Study: *Pangasius* Effect Frozen Fish Fillet Imports In European Union

The entry of *Pangasius* into the E.U. market changed the equilibrium for imported frozen fish fillets.

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Summary:
The entry of *Pangasius* into the E.U. market changed the equilibrium for imported frozen fish fillets. *Pangasius* is displacing traditional species like cod and hake. In a study, the largest levels of cointegration among species and exporting countries were found in a group including the five top non-European exporters of fish fillets to the E.U. Exports from the U.S. and Russia showed the highest level of significance in the interaction of their prices with those from Vietnam.

Frozen *Pangasius* fillets entered the European market in the early years of the new century with strong potential for growth. The volume of imports increased from 2,140 mt in 1999 to 226,950 mt in 2009, about 19% of the total volume of frozen fish fillet imports. Over the same period, yearly average prices for *Pangasius* imports decreased from 3.82 to 1.86 euros.

This rapid penetration caused shocks in the European market for imported frozen fish fillets, shifting equilibrium and changing the existing competitive relationships across species and countries.

To examine the situation, the authors performed research using cointegration with vector of error correction to study price interactions in the European Union market for imported frozen fish during the first decade of the new century. The analysis was performed at different levels and with different groups of countries and species, with a special focus on the role of Vietnamese imports in the evolution of prices.

Study Methodology

Cointegration analysis has already been used by researchers in the field of seafood marketing. It focuses on the study of interactions among prices and quantities of a set of products to assess whether they are competing within the same market or if they can be considered differentiated products.

Quantities and values for the top 10 exporters of frozen fish fillets to the European Union were taken from the Eurostat external trade database. Local and United Nations Food and Agriculture Organization databases were used to identify the relevant species produced by each country. The countries were classified in groups according to fishing areas (North Atlantic, North Pacific and South Atlantic) and membership in specific trade areas with special agreements with the E.U. (Table 1).

Cointegration of price log series was tested with the inclusion of Vietnamese imports in all groups. Three different models were tested for each group. The first test considered only the series of the original members of each group and indicated whether the fillet exports of the involved countries were competing against each other. Lack of cointegration reflected product differentiation, and each country/species was considered as a unique market.

A second model included a Vietnamese series, testing whether *Pangasius* fillets were involved in specific markets and competing with other countries harvesting different species. Finally, a long-run analysis indicated whether the yearly prices of a country could be considered a causal antecedent to the short-term prices of the rest.

Results

Preliminary bivariate tests were performed to specify whether the evolution of prices and quantities were following a linear or quadratic trend. Quadratic models have shown better performance in describing the evolution of prices through the years

Table 1. Groups of countries and relevant species.

			Johansen Test (Quadratic Trend)	
Group	Countries	Dominant Species	First Test	Second Test
Southern Fishery	Argentina Namibia Chile	Hake	No cointegration	Rank = 1 Sig. = 0.035
Northern Fishery	Faroe Iceland Norway Russia United States	Cod Atlantic pollock Alaskan pollock Haddock	No cointegration	Rank = 2 Sig. = 0.010
North Pacific Fishery	Russia China United States	Alaskan pollock Tilapia	No cointegration	Rank = 1 Sig. = 0.036
European Free Trade Association	Faroe Norway Iceland	Cod Atlantic pollock Haddock	No cointegration	No cointegration
Top Non-EFTA	Argentina Vietnam China Russia USA	*Pangasius* Tilapia Alaskan pollock Hake	Rank = 1 Sig. = 0	

for almost all series. The prices for China, Iceland and Vietnam followed clear linear trends, ascending in the case of China and descending in the other two countries.

Effects from Vietnamese prices were also tested in an exploratory simple regression model with the *Pangasius* series as an exogenous variable. Argentina, Russia and the United States showed better performance with quadratic functions, while all others showed greater significance using linear functions. Although both models resulted in similar conclusions, quadratic models were preferred in assessing the potential effects of price cycles.

Results from the Johansen test for cointegration (Table 1) indicated that no significant relations could be established without considering the potential effects from the Vietnamese figures. But cointegration appeared when the prices or quantities of *Pangasius* imports were taken into account. This result was common to all models in which Vietnam was considered, with the only exception the European Free Trade Association countries. The special relation of these countries to the E.U. could be behind this result.

The largest levels of cointegration were found in the last group, which included the five most important non-European exporters of frozen fish fillets to the E.U. Vietnam, the second-largest exporter, was a natural member of this group. The evolutions of prices and quantities of the fillets exported to the E.U. by these five countries were reduced and explained using a single vector, which provided a common trend for equilibrium. Exports from the U.S. and Russia showed the largest level of significance in the interaction of their prices with those from Vietnam.

Pangasius and Alaskan pollock were the species showing the strongest interaction. Significant positive parameters in the VECM between USA and Vietnam (Table 2) suggested that both countries were following similar pricing policies with the fillets exported to the E.U. Vietnam showed the more significant relations with U.S. prices for different time lags, and the positive sign indicated that prices changed in the same way as those of Vietnamese *Pangasius*. Analysis with series of quantities confirmed substitution of different species with *Pangasius* and Alaskan pollock (Vietnam and U.S.), while these species followed similar evolutions in their trends for prices and quantities.

Perspectives

The cointegration analysis verified market delimitations at a commodity level across frozen fish fillets from different species and countries of origin. Traders and consumers could be considering whitefish fillets of different species as if they were, at some level, the same undifferentiated product, which allows working with the different series as a single market.

The entry of *Pangasius* into the E.U. market changed the equilibrium in the market for imported frozen fish fillets. The evolution of prices also related to imports from Vietnam in the majority of the groups considered.

If the "law of one price" stands for this market, then the species with the most competitive prices are those that lead the evolution of the market. With increased quantities traded, *Pangasius* and Alaskan pollock are competing with the rest of the filleted fish and displacing traditional species like cod and hake in the E.U.

Part of the wild whitefish market is also being replaced by farmed species. However, wild Alaskan pollock is also contributing to substitution and has shown the potential for competing with the massive supply of farmed *Pangasius*.

Attractive pricing has allowed *Pangasius* to compete with other whitefish in Europe.