The effects of sanitary and phytosanitary barriers on the international trade of apples from France and Chile

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TOWARDS SUSTAINABLE AGRI-FOOD SYSTEMS:
BALANCING BETWEEN MARKETS AND SOCIETY

Context

In the case of fresh vegetable products, trade is governed by two types of SPS requisites, those protecting humans' health and those protecting plants' health. While those concerning humans are universal, those concerning plants (whether for crops or indigenous species' protection) are often specific. Food safety standards like Maximum Residual Levels (MRL) of any contaminant, apply indiscriminately to the domestic and foreign producers. The only divergence is that each country is free to adopt its own standard (Drogue and DeMaria, 2012). In the context of pest and disease management, the phytosanitary protocols are not only set by each country independently but can also be discriminating between domestic and foreign producers but also across foreign producers (Roberts and al., 1999). Moreover the level of the standard can vary greatly over time because a country may be affected by a pest or a disease regarding for instance favorable climatic conditions (as it is the case for the Mediterranean fly). Consequently a tightening in a partner standard may induce an increase in the cost of compliance with the standard and affect the competitiveness of countries that were major exporters, causing a redistribution of the market shares (Fisher and Serra, 2000). Even if these standards have an incidental impact on trade, it is still interesting to measure it as the size of the impact can incentivize policymakers in negotiating bilateral phytosanitary requirements.

Why France & Chile?

- France and Chile are great apples exporters with very different geographical, economic and social characteristics.
- In comparison with Chile, French producers are losing competitiveness; the reason could be due to the difficulties to comply with international phytosanitary regulations.
- France is a mature market of apples with a long history of production and consumption, while Chile is a more recent and dynamic export-oriented market, and being located in a different hemisphere apples in Chile are produced off-season.

Why apples?

Apple is nowadays the second fruit most produced and consumed in the world after banana and before oranges and grapes. Its production evolved greatly during the last 50 years, from 17 million tons in 1961 to more than 76 million tons in 2012 (+300%). The geography of production deeply changed.

PPML Estimations

X_{ijt}	Coef.	SE		Coef.	SE		Coef.	SE	
$Lngdpc_j$	1.200	0.174	***	1.292	0.197	***			
$Lnprod_i$	0.294	0.272							
$Lndist_{ij}$	-1.915	0.158	***	-2.204	0.158	***	-2.189	0.158	***
$Lang_{ij}$	0.440	0.144	***	0.431	0.143	***	0.440	0.146	***
$Border_{ij}$	-0.710	0.184	***	-0.802	0.191	***	-0.823	0.191	***
PS_{ij}	-0.831	1.270	**	-3.259	1.257	***	-2.939	1.257	**
EU	-2.598	1.114	***	11.598	1.103	***	11.265	1.112	***
$Lngdpc_i$				-0.215	0.273				
$Lngdp_j$							1.207	0.195	***
$Lngdp_i$							-0.298	0.258	
N obs	2071			3637			3637		
R2	0.87			0.90			0.90		

Research Question

Our objective is that of assessing the impact on French and Chilean apples trade of sanitary and phytosanitary (SPS) regulations and concerning diseases and pest management.

Methodology

PS captures the level of requirement of an importing country for each stage of its SPS regulation. 1< PS < 2.72, it can be considered as a restrictiveness index

$$PS_{ij} = \frac{1}{N}\left[\sum_{t=1}^{N} \exp\left(\frac{MaxPhyto_N - Phyto_{ijN}}{minPhyto_N - maxPhyto_N}\right)\right]$$

Here $maxPhyto_N$ is the highest grade in the sub-dimension N; $Phyto_{jN}$ is the score of the requirement imposed by country j in the dimension N to the French / Chile export; $minPhyto_N$ is the lowest grade in the sub-dimension N.
The basic specification of the gravity equation in a log form can be written as follows:

$$logX_{ijt} = \alpha + \beta_1 logPROD_{it} + \beta_2 logGDPc_{jt} + \beta_3 Distance_{ij}$$
$$+\beta_4 PS_{ij} + \beta_5 Border_{ij} + \beta_6 Language_{ij}$$
$$+EU + fe_{it} + fe_{jt} + fe_{ijt}$$

PPML Estimations

	France			Chile		
X_{ijt}	Coef.	SE		Coef.	SE	
$Lngdp_j$	0.880	0.112	***	0.880	0.163	***
$Lndist_{ij}$	-1.264	0.318	***	-1.830	0.330	***
$Lang_{ij}$	-0.994	0.363	**	1.492	0.268	***
$Contig_{ij}$	-2.366	0.784	***	-1.948	0.174	***
PS_{ij}	1.656	0.299	***	2.740	0.140	**
EU	1.331	0.487	**	-1.012	0.420	***
N obs	761			729		
R2	0.87			0.90		

Database

- Exports *(X)* are from the United Nations database on trade (COMTRADE).
- Production of apple *(PROD)* is from the Faostat.
- Gross Domestic Product *(GDP)* comes from World Bank Data Indicators.
- Trade costs *($Distance_{ij}$ $Language_{ij}$ and $Border_{ij}$)* from the CEPII
Data on phytosanitary constraints (PS) are from different sources: the French Ministry of Agriculture dataset Exp@don, the French regional food service (SRAL), the Chilean Ministry of Agriculture (SAG), the World Integrated Trade Solution (WITS), the WTO, and the International Plant Protection Convention (IPPC).

Conclusion

Phytosanitary requirements may exert different effect on the exporting countries depending on some producer's characteristics and on their capacity to comply with the regulations. France and Chile do not face significant differences in terms of phytosanitary restrictions when exporting to the same destination. However, France and Chile apply different regulatory restriction. *France belongs to the EU group that applies relatively loose regulatory restrictions, while Chile belongs to the group of countries applying more complex regulations* (DeMaria and al., 2015: 14).

We showed that France is less capable than Chile to comply with the foreign SPS regulations, suggesting that French producers need to make a greater effort to comply with the phytosanitary requirements imposed by the importing countries as USA and Asian countries. On the contrary, Chilean SPS requirements are very similar to those of importing countries. Thanks to this similarity Chile gains advantages in terms of volume of apples exported as in the case of the USA, Venezuela, Russia, Brazil and some EU countries (Ireland, Germany and United Kingdom).

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