; non-market economy; trade barriers; Vietnam

## I. Introduction

Along with rapid trade liberalization, countries have been widely using contingent protective measures as temporary trade barriers for more than two decades. Among the contingent protective measures, the antidumping (AD) duties are still known as the predominant measure used by both developed and developing countries to protect local industries against foreign competition (Blonigen and Prusa 2015). The more frequent use of antidumping actions shows up not only in the increasing number of AD cases initiated and the number of AD duty orders issued over time, but also over a wider set of users and products. According to the World Trade Organization (2019a, 2019b), from 1995 to 2017, there were 5,531 AD investigations or about 240 AD investigations per year initiated by 62 countries or customs territories in which a total of 3,602 AD measures were applied over this period. This led to a proliferation of studies on the effects of AD measures on various issues.

The effects of AD duties on firms' pricing behavior have recently been attracting much interest. To date, several studies have shown an increase in trade prices due to the imposition of AD duties, for example, Prusa (2001), Blonigen and Haynes (2002, 2010), Ganguli (2008), Avsar (2013), and

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Nizovtsev and Skiba (2016). The significant change in the exchange rate pass-through to US import prices of affected products resulting from AD duties has been found in Blonigen and Haynes (2002) and Turkcan (2007). Together, these studies argued that the method for calculating AD duties and the procedure of administrative review (recalculation of AD duty) are the rationale behind their findings. However, previous studies have almost exclusively mentioned the method used for the case of a market economy country. Therefore, one question that needs to be asked is whether the case of non-market economy countries, which use a different method of AD duty calculation, differs from the cases of previous studies.

In this article, we specifically examine the impact of the United States (US) AD investigations and administrative reviews on the pricing behavior of Vietnamese shrimp exporters for the period of 2000M1 to 2011M12. The most important feature of this case is that Vietnam was treated as a non-market economy (NME).<sup>1</sup> There are two primary aims of this study: (1) to investigate how the prices received by Vietnamese shrimp exporters respond to the AD duty changes after the final determination, and (2) to empirically examine whether or not AD duties affect the exchange rate pass-through of affected shrimp products (defined as the effect of exchange rate changes on local currency import prices exclusive of tariffs and duties).

The first systematic study of the impact of antidumping duties' imposition on prices was reported by Blonigen and Haynes (2002). The authors examined the effects of the US AD investigations on the pass-through of exchange rates and AD duties in the US import prices exclusive of the AD duties for Canadian steel between 1989 and 1995. They demonstrated that the US AD duties become endogenous with the pricing decision of exporting firms in both its home market and the US market because of the method for calculating the AD duty. This change causes a significant increase in the exchange rate pass-through after the imposition of the final AD duties. Furthermore, the presence of an AD duty might lead to asymmetric pass-through of exchange rate movements, but the empirical results did not support this. Also, they found the AD duty pass-through rate to US border prices (exclusive of AD duties) to be around 60% (Blonigen and Haynes 2010). Similar results have been reported by Turkcan (2007), who found a structural break and no asymmetric behavior in the exchange rate pass-through following the imposition of AD duties on US steel imported products from Turkey – a market economy.

A study of the effects of the AD investigations on trade prices has not been done extensively for non-market economy cases. Lu, Tao, and Zhang (2013)

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<sup>1</sup>According to the US AD law in Title VII of the Tariff Act of 1930 (1930), the term “non-market economy (NME) country” is generally defined as any foreign country that does not run the economy based on market principles, implying that the fair value is not reflected in the sales of final goods. For example, Vietnam and China are designated as NMEs.

found a small increase in export prices when preliminary AD duties are in place, while they found no changes after the final AD duties were imposed by the US on Chinese exporters. As far as we know, previous studies have only been carried out in a period before the ultimate results of the first administrative review were announced. It means that there was no change in the AD duty rate during the sample period in existing studies. One of our innovations is that by using a longer sample period that encompasses the results of several administrative reviews, new insights on the NME exporters' price response to a change in the AD duty will be examined.

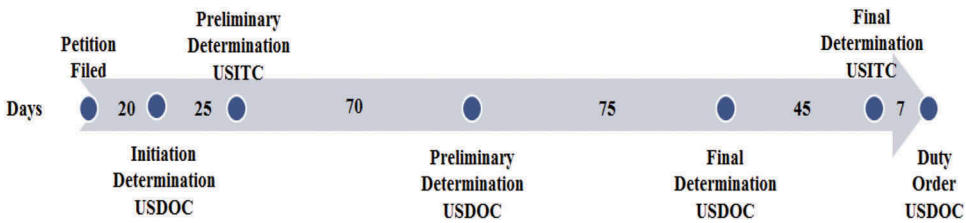
Our main finding is that Vietnamese shrimp exporters lowered their prices by a small amount in the presence of preliminary AD duties. However, after the final determination, the average export price increase for products subject to US AD duties is about 1.34% and 0.89% in response to a 1% increase and decrease in AD duties, respectively. These results suggest that NME exporting firms increase their prices by much more than the amount of the AD duty imposed or increased in an attempt to eliminate future duties. Secondly, our estimates also show that US AD duties do not affect the exchange rate pass-through of affected shrimp products. More specifically, the exchange rate coefficients for the affected products remain unchanged when the final AD duties are imposed. This result differs from the cases of Blonigen and Haynes (2002) and Turkcan (2007). Additionally, there is no evidence of asymmetric pass-through of exchange rate movements following the final AD duties.

Overall, this research highlights the difference between the effects of AD duties on the pricing behavior of exporters from market and non-market economies. Understanding NME exporting firms' pricing behavior is important for the future of AD duty implementation, especially because the price-increasing response of exporting firms to AD duties increases the net welfare loss of implementing countries (Gallaway, Blonigen, and Flynn 1999).

The next section presents a brief overview of the US antidumping investigation procedures and the method for calculating AD duties in a non-market economy case. Section 3 presents the history of US antidumping petitions in certain frozen warmwater shrimp's imports from Vietnam. Our empirical methodology and data description are outlined in Section 4, and results are presented in Section 5. Conclusions are given in Section 6.

## **II. The US antidumping investigation in a non-market economy case**

Figure 1 presents the timeline showing the main stages of the US AD investigation process. In an AD investigation, the US Department of Commerce (USDOC) determines whether the investigated products are priced in the US market at less than fair value (LTFV). Then, if dumping is proved by the US International Trade Commission (USITC) to be the reason for the severe injury of the US domestic industry, the imports of violating firms or countries will be



**Figure 1.** The overall US antidumping investigation timeline. Source: Author's own compilation based on USITC (2015).

levied with an AD duty equal to the estimated amount by which the fair value exceeds the price charged in the US market.

As shown in [Figure 1](#), in each stage, there is a short period of time for agencies to investigate and come to a determination. If both the USITC and USDOC end their preliminary phase with an affirmative determination, then importers are required to post a cash deposit or a bond based on the estimated AD duties as shown in the USDOC preliminary determination. Then, if affirmative determinations are made by both the USDOC and USITC in the final phases, an AD duty order will be issued to impose an ad valorem AD duty on the affirmative products. In this final step, both the list of affirmative products and the final AD duties may be different from the preliminary determinations.

However, the actual AD duties faced by foreign firms are only determined after the subject merchandise is imported. So, each year, if the USDOC receives requests from any interested parties (such as domestic petitioners, importers, or foreign firms) to conduct an administrative review on any foreign firms, the dumping margins (AD duties) will be recalculated for those particular firms. If the new AD duty differs from the previous duty, a duty equal to this new rate shall be applied to the subject imports. Then, a bill (or a reimbursement) equal to the different amount plus interest is assessed (or rebated). Thus, this kind of procedure allows foreign firms to have some strategies to have the future duty stopped or reduced (Blonigen and Haynes 2002).

Regarding the AD duty calculation, there are several different methods depending on the features of the investigated country and firm. In this study, we specifically focus on the method normally used for a non-market economy country. When the USDOC treats a country as a non-market economy (NME), a NME method will be applied to derive the "fair value."<sup>2</sup> The USDOC conducts a calculation of fair value based on factors of production (labors, materials, electricity, and so on) reported by some top NME suppliers of the subject merchandise and then values these factors using publicly available data from

<sup>2</sup>In a market economy case, the USDOC uses the foreign firms' prices in their home market or third-country market as the "fair value." For more details about the method for a market economy country, see Blonigen and Haynes (2002).

a surrogate country to get the “fair value.”<sup>3</sup> After that, the USDOC converts the constructed “fair value” in the surrogate country’s currency into US dollars, using the bilateral exchange rate of the surrogate country. If the export price is below the “fair value” (the usual case), the USDOC concludes that the investigated firm has dumped the subject merchandise in the US market. Then, the NME dumping margins will be computed based on the difference between the export prices and the “fair value.”

As discussed and examined empirically in Blonigen and Haynes (2002, 2010), all firms in a market economy facing AD duties may adjust their prices in their home market associated with the increase in the export prices for the US market to lower or eliminate AD duties through the US practice of administrative reviews. Unlike the market economy country approach, the surrogate country approach for NME countries is totally unpredictable and all exporters from the NME country cannot control the fair value in order to benefit from lower or no duties in the future. This means that if the NME exporter attempts to completely remove the AD duty, one would have to see that the NME country’s export price rose by much more than 100% of the AD duty imposed or increased. For the case of Vietnamese shrimp exports to the US, some investigated firms from Vietnam earned a duty of zero in some administrative reviews. Therefore, one would expect that the coefficient for AD duty increases in the case of Vietnamese shrimp exports to the US may be much greater than one.

The use of the firms’ home price in calculating the future AD duties for a market economy makes the exporters’ pricing decision in the US market dependent on the demand of both their home market and the US market (Blonigen and Haynes 2002). This resulted in a substantial change in the exchange rate pass-through after the imposition of the final AD duties. However, in contrast to the market economy case, the pricing decision model for the NME exporters facing the final AD duties does not change because the method used for the NME firms does not use their pricing in the home market to calculate the future AD duties under review. Therefore, there may be no structural change in the estimated coefficient of exchange rate pass-through for the affirmative products from the NME country.

Lastly, the asymmetric pass-through of exchange rates for the products subject to AD duties may be possible in complicated scenarios. Suppose, for simplicity, we assume that all factors which are used in deriving the fair value are constant, except for exchange rates. By increasing (decreasing) the exchange rate pass-through when the NME country’s exchange rate is expected to appreciate (depreciate), NME exporters can benefit from lower duties in the administrative review if the surrogate country’s exchange rate

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<sup>3</sup>The selection of a surrogate country is under the control of the USDOC based on the AD law. There are some criteria for choosing a surrogate country in an investigation, for example, economic comparability, comparable merchandise, significant producers, and data availability.

depreciates, or they may mitigate the impact of AD duties if the surrogate country's exchange rate appreciates.

### III. The US AD case of Vietnamese shrimp products filed in 2003

On December 31, 2003, the Ad Hoc Shrimp Trade Action Committee – a representative group of American shrimp producers – filed an AD petition on certain frozen and canned warmwater shrimp products from six major shrimp exporting countries in the US market including Brazil, Ecuador, China, Thailand, India, and Vietnam (USDOC 2004). After receiving the petition, the USDOC and USITC conducted AD investigations on 13 of the total 19 shrimp products disaggregated at the ten-digit Harmonized Tariff Schedule (HTS) level involving foreign exporters or producers from these six countries. The list of 19 shrimp product codes is shown in Table 1. In addition to China, Vietnam was treated as a non-market economy, and the USDOC used Bangladesh as the surrogate country for the calculation of the dumping margins. On July 16, 2004, the USDOC released their affirmative preliminary determination on 13 ten-digit HTS products, with the preliminary AD duties for Vietnamese shrimp exporters ranging from 12.11% to 19.6% for four investigated firms, 16.01% for seventeen firms who applied for a separate rate, and 93.13% for other firms from Vietnam who did not participate in the investigation. So, for all subject merchandise which entered the US from July 16, 2004, importers were required to deposit the

**Table 1.** Shrimp HTS codes to producer price index codes (NAICS) concordance.

10-digit HTS codes	Producer Price Index Codes	
0306130003 <sup>ADD</sup>	NDU311712.311712.31	Prepared frozen shrimp
0306130006 <sup>ADD</sup>		
0306130009 <sup>ADD</sup>		
0306130012 <sup>ADD</sup>		
0306130015 <sup>ADD</sup>		
0306130018 <sup>ADD</sup>		
0306130021 <sup>ADD</sup>		
0306130024 <sup>ADD</sup>		
0306130027 <sup>ADD</sup>		
0306130040 <sup>ADD</sup>		
0306230020		
0306230040		
1605201010 <sup>ADD</sup>		
1605201020		
1605201030 <sup>ADD</sup>		
1605200510		
1605201040 <sup>PRE</sup>	NDU311711.311711	Seafood Canning
1605201050		
1605200590	NDU311712.311712.4	Other prepared frozen seafoods

<sup>ADD</sup> indicates the shrimp products subject to the final AD duty.

<sup>PRE</sup> indicates the shrimp products subject to the preliminary AD duty, but not the final duty.

Source: Author's compilation based on the concordance information from the US Bureau of Labor Statistics (2004) and FREIT (2017).

preliminary AD duties. Then, on December 8, 2004, the USDOC announced the affirmative final determination with significant decreases in the estimated AD duties. On January 21, 2005, the USITC finalized their determination and concluded that the canned warmwater shrimp and prawns under the ten-digit HTS code 1605.20.10.40 imports from Vietnam (China and Thailand) did not cause material injury for the American canned shrimp industry. Then, the USITC excluded it from the scope of the investigation and ruled an affirmative determination on the remaining 12 shrimp products. Finally, on February 1, 2005, the USDOC issued a final AD duty order which imposed on three Vietnamese shrimp exporters and producers a duty ranging from 4.3% to 5.24% for these 12 shrimp products. A weighted-average rate equal to 4.57% was levied on 31 Vietnamese exporters or producers in Section A respondents (separate rate groups) and 25.76% was the Vietnam-wide rate for nonparticipating firms. Over the period of 2005 through 2011, the USDOC conducted and announced the results of five administrative reviews as shown in [Table 2](#).

## IV. Methodology and data

### Methodology

This section discusses our empirical approach used to examine the effects of the US AD investigations on the prices received by Vietnamese shrimp exporters. Using disaggregated and detailed panel data of US imports of shrimp products from Vietnam, we estimated the following price equations based on Feenstra (1989):

$$\ln p_{it} = \beta_0 + \beta_1 \ln(1 + \text{tariff}_{it}) + \beta_2 \ln(1 + \text{ADD}_{it}) + \beta_3 \ln e_t + \beta_4 \ln \text{expend}_t + \beta_5 \ln \text{CPI}_t + \beta_6 \ln p_{it}^{\text{US}} + \beta_7 \ln p_{it}^{\text{ROW}} + \varepsilon_{it} \quad (1)$$

for product  $i$  and time  $t$  in which:

$p_{it}$  is the tariff and AD duty-exclusive import price measured in US dollars. This differs from Feenstra (1989), who used prices inclusive of tariffs, and Blonigen and Haynes (2002), who included not only the regular tariff but also the AD duty in their dependent variable. However, there are several reasons for our choice of prices exclusive of tariff and AD duty to construct the dependent variable. First, Kelly (2010) gave a comment on an incorrect assumption of Blonigen and Haynes (2002) that the USDOC deducts AD duties in calculating the export prices in the US market, which led to an inappropriate hypothesis that the AD duty pass-through might be 200% in order to eliminate the AD duties. Then, in the reply, Blonigen and Haynes (2010, 1283) concluded that using the AD duty-inclusive price is not appropriate to estimate the AD duty pass-through. Second, there are only two non-affirmative products that are imposed with the ad valorem tariff, and the other 17 shrimp products do not have a tariff



Table 2. Results of the AD investigation and administrative reviews.

Manufacturers/exporters	Preliminary	Final	1st Review	2nd Review	3rd Review	4th Review	5th Review
	(Jul 16, 2004) Duty (%)	(Feb 1, 2005) Duty (%)	(Sep 12, 2007) Duty (%)	(Sep 9, 2008) Duty (%)	(Sep 15, 2009) Duty (%)	(Aug 9, 2010) Duty (%)	(Sep 12, 2011) Duty (%)
Camimex	19.6(M)	5.24(M)	5.24	0 (M)	0.08*(M)	4.27	0.83(M)
Minh Phu	14.89(M)	4.38(M)	4.38	0.01*(M)	0.43*(M)	2.96(M)	1.15(M)
Kim Anh	12.11(M)	VWR	VWR	4.57	4.57	4.27	1.04
Seaprodex Minh Hai	18.68(M)	4.3(M)	4.3	4.3	4.3	4.27(M)	1.04
Grobtest	-	-	0 (M)	0	0	4.27	1.04
Fish One	-	-	0 (M)	0	0	4.27	1.04
Phuong Nam	-	4.57	4.57	4.57	0.21*(M)	4.27	1.04
Amanda	16.01	4.57	4.57	4.57	4.57	VWR	1.04
C.P. Vietnam	16.01	4.57	4.57	4.57	4.57	4.27	1.04
Cadovimex	16.01	4.57	4.57	4.57	4.57	4.27	1.04
Cafatex	16.01	4.57	4.57	4.57	4.57	4.27	1.04
Cataco	16.01	4.57	4.57	4.57	4.57	4.27	1.04
Cuu Long Seapro	16.01	4.57	4.57	4.57	4.57	4.27	1.04
Minh Hai EFSP	16.01	4.57	4.57	4.57	4.57	4.27	1.04
Minh Hai Seaproducts	16.01	4.57	4.57	4.57	4.57	4.27	1.04
Nha Trang Fisco	16.01	4.57	4.57	4.57	4.57	4.27	1.04
Nha Trang Seaproduct	16.01	4.57	4.57	4.57	4.57	5.58(M)	0*(M)
Sao Ta Foods	16.01	4.57	4.57	4.57	4.57	4.27	1.04
Seaprodex Da Nang	16.01	4.57	4.57	4.57	4.57	4.27	1.04
Soc Trang Aquatic	16.01	4.57	4.57	4.57	4.57	4.27	1.04
Thuan Phuoc	16.01	4.57	4.57	4.57	4.57	4.27	1.04
Pataya VN	16.01	4.57	4.57	4.57	-	-	-
Viet Nhan Company	16.01	4.57	-	-	-	-	-
Seaprodex Hanoi	16.01	4.57	-	-	-	-	-
Bac Lieu Fisheries	-	4.57	4.57	4.57	4.57	4.27	1.04
Coffdec	-	4.57	4.57	4.57	4.57	4.27	1.04

(Continued)



**Table 2.** (Continued).

Manufacturers/exporters	Preliminary (Jul 16, 2004) Duty (%)	Final (Feb 1, 2005) Duty (%)	1st Review (Sep 12, 2007) Duty (%)	2nd Review (Sep 9, 2008) Duty (%)	3rd Review (Sep 15, 2009) Duty (%)	4th Review (Aug 9, 2010) Duty (%)	5th Review (Sep 12, 2011) Duty (%)
Cam Ranh Seafoods	-	4.57	4.57	4.57	4.57	4.27	1.04
Incomfish	-	4.57	4.57	4.57	4.57	4.27	1.04
Ngoc Sinh Private Enterprise	-	4.57	4.57	4.57	4.57	4.27	1.04
Phu Cuong Seafood	-	4.57	4.57	4.57	4.57	4.27	1.04
UTXI Aquatic	-	4.57	4.57	4.57	4.57	4.27	1.04
Viet Foods Co., Ltd.	-	4.57	4.57	4.57	4.57	4.27	4.27
Vinh Loi	-	4.57	4.57	4.57	4.57	4.27	4.27
Viet Hai Seafood	-	4.57	-	-	-	-	-
APT	-	4.57	-	-	-	-	-
Song Huong ASC	-	4.57	-	-	-	-	-
Kien Giang	-	4.57	-	-	-	-	-
Cafish	-	-	-	-	-	4.27	1.04
Gallant Ocean Vietnam	-	-	-	-	-	4.27	4.27
Nhat Duc	-	-	-	-	-	-	1.04
Vietnam-wide Rate	93.13	25.76	25.76	25.76	25.76	25.76	25.76
Average (excluding Vietnam-wide rate)	<b>16.07</b>	<b>4.58</b>	<b>4.27</b>	<b>3.97</b>	<b>3.8</b>	<b>4.27</b>	<b>1.3</b>

\*De minimis: a zero cash deposit is required; (M): Rates for mandatory respondents; VWR: Vietnam-wide rate; Companies' names are abbreviated or shortened.  
Source: USDOC (2004, 2005, 2007-11).

over the sample period. In addition, this research is only interested in the pricing behavior of exporters to the US AD duties and pass-through of exchange rates to the price received by Vietnamese exporters; thus, we use the US customs-based unit value (exclusive of AD duty and tariff) to construct our dependent variable.

$\text{tariff}_{it}$  is the regular tariff rate of the US. The tariff coefficient is expected to be negative, indicating that a reduction in the regular tariff rate will lead to an increase in export prices.

$\text{ADD}_{it}$  is the average rate of the antidumping duty rate imposed on Vietnam's shrimp products. Unlike a regular tariff, the coefficient of the AD duty is expected to be positive.

$e_t$  is the monthly average nominal exchange rate of the Vietnamese dong (VND) against the US dollar (VND/USD). The expected sign of the exchange rate coefficient is negative, indicating that a depreciation (appreciation) of the VND against the US dollar lowers (increases) export prices.

$\text{expend}_t$  is the estimated US monthly expenditures (US dollar) on shrimp products at time  $t$ , which is expected to control for the demand size in the US. The coefficient for US expenditures on shrimp is expected to be positive, implying that the rise of US expenditures raises the export prices of Vietnamese shrimp in dollars.

$\text{CPI}_t$  is Vietnam's monthly consumer price index at time  $t$ , which is used as a proxy of home factor costs. The expected sign of the coefficient of this variable is positive, which indicates that the rise of home factor costs leads to an increase in export prices.

$p_{it}^{US}$  represents the US substitute goods price in USD for product  $i$  at time  $t$ .  $p_{it}^{ROW}$  is the USD unit value of US shrimp imports from the rest of the world of product  $i$  at time  $t$ . The coefficients of the above competing prices are expected to be positive.

Firstly, we use Equation (1) to estimate the coefficients for the full sample of all 19 products, as well as for two subgroups: (1) affirmative sample of those products that received the final duties and (2) non-affirmative sample including those products that were not subjected to the final duties. In particular, we would like to see whether there is a difference in the exchange rate pass-through coefficients between affirmative products subject to the final AD duties imposition and non-affirmative products facing no final AD duties.

Secondly, there may be a structural change in the coefficient of AD duties before and after the final duties were accessed (Blonigen and Haynes 2002). To test that, we relax the assumption that the AD duty coefficient is restricted to be constant over time by allowing a difference in the AD duty coefficients before and after the imposition of the final AD duties and assume that other things are unchanged. Recall that a preliminary AD duty was levied on the subject merchandise on July 16, 2004, 6 months before the final duty was announced on

February 1, 2005. Specifically, the AD duty coefficient is allowed to vary in the period of 2000M1 to 2005M1 and the period of 2005M2 to 2011M12. By introducing the dummy variables **Before** and **After**, Equation (1) is modified as follows:

$$\begin{aligned} \ln p_{it} = & \beta_0 + \beta_1 \ln(1 + \text{tariff}_{it}) + \beta_2' \ln(1 + \text{ADD}_{it}) \times \text{Before} \\ & + \beta_2'' \ln(1 + \text{ADD}_{it}) \times \text{After} + \beta_3 \ln e_t + \beta_4 \ln \text{expend}_t + \beta_5 \ln \text{CPI}_t \\ & + \beta_6 \ln p_{it}^{\text{US}} + \beta_7 \ln p_{it}^{\text{ROW}} + \varepsilon_{it} \end{aligned} \quad (2)$$

where **Before** takes the value of one if the observation is in the period of 2000M1 to 2005M1, and zero otherwise; **After** takes the value of one if the observation is in the period of 2005M2 to 2011M12, and zero otherwise.

Thirdly, our prediction is that the exchange rate pass-through of affirmative shrimp products in the period before and after the final imposition of AD duties remains constant for the case of Vietnam. It means that no structural change in the exchange rate pass-through occurs in the context of a NME country which differs from the prediction of Blonigen and Haynes (2002). Hence, in order to test the prediction, we also relax the second assumption of a constant coefficient of exchange rates before and after the final determination of the investigation. The following modified equation is estimated:

$$\begin{aligned} \ln p_{it} = & \beta_0 + \beta_1 \ln(1 + \text{tariff}_{it}) + \beta_2' \ln(1 + \text{ADD}_{it}) \times \text{Before} \\ & + \beta_2'' \ln(1 + \text{ADD}_{it}) \times \text{After} + \beta_3' \ln e_t \times \text{Before} + \beta_3'' \ln e_t \times \text{After} \quad (3) \\ & + \beta_4 \ln \text{expend}_t + \beta_5 \ln \text{CPI}_t + \beta_6 \ln p_{it}^{\text{US}} + \beta_7 \ln p_{it}^{\text{ROW}} + \varepsilon_{it} \end{aligned}$$

Coefficient  $\beta_3'$  indicates the pass-through for exchange rates before the final duty was imposed. Coefficient  $\beta_3''$  represents the pass-through for exchange rates after the imposition of the final AD duty.

To distinguish between the exporting firms' price response in the period of the AD duties increase and decrease after the final determination, we interact dummy variables **Up** and **Down** for the period that exporters received a higher AD duty and a lower AD duty, respectively, with a log variable of the AD duty after the final determination  $\ln(1 + \text{ADD}) \times \text{After}$  in Equation (2):

$$\begin{aligned} \ln p_{it} = & \beta_0 + \beta_1 \ln(1 + \text{tariff}_{it}) + \beta_2' \ln(1 + \text{ADD}_{it}) \times \text{Before} \\ & + \beta_2''' \ln(1 + \text{ADD}_{it}) \times \text{After} \times \text{Up} + \beta_2'''' \ln(1 + \text{ADD}_{it}) \times \text{After} \times \text{Down} \\ & + \beta_3 \ln e_t + \beta_4 \ln \text{expend}_t + \beta_5 \ln \text{CPI}_t + \beta_6 \ln p_{it}^{\text{US}} + \beta_7 \ln p_{it}^{\text{ROW}} + \varepsilon_{it} \end{aligned} \quad (4)$$

Variable **Up** takes the value of one in the period that exporters experience an increase in the AD duty, and zero otherwise; while the variable **Down** takes the value of one in the period that exporters experience a lower AD

duty, and zero otherwise. The coefficients of these above mentioned interaction terms reveal how exporters respond to an increasing AD duty and a decreasing AD duty in the post-review period.

Lastly, in order to examine the asymmetric pass-through of exchange rates on the prices received by Vietnamese shrimp exporters between the Vietnam dong (VND) depreciation and appreciation after the imposition of the final AD duties in February 2005, we generated dummy variables  $D$  and  $A$ . The dummy variable  $D$  takes the value of one if the VND depreciates in the period of 2005M2 to 2011M12, which is an increase in the exchange rate, and zero otherwise, while  $A$  takes the value of one if the VND appreciates in the period of 2005M2 to 2011M12, which is a decrease in the exchange rate, and zero otherwise. We include an interaction term of the exchange rate with  $A$  and  $D$  dummy variables to Equation (2).

$$\begin{aligned} \ln p_{it} = & \beta_0 + \beta_1 \ln(1 + \text{tariff}_{it}) + \beta_2' \ln(1 + \text{ADD}_{it}) \times \text{Before} \\ & + \beta_2'' \ln(1 + \text{ADD}_{it}) \times \text{After} + \beta_3 \ln e_t + \beta_{3a} \ln e_t \times A + \beta_{3d} \ln e_t \times D \\ & + \beta_4 \ln \text{expend}_t + \beta_5 \ln \text{CPI}_t + \beta_6 \ln p_{it}^{US} + \beta_7 \ln p_{it}^{ROW} + \varepsilon_{it} \end{aligned} \quad (5)$$

The expected sign of the coefficient  $\beta_{3a}$  is negative and the exchange rate pass-through coefficient in the VND appreciation after the imposition of the final AD duties is equal to  $(\beta_3 + \beta_{3a})$ , which is expected to be close to minus one (full pass-through). The coefficient  $\beta_{3d}$  is expected to be positive and the exchange rate pass-through coefficient in the VND depreciation after the imposition of the final AD duties is equal to  $(\beta_3 + \beta_{3d})$ , which is expected to be close to zero (no pass-through).

Similar to Blonigen and Haynes (2002), the estimation is performed using the weighted least squares (WLS) method with the weight being the customs values of imported shrimp products, correcting for the possibility of heteroskedasticity to obtain estimators that are more precise than their ordinary least squares (OLS). The rationale for this is that trade values and trade volumes in the sample are highly variable across shrimp products and some are very small or even zero for many months. So, one would expect that the lesser the trade value, the larger the variance in the residual for that observation (Blonigen and Haynes 2002). Therefore, weighting by the customs value of imported shrimp products may help to achieve more precise estimations. In all specifications, we also include product fixed-effects and monthly fixed-effects to control for unobserved variables which might affect our dependent variable.

## Data

The United States International Trade Commission (USITC) provides very detailed US international trade data available for years 1989 to the present. In

this article, we collected monthly data on customs values, quantities, and calculated duties of American shrimp imports for consumption from Vietnam for 10-digit HTS products under subheadings 030613, 030623, and 160520. Under these codes, there are 12 products from Vietnam that received the final AD duties, a single product which was involved in the investigation but did not receive the final AD duty, and the remaining shrimp products that were not involved in the investigation. To maintain the consistency of the HTS code system, the sample period lies from 2000 through 2011.

From the customs data, the monthly US import prices exclusive of tariff for each product from Vietnam are measured in US dollars per kilogram and were calculated as the ratio of customs value to the quantity of the product for each month. The ad valorem tariffs applied to the products were computed by dividing the calculated duty by the customs value. However, the calculation showed that the ad valorem tariff on Vietnamese shrimp products changed for only two products at the time of the US and Vietnam Bilateral Trade Agreement, and all other shrimp products had a zero tariff rate during the period of estimation.

For the AD duty data on imported Vietnamese shrimp cases filed in late 2003, we obtained the rates from various issues of Federal Register notices related to the results of the investigations and administrative reviews. In the context of a non-market economy like Vietnam, the USDOC computes and publishes three kinds of AD duties for producers and exporting firms in Vietnam. Firstly, a separate AD duty rate is calculated for each investigated firm for which it is compulsory to participate fully in the petition (also called “mandatory respondents”); a trade-weighted average of these mandatory respondents’ AD duties is imposed for a list of firms (“Section A” respondents) that apply for a separate rate; and a common rate, called the “Vietnam-wide” rate, which is applied to any noncooperative or new firms that export the subject products into the US. We exclude the Vietnam-wide rate and then take a simple average of all the AD duty rates of “mandatory” and “Section A” respondents to construct our AD duty independent variable because the Vietnam-wide rate is too high and firms facing the rate will not have an incentive to export the subject shrimp to the US. Moreover, if any new firms seriously want to enter the US market with a long-term strategy, they can easily get a refund for their deposit by requesting that the USDOC conduct an administrative review on their product. The progress of AD duties over time levied on the subject shrimp products imported from Vietnam is shown in [Table 2](#).

Monthly data on the US substitute goods prices that are used in the regression comes from monthly producer price indexes from 2000 through 2011, available from the website of the US Bureau of Labor Statistics (USBLS). The concordance that matches HTS codes in shrimp products to

its corresponding producer price indexes codes North American Industry Classification System (NAICS basis) can be found in Table 1. Besides the US substitute goods prices, another competing price is the unit-value of shrimp imported from other countries, which is calculated by dividing the customs value of shrimp imports (exclusive of Vietnamese import) by quantity. These data also come from the USITC.

Among the independent variables, data for the US monthly expenditures on shrimp was estimated as the US monthly commercial landing on shrimp plus imports and minus exports. The US Department of Commerce provides the US monthly commercial landing data for all kinds of shrimp through the website of the National Marine Fisheries Service Office of Science and Technology (2017). The data for monthly shrimp imports and exports also come from the same website.

Other independent variables include Vietnam's monthly consumer price index (CPI) published by the General Statistics Office of Vietnam (2005-12) and the monthly average nominal exchange rate defined in terms of the Vietnamese dong per US dollar, which is obtained from the International Monetary Fund website. Both dependent and independent variables in the regression are in logarithmic form.

Combining all variables for the period of 2000 to 2011, the dataset includes a total of 2,043 observations due to zero trade and missing data in some variables. Table 3 presents summary statistics of our dependent and independent variables for the full sample of 19 shrimp products.

## V. Empirical results

Table 4 reports the estimated results of Equations (1), (2), and (3) by using the WLS for the full sample of all 19 shrimp products, affirmative sample of 12 products subject to the final AD duties, and seven non-affirmative products that did not receive final AD duties from January 2000 through

**Table 3.** Descriptive statistics of variables.

Variable Name	Mean	Standard Deviation	Min	Max
Log of export price, <b>lnp</b>	2.0681	0.4494	-0.6274	3.8173
Log of tariff, <b>ln(1+ tariff)</b>	0.0025	0.0138	0	0.1823
Log of AD duty, <b>ln(1+ ADD)</b>	0.0215	0.0295	0	0.1490
Log of exchange rate, <b>lne</b>	9.7007	0.0972	9.5497	9.9433
Log of US expenditures on shrimp, <b>lnexpend</b>	19.6634	0.2996	19.0164	20.2577
Log of Vietnam's CPI, <b>lnCPI</b>	4.6119	0.0091	4.5941	4.6435
Log of US substitute price, <b>lnp<sup>US</sup></b>	4.6051	0.0171	4.5068	4.6987
Log of US shrimp price imported from the rest of the world, <b>lnp<sup>ROW</sup></b>	1.9936	0.3784	0.5407	3.1854

The full sample has 2,043 observations.

Source: Author's own calculation.

**Table 4.** Estimated results of pass-through regression for Vietnam's shrimp exports to the US.

	Full sample WLS (1)	Affirmative sample WLS (2)	Non-affirmative sample WLS (3)	Affirmative sample WLS (4)	Affirmative sample WLS (5)	Non-affirmative sample WLS (6)
$\ln(1 + \text{tariff})$	-3.215*** (0.825)		-2.435*** (0.656)			-2.082*** (0.712)
$\ln(1 + \text{ADD})$	-0.015 (0.129)	0.017 (0.129)				
$\ln(1 + \text{ADD}) \times \text{Before}$				-0.143 (0.106)	-0.107 (0.106)	
$\ln(1 + \text{ADD}) \times \text{After}$				0.766** (0.31)	-0.571 (1.359)	
$\ln e$	-0.544*** (0.066)	-0.543*** (0.067)	-0.525*** (0.199)	-0.61*** (0.075)		
$\ln e \times \text{Before}$					-0.694*** (0.084)	-0.756*** (0.186)
$\ln e \times \text{After}$					-0.687*** (0.079)	-0.745*** (0.185)
$\ln \text{expend}$	0.199*** (0.045)	0.187*** (0.045)	0.455*** (0.125)	0.179*** (0.042)	0.179*** (0.042)	0.483*** (0.122)
$\ln \text{CPI}$	1.478** (0.703)	1.603** (0.72)	-0.823 (1.629)	1.100 (0.761)	1.379* (0.769)	-1.225 (1.593)
$\ln p^{\text{US}}$	0.973*** (0.341)	0.951*** (0.348)	0.975 (0.738)	0.993*** (0.348)	0.912** (0.359)	0.95 (0.733)
$\ln p^{\text{ROW}}$	0.527*** (0.035)	0.555*** (0.036)	-0.101 (0.075)	0.591*** (0.035)	0.591*** (0.035)	-0.055 (0.074)
$R^2$	0.75	0.75	0.43	0.75	0.75	0.44
N	2043	1538	505	1538	1538	505

\*\*\*, \*\*, and \* indicate 1%, 5%, and 10% significance, respectively. The robust standard errors are in parentheses. All specifications include products and monthly fixed effects.

Source: Author's own calculation.

December 2011. As pointed out in Solon, Haider, and Wooldridge (2015), however, the WLS sometimes gives less precise estimates than the OLS if the error terms of observations within a group are not independent of each other. Therefore, as suggested by Solon, Haider, and Wooldridge (2015), we also examine the OLS estimates and then compare the robust standard errors of the OLS estimates with the estimates in Table 4 to determine which method provides a more precise estimation. The estimates show that almost all the robust standard errors are smaller for WLS than for OLS.<sup>4</sup> In addition, a Breusch-Pagan test revealed that the residuals in all the OLS estimates suffer significant customs-value-related heteroskedasticity. Hence, these results suggest that the WLS estimator gives more precise estimations of the coefficients.

In Table 4, Column (1) presents the case where Equation (1) is estimated using the full sample (2,043 observations). All coefficients in this regression, except the coefficient for the AD duty, have the expected sign and are highly significant. The coefficient on the AD duty is negative and not statistically different from zero. The coefficient for nominal exchange rates is estimated to

<sup>4</sup>The OLS estimates are omitted for brevity but are available upon request.

be  $-0.544$ , in line with our a priori, and significant at the 1% level, indicating that a 10% depreciation (appreciation) of Vietnam's currency against the US dollar translates into a 5.44% decrease (increase) in prices exporters receive. Lowering export prices (evaluated in US dollars) in the event of an exchange rate depreciation may help Vietnamese shrimp exporters create a competitive advantage in terms of price over the other competing shrimp products in a fiercely competitive market like the US shrimp market.

Next, the estimated coefficients of Equation (1) for the affirmative group (1,538 observations) and for the non-affirmative group (505 observations) are reported in Columns (2) and (3), respectively. The exchange rate pass-through coefficients in Columns (2) and (3) are  $-0.543$  and  $-0.525$ , both indicating significance at a 1% level. In addition, the above coefficients are quite similar to each other and the one in Column (1) ( $-0.544$ ). Hence, this result may suggest that the imposition of the AD duties has no impact on the degree of the exchange rate pass-through of affirmative shrimp products, thus supporting our prediction about the exchange rate pass-through in the presence of AD duties for the case of a non-market economy. We now turn to the estimated coefficient of the AD duty. In the non-affirmative sample, there is a product which received a preliminary AD duty but did not have any transactions during that period. So, the coefficient of the AD duty in Column (3) was dropped. The coefficient of the AD duty in Column (2) is now positive, as expected, but small (0.017) and still insignificant. This unexpected result of the AD duty coefficient may come from the period examined, where the subject firms suffered from the preliminary AD duties and might not respond to this high duty rate. So, there may be a structural break in the AD duty coefficient as in Blonigen and Haynes (2002), which may be tested for by relaxing the constant AD duty restriction and estimating Equation (2) for the affirmative sample.

Column (4) shows the estimated results of the unrestricted Equation (2), which allows for a difference in the AD duty coefficient between the period before and after the final determination. This estimation indicates that the AD duty coefficient before the final determination ( $\beta_2'$ ) is negative but insignificant at a 10% level but becomes statistically significant at a 5% level and a value of 0.766 ( $\beta_2''$ ) after the final determination, similar to Blonigen and Haynes (2002). We also conduct a partial F-test to compare the estimates of the unrestricted Column (4) to the restricted Column (2). The partial F-test suggests a structural change in the AD duty pass-through, as predicted. The exchange rate pass-through is significant with a value of  $-0.61$ , still indicating a high but incomplete pass-through. Other coefficients are still similar to the estimates in Column (2), except the coefficient of CPI now becomes insignificant.



Looking at Column (5), the estimated results suggest that the null hypothesis of a constant exchange rate pass-through coefficient for affirmative products cannot be rejected for this study. The two unrestricted coefficients of exchange rate pass-through in Column (5) look numerically similar to each other and the coefficients in Column (4). Furthermore, we cannot reject the null hypothesis that the coefficients of exchange rate movements before and after the final determination are equal at the 10% significance level. In addition, relaxing the restriction of constant exchange rate pass-through resulted in a significant change in the coefficients of AD duty changes. Also, the restriction of constant exchange rate pass-through can be found in Column (6), where the two unrestricted coefficients of exchange rate pass-through for the non-affirmative sample are very similar. We can clearly see that the magnitude and direction of the change in the exchange rate coefficients in Column (6) are nearly identical to the corresponding change in Column (5). Taken together, we can once again conclude that the exchange rate pass-through on the price received by shrimp exporters from Vietnam did not experience a structural break, which was found in the case of a market economy country in previous studies.

Unlike previous studies, our sample period includes the results of five administrative reviews that allow us to further investigate the pricing behavior of Vietnam's shrimp exporters when the AD duty changes (increase and decrease) after the final determination. Table 5 shows the estimates of Equation (4) for the affirmative sample. The coefficient of the

**Table 5.** Price responses of Vietnamese shrimp exports to the AD duty changes.

	Affirmative Sample
$\ln(1 + \text{tariff})$	-
$\ln(1 + \text{ADD}) \times \text{Before}$	-0.212** (0.101)
$\ln(1 + \text{ADD}) \times \text{After} \times \text{Up}$	1.336*** (0.300)
$\ln(1 + \text{ADD}) \times \text{After} \times \text{Down}$	-0.881** (0.390)
$\ln e$	-0.561*** (0.076)
$\ln \text{expend}$	0.138*** (0.039)
$\ln \text{CPI}$	1.077 (0.726)
$\ln p^{US}$	1.326*** (0.322)
$\ln p^{ROW}$	0.552*** (0.036)
$R^2$	0.77
$N$	1538

\*\*\*, \*\*, and \* indicate 1%, 5%, and 10% significance, respectively. The robust standard errors are in parentheses. All specifications include products and monthly fixed effects.

Source: Author's own calculation.

preliminary AD duty turns out to be significant at a 5% significance level, but still negative and small ( $-0.212$ ), indicating a small decrease in the export prices when the preliminary AD duty was in place. After the final determination, the coefficient on an increase in the AD duty is significantly positive with a value of  $1.336$ , suggesting that a 1% increase in the AD duty raises shrimp export prices by about 1.34% ( $(1 + 0.01)^{1.336} = 1.01338$ ). Importantly, this result supports our prediction that the NME country's export price rises by much more than 100% of the AD duties imposed or increased in an attempt to eliminate the future duties. In addition, the Vietnamese shrimp exporters' price response to a decrease in the AD duty is also set out in [Table 5](#). The coefficient for a decrease in the AD duty is estimated to be  $-0.881$  and significant at a 5% level. Specifically, a 1% decrease in the AD duty raises the prices by about 0.89%. Even so, most investigated firms from Vietnam still received higher AD duties in the fourth administrative review. A possible explanation for this may be the fluctuation of production costs or exchange rates of the surrogate country that lead to a significant increase in the constructed "fair value." Thus, these findings confirm the unpredictability of the NME method for calculating the AD duty.

However, it has been demonstrated that lagged exchange rates may affect the firm's pricing decisions, and the omission of lagged exchange rates may lead to a downward bias in the estimates (e.g., Blonigen and Haynes 2002; Feenstra 1989). To test this, we follow the approach applied in Blonigen and Haynes (2002) and create several lag length moving average variables of the exchange rate, namely three months, six months, and nine months.<sup>5</sup> The estimated results, using these moving average variables instead of the contemporaneous value, still support the major findings of [Tables 4](#) and [5](#).<sup>6</sup> The moving average exchange rate coefficients of the affirmative products before and after the final determination are nearly identical and have a similar trend with the corresponding coefficients of the non-affirmative products. Additionally, the moving average coefficients increase slightly in comparison with the contemporaneous coefficients for both affirmative and non-affirmative products, and this change becomes bigger with longer lag lengths. In addition, the coefficients of AD duties and other variables are similar to those of previous estimates with the contemporaneous exchange rates.

Lastly, we estimated Equation (5) for our subsets of affirmative and non-affirmative products by using weighted ordinary least squares to test the asymmetry of the exchange rate pass-through after the final AD duties were imposed. The results are shown in [Table 6](#). The interaction terms of the exchange rate variable with dummy variables *A* and *D* in

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<sup>5</sup>Contemporaneous exchange rate plus the previous three, six, and nine monthly observations.

<sup>6</sup>The moving average estimates are omitted for brevity but are available upon request.

**Table 6.** Testing for asymmetric exchange rate pass-through.

	Affirmative (1)	Non-affirmative (2)
$\ln(1 + \text{tariff})$	-	-2.028*** (0.683)
$\ln(1 + \text{ADD}) \times \text{Before}$	-0.142 (0.106)	-
$\ln(1 + \text{ADD}) \times \text{After}$	0.781* (0.472)	-
$\ln e$	-0.615*** (0.072)	-0.717*** (0.197)
$\ln e \times A$	-0.0006 (0.0021)	0.0118*** (0.004)
$\ln e \times D$	0.0002 (0.0019)	0.012*** (0.0029)
$\ln \text{expend}$	0.181*** (0.043)	0.501*** (0.125)
$\ln \text{CPI}$	1.15 (0.753)	-1.365 (1.41)
$\ln p^{\text{US}}$	0.995*** (0.351)	1.127* (0.634)
$\ln p^{\text{ROW}}$	0.592*** (0.035)	-0.07 (0.073)
$R^2 N$	0.75 1,538	0.45 505

\*\*\*, \*\*, and \* indicate 1%, 5%, and 10% significance, respectively. The robust standard errors are in parentheses.

Source: Author's own calculation.

Column (1) have the expected signs but are small and not statistically different from zero. In addition, we consider an F-test with the null hypothesis of equality between these coefficients in both columns of Table 6. In the end, failure to reject the null hypothesis, even at a 10% significance level, suggests that the final imposition of the US AD duties does not produce asymmetric behavior of the exchange rate pass-through to the export prices of Vietnamese shrimp products. This result comes as no surprise to us because the asymmetric exchange rate pass-through can be found only in complicated circumstances, in which NME firms subject to AD duties attempt to mitigate the negative impact of exchange rate movements of the surrogate country's currency against the US dollar.

## VI. Conclusions

Recent years have seen an increase in the number of countries using the AD measures with the purpose of eliminating injury caused to domestic industries due to unfair trade. In that context, this research examines the effects of the US AD investigations on the prices received by Vietnamese shrimp exporters before and in the post-review period. Unlike previous studies on

this literature, we focus on the AD cases filed against a non-market economy (NME) country as well as examine the NME exporters' price response to AD duty changes by using a sample of monthly data on American shrimp imports from Vietnam, having some products subject to the AD investigation and final duties in 2005.

Our analysis shows that the most appropriate option for NME exporters to eliminate future AD duties is to increase their prices by much more than 100% of the AD duties, which is supported by our empirical results. The estimates indicate that Vietnamese shrimp exporters decreased their prices by a small amount due to the imposition of the preliminary AD duty. However, the coefficients of the AD duty changes become very high and statistically significant after the final determination. The estimates indicate that Vietnamese exporters tend to raise shrimp export prices by about 1.34% in response to a 1% increase in the AD duties and continue to increase their prices by about 0.89% when they experience a 1% decrease in the AD duties.

Unlike the case of the market economy (Blonigen and Haynes 2002), our results support our prediction that the final imposition of AD duties does not produce a structural break in the exchange rate pass-through of affirmative products before and after the final determination. The two coefficients are nearly identical in our estimation. As discussed in this article, this differing result may come from the method of calculating AD duties for subject firms from NME countries, which do not alter the firm's pricing equation, in contrast with the method used for market economies which makes the firm's pricing decision dependent on both the demand of its home and exporting market (Blonigen and Haynes 2002). Furthermore, our analysis shows that there might be an asymmetry of exchange rate pass-through to the border prices of affirmative products after the imposition of the final AD duties in complicated scenarios. However, our empirical results did not support that prediction.

Our study offers a better understanding of NME exporters' pricing reaction to AD duties and may help trade policymakers when considering the gains and losses of implementing AD duties by using the NME treatment. It is important to note that the higher the price due to AD duties, the larger the net welfare loss of the importing country that implements the AD duties. Our analysis and empirical results revealed that if non-market exporters facing AD duties aim to eliminate the future duty, the prices received by NME exporters tend to increase by more than 100% of the AD duties and, therefore, the net welfare loss for implementing AD duties is generally more substantial.

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No potential conflict of interest was reported by the author.

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