Competition and Price transmission
In the Spanish seafood value chain

José Fernández Polanco,

Ignacio Llorente

Ladislao Luna

José Luis Fernández Sánchez

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Value chain analysis in seafood markets

- **Producers receive a relatively low share of the final product value** compared with other agents in the chain. **The share** amount was found **higher for fresh** rather than for highly processed fish and also **higher for producers in developed countries** rather than for those in developing.

  Gudmundsson, E.; Asche, F. & M. Nielsen. 2006. Revenue distribution through the seafood value chain. FAO Fisheries Circular. No. 1019. Rome, FAO.

- Project was funded by the Norwegian Agency of Cooperation (**NORAD**) between 2010 and 2012. Since the project covered many **different geographic locations and development levels**, the value chains analyzed differed significantly. In general terms, and with exceptions, the **case studies found that processors and retailers are those receiving the largest benefits from the value chain**, sometimes due to their stronger bargain power.

  Bjorndal, T., Child, A. & A.Lem, eds. 2014. Value chain dynamics and the small-scale sector: policy recommendations for small-scale fisheries and aquaculture trade. FAO Fisheries and Aquaculture Technical Paper No. 581. Rome, FAO.

Price integration analysis

Law of one price (LOP), which states that all products in the same category are equally priced in an efficient market.

Considering a market of two products, the relationship studied in the analysis of integration is given by the expression:

$$Ln(p_{1t}) = \alpha + \beta \ln(p_{2t})$$

When $\beta = 0$, then the prices are unrelated to each other. The products in question are not competitors.

if $\beta = 1$, the Law of One Price (LOP) is verified and it can be concluded that both commodities are competing in the same delimitated market.

Price integration analysis

Horizontal integration, or market delimitation, describes price linkages across different market places and commodities (Asche et al, 1999; Singh et al, 2015).

- Asche, F., Bremnes, H., & Wessells, C. R. (1999). Product aggregation, market integration, and relationships between prices: an application to world salmon markets. American Journal of Agricultural Economics, 81(3), 568-581.
- Singh, K., Dey, M. M., Laowapong, A., & U. Bastola, 2015. Price transmission in Thai aquaculture product markets: An analysis along value chain and across species. Aquaculture Economics & Management, 19(1), 51-81.

Vertical integration focuses on the study of price transmission along the value chain (Asche et al, 2007).

- Asche, F., S. Jaffry, & J. Hartmann (2007) Price transmission and market integration: vertical and horizontal price linkages for salmon. Applied Economics, 39(19), 2535–2545.

Case studies in the Spanish market

Case Study	Species	Product	Main results
Seabream & Seabass	Seabream	Fresh	Vertical and horizontal integration
Mussel	Mussel	Fresh	Vertical integration
Whitefish	Hake	Fresh	Vertical integration
		Frozen whole	No integration
		Frozen fillets	Vertical and horizontal integration
	Cod	Fresh	Vertical integration
Flatfish	Turbot	Fresh	No integration
Salmonids	Salmon	Fresh	Vertical integration
		Smoked	Vertical integration
	Trout	Fresh	No integration
		Smoked	No integration

Seabream

- The prices for sea bream at **ex-farm, wholesale and retail levels** have been collected **weekly** for sea bream from 2009 to 2016 by **Spain's Ministry of Agriculture and Food through the Observatory of Food.**

- Prices for **imports from Greece and Turkey were obtained from 2009 to 2016** from **the European Commission's Eurostat trade database**.

Seabream ADF

	Constant		Linear trend		Quadratic trend	
	Levels	1st diff.	Levels	1st diff.	Levels	1st diff.
Greece	-2.401	-8.122***	-3.517	-8.142***	-3.460	-8.162***
Turkey	-2.582	-8.075***	-2.574	-8.207***	-2.655	-8.149***
Spain	-1.867	-8.165***	-3.094	-8.177***	-3.025	-8.220***
Wholesale	-2.259	-8.189***	-2.898	-8.181***	-2.964	-8.136***
Retail	-1.428	-9.437***	-1.597	-9.393***	-1.331	-9.467***

*** 99% CL; ** 95% CL; * 90% CL

- **Unit root can not be rejected** for all the involved variables at their levels, rejecting the null hypothesis for the first differences. **The price series behave as non stationary variables**.

Seabream Johansen and weak Exogeneity

Rank	Eigenvalue	Trace Test	Lmax test
0	0.36351	107.980***	42.016***
1	0.28831	65.969***	31.631***
2	0.19608	34.337*	20.298
3	0.097826	14.040	9.5741
4	0.046883	4.4657**	4.4657**
Weak exogeneity test			
Greece	Turkey	Spain	Wholesale
16.303***	2.157	6.909**	4.624

- A significant rank order of 1 was found in the Johansen test. Since the variables were found to be non-stationary for the selected number of lags and model specifications, **further tests are performed using two cointegrating vectors**.
- Under these conditions, the weak exogeneity test points **Greek imports and Spanish ex-farm prices as endogenous**, being all other variables exogenous.

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Fresh mussel

- The prices for fresh mussel at **ex-farm level** has been collected **monthly from** from 2004 to 2016 from **PescadeGalicia.**

- The prices for fresh mussel at **wholesale and retail levels** have been collected **weekly** for sea bream from 2004 to 2016 by **Spain's Ministry of Agriculture and Food through the Observatory of Food.**

Mussel ADF

	Constant		Linear trend		Quadratic trend	
	Levels	1st diff.	Levels	1st diff.	Levels	1st diff.
Producer	-3.626***	-9.536***	-5.451***	-9.542***	-5.946***	-9.499***
Wholesale	-3.042**	-10.17***	-3.241**	-10.16	-4.598***	-10.16***
Retail	-2.097	-10.72***	-3.182*	-10.76***	-2.788	-10.84***

*** 99% CL; ** 95% CL; * 90% CL

- **Unit root can be rejected for all models** in the producer and wholesale price series.
- Since the series were found stationary, analysis will be based on a VAR system and no further cointegration tests are performed

Mussel Granger causality

Producer	
All lags of Producer	F(2, 123) = 52.290 [0.0000]***
All lags of Wholesale	F(2, 123) = 6.5161 [0.0020]***
All lags of Retail	F(2, 123) = 0.23456 [0.7913]
All vars, lag 2	F(3, 123) = 2.6784 [0.0500]*
Wholesale	
All lags of Producer	F(2, 123) = 0.86142 [0.4251]
All lags of Wholesale	F(2, 123) = 127.23 [0.0000]***
All lags of Retail	F(2, 123) = 1.4621 [0.2357]
All vars, lag 2	F(3, 123) = 1.5632 [0.2017]
Retail	
All lags of Producer	F(2, 123) = 2.5719 [0.0805]*
All lags of Wholesale	F(2, 123) = 2.6214 [0.0768]*
All lags of Retail	F(2, 123) = 372.57 [0.0000]***
All vars, lag 2	F(3, 123) = 1.4123 [0.2424]

- Wholesale prices appear to be independent and affecting producer prices and, in less intensity, retail prices.

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Fresh hake

- The prices for hake at **ex-vessel, wholesale and retail levels** have been collected **weekly** from 2004 to 2016 by **Spain's Ministry of Agriculture and Food through the Observatory of Food.** The price is the average between "Merluza"(2,5 kg to 5 kg) and "Pescadilla" (1,5 kg)

- Prices for **imports were collected from 2009 to 2016** from **the European Commission's Eurostat trade database**.

Fresh hake ADF

	Constant		Linear trend		Quadratic trend	
	Levels	1st diff.	Levels	1st diff.	Levels	1st diff.
Local	-2.377	-9.865***	-3.1308	-9.835***	-4.293***	-9.801***
Wholesale	-1.73906	-10.63***	-2.33449	-10.60***	-3.00726	-10.58***
Retail	-0.913	-9.783***	-1.481	-9.748***	-1.547	-9.873***
Imports	-4.797***	-12.78***	-5.677***	-12.73***	-5.669***	-12.69***

*** 99% CL; ** 95% CL; * 90% CL

- Unit root can be rejected for imports and the domestic prices in a quadratic trend model. The remaining **price series behave as non stationary variables**.

Fresh hake Johansen and weak Exogeneity

Rank	Eigenvalue	Trace Test	Lmax test
0	0.23923	62.033***	42.108***
1	0.11388	19.925***	18.619***
2	0.0084433	1.3058	1.3058

Weak exogeneity test

Ex vessel	Wholesale	Retail
9.08136***	7.05397***	8.2214***

- Two cointegrating vectors result from the Johansen test. Weak exogeneity tests point to endogeneity in all the three involved variables.

Fresh salmon

- The prices for fresh salmon at **imports, wholesale and retail levels** have been collected **weekly** from 2004 to 2016 by **Spain's Ministry of Agriculture and Food through the Observatory of Food.** The price is the average between "Merluza"(2,5 kg to 5 kg) and "Pescadilla" (1,5 kg)

Fresh salmon ADF

	Constant		Linear trend		Quadratic trend	
	Levels	1st diff.	Levels	1st diff.	Levels	1st diff.
Imports	-1.781	-7.854***	-5.191***	-7.835***	-5.261***	-7.816***
Wholesale	-2.700*	-3.222***	-4.337***	-3.225*	-4.501***	-3.402
Retail	-0.258	-7.035***	-2.663	-7.049***	-2.509	-7.172***

*** 99% CL; ** 95% CL; * 90% CL

- Unit root can be rejected for all price series in models with constant and linear trend. In these kind of models **price series behave as non stationary variables**.

Fresh salmon Johansen and weak Exogeneity

Rank	Eigenvalue	Trace Test	Lmax test
0	0.20693	64.077***	35.936***
1	0.16516	28.141***	27.979***
2	0.0010398	0.16125	0.16125

Weak exogeneity test		
Imports	Wholesale	Retail
27.314***	4.3253	19.088***

- Two cointegrating vectors result from the Johansen test. Weak exogeneity tests point to endogeneity in the price series excepting wholesale.

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Summary

Seabream provided examples of vertical and horizontal integration. With some differences by country, there is a consistent upstream connection of the prices in origin or imports which are changing according to those of the following steps in the value chain. Competition across imports and domestic product is also tested and confirmed in some cases.

Vertical integration was found in the value chain of fresh mussels in Spain. The case of Spain shows another situation of upstream price transmission in which the ex-farm price is being affected by wholesale prices and transferred to exports, but not to the retail place. This result is consistent with the fact of a highly fragmented harvesting industry and a much more concentrated processing industry.

Summary

Price transmission in the Spanish market of fresh hake works downstream. The prices of fresh hake at the wholesale and retail levels change according to previous changes in the ex-vessel price of domestic catches, and have no connection at all with the price of imports. A similar situation is observed in the case of frozen fillets, mainly supplied by imports, where retail prices are reciprocally connected with the prices of imports according to the country of origin.

The value chain of salmon provides another example of downstream price transmission which was also verified in France and Spain both for fresh and smoked products. Import price is transferred to retail so any change in the prices at the starting point of the value chain will reach final consumers.

Conclusions

Variability in results highlights the heterogeneity of the seafood industry. Despite general trends can be drawn, every species and countries may differ in the results for the same category. This is a consequence of differences in market conditions and demand.

Product differentiation is high at the species level. It is also across production systems and farmed fish does not substitute the corresponding wild species. However, there is keen competition across producers of the same species. Competition across countries, imports and domestic products depend on the level of differentiation across products.

Conclusions

Downstream price transmission. Producers are more likely to be able to transfer their costs downstream in the value chain when they operate a differentiated product, concentrate large volumes of supply and participate as exporters in the international markets.

Bidirectional price transmission is frequent also in industries where producers are concentrated and differentiated. Despite market differences across countries, an upstream price transmission contributes to set the equilibrium price according to producers' costs and consumers' price sensitivity.

One-way upstream price transmission, in contrast, is more frequent when the harvesting industry is fragmented in companies operating small volumes and the product is not differentiated.

Thanks for your attention

Ship mosaic in Ostia Antica, Italy, Ca. 1,800 years ago.
Picture: José Fernández Polanco