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## **Trade Deflection arising from U.S. Antidumping Duties on Imported Shrimp**

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# **Trade Deflection arising from U.S. Antidumping Duties on Imported Shrimp**

## **Abstract**

We empirically test whether the investigation and impositions of U.S. antidumping duties in 2004 on imported shrimp distorts a named country's exports to third markets. We constructs a panel of bilateral, disaggregated product-level data for annual trade flows of subjected shrimp between the six named countries (Brazil, China, Ecuador, India, Thailand, and Vietnam) and four major importers (EU, Indonesia, Japan, and Malaysia) between 1999 and 2010. Our results show that named countries' trade flows were reoriented to other destination markets when U.S. anti-dumping duties were levied against their shrimp products.

*Keywords:* Shrimp; Antidumping duties; Trade deflection

*JEL classification:* F10; F12; F13

## **Introduction**

Shrimp has been the largest single commodity in value terms, accounting for about 15 percent of the total value of internationally traded fishery products in 2010 (FAO, 2012). Although over 100 countries export substantial quantities of shrimp, the international shrimp markets are concentrated in just three markets: the United States, Japan and Europe (Gillet, 2008). Thus the international shrimp trade is susceptible to trade policies from these three major importers.

For instance, imported shrimp has frequently been the subject of antidumping investigations (imports sold at less than fair value, LTFV) and countervailing duty investigations (subsidized imports) in the United States. In January 2005, after one-year investigations, the U.S. International Trade Commission (USITC, Commission) determined that an industry in the United States was materially injured by reason of frozen warm water shrimp imports from Brazil, China, Ecuador, India, Thailand, and Vietnam. The Department of Commerce found these imports to be sold in the United States at LTFV (USITC, 2005). On December 28, 2012, the Coalition of Gulf Shrimp Industries, Biloxi, MS, the same petitioner in the prior antidumping investigations, launched a petition, which alleged that material injury by subsidized imports from China, Ecuador, India, Indonesia, Malaysia, Thailand, and Vietnam. The petition requested the Commission and the U.S. Department of Commerce (USDOC, Commerce) to impose duties on imports from these countries. The final determination by USITC was negative in October 2013 (USITC, 2013).

In a framework for the international trading system, exporters are simultaneously subject to low (on average) applied import tariffs, but they also face the threat of frequently changing (i.e., newly imposed or removed temporary trade barrier (TTB) policies such as antidumping, safeguards and countervailing duties. While lower applied tariffs have been reduced and sustained in the past three decades through bilateral and multilateral trade agreements, the global use of antidumping (AD) and countervailing duties (CVD) have been increasing as alternative mechanisms for protection (Bown, 2011). Blonigen (2003b)

reports that antidumping cases worldwide increased to 2,200 in the 1990s from 1,600 in the 1980s and only a few in the 1970s. In the United States calculated dumping margins between 1980 and 2000 rose from 15% to over 63% and the probability of an affirmative ruling rose from 45% to over 60% (Blonigen, 2003a).

The economics literature on the trade effects of the TTB policies focuses predominately on the manufacturing sector. These effects have been summarized by Bown and Crowley (2007) into four categories: trade destruction effect (i.e., antidumping or countervailing duties measures result in a reduction in imports among the targeted/named countries); trade creation via import source diversion (which occurs when imports from a non-named country in a trade-remedy action increase in response to a fall in imports from countries targeted by the AD or CVD action); trade deflection/reorientation (i.e., increases in exports of the named countries to other non-named countries); and trade depression (a decrease in non-named countries' export to named countries).

Majority of the studies focuses on trade destruction and trade diversion effects. Within the first category, some studies observed an interesting phenomenon that the mere initiation of an unfair trade investigation reduces imports from the targeted country even when no final AD or CV duties are levied, which is referred to the 'investigation effect' or 'harassment effect' (Prusa, 1992; Staiger and Wolak, 1994; Prusa, 2001). This effect creates an incentive for domestic firms to initiate an AD or a CVD case, even if they do not necessarily anticipate a ruling in their favor. Carter and Gunning-Trant (2010) did an empirical study U.S. agricultural antidumping and countervailing duty cases from 1980 to

2005. They find that when the ruling is affirmative and AD or CVD duties are imposed, trade destruction affects U.S. agricultural imports from named countries for at least three years after the investigation year. In contrast to previous literature's findings for manufactures, they find no evidence of an investigation effect when the ruling is negative in their study of antidumping duties and no significant trade diversion in the U.S. agriculture sector. For disaggregate commodity studies, Malhotra, Rus, and Kassam (2008) and Keithly and Poudel (2008) are two descriptive analyses on antidumping legislation on U.S. imports of fresh tomatoes and shrimp. Notably, the latter find significant investigation and trade diversion effects, which contradicts Carter and Gunning-Trant (2010)'s finding and makes their principal assumption that the estimated parameters are identical across panels questionable. Also they point out the trade effect of antidumping duties on subject products and non-subject products.

Compared to the prolific literature on the trade destruction and trade diversion effects, only a few studies have quantified the magnitude of "unintended" externalities of nontariff barriers levied in one country on bilateral trade flows to rest-of-world markets. Bown and Crowley (2007) estimated the trade deflection effect arising from contingent protectionist measures (i.e., anti-dumping duties) applied by the United States against imports from Japan between 1992 and 2001. They find that the imposition of U.S. anti-dumping duties against specific Japanese products significantly increased Japan's exports of these same products to third-party countries (5–7% increase). Grant and Anders (2011) investigated whether exporters systematically alter their fishery and seafood trade patterns once their products have been flagged for refusal by the FDA and find that FDA

import refusals are significantly correlated with higher exports to markets other than the United States.

Wang and Reed (2014) estimate the import demand for shrimp in the United States from 1999-2012, using the Barten's synthetic model. They find significant investigation effects for China, India, and Vietnam (named countries) and positive investigation effects for the Indonesia (non-named country), which is consistent with the findings from previous antidumping studies (Staiger and Wolak, 1994; Prusa, 2001). They also find antidumping have a trade destruction effect for China, while antidumping duties do not seem to affect the total shrimp imports from these countries, namely, Ecuador, India and Vietnam. A natural question is: do US antidumping investigation and impositions on imported shrimp redirect trade flows from named countries to other major shrimp importers (e.g., Japan and EU)? This study aims to empirically investigate these effects, using highly disaggregated data.

### **Empirical Method**

Bown and Crowley (2007) use a simple three-country model and demonstrate the impact of a trade policy (e.g., tariffs, temporary trade barriers, trade detentions/refusals, etc.) from one country on world trade flows. Trade deflection occurs when an increase in a named country's exports to a third country.

Following Prusa (2001), our empirical model is specified as:

$$\ln M_{ijt} = \alpha + \eta \ln P_{ijt} + \varphi I E_i + \gamma \ln T_i * D_t + \beta X + u_{ijt}$$

Where  $M_{ijt}$  represents annual export quantity from country  $i$  to country  $j$  in year  $t$ .  $P_{ijt}$  is

the annual export unit value from country  $i$  to country  $j$  in year  $t$ .  $IE_i$  is a dummy variable indicating the year in which US antidumping investigation was undertaken (=1 for year 2004, =0 for all other years).  $\ln(T_i)$  denotes the size of the weighted average final antidumping duty rate.  $D_t$  is a time dummy, =1 when antidumping duties are in effect. Coefficients on  $IE_i$  and  $\ln(T_i)$  (i.e., are of major interest in this study, measuring the extents to which trade is redirected to destinations other than the United States conditional on antidumping investigation and duties.  $X$  is a vector of control variables: gross domestic product (GDP) per capita for both exporters and importers.  $\beta$  is a vector of parameters for to be estimated.  $u_{ijt}$  is the i.i.d. disturbance term.

## **Data**

Exports quantities (in kilograms) and values of the subject shrimp for the years from 1999 to 2010 come from the UN Comtrade database. The subject shrimp under US antidumping investigations in 2004 are provided for in subheadings of two 6-digit Harmonized System (HS) codes (i.e., 030613 and 160520). Trade flows are between named countries and third countries. Specifically, exporters are the six named countries: Brazil, China, Ecuador, India, Thailand, and Vietnam. Importers are EU, Indonesia, Japan, and Malaysia. Unit values (\$/kg) are calculated to serve as proxies for prices.

Information of preliminary rulings, final rulings, and results of five-year (Sunset) reviews are from United States International Trade Commission, and International Trade Administration, United States Department of Commerce. Rates of AD/CVD are obtained from the Temporary Trade Barriers Database, World Bank and various Federal Register



Notices of US (US Imported Shrimp Antidumping Duty Investigations during the period 1999-2011 is shown in Table 1).

We include control variables: GDP per capita (in US\$) of the exporting and importing countries, which are obtained from the World Bank's (2014) World Development Indicators. For instance, we expect an increase in the GDP per capita growth of the exporting country to lead to a fall in export growth because domestic demand for the shrimp will be higher. Detailed data description and statistics are summarized in table 2.

## **Results**

Because our data is panel, we use three main approaches to regression analysis with panel data to fit our model: pooled OLS (with panel-corrected standard errors), the fixed effects model, and the random effects model. Breusch-Pagan Lagrange Multiplier test (tests for the random effects model based on the OLS residual) and Hausman test (tests whether there is a significant difference between the fixed and random effects estimators) are employed for model selection (Greene, 2012).

Breusch-Pagan Lagrange Multiplier test statistic ( $p=0.00$ ) is significant at the 1% significance level, thus the random effects model is preferred over the OLS model. The Hausman test statistic is significant at the 5% significance level ( $p= 0.03$ ), indicating the there are significant differences between the coefficients for the fixed effects and random effects model and fixed effects model is more efficient. Therefore we mainly focus on interpreting results from the fixed effects model.

Do US antidumping investigation and duty impositions on imported shrimp deflect trade flows from named countries to rest-of-world markets? The results in table 3 suggest that the answer to this question is a yes. Results show that US antidumping investigation is associated with higher shipments from named countries to third import markets as expected. To understand the magnitude of this effect, we follow the formula in Greene (2012, P150) to calculate the percentage change in the dependent variable associated with dummy variables. US antidumping investigation would increase exports of the subject shrimp from named countries to third markets (other than the United States) by 246%. An additional 1% of antidumping duties rates imposed on shrimp imports from Brazil, China, Ecuador, India, Thailand, and Vietnam leads to 102% increase in exports from these countries to rest-of-world markets. It indicates that, US as the largest importer has the power in the international shrimp market and its trade policies affect trade flows. The trade impact of sheer initiation of antidumping investigation is more pronounced than that from the actual impositions of duties, which is consistent with findings about US demand for imported shrimp in Wang and Reed (2014). It suggests that named countries deflect trade to other import markets during the investigation year. Price elasticity for named countries' exports is -0.782. Coefficient on exporter's GDP is significantly positive, contradictory to expectation. Coefficient on importer's GDP is not statistically significant. We use trade flows for commodity at 6-digit HS disaggregate level, GDP may be too large of an economic indicator to be a good control variable for this small amount of trade.

## **Conclusions**

In the paper Wang and Reed (2014), we estimate imported shrimp in the US, using the Barten's synthetic model and monthly trade data from 1999 to 2012. By incorporating investigation dummy and antidumping duties rates variables, we examine the trade destruction and diversion effects of the US antidumping incidents and find significantly negative investigation effects for named countries, such as China, India, and Vietnam and positive investigation effect for non-named county Indonesia.

This paper extends the study and investigates whether named exporters systematically alter their shrimp trade patterns once their products have been subject to US anti-dumping duties. Our results show that named countries' trade flows were reoriented to other destination markets when U.S. anti-dumping duties were levied against their shrimp products. In the case of shrimp, our results indicate that the imposition of a US trade remedy can lead to a substantial export surge to a third country's market. This finding is in accordance with previous studies on trade deflection (Bown and Crowley, 2007; Grant and Anders, 2011).

There are some limitations of our results and approach. There are many other factors may influence trade flows, such as bilateral or multilateral free trade agreement, supply shocks, import refusals due to sanitary and phytosanitary reasons, etc. In addition, some studies (e.g., Prusa, 2001; Chang and Winters, 2002) show that trade policy decisions made by "large" countries are able to affect exporters' prices, introducing multicollinearity problem. Future work will need to address these important issues.

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**Table 1. US Imported Shrimp Antidumping Duty Investigations, 1999-2011**

<b>Country</b>	<b>Product</b>	<b>Initiation</b>	<b>Final</b>	<b>Duty Order</b>	<b>Min Margin</b>	<b>Max Margin</b>
Brazil	Frozen Warmwater Shrimp	27-Jan-04	23-Dec-04	1-Feb-05	4.97%	67.80%
Ecuador*	Frozen Warmwater Shrimp	27-Jan-04	23-Dec-04	1-Feb-05	2.48%	4.42%
India	Frozen Warmwater Shrimp	27-Jan-04	23-Dec-04	1-Feb-05	4.94%	15.36%
Thailand	Frozen Warmwater Shrimp	27-Jan-04	23-Dec-04	1-Feb-05	5.29%	6.82%
China (PRC)	Frozen Warmwater Shrimp	27-Jan-04	8-Dec-04	1-Feb-05	27.89%	112.81%
Vietnam	Frozen Warmwater Shrimp	27-Jan-04	8-Dec-04	1-Feb-05	4.30%	25.76%

Source: United States Department of Commerce. International Trade Administration (ITC). Enforcement and Compliance. Antidumping and Countervailing Case Information. <http://enforcement.trade.gov/stats/iastats1.html>.

\*Antidumping duty order on frozen warmwater shrimp from Ecuador was revoked on August 15, 2007 as a result of World Trade Organization (“WTO”) panel findings. (Federal Register /Vol. 72, No. 163 /Thursday, August 23, 2007.)

**Table 2. Summary of Data statistics**

<b>Variables</b>	<b>Mean</b>	<b>Std. Dev.</b>	<b>Min</b>	<b>Max</b>
<i>Export Quantities (1,000 kg)</i>	9,451	15,828	0.002	79,268
<i>Export Values (1,000 US \$)</i>	68,912	113,337	0.008	486,155
<i>Exporter GDP per capita (US \$)</i>	2,107	1,698	374	12,576
<i>Importer GDP per capita (US \$)</i>	17,216	16,518	679	46,203
<i>US antidumping rates (%)</i>	0.19	0.36	0	1.128



**Table 3. Trade Deflection Effects Arising from US Antidumping Investigations and Duties on Shrimp**

<b>Export quantities</b>	<b>Pooled OLS regression</b>	<b>Fixed Effects Model</b>	<b>Random Effects Model</b>
<i>Price</i>	-0.941** (0.417)	-0.782*** (0.271)	-0.859*** (0.274)
<i>US antidumping Investigation</i>	1.477*** (0.521)	1.242*** (0.296)	1.271*** (0.302)
<i>US antidumping Duties</i>	2.243*** (0.427)	1.018*** (0.386)	1.330*** (0.379)
<i>Importers (Indonesia/Malaysia)</i>	-1.765*** (0.655)		-2.718** (1.360)
<i>Exporter GDP</i>	-0.605*** (0.201)	0.713** (0.342)	0.219 (0.303)
<i>Importer GDP</i>	0.877*** (0.246)	-0.479 (0.446)	0.108 (0.391)
<i>Constant</i>	12.177*** (2.812)	13.992*** (2.760)	12.033*** (3.196)
<i>Observations</i>	285	285	285
<i>R<sup>2</sup></i>	0.4231		
<i>R<sup>2</sup>-within</i>		0.1573	0.1498
<i>R<sup>2</sup>-between</i>		0.1159	0.3093
<i>R<sup>2</sup>-overall</i>		0.0713	0.3908

Note: Standard errors in parentheses.

Statistic significance levels are represented by \*\*\* (p<0.01), \*\* (p<0.05), \* (p<0.1).