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# **The Impact of US anti-dumping measures during the “Catfish War” on Vietnamese Pangasius exports**

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## List of Abbreviations

AD	Anti-dumping
BTA	Bilateral Trade Agreement
CFA	Catfish Farmers of America
DOC	Department of Commerce
EU	European Union
FDA	Food and Drug Administration
ITC	International Trade Commission
LSDV	Least square dummy variable
MD	Mekong Delta
OLS	Ordinary least squares
USA	United State of America
VASEP	Vietnam Association of Seafood Exporters and Processors
VND	Vietnamese Dong
WTO	World Trade Organization

## Abstract

The Vietnamese pangasius industry has faced anti-dumping (AD) measures imposed by the United States of America (USA). This is a historical event of great importance after Vietnam's transition from a centrally planned economy to a free market economy integrating in the world market. Vietnamese pangasius exporters and the Vietnamese government in general are very confusing for the first trade dispute between Vietnam and the USA, the so-called Catfish War. In the present paper, an econometric approach is followed and a regression analysis applied to investigate how the US AD measures have impacted on the volume and the value of Vietnam's pangasius exports, taking into account the timing of the AD investigation and of the imposition of the measures, as well as other influencing factors, such as the exchange rate ratio between Vietnamese Dong (VND) and USD. Based on the estimate results of the regression analysis, a significant negative impact of the size of the AD duty is found during the period of January 1999 to December 2006, with the preliminary and final determination duration having more negative impact, particularly for the final determination, for both the export volume and value. In addition, it is found that the exchange rate ratio significantly and positively affects the volume and the value of Vietnam's pangasius exports.

**Keywords: Aquaculture, Pangasius, Anti-dumping**

## 1. Introduction

Anti-dumping (AD) use has increased dramatically over the last two decades (Miranda et al, 1998; Prusa, 2001). It has been a most popular way of protecting a country's economic situation. Dumping is considered as unfair competition although price discrimination between markets can be considered as a legitimate business strategy (Krugman and Obstfeld, 2003). The World Trade Organization (WTO) ruled for instance, that the United States of America (USA) was violating international trade rules with a tax on specific products, such as shrimp imports from Thailand and India, thus damaging the USA's credibility as a free trader<sup>4</sup>. AD measures nowadays are among the most customary non-tariff barriers.

According to the WTO, dumping occurs when "a company exports a product at a price lower than the price it normally charges on its own home market". Unlike traditional forms of protection, current AD measures are selective and less transparent tariffs (Ethier and Fishcher, 1990).

Three alternative methods are considered to determine the normal value of products: the product price in the exporter's domestic market, the price charged by the exporter in another country, or the price computed as a combination of the exporter's production costs, other expenses and normal profit margins.

The USA and the European Union (EU) have laws allowing governments to investigate charges of dumping and to take antidumping actions. In the USA, industries can petition the International Trade Commission (ITC) and the Department of Commerce (DOC) to take antidumping actions to counteract dumped imports. If the DOC finds evidence of dumping and the ITC finds that the industry is "materially injured or threatened with material injury", antidumping duties can be imposed. Similarly, the EU can bring antidumping actions if it finds evidence of dumping which causes or threatens to cause material injury to a domestic industry.

Many quantitative studies have investigated how AD has impact on trade trends of exporting countries, and found evidence of trade diversion for the USA (Prusa, 1997) and for the EU (Konings et al, 2001). In addition, Cuyvers and Dumont (2005) used a panel regression to estimate the impact of AD duties on trade in some 12 products from ASEAN countries and found a significant negative impact of AD duties on both the value and the quantity of imports of the EU from ASEAN countries.

During the period 1981-2001, among the top 40 countries targeted for AD investigation (Zanardi, 2004), Asian countries were the target of more than 38 percent of AD investigations and the ASEAN countries accounted for 7 percent of the investigations (Cuyvers and Dumont, 2005). At the same time, Vietnam was not in case. As a result, the AD has been like a warning sign for the developing countries

The purpose of this paper is to investigate the effects of the USA anti-dumping measures on the Vietnamese pangasius industry. Between the USA and Vietnam a trade dispute erupted in 2002 and became known as the "Catfish War". The US authorities conducted an AD investigation against alleged

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<sup>4</sup> <http://www.enn.com/wildlife/article/32901>

Vietnamese dumping of certain frozen pangasius fillets and imposed an AD duty. In the next section, the evolution of trade dispute is discussed.

In the third second the reasons leading to the trade dispute and the impact of the AD measures against Vietnamese pangasius exports are discussed. Next the results of our econometric analysis are discussed. The final section offers conclusions.

## 2. The USA anti-dumping on Vietnamese pangasius

### 2.1 Introduction

Basa (*Pangasius bocourti*) and tra fish (*Pangasius hypophthalmus*) are the two species of pangasius cultured in Vietnam. These are also the most important freshwater product in the Mekong Delta (MD) region in the south of Vietnam. Mostly the pangasius is produced in cages anchored on and ponds nearby rivers. In the USA, catfish is raised in man-made ponds, predominantly in the states of Mississippi, Arkansas, Alabama and Louisiana. The catfish industry is by far the largest farm raised fishing sector in the USA, accounting for 80 and 60 percent of aquaculture production in volume and value respectively (USA International Trade Commission, 2001). In the Southeast of the United States, there are over 1000 farms that raise catfish and 25 processing plants. The American catfish belongs to the family of Channel Catfish.

Before 1986, extensive fish farming was practiced in Vietnam, mainly catering to domestic demand. In 1986, supported by Australian experts and by the establishment of AGIFISH in the An Giang province, tra and basa were produced and exported to Australia as fillet products. Until 1990, tra and basa fillets were important in the Asian market, such as Hong Kong, Japan and China. During this period, tra and basa farming expanded in many provinces in the MD, as the demand for raw fish increased rapidly, and most of the farm households involved were shifting to intensive fish farming.

After the lifting of the USA embargo in 1995 and the Vietnam-USA Bilateral Trade Agreement (BTA) ratified in 2001, increasing opportunities emerged for the Vietnamese pangasius industry to export to the USA, the EU, Japan, Hong Kong, Singapore and on the world market at large. Moreover, as the MD is particularly suited for tra and basa farming, together with a high and longstanding experience of the farmers, basa and tra farming rapidly developed from 1996 onwards.

The development of the farming of tra and basa was influenced by factors such as: (i) the quality of the Vietnamese tra and basa fish meeting domestic and international standards of quality: food safety and hygiene; (ii) Vietnamese tra and basa fish showing specific product characteristics (special flavour, coloring and low-fat); (iii) an attractive price due to low production cost as a result of cheap prices of labour and fingerling; (iv) the fingerling socialization program being actively implemented and disseminated from 1995. Before that time, the fish farmers depended much on the source of natural fingerling and they had to catch natural fingerling fish themselves from rivers, or alternatively, to buy them

from others whose main occupation was to fish and to catch natural fingerling fish. Because of the above mentioned positively influencing factors, the tra and the basa fingerling source of the farmers became much more flexible.

With to the increased development potential, and the Government policies of economic transition, many exporting and processing companies started tra and basa business activities. Instead of two main companies (AGIFISH and AFIEX) ten years ago, seven companies today are operating in the An Giang province, the leading fish farming province (AGIFISH, AFIEX, NAVICO, TUAN ANH, CUU LONG, VIET AN, AFASCO).

The development of tra and basa fish farming has positively affected Vietnam's regional and national economic development. However, this has been stalled by increased trade barriers that Vietnamese basa and tra exporters have faced. Among these barriers, mention can be made of the penal anti-dumping duty, imposed on the imports of tra and basa fillets by the USA ITC, as well as many technical barriers (e.g. the USA FDA<sup>5</sup> addition of prohibited antibiotics). Consequently, a lot of fish farmers had to shift their main occupation to other unskilled farming and cultivation, with many completely failing. This, evidently, had severe social consequences in Vietnam: with an increasing unemployment rate in the rural areas (Tung et al, 2004) and a complete loss of investments made, destitution, etc., at a time when fish farmers had to bear huge interest payments to the banks on the loans for their initial investment.

## 2.2 Review of the catfish war

Over the last few years, thousands of kilograms of Vietnamese tra and basa have been sold in the USA market, thus reaching a large market share, rapidly capturing 20%<sup>6</sup> of the USA catfish market. Imports of the USA subsequently soared to 21,000 tons of fillets in 2002. Advantages of cheap labour, artificial fertilizer, fingerling and preferential natural conditions are among the main reasons for the taking off of Vietnam's pangasius industry. Based on these advantages, more active government planning and development programs were evolved to facilitate economic sectors addressing a effective investment. With tariffs dropped to zero for the pangasius product, Vietnam has been able to export at its normal price, which comes out appeared to be much cheaper than the American counterpart. However, the American catfish farmers launched protest about the Vietnamese catfish allegedly not being produced under the hygienic conditions required by international standards, in spite of inspection by the DOC having clearly revealed that this was not so. Vietnamese catfish is produced according to international standards, and most of the fish feed is supplied by American companies, such as Cargill.

A corollary of the above was, that the USA domestic producer prices dropped from 1.6 USD/kg in January 1997 to 1.2 USD/kg in December 2002, as depicted in Figure 1. Consequently, on 28 June 2002, the USA Catfish Farmers' Association (CFA) and eight seafood production companies lodged an application with the USA ITC, to sue the Vietnamese Association of Seafood Exporter and Processors (VASEP) for dumping catfish products in the USA. They claimed that since the catfish produced by them counted for

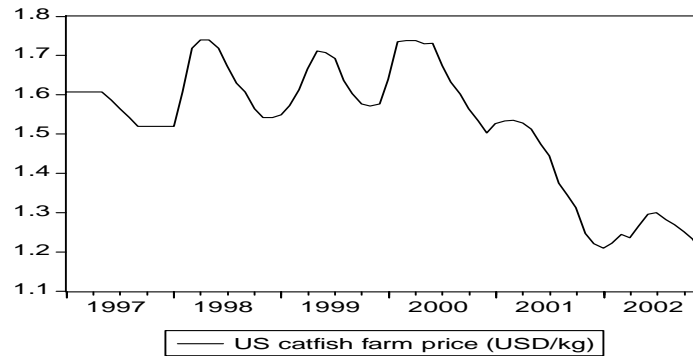
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<sup>5</sup> Food and Drug Administration

<sup>6</sup> [www.aseanfocus.com/asiananalysis/article.cfm?articleID=716](http://www.aseanfocus.com/asiananalysis/article.cfm?articleID=716)

85.7 percent<sup>7</sup> of the total USA market, they were in effect acting on behalf of all catfish farmers in the USA. The defendants named in the case were 56 seafood processors in Vietnam, although some of the named firms had nothing to do with the varieties of catfish produced for exporting in Vietnam.

**Figure 1 : Average monthly price for the USA farm-raised catfish**



Source: Monthly catfish producing report, National Agricultural Statistics Service, USDA.

The crux of the investigation appears to lie in the conclusion that the USA investigators have drawn. First of all, trade description legislation was used to restrict the name “catfish” solely to Ictalurids grown in the USA, so denying the basa a key brand advantage, especially because the Vietnamese imported fish was much cheaper than the local fish. This was the first success of the USA catfish producers in convincing the USA Congress to force Vietnamese exporters to change the name of their product to “tra” or “basa”.

On June 28, 2002, the DOC received a petition on the imports of certain frozen fish fillets from Vietnam filed by the CFA and the individual U.S. catfish processors America's Catch Inc.; Consolidated Catfish Co., L.L.C.; Delta Pride Catfish, Inc.; Harvest Select Catfish, Inc.; Heartland Catfish Company; Pride of the Pond; Simmons Farm Raised Catfish, Inc.; and Southern Pride Catfish Co., Inc., hereinafter referred to collectively as "the petitioners." This investigation was initiated on July 18, 2002.

On August 8, 2002, the USA ITC issued its affirmative preliminary determination that there was a reasonable indication that an industry in the USA was threatened with material injury by imports from Vietnam of certain frozen fish fillets. On August 9, 2002, the DOC requested quantity and value information from a total of fifty-three Vietnamese companies, which were identified in the Petition for the Imposition of Antidumping Duties: Frozen Fish Fillets from Vietnam, dated June 28, 2002 ("Petition"). The DOC chose to pick India and Bangladesh as surrogate economies for comparing catfish price levels. The DOC found the price levels in these countries much higher than in Vietnam. Despite protests by the VASEP, the DOC concluded in its preliminary order on January 27, 2003 that "Vietnamese producers/exporters have made sales to USA. customers at less than fair value" and recommended anti-dumping duties on all major producers' products of fish fillets (table 1). This preliminary determination was based on the AD investigation on imports of certain frozen fish fillets. The Department of Commerce made its preliminary determination with the AD duties for the producers/exporters, who voluntarily

<sup>7</sup> The Mississippi-Mekong Catfish war, [www.peoplesfoodsovereignty.org/docs/doc9.htm](http://www.peoplesfoodsovereignty.org/docs/doc9.htm).

responded to Section A<sup>8</sup> of the Department's questionnaire. The DOC and the ITC made final affirmative determinations that critical circumstances existed regarding the imports of frozen fish fillets, and that antidumping duties would be assessed retroactively on goods imported up to ninety days prior to the publication of the Department's preliminary determination.

**Table 1: Preliminary Anti-dumping duties**

Vietnamese Exporter	Preliminary Anti-dumping (27 January 2003)
AGIFISH Co	61.88%
CATACO	41.06%
NAVICO	53.96%
VINH HOAN CO., LTD	37.94%
Respondents who voluntarily submitted Section A responses	49.16%
Vietnam-wide	63.88%

Source: ITC Dataweb; <http://ia.ita.doc.gov/download/factsheets/factsheet-vietnam-catfish-prelim-012703.pdf>

On August 6, 2003, the ITC notified the DOC of its final determination pursuant to section 735(b)(1)(A)(e)<sup>9</sup> of the Tariff Act that an industry in the USA is materially injured by reason of less than fair value imports of subject merchandise from Vietnam. The AD duty would be assessed on all unliquidated entries of certain frozen fish fillets from Vietnam entered, or withdrawn from the warehouse, for consumption on or after January 31, 2003, the date on which the Department published the Notice of Preliminary Determination of Sales at Less Than Fair Value, Affirmative Preliminary Determination of Critical Circumstances and Postponement of Final Determination: Certain Frozen Fish Fillets From the Vietnam<sup>10</sup>.

The product coverage of the investigation is frozen fish fillets, including regular, shank, and strip fillets and portions thereof, whether or not breaded or marinated, of the species *Pangasius Bocourti*, *Pangasius Hypophthalmus* (also known as *Pangasius*), and *Pangasius Micronemus*. The merchandise would be referred to as frozen "basa" and "tra" fillets, which are the Vietnamese common names for these species of fish. These products are classifiable under tariff article codes 0304.20.60.30 (Frozen Catfish Fillets), 0304.20.60.96 (Frozen Sole Fillets, NESOI), 0304.20.60.43 (Frozen Freshwater Fish Fillets) and 0304.20.60.57 (Frozen Sole Fillets) of the Harmonized Tariff Schedule of the United States (HTSUS).

On November 8, 2002, the Import Administration of the DOC announced its determination in the inquiry into the status of Vietnam as a non-market economy country or as a market economy country under USA antidumping and countervailing duty laws. Meanwhile the DOC also said that Vietnam offered subsidies to fish producers, resulting in market distortions. Another conclusion was that the export price was below the production cost. Based on this report, the DOC decided to raise tariffs on the Vietnamese frozen tra

<sup>8</sup> <http://ia.ita.doc.gov/download/factsheets/factsheet-vietnam-catfish-prelim-012703.pdf>

<sup>9</sup> U.S. International Trade Commission

<sup>10</sup> <http://www.thefederalregister.com/d.p/2003-08-12-03-20509>



and basa fillets from 37% to 53%. A number of Vietnamese exporters had to bear anti-dumping duties as high as shown in table 2.

**Table 2: Anti-dumping duties levied by the USA DOC**

Vietnamese Exporters	Anti-dumping Duty (18-June-2004)	Anti-dumping Duty (18-July-2003)
AGIFISH Co	44.76%	47.05%
CATACO	45.55%	45.81%
NAVICO	52.90%	53.68%
VINH HOAN CO., LTD	36.84%	36.84%
Respondent with "separate rates"	44.66%	45.55%
Vietnam-wide	63.88%	63.88%

Source: VASEP, Final determination in the Anti-dumping duty investigation of certain frozen fish fillets from Vietnam<sup>11</sup>

The dumping charges shocked the VASEP, the Vietnamese Government and practically all those familiar with the catfish industry in Vietnam, including the USA Embassy and a number of USA businesses based in Vietnam. Vietnam had been in transition from a centrally planned, to a market economy since 1986 and for all practical purposes, was now a market economy. It was under an IMF-World Bank structural adjustment regime and had dismantled whatever meager subsidies it was able to provide in the past to its agriculture producers and fishers. In fact, proof of Vietnam's status as a market economy was one of the preconditions of the USA-Vietnam BTA, that was signed by the two countries in 2000. Moreover, compared with the USA, Vietnam is a poor country, and simply does not have the resources to provide its industrial sectors with the levels of subsidies and supports that the USA provides to its own producers.

The dumping investigation and the anti-dumping measures were regrettable for a lot of reasons. From an economic perspective, they were not justified. The conclusion of Vietnam not being a market economy was unwarranted. First, while Vietnam is not yet an adult market economy, the domestic tra and basa market in Vietnam has many characteristics of a competitive market, in which the forces of supply and demand largely determine market outcomes. Secondly, from a purely theoretical point of view, even though Vietnam is not a market economy, the USA and Vietnam can still engage in mutually beneficial trade. Thirdly, the label of a non-market economy can be conveniently applied to many transitional economies (including China and the East European countries) with potentially harmful consequence for free trade<sup>12</sup>.

After one year of AD measures imposed, the AD duties were adjusted according to table 3. Due to compliance with what the AD requirements and the US regulations on good cooperation to supply information asked, some Vietnamese exporters had a good chance for the AD duty being reduced. Illustratively, the AD duty against VINH HOANG CO, LTD came down to 6.81% in 2004, instead of 36.84% in 2003. In contrast, CATACO was confronted with a higher duty level of 80.88%, instead of 45.81% in 2003. The AD duties against the other exporters were not adjusted.

<sup>11</sup> [www.ita.doc.gov/media/FactSheet/0603/catfish\\_final\\_061703.html](http://www.ita.doc.gov/media/FactSheet/0603/catfish_final_061703.html).

<sup>12</sup> Prof. Binh Tran-Nam, Australian Taxation Studies Program (Atax) University of New South Wales.

**Table 3: The first adjustment of USA Anti-dumping duties on Vietnamese catfish  
(1/8/2004 – 2006)**

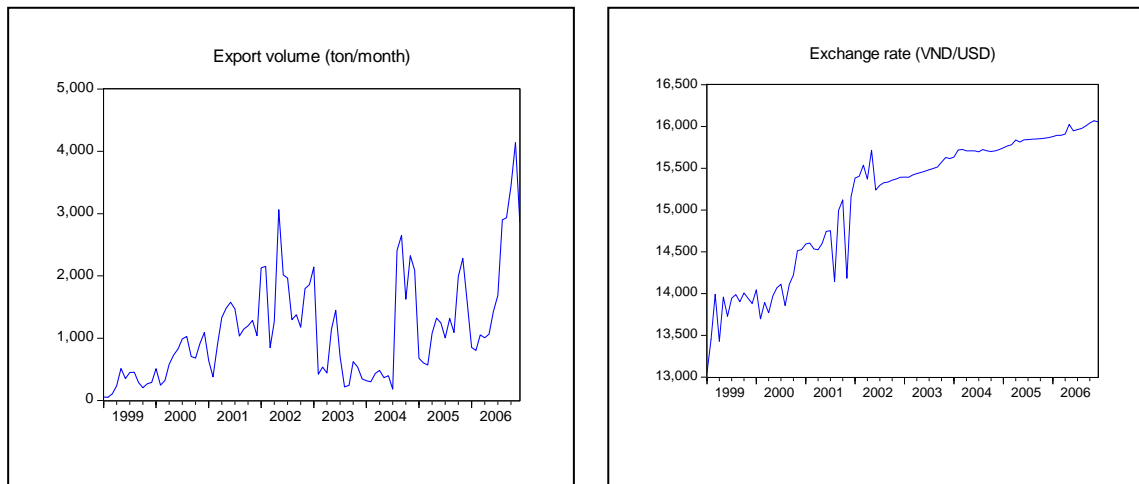
Vietnamese Exporters	Anti-dumping Duty
AGIFISH Co.	47.05%
CATACO	<b>80.88%</b>
NAVICO	45.81%
VINH HOAN Co., LTD	<b>6.81%</b>
Respondent with “separate rates”	45.55%
Vietnam-wide	63.88%

Source: Magazine BT37-2006 VASEP (Vietnam Association Seafood of Exporters and Producers)

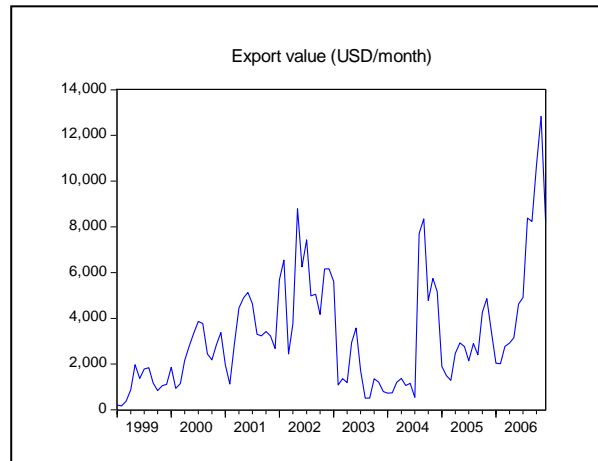
Within just a few months after June 2003 Vietnam’s exports of pangasius to the USA fell by about 50% due to the penal AD duties imposed by the USA. However, as shown in figure 2, the Vietnamese exporters recovered quickly after one year of “catfish fighting”. In particular, either the export volume or the export value increased. As a result, the USA is still an important traditional market for Vietnam, although in the mean time the Vietnamese exporters have been diversifying and expanding into new markets as the EU<sup>13</sup>.

Another important factor which contributed to the increasing export volumes was the exchange rate of the Vietnamese Dong (VND) against the USD, which showed an upward trend during the 1999- 2006 period, thus enhancing Vietnam’s competitive position in the world market of cathfish products.(see figure 2).

**Figure 2: Vietnamese pangasius exported to the USA**



<sup>13</sup> Can see more in Cuyvers and Binh (2008)



Source: VASEP, Daily price information of An Giang province-Vietnam, the USA Bureau of Census; VND/USD is the exchange rate ratio between VND (Vietnamese Dong) and USD. 1 USD = 13772 VND in 1999; 1 USD = 14065 VND in 2000, 1 USD = 14663 in 2001; 1 USD = 15441 VND in 2002; 1 USD = 15450 in 2003; 1 USD = 15730 VND in 2004; 1 USD = 15807 in 2005; 1 USD = 15971 VND in 2006

### 3. Econometric Analysis

#### 3.1 Data

In the present study monthly data on export volume (ton/month), export value (USD/month and average monthly exchange rate between VND<sup>14</sup> and USD are used, relating to Vietnamese pangasius exports to the USA and covering the period from January 1999 to December 2006. These data are from various Vietnamese sources, including VASEP and the daily market price information of the An Giang province in the MD, as well as the USA Bureau of Census. The monthly export volume and value data were tested for the presence of outliers. The Jarque-Bera normality test was not rejected.

#### 3.2 Model and estimation results

Empirical studies indicate that AD measures significantly reduce the imports from countries that are targeted by such measures, both for the USA (Staiger and Wolak, 1994; Krupp and Pollard, 1996; Prusa, 1997) and the EU (Messerlin, 1989; Brenton, 2001; Cuyvers and Dumont, 2005).

Following Prusa (1997) and Cuyvers and Dumont (2005), equation (1) will be used to estimate the anti-dumping impact on the export volume and the export value of pangasius.

$$\ln y_t = \alpha + \beta_1 \ln y_{t-1} + \beta_2 \left( \frac{\ln y_{t-1}}{\ln y_{t-2}} \right) + \beta_3 \ln ER + \beta_4 \ln duty + \sum_{j=0}^{13} \gamma_j t_j + \sum_{j=6}^{13} \delta_j (t_j \ln duty) + \varepsilon_{i,t} \quad (1)$$

<sup>14</sup> VND = Vietnamese Dong

where  $y_t$  is the volume of the export (ton/month) and/or the value of the export (USD/month) to the USA of Vietnamese pangasius at time  $t$ . Duty is the AD duty level imposed on pangasius products. The specification considers dummy variables for four different periods, with  $t_0, t_1, t_2, t_3, t_4, t_5$  equal to 1 in the months July up to December 2002 (the period of the AD investigation) and 0 otherwise;  $t_6, t_7, t_8, t_9, t_{10}, t_{11}$  equal 1 in the months January up to June 2003 (the period of preliminary AD duties) and 0 otherwise;  $t_{12}, t_{13}$  equal 1 in July and August 2003 (final AD duties) and 0 otherwise, and finally  $t_{14}, t_{15}, t_{16}, t_{17}$  equal 1 in the months September up to December 2003 (the period after the final AD duties imposed) and 0 otherwise. These dummy variables are based on the process of investigation and the AD determination as shown in table 4. Because the dummy variables  $t_0, t_1, t_2, t_3, t_4, t_5$  consider the months of investigation they are not interacted with the AD duty level in columns 3 and 5 in table 5, as are the dummies that consider the months in which duties were imposed ( $t_6, \dots, t_{17}$ ).

**Table 4: Process of investigation toward final determination**

Event	Date
Petition Filed	June 28, 2002
Initiation Deadline – Investigation Started	July 18, 2002
ITC Preliminary Determination	August 9, 2002
ITA Preliminary Determination*	January 24, 2003
DOC Final Determination**	June 16, 2003
ITC Final Determination***	July 31, 2003
Order****	August 7, 2003

Source: U.S. International Trade Commission (2002); ITA: International Trade Administration  
[http://www.ita.doc.gov/media/FactSheet/0603/catfish\\_final\\_061703.html](http://www.ita.doc.gov/media/FactSheet/0603/catfish_final_061703.html).

\* This deadline was fully extended in accordance with the governing statute

\*\* Estimated deadline with full extension in accordance with the governing statute

\*\*\* Estimated deadline.

\*\*\*\* This will take place only in the event of a final affirmative determination from the Department and the International Trade Commission (ITC).

Recent analysis shows that the real exchange rate has a sizeable effect on export volumes. Nielsen (2001) argued that the exchange rate is one of main factors affecting export volumes.

The exchange rate (ER) between the VND and USD (VND/USD) is therefore included in the econometric specification.

Due to the inclusion of a lagged dependent variable, the ordinary least squares estimation or fixed effects (least squares dummy variable (LSDV)) estimation can be biased (Nickel, 1981; Kievit, 1995; Greene, 2000). A possible solution is the use of generalized method of moments (GMM) or alternatively a bias-corrected LDSV estimator. Unfortunately, due to the relatively small size of the sample GMM cannot be applied. The results reported are therefore those of fixed effects estimation, keeping in mind the caveat of a possible bias.

To assess the impact of AD measures taken by the USA against Vietnamese pangasius products, we will use specification (1). The volume of exports and the value of exports are alternatively used as dependent variable ( $\ln y_t$ ).

Following Prusa (1996), we expect the coefficients  $\beta_4$  and  $\delta_j$  of the duty level and the variable dummies integrated with the duty level, to be negative.  $\beta_3$  is expected to be positive, meaning that trading firms can increase their international trade volume when the exchange rate between VND and USD increases

**Table 5: Estimation results of the impact of anti-dumping duties on the Vietnamese pangasius export volume and value to USA (January 1999 – December 2006)**

Variables	Fixed Effects			
	Export Volume		Export Value	
$\ln y_{t-1}$	0.61 (7.22)***	0.61 (7.22)***	0.61 (7.36)***	0.61 (7.36)***
Ratio $\Delta$ volume/value between t-1 and t-2	0.62 (0.94)	0.61 (0.94)	0.86 (1.12)	0.86 (1.12)
$\ln duty$	-0.12(-1.84)*	-0.12 (-1.84)*	-0.12 (-1.87)*	-0.12 (-1.87)*
$\ln ER$	6.17 (2.59)**	6.17 (2.60)**	5.29 (2.34)**	5.29 (2.34)**
Dummy t0	-0.02 (-0.04)	-0.02 (-0.04)	0.20 (0.41)	0.20 (0.42)
Dummy t1	-0.46 (-0.97)	-0.46 (-0.67)	-0.36 (-0.76)	-0.36 (-0.76)
Dummy t2	-0.12 (-0.25)	-0.12 (-0.25)	-0.05 (-0.11)	-0.05 (-0.11)
Dummy t3	-0.36 (-0.75)	-0.36 (-0.75)	-0.29 (-0.61)	-0.29 (-0.61)
Dummy t4	0.18 (0.38)	0.18 (0.38)	0.23 (0.48)	0.23 (0.48)
Dummy t5	-0.09 (-0.20)	-0.09 (-0.20)	-0.07 (-0.14)	-0.07 (-0.14)
Dummy t6	0.08 (0.18)		-0.09 (-0.19)	
Dummy t7	-1.63 (-3.47)***		-1.67 (-3.49)***	
Dummy t8	-0.27 (-0.55)		-0.30 (-0.59)	
Dummy t9	-0.79 (-1.62)		-0.77 (-1.55)	
Dummy t10	0.33 (0.67)		0.26 (0.52)	
Dummy t11	-0.12 (-0.25)		-0.22 (-0.45)	
Dummy t12	-0.92 (-1.94)*		-0.98 (-2.04)**	
Dummy t13	-1.99 (-2.56)**		-1.27 (-2.69)***	
Dummy t14	-0.34 (-0.71)		-0.47 (-0.96)	
Dummy t15	0.40 ( 0.84)		0.34 (0.71)	
Dummy t16	-4.44 (-0.93)		-0.51 (-1.06)	
Dummy t17	-0.67 (-1.45)		-0.71 (-1.51)	
Dummy t6* $\ln duty$		0.16 (0.18)		-0.18 (-0.19)
Dummy t7* $\ln duty$		-3.08 (-3.47)***		-3.14 (-3.49)***
Dummy t8* $\ln duty$		0.49 (-0.55)		-0.54 (-0.59)
Dummy t9* $\ln duty$		-1.61 (-1.62)		-1.58 (-1.56)
Dummy t10* $\ln duty$		0.61 (0.67)		0.49 (0.52)
Dummy t11* $\ln duty$		-0.22 (-0.25)		-0.38 (-0.45)
Dummy t12* $\ln duty$		-1.58 (-1.94)*		-1.70 (-2.04)**
Dummy t13* $\ln duty$		-0.31 (-2.56)**		-0.33 (-2.69)***
Dummy t14* $\ln duty$		-0.09 (0.71)		-0.12 (-0.96)
Dummy t15* $\ln duty$		0.10 (0.84)		0.09 (0.71)
Dummy 16* $\ln duty$		-0.11 (-0.93)		-0.13 (-1.06)
Dummy 17* $\ln duty$		-0.17 (-1.45)		-0.18 (1.51)
Number of observations	94	94	94	94
Adjusted R Squares	0.66	0.66	0.65	0.65

Note: Values in brackets are t-values.

\*, \*\* and \*\*\* indicate significance at the 10%, 5% and 1% level, respectively.

Using the fixed effects model with the export volume as the dependent variable, the estimated coefficients of the lagged export volume, the duty level, the exchange rate and the dummy variables  $t_7$ ,  $t_{12}$ ,  $t_{13}$  have the expected sign and are statistically significant, as shown in the second and the third column in table 5. The size of the AD duty has clearly determined significantly the volume of exports of pangasius from Vietnam to the USA.

After the preliminary duties imposed in January 2003, there is a continuous decrease in Vietnamese exports of pangasius to the USA, but the effect is only significant in February 2003 ( $t_7$ ). Significant impacts of the US AD duties on the volume of Vietnamese pangasius exports are also found in July and August 2003, with negative and significant coefficients of  $t_{12}$ ,  $t_{13}$ , providing evidence that the final determination of the AD measures imposed by the USA in June 2003 has reduced the export volumes in the subsequent months July and August. As the coefficients of the dummies for September up to December 2003 are not statistically significant, the impact of the final AD duties seems to have waned rather quickly.

The fixed effects estimation using the export value as the dependent variables (fourth and the fifth column of table 5) provides similar results. The coefficients of the duty level, the exchange rate and the dummy variables  $t_7$ ,  $t_{12}$ ,  $t_{13}$  have also the expected sign and are statistically significant. The size of the AD duty has clearly determined significantly the value of exports of pangasius from Vietnam to the USA.

According to the estimated  $\beta_4$ , a rise of 10 percent in the US AD duty has caused an overall reduction of 1.2 percent in both the Vietnamese export volume and value of pangasius to the USA. This result is consistent with Brenton (2001), who found that a 10 percent AD duty overall decreases the value of EU imports from targeted ASEAN countries by 1.2 percent. On the other hand, according to Cuyvers and Dumont (2005) a 10 percent AD duty decreases the value of EU imports from targeted ASEAN countries by 1.6% percent in the year that the duty is levied. We found no evidence of an investigation effect as the decrease in the exports after the USA started the AD investigation is, for both the volume and value of the exports, not statistically significant.

The exchange rate has a very positive impact on the trade of pangasius, as is evidenced by the significantly positive coefficient  $\beta_3$ . The more the ratio of the VND and USD increases, the more the volume/value of the pangasius export increases.

#### 4. Conclusion

Our LSDV estimations show that the estimate results are not very different using the export volume and the export value as the dependent variable. In the case of the Vietnamese pangasius exports to the USA, during the months of the US anti-dumping investigation no significant influence seems to be exerted on the Vietnamese pangasius export volume. The impact of the anti-dumping duty imposed by the USA, however, has been considerable. During the first month following the month of imposition of the AD

measures according to the preliminary determination (February) and during the first two months after the final determination, there is evidence of significant negative impact on the Vietnamese exports of frozen pangasius fillets.

In addition, based on the significant positive coefficient for the exchange rate, there is evidence that the upward trend of the exchange rate (VND/USD) during the 2000 – 2006 period, has partly contributed to the increase both of the pangasius export volume and of the pangasius export value to the USA, thus undermining the legitimacy of the US anti-dumping investigation and the AD measures against the Vietnamese pangasius exports.

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