Price integration in the frozen hake value chain in Spain

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❑ The **evolution of imports of frozen hake** presents an **upward trend** between 2013 and 2015.

❑ **Whole frozen hake imports increased** by 13.2% in quantities and by 40.5% in value

❑ **Frozen fillets and meat of hake also increased** during the period **(1.8% and 12.7%)**

❑ In 2015 virtually **all imports come from non-EU countries**

  ❑ Frozen hake = South Africa (20.9%), Namibia (17.15%), Chile (16.7%)

  ❑ Frozen fillets and meat = Namibia (54.8%), Argentina (19.4%) and South Africa (10%)

Source: MAPAMA 2016

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- **Frozen hake** accounts for **19% of the total volume** of hake imported in 2015

- **Frozen fillets and meat of hake** accounted the **44% of the total volume** of hake imports in 2015

Source: MAPAMA 2016

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Hake consumption in Spain

❑ Fresh hake (2015). 2.43 kg/per capita. 108,426 t with a value of 778 million €

❑ **Frozen hake** (2015). **0.94 kg/per capita**. 42.155 t with a value of 284 million €

Most consumed fish in Spain

13% of total seafood products / 23% of fish products

Source: Base datos consume en hogares
MAPAMA 2016

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- ❑ Analyse **market delimitation and price transmission and imports price to the retail stage** in **the frozen fillets hake value chain in Spain**

- ❑ Scrutinise the **influence of international trade on domestic prices formation**

- ❑ Identification of **asymmetries in the transmission of prices and market powers**

Frozen Hake: Fillets

The imports price have been obtained from Eurostat Database. Imports value and quantities with **monthly** frequency from 2004 to 2016.

❑ 03042055/03042955/03047411: Frozen Fillets of **Cape Hake** (*Merluccius Capensis* and *Merluccius Paradoxux*) (**Namibia /South África**)

❑ 03042056/03042956/03047415: Frozen Fillets of **Argentine Hake** (*Merluccius Hubbsi*) (**Argentina**)

❑ 03042058/03042958/03047419: Frozen fillets of hake Merluccius spp.

❑ 03042059/03042959/03047490: Frozen fillets of hake Urophycis spp.

Frozen Hake: Retail

❑ **Source:** Households Consumption Database (*Base de datos de Consumo en Hogares*) (MAPAMA)

❑ **Frequency:** Monthly   **Data:** 2004-2016

❑ Note: The retail price of frozen hake is calculated as a weighted average in the function of the quantities marketed in each type of retail shop. Hypermarket, Supermarket, Fish shop, Traditional market

❑ The **Augmented Dickey-Fuller (ADF)** test (Dickey & Fuller, 1979; 1981) is used to test the time series properties of the data (non-stationarity).

	Constant		Linear trend		Quadratic trend	
	Levels	1st diff.	Levels	1st diff.	Levels	1st diff.
Argentina	-1.72911	-19.04***	-2.62058	-19.02***	-2.75322	-18.95***
Namibia	-1.49903	-14.76***	-2.48748	-14.71***	-2.48896	-14.66***
South Africa	-2.62097	-10.52***	-4.601***	-10.48***	-4.857***	-10.45***
Retail	-1.36953	-12.70***	-2.04948	-12.65***	-2.13765	-12.61***

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

❑ Unit root can be rejected for Linear and Quadratic models in the South African price series. All the other cases behave as non stationary variables. The **final model** will consist in the prices of **Argentinean** and **Namibian imports plus the average price for frozen hake at the retail level**.

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Model 1: Namibia VS Argentina, and Retail

Granger causality

Argentina

All lags of Argentina	$F(2, 130) = 83.424 \; [0.0000]^{***}$
All lags of Namibia	$F(2, 130) = 2.0030 \; [0.1391]$
All lags of Retail	$F(2, 130) = 0.50133 \; [0.6069]$
All vars, lag 2	$F(3, 130) = 8.6998 \; [0.0000]^{***}$

Namibia

All lags of Argentina	$F(2, 130) = 1.3475 \; [0.2635]$
All lags of Namibia	$F(2, 130) = 18.098 \; [0.0000]^{***}$
All lags of Retail	$F(2, 130) = 3.8978 \; [0.0227]^{***}$
All vars, lag 2	$F(3, 130) = 3.7182 \; [0.0132]^{***}$

Retail

All lags of Argentina	$F(2, 130) = 1.6543 \; [0.1952]$
All lags of Namibia	$F(2, 130) = 4.9375 \; [0.0086]^{***}$
All lags of Retail	$F(2, 130) = 43.786 \; [0.0000]^{***}$
All vars, lag 2	$F(3, 130) = 10.707 \; [0.0000]^{***}$

❑ **Imports from Argentina are not related to any of the other two price series.**

❑ The price of the **imports from Namibia** is **cause of the frozen hake fillets price at retail**

❑ At the same time, **the import price of the frozen fillets from Namibia** is **also affected by retail prices**

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Model 1: Namibia VS Argentina, and Retail

Rank	Eigenvalue	Trace Test	Lmax test
0	0.19290	46.817***	31.931***
1	0.081157	14.886*	12.611***
2	0.015154	2.2752	2.2752
Weak exogeneity test			
Argentina	Namibia		Retail
6.04015*	20.4272***		17.2446***

❑ Despite of a low confidence level, two cointegrating vectors result from the Johansen test.

❑ The weak exogeneity tests indicate imports from Argentina can be assumed independent at a 95% CL.

❑ On the contrary, imports from Namibia and retail prices of frozen hake are endogenous, confirming the reciprocal relations observed in the Granger causality test across these pair of price series.

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Model 1: Namibia VS Argentina, and Retail

❑ **NO MARKET INTEGRATION:** There is not price interactions between the two products.

❖ **Argentina and Namibia** frozen hake fillets **do not compete in the same market**

❑ **PRICE TRANSMISSION,** from Namibian import prices to retail prices and vice versa

❑ **Argentina** frozen fillets are **independent, that is, not caused and not the cause of any other price** considered in the model

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Model 2: Namibia VS South Africa, and Retail

Granger Causality			
Causes			
	Namibia	South Africa	Retail
Namibia	11.714***	16.489***	11.289***
South Africa	1.9247	19.522***	0.0082442
Retail	4.6858**	0.17388	56.446***

❑ The corresponding Granger causality test for this model shows no evidences of endogeneity for the South African price series which appear to be differentiated from the Namibian fillets. In contrast there is a strong reciprocal link across the price series of Namibia and retail in Spain.

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Model 2: Namibia VS South Africa, and Retail

Granger causality

Namibia
All lags of fNamibia $F(2, 131) = 11.714\ [0.0000]$***
All lags of fSouthAf $F(2, 131) = 16.489\ [0.0000]$***
All lags of Retail $F(2, 131) = 11.289\ [0.0000]$***
All vars, lag 2 $F(3, 131) = 14.773\ [0.0000]$***

South Africa
All lags of fNamibia $F(2, 131) = 1.9247\ [0.1500]$
All lags of fSouthAf $F(2, 131) = 19.522\ [0.0000]$***
All lags of Retail $F(2, 131) = 0.0082442\ [0.9918]$
All vars, lag 2 $F(3, 131) = 5.9688\ [0.0008]$***

Retail
All lags of fNamibia $F(2, 131) = 4.6858\ [0.0108]$**
All lags of fSouthAf $F(2, 131) = 0.17388\ [0.8406]$
All lags of Retail $F(2, 131) = 56.446\ [0.0000]$***
All vars, lag 2 $F(3, 131) = 10.558\ [0.0000]$***

❑ The corresponding Granger causality test for this model shows **no evidences of endogeneity for the South African price** series which appear to be **differentiated from the Namibian fillets**.

❑ In contrast there is a **strong reciprocal link across the price series of Namibia and retail in Spain.**

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Model 2: Namibia VS South Africa, and Retail

Rank	Eigenvalue	Trace Test	Lmax test
0	0.30482	75.462***	54.174***
1	0.12211	21.288***	54.174***
2	0.012558	1.8830	1.8830
Weak exogeneity test			
Namibia	South Africa		Retail
36.7497***	17.0366***		16.9601***

❑ Cointegration is much better across imports from the two African countries and the Spanish retail prices of frozen hake. All the three variables are endogenous, indicating reciprocal relations across them.

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Model 2: Namibia VS South Africa, and Retail

❑ **MARKET INTEGRATION:** There is price interactions between the two products, but not in the two directions

   ❖ **South Africa and Namibia** frozen hake fillets **compete in the same market. South African cause Namibia import prices.**

❑ **PRICE TRANSMISSION,** from Namibian import prices to retail prices and vice versa

❑ Changes in the price of frozen hake fillets from South Africa do not arrive directly to the retail segment.

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Thank you!

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Frozen Hake: Whole

The imports price have been obtained from Eurostat Database. Imports value and quantities with **monthly** frequency from 2004 to 2016.

❑ 030366: FROZEN HAKE "MERLUCCIUS SPP., UROPHYCIS SPP." (**South Africa/Namibia/Chile/Argentina**) Which includes:

  ○ 03036611: FROZEN CAPE HAKE "SHALLOW-WATER HAKE" "MERLUCCIUS CAPENSIS" AND DEEPWATER HAKE "DEEPWATER CAPE HAKE" "MERLUCCIUS PARADOXUS"

  ○ 03036612: FROZEN ARGENTINE HAKE "SOUTHWEST ATLANTIC HAKE" "MERLUCCIUS HUBBSI"

  ○ 03036613: FROZEN SOUTHERN HAKE "MERLUCCIUS AUSTRALIS„

  ○ 03036619: FROZEN HAKE "MERLUCCIUS SPP." (EXCL. CAPE HAKE, DEEPWATER HAKE, ARGENTINE HAKE AND SOUTHERN HAKE)

  ○ 03036690: FROZEN HAKE "UROPHYCIS SPP."

Frozen Hake: Retail

❑ **Source:** Households Consumption Database (*Base de datos de Consumo en Hogares*) (MAPAMA)

❑ **Frequency:** Monthly   **Data:** 2004-2016

❑ Note: The retail price of frozen hake is calculated as a weighted average in the function of the quantities marketed in each type of retail shop. Hypermarket, Supermarket, Fish shop, Traditional market

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