*Università degli Studi del Molise*
*Dipartimento di Economia, Gestione, Società e Istituzioni*


ECONOMICS & STATISTICS DISCUSSION PAPER
No. 072/14

# Italian agri-food exports in the international arena

Anna Carbone

Roberto Henke

Alberto Franco Pozzolo

**Italian agri-food exports in the international arena**

A. Carbone (Università della Tuscia), R. Henke (Italian National Institute of Agricultural Economics – INEA), A. F. Pozzolo (Università del Molise)[1]

Abstract

We study the performance of the so called Made in Italy agri-food exports over the last fifteen years, merging the strand of analysis that estimated price and demand elasticities with that considering more explicitly the role of product quality. We proceed in three steps. First, we estimate the elasticities of exports with respect to world imports, export prices and the competitors' prices, both at aggregate and product level. Second, we calculate an index of sophistication capturing the position of each product in different layers of world markets. Finally, we compare the outcomes of the estimates of the long-run elasticities with the changes in sophistication levels. The picture we got is a coherent synthesis of the tendencies and forces shaping world competition in the agri-food sector.

Our results show that the strategy of Italian exporters varies according to the type of product and to the degree of market completion. In some cases, Italian exports contrast increasing world competition by increasing quality levels (i.e. their sophistication content); in other cases, price competition is chosen by keeping average unit values at lower levels than those of the competitors. All considered, in many cases, these strategies are successful in allowing Italy to defend and sometimes even to increase its positions in the world markets, in spite of a growing world competition.

*Keywords: exports' elasticities, exports' sophistication, Made in Italy, world demand*

*JEL classification: Q17; F14*

[1] We would like to thank Fabrizio De Filippis and Donato Romano for comments and suggestions. All remaining errors are our own responsibility.

## *1. Introduction*

In the recent years, the expression *Made in Italy* has been more and more often used as a quality clue to define the most advanced segment of Italian exports, with specific and distinctive attributes such as packaging, technology, labour skills, certification of origin, and so forth. These attributes have often been seen as the key characteristics that allow increasing the value of our exports that by and large are characterized by mature products in markets basically exposed to mere price competition (Di Maio and Tamagni, 2008; Monti, 2005). The definition of Made in Italy (henceforth, MiI) referred to agri-food exports applies mostly to Italian typical and worldwide highly reputed products. These goods identify with the Italian territory and recall the Mediterranean diet including some of the most typical food products of Italy, or at least those who are acknowledged abroad as characterising the Italian agri-food sector (Ismea, 2012; Inea, 2009; Antimiani, Henke, 2005 e 2007).

These features can stem both from the nature of the agricultural produce – this is especially the case for fresh vegetables and fruit – and from traditional and peculiar processing techniques. Indeed, while many processed products that are clearly identified as *Made in Italy* are in practice transformed from imported agricultural products (i.e., Italian pasta produced using imported durum wheat), a non-negligible share of the agri-food MiI is instead composed of fresh agricultural products that are internationally identified with Italy and are considered a "cultural expression" of the territories where they are produced and provide an important contribution to our trade balance surplus, such as some fruit (apples from Trentino Alto Adige), nuts (hazelnuts and chestnuts from Lazio), vegetables (cherry tomatoes from Campania, artichokes from Lazio, onions from Calabria). The identification of MiI agri-food products is therefore not necessarily referred to the origin of the final product or to the process in itself, but it is rather connected to the territorial links that are at the very base of the production of food, no matter if it is processed or not, or if it is made with imported raw material.

In world markets characterised by increasing competition, any specificity of the goods that can segment the market and smooth the pressure of competitors is valuable to exporters. In light of these considerations, the aim of our research is to assess the performance of the agri-food MiI exports in the international arena over the period 1996/97-2010/11, highlighting the factors that are influencing the position and degree of competitiveness of these products.

To investigate this topic, we follow a three-step methodology. First, we estimate the short-run and long-run elasticities of exports to: i) the world demand; ii) the prices of exports; and iii)the prices applied by main competitors. This highlights the capacity of MiI exports to adjust to market trends and to react to competitive pressures. Second, we assess the level of so-called "sophistication" (Lall et al., 2006) of our exports, a concept that encompass all product and process quality attributes and that is related to its profitability and to the kind of competition prevailing on the market for that very product.

Last, we compare the estimated elasticities with the analysis of the changes in the level of "sophistication" of each product, as expressed by the Prody index. In our view, this later step is the

most original contribution of the paper and it is aimed at providing at the same time information on the trends developing in the world markets and those of a single exporter.

Our results show that the strategies of Italian exporters vary according to the type of product and to the degree of market completion. In some cases, Italian exports contrast increasing world competition by increasing quality levels (i.e. their sophistication content); in other cases, price competition is chosen , by keeping average unit values at lower levels than those of the competitors. All considered, in many cases, these strategies are successful in allowing Italy to defend and sometimes even to increase its world market shares, in spite of a growing world competition.

The rest of the paper is organized as follows: section 2 presents some descriptive data on MiI exports; section 3 describes the methodology; sections 4 to 6 present the main results while section 7 concludes.

## *2. Agri-food Made in Italy exports: a short description*

Moving from trade data available in the UN Comtrade databank at 6 digit level (HS-6), we aggregated the over 700 items referred to agri-food into 95 macro-items from which we selected the 30 items included in the agri-food made in Italy[2]. This aggregate includes a mix of fresh produce (vegetables, tomatoes, grapes and the cluster "apples, kiwis and pears") and processed food (all the other items, as shown in table 1). The group represents a rather large share of the total Italian agri-food exports: 71% of the total in 2010/11 and less than 68% in 1996/97 (table 1). As mentioned in the previous section, the common feature of these is in that they recall the Italian diet and life-style and their net trade balance is mostly positive even if there are few exceptions (one of the most noticeable is olive oil whose net trade balance is negative).

In the observed period of time, bottled wine (i.e. wine in bottles with less than two litres, in tables and figures is: *wine< 2 lts*) shows by far the largest share of the export values (16.4% in 2010/11, 13.9% in 1996/97). In 2010/11 wines are followed, at a distance, by *dry pasta* (6.5%), *sauces and other condiments* (6.4%) and *canned tomatoes* (6.2%). Of these products, *sauces and other condiments* show the largest increase in the share, as they were featuring a value of 4.2% in 1996/97. Actually, all the other major items represent quite a stable share of the total export values over the period observed, as a result of export trends basically aligned and with a limited expansion over time, especially when compared to minor flows which are relatively more dynamic.

Looking at the fresh component of the agri-food Made in Italy exports, data show a sort of steadiness of the shares (as in the case of "apples, kiwis and pears") if not a certain degree of reduction (fresh vegetables and grapes), so that their position in the ranking of the 30 MiI products becomes relatively low.

Looking at the export dynamics, the average annual variation of the export values at current prices are all positive, with the only exception of the non-virgin olive oil.

[2] The exports are referred to 122 countries (world). Values are at current values in US Dollars.

In the same table we considered also the Balassa specialisation index (also referred to as the Revealed Comparative Advantage – RCA). The index formula is as follows:

$$RCAi,j = \frac{\frac{Xi,j}{Xj}}{\frac{Xi,w}{Xw}}$$

Where $X_{i,j}$ is the exports of the item *i* of the country *j*; $X_j$ the total agri-food exports of the country j; $X_{i,w}$ is the world exports of the good i and e $X_w$ the world agri-food exports. Clearly enough, the index for all the agri-food made in Italy items is greater than 1, indicating specialisation of the country for these items (except *confectionery* products for which Italy does not show a revealed competitive advantage, with a value of Balassa index of 0.9). However, the values span from 1.2 for prepared vegetables to 28.4 for *virgin olive oil*. The lower values (around 1 and 2) are relative to *fresh* and *prepared vegetables* as well as *prepared fruits* and *fruit juices*; while for products such as *dry pasta*, *canned tomatoes*, *grated cheese*, *virgin olive oil*, grapes and *wine < 2 lts*, *sparkling wines* and *vermouth*, Italy shows higher level of revealed competitive advantage (index values above 10).

More interestingly, the variations of RCA show the trends in the specialization pattern of the country relative to world specialization. Index variations are mixed, with some products that show negative values while other facing a positive one, with varying intensity. Particularly high rates of increase in specialisation are recorded for many cheese categories, and for *virgin olive oil, chocolate products, sauces and other condiments, mineral water and wine < 2 lts*. On the contrary, for some products such specialisation significantly decreases by time: *fresh tomatoes* and *fresh vegetables*, *processed coffee* and *rice*, *non-virgin* and *mixed olive oils*, *confectionery products*, *prepared fruit* and *wine > 2 lts*. For all these products, Italy is de-specialising on the international arena, due to a wider presence of the old competitors or due to the entry of new ones on the world market.

Table 1 – Agri-food Made in Italy exports: shares and variations

| | shares on total made in Italy | | export var. % | RCA | var. RCA |
|---|---|---|---|---|---|
| | 2010/11 | 1996/97 | Ann. av. var. | 2010/11 | % |
| wines < 2 lts | 16.4 | 13.9 | 8.0 | 11.3 | 75.8 |
| dry pasta | 6.5 | 7.8 | 5.2 | 20.8 | 12.5 |
| sauces and other condiments | 6.4 | 4.2 | 9.5 | 1.5 | 60.7 |
| canned tomatoes | 6.2 | 6.3 | 5.9 | 13.5 | 18.8 |
| apples, kiwis and pears | 5.5 | 5.5 | 6.6 | 6.8 | 63.1 |
| other cheese | 5.3 | 4.9 | 6.8 | 5.0 | 110.9 |
| bakery products | 4.6 | 3.8 | 7.5 | 3.1 | 10.1 |
| virgin olive oil | 4.6 | 4.1 | 6.9 | 28.4 | 147.7 |
| fresh vegetables | 4.3 | 5.5 | 3.6 | 2.1 | -24.3 |
| chocolate products | 4.1 | 3.6 | 7.1 | 3.0 | 70.4 |
| processed coffee | 3.8 | 2.1 | 11.6 | 6.2 | -45.4 |
| grapes | 2.9 | 4.3 | 3.3 | 11.6 | 17.7 |
| fresh pasta | 2.8 | 2.6 | 6.5 | 8.1 | 0.9 |
| sparkling wine | 2.5 | 2.1 | 8.0 | 18.7 | 23.0 |
| fruit juices | 2.5 | 3.0 | 4.9 | 2.5 | 5.4 |
| confectionery products | 2.2 | 2.8 | 5.1 | 0.9 | -30.2 |
| prepared vegetables | 2.1 | 2.1 | 6.6 | 1.2 | 13.5 |
| processed rice | 2.1 | 3.1 | 2.9 | 2.2 | -81.7 |
| fresh cheese | 2.0 | 0.7 | 15.1 | 9.0 | 244.4 |
| Meat cuts | 2.0 | 1.6 | 7.5 | 4.4 | 43.2 |
| mineral water | 1.9 | 1.1 | 11.0 | 3.1 | 78.6 |
| prepared fruit | 1.9 | 3.4 | 2.0 | 1.7 | -60.7 |
| wine > 2 lts | 1.8 | 3.3 | 2.2 | 5.4 | -24.8 |
| ice creams | 1.2 | 0.9 | 7.6 | 4.1 | 15.3 |
| non-virgin olive oil | 1.1 | 3.0 | -1.4 | 9.7 | -47.7 |
| fresh tomatoes | 1.0 | 1.1 | 4.2 | 1.2 | -18.6 |
| grated cheese | 0.9 | 0.7 | 9.0 | 12.3 | 47.9 |
| vermouth | 0.8 | 1.3 | 2.1 | 15.2 | 26.3 |
| blue cheese | 0.5 | 0.7 | 4.4 | 9.6 | 73.3 |
| mixed olive oil | 0.3 | 0.4 | 2.4 | 9.0 | -37.8 |
| Total Made in Italy | 100.0 | 100.0 | 6.3 | - | - |
| MiI on total agri-food exp. | 71.2 | 67.9 | 6* | - | - |

* variation of total Italian agri-food exports

Source: our elaborations on UN-Comtrade data.

Table 2 shows the main destination of the agri-food MiI exports. It is worth stressing that exports are rather concentrated, even though concentration decreases in the period considered as in 1996-97 the first 5 destinations represented more than 65% of the total, whereas in 2010/11 they represent around 50%. As expected, destinations are mainly EU-15 Members and rich countries; however, the new Member States, as well as emerging countries, record the highest growth rates (above all, China, Poland, Czech Republic and also Norway). As we will see further in the paper, the composition of the import countries from Italy is the key in order to understand some long term dynamics.

Another interesting point is that overall the distance covered by the agri-food MiI exports has increased, with larger flows of exports going to further countries such as China, and Canada.

Table 2 – Main destinations of agri-food Made in Italy exports

| | 2010-11 | | 1996-97 | | export var. % |
|---|---|---|---|---|---|
| | Share (%) | Cum share (%) | Share (%) | Cum share (%) | Ann. av. var. |
| Germany | 19.9 | 19.9 | 28.2 | 28.2 | 3.9 |
| France | 11.7 | 31.6 | 13.8 | 42.0 | 5.2 |
| USA | 10.7 | 42.3 | 11.1 | 53.1 | 6.1 |
| United Kingdom | 9.9 | 52.2 | 9.6 | 62.7 | 6.5 |
| Switzerland | 4.5 | 56.6 | 4.7 | 67.4 | 5.9 |
| Spain | 3.5 | 60.1 | 2.6 | 70.0 | 8.5 |
| Netherlands | 3.3 | 63.4 | 3.4 | 73.4 | 6.2 |
| Austria | 3.3 | 66.7 | 3.0 | 76.4 | 6.9 |
| Canada | 2.6 | 69.3 | 1.9 | 78.3 | 8.7 |
| Belgium | 2.6 | 71.9 | 3.1 | 81.4 | 5.0 |
| Japan | 2.4 | 74.3 | 2.6 | 84.1 | 5.6 |
| Russian Federation | 2.0 | 76.3 | 2.4 | 86.4 | 5.0 |
| Denmark | 1.8 | 78.0 | 1.3 | 87.7 | 8.7 |
| Sweden | 1.8 | 79.8 | 1.4 | 89.2 | 7.7 |
| Poland | 1.6 | 81.3 | 0.7 | 89.9 | 11.7 |
| Greece | 1.6 | 82.9 | 1.1 | 91.0 | 8.7 |
| Australia | 1.4 | 84.3 | 1.0 | 92.1 | 8.6 |
| Czech Republic | 1.2 | 85.6 | 0.6 | 92.7 | 11.0 |
| Norway | 0.8 | 86.4 | 0.4 | 93.1 | 11.0 |
| China | 0.8 | 87.1 | 0.1 | 93.2 | 27.0 |
| Total Made in Italy | 100.0 | 100.0 | 100.0 | 100.0 | 6.3 |

Source: our elaborations on UN-Comtrade data.

## *3. Methodology*

Understanding the determinants of international trade is one of the key research questions in economics. The interest on the causes and consequences of international trade goes back in time at least to the Mercantilists, and it never shrunk. One perspective adopted to study trade flows is that of looking at the elasticity of imports and exports relative to different sets of variables. Notions like the Marshall-Lerner conditions – the conditions on the price elasticity of demand for exports and imports that need to be satisfied for a devaluation to improve the trade balance – and the J-curve effect – suggesting that in the short run the Marshall-Lerner conditions are unlikely to be satisfied, but they are in the long run – are indeed part of the basic analytical tools not only of economists but also of policy makers.

Aside from theoretical analyses, empirical investigations of the determinants of the export performance are often a basic pillar on which building a country's trade policy. Specializing in the export of goods with low price elasticity and with high elasticity of demand from fast growing countries is often a recipe for economic success. Indeed, econometric analyses of export demand

elasticities, specific both at country and at product level, have long tradition in economics, going back at least to Adler (1946) and Horner (1952). More recent examples include, among others, the estimates of short- and long-run elasticities of exports and imports for the G7 countries in Hooper et al. (2000) and those of US import and export at the sector level by Mann and Pluck (2007).[3] A vast strand of literature has also focused on country level imports and exports of agricultural products, in particular commodities.[4] Overall, the estimates of export demand elasticities obtained in literature are quite heterogeneous, depending on the goods, the countries and the time periods under scrutiny. However, a common view in the most recent literature is the importance of conducting analyses at a narrow sector level, to reduce the impact of changes in product quality.

For this reason, our estimates are based on a large data set of Italian exports of 95 food and agricultural products towards the 49 largest trade partners. The econometric specification follows Mann and Plück (2007), where the annual growth rate of each product exports on each customer country is a function of two distinct sets of variables, respectively catching the short and the long run reactions:

$$\begin{aligned}\Delta\ln(export_{ijt}) = {} & \beta_0 + \beta_1 \Delta\ln(export_{ijt-1}) + \beta_2 \Delta\ln(import_{ijt}) + \beta_3 \Delta\ln(import_{ijt-1}) + \beta_4 \Delta\ln(AUVexp_{ijt}) + \\ & + \beta_5 \ln(\Delta AUVimp_{ijt}) + \beta_6 \ln(export_{ijt-1}) + \beta_7 \ln(import_{ijt-1}) + \beta_8 \ln(AUVexp_{ijt-1}) + \\ & + \beta_9 \ln(AUVimp_{ijt-1}) + \beta_{10} Y_t + \alpha_{ij} + \varepsilon_{ijt} \qquad (1)\end{aligned}$$

where:

$\Delta X$ is the annual variation of the generic variable $X$; $ln(export_{ijt})$ is the logarithm of the Italian exports of product $i$ towards country $j$ in year $t$; $ln(AUVexp_{ijt})$ is the logarithm of the Average Unit Values (AUV) of Italian exports of product $i$ toward country $j$ in year $t$; $ln(import_{ijt})$ is the logarithm of the total imports of the product $i$ from the country $j$ in year $t$; $ln(AUVimp_{ijt})$ is the logarithm of the AUV of the imports of product $i$ from the country $j$ in year $t$; $Y_t$ is a dummy variable per each year $t$; $\alpha_{ij}$ is a dummy variable per each product $i$ and country $j$; $\varepsilon_{ijt}$ is a zero-mean error term.

The estimated coefficients can be interpreted as follows:

- $\beta_1$ measures the inertia of Italian exports;
- $\beta_2$ is the instant elasticity of Italian exports to the import demand;
- $\beta_2 + \beta_3$ is the short-run elasticity of Italian exports to the import demand;
- $\beta_4$ is the short-run elasticity of the Italian exports to the export AUV;
- $\beta_5$ is the short-run elasticity of the Italian exports to the import AUV;
- $-\beta_7/\beta_6$ is the lung-run elasticity of the Italian exports to the import demand;
- $-\beta_8/\beta_6$ is the long-run elasticity of the Italian exports to the export AUV;
- $-\beta_9/\beta_6$ is the long-run elasticity of the Italian exports to the import AUV.

[3] See also Sawyer and Sprinkle (1996), for a survey of the previous literature.
[4] See for example Devadoss et al. (1988) and, more recently, Reimer et al. (2012).

The model is estimated using the procedure suggested by Arellano and Bond (1991) for dynamic panels.

In addition to estimating standard export demand functions, we looked at the MiI exports watching at its "sophistication". This is defined as the content of a good in terms of technology, packaging, branding, other aspects of quality, as well as scale economies and any other factor affecting the value of the product (Lall *et al*., 2006). The basic idea is that the more sophisticated the items produced and exported the higher the income earned. Thus, the sophistication content of a product can be indirectly measured by the per-capita GDPs of the exporting countries through the Prody index (Lall *et al*., 2006; Rodrick, 2006; Hausmann *et al*., 2007). Following the literature, the Prody index associated to each good (or set of goods) *i* is defined as the sum of the per-capita GDP of all the countries *j* exporting that good, where each country's GDP is weighted by a measure of the trade specialisation of the country in that item, expressed by Balassa's index of revealed comparative advantages – RCA, normalized by the sum of RCA of all exporting countries. Formally:

$$Prody_i = \sum_j s_{ij}\, GDPpc_j \qquad (2)$$

where $s_{i,j}$ is the weighting factor given by

$$s_{i,j} = \frac{RCA_{i,j}}{\sum_j RCA_{i,j}}$$

The index produces a ranking of values that is interpreted as a relative measure of the content of attributes that better remunerate inputs. More in details, products with a high index are sold by richer countries, that are supposedly better able to focus on quality attributes and on market imperfections to reduce the impact of sheer price competition.

Furthermore, the evolution of the Prody index reflects changes in the sophistication level of each product. From the formula above, it is clear that its variation over time can be explained by two different effects. First, it can change according to variation in GDP per capita of the exporting countries. Second, it may reflect changes in countries' export specialization patterns.

Though relatively new, the Prody index has already been applied to the analysis of Chineese exports (Rodrick, 2007), Portoguese exports (Lebre De Freitas and Salvado, 2009), Italian total exports (Di Maio e Tamagni, 2008) and Italian agri-food exports (Carbone and Henke, 2012).

In this paper, we apply the Prody index to agri-food products that are defined also by the quality level within each category. Following Minondo (2007), for each product we considered two levels of quality according to the median world-level value of the export AUV and then apply the usual formulaFormally:

$$Prody_{iq} = \sum_j \frac{RCA_{i,jq}}{\sum_j RCA_{i,jq}} GDP_j$$

Were *q* indicates the different level of quality of the exports (high and low), and all other expressions are as defined above.

Combining the analysis of the elasticities and of the sophistication of MiI agri-food exports we can obtain a broader picture of their global and country specific determinants. More in detail, the proposed approach allows on one side, to look at the kind of competition that characterizes world markets for a given product and, on the other side, to detect to what extent Italian exports are able to adjust to trends in both costumers' demand and competitors supply, focusing on markets where price competition is less intense and exports are, hence, more rewarding.

### *4. Elasticities of Italian exports of MiI agri-food products*

Measures of the short-run and long-run elasticities of Italian exports with respect to the evolution of world demand allow a better understanding of the strength and weaknesses of the country agri-food international specialization. A high elasticity with respect to world demand, for example, witnesses the ability to single out the fastest growing markets. On the contrary, it clearly implies a higher vulnerability during recessions.

The elasticity with respect to relative prices is also a crucial characteristic of exports. Indeed, when exporters enjoy some degree of market power, the total value of aggregate exports is less affected by changes in Italian export AUVs or in the AUVs of the imports of our clients from our competitors.

Table 3 presents the values of the average short- and long-run elasticities with respect to world demand and prices; these were obtained from the estimation of the econometric model described in Section 3 on a sample of yearly data within the last 15 years on exports to our 46 major trade partners. We distinguished between MiI and other agri-food products and high and low income countries (these respectively accounts for about 94% and increasing over the period, and about 6% and descreasing). All estimates are statistically significant at the 1% level, with the only exception of the long run elasticity to import demand for low income countries, that, for this reason, is reported in parenthesis.

The estimated instant elasticity to import demand is 0.36. This means that, on average, a 10% increase in the total value of agri-food imports of our trade partners determines immediately a 3.6% increase in the value of Italian exports. This reaction is larger for MiI agri-food exports (0.40) than for other agri-food products (0.33) and the difference is statistically significant at the 5% level. Although the expansion of our exports in reaction to an increase in demand is higher for high income countries (0.39) than follow income countries (0.31), the difference is not statistically significant The estimates of the short-run elasticity – that measures the total effect after two years – show the capacity to better adjust to changes in demand as time goes by. The average coefficient raises to 4.4%, and adjustment remains significantly higher for MiI agri-food products ( 0.54 vs 0.39)and for high income countries (0.45 vs 0.39), although in the latter case the difference is not statistically significant at the standard confidence levels.

Table 3 – Elasticity of Italian exports of agrifood products

| | Elasticities | Total | Made in Italy (A) | Others (B) | Difference (A) vs. (B) | Low income countries (C) | High income countries (D) | Difference (C) vs.(D) |
|---|---|---|---|---|---|---|---|---|
| $\beta_2$ | instant to import demand | 0.36 | 0.40 | 0.33 | ** | 0.31 | 0.39 | |
| $\beta_2 + \beta_3$ | short-run to import demand | 0.44 | 0.54 | 0.39 | ** | 0.39 | 0.45 | |
| $\beta_4$ | short-run to export AUV | -0.13 | -0.09 | -0.12 | | -0.16 | -0.11 | *** |
| $\beta_5$ | short-run to import AUV | 0.11 | 0.12 | 0.10 | | 0.10 | 0.09 | *** |
| $-\beta_7/\beta_6$ | lung-run to import demand | 0.68 | 0.75 | 0.62 | *** | (0.53) | 0.69 | ** |
| $-\beta_8/\beta_6$ | long-run to export AUV | -0.83 | -0.65 | -0.86 | * | -0.77 | -0.96 | |
| $-\beta_9/\beta_6$ | long-run to import AUV | 0.68 | 0.69 | 0.65 | | 0.37 | 0.90 | ** |
| Obs. | | 38,496 | 15,202 | 23,294 | | 18,097 | 11,162 | |

Source: our elaborations on UN-Comtrade data.

The value of -0.13 of the short-run elasticity with respect to export AUVs implies that a 10% rise of Italy's export prices determines a reduction in total revenues of 1.3%, a small value also in comparison to similar analyses for other sectors (e.g., Hooper *et al.*, 2000). This means that Italian exports enjoy a relatively stable demand even in situations of increasing prices. In the case of non MiI agri-food produtcs, this elasticity is slightly higher (0.12 as opposed to 0.09), plausibly because of a lower market power, but the difference is not statistically significant.Accordingly, the coefficient is larger in the case of exports to low income countries (1.6% as opposed to 1.1% for high income countries), and the difference is statistically significant at the 1% level. As expected, exports to low income countries are therefore more sensitive to price competiton.

In the case of the elasticity with respect to average AUVs of imports of the trade partners, the average short-run elasticity is relatively low (0.11), implying that in the short-run Italian exporters are relativley shed from price competition coming from their foreign competitors. Looking at the disaggregated coefficients, we see that the results are consistent with the previous findings, with MiI products ready to get advantage of competitors' price increases and with low income countries more sensitive to prices.

Consistent with economic theory, long-run elasticities are higher than instant and short-run elasticities. Table 3 shows that a 10% increase in world import agri-food products determines a raise in Italian exports of 6.8% (an elasticity of 0.68). A high value, although smaller than unity, indicating that Italian shares are declining in the long-run. As expected, the elasticity in the case of MiI agri-food products is much higher than the one of the other products, and the difference between the two values is statistically significant. Once again, this is evidence of the ability of MiI to better follow world demand. A similar result applies to long-run elasticity to import AVUs when

separating high income countries and low income countries. The former value being well above the second with statistically significant difference.

Contrary to the case of the short-run, long-run elasticities with respect to Italy's export AUVs and the average import AUVs of trade partners are higher for high income countries than for low income countries. Elasticities to export's AUVs are also lower for MiI agri-food products, while those with respect to the average import AUVs of our trade partners are very similar across the two sets of goods, and close to those estimated by Hooper *et al.* (2000) for a set of manufacturing products.

The elasticities presented so far are average values. However, we may expect significant differences across products, depending on their capacity to match consumers' needs and the degree of market power gained in different sectors and countries. To gauge a sense of these differences, we have estimated the econometric model of Section 3 separately for each MiI agri-food product.

Figure 1 presents the short- and long-run elasticities of Italian exports of each MiI agri-food product with respect to the total import of that same product by our 46 major trade partners.[5] In the short-run, with the only exception of the value estimated for confectionery products (that is not statistically diferent from zero), all other elasticities are positive. The largest values are those of *ice creams, bakery products, fruit juices* and *fresh and prepared vegetables* (excluding tomatoes). For these products, the ability of Italian exports to satisfy a short-run increase in foreign demand is indeed high. Products with the lowest elasticities are instead *processed coffee, chocolate products, blue, grated and fresch cheeses, mixed olive oil, processed rice and sauces* and *other condiments*. Also *sparkling wine* and *wine in large bottles* show fairly small elasticities.

In the long-run, elasticities are on average larger. With the exception of *blue cheese* (that shows a negative value, probably due to some export dynamics that are not adequatly captured by the econometric specification), all other products show elasticities ranging from slightly below 0.5 for *sauces and other condiments* to values above unity for *ice creams, mixed olive oil and non-virgin olive oil, fruit juices, vermouth, sparkling wine* and *wine in large bottles*. In these sectors, exporters are therefore able to successfully exploit the long-run dynamics of foreign demand. The smallest values are, instead, those of *processed rice, virgin olive oil* and *of processed coffee*. Figure 1 also excludes *fresh* and *canned tomatoes* and *grapes*, whose estimates of the long-run elasticities are statistically and economically insignificant.

Interstingly, although the correlation between short- and long-run elasticities with respect to foreign demand is positive (0.37), it is not very strong. The instant reaction of Italian exports to changes in world demand should therefore be interepreted with caution, since they could lead to different patterns in the longer run.

[5] In the case of few products, econometric estimates did not provide statistically and economically significant results; for this reason we have decided to drop them from this and the following Figures.

Figura 1 – Elasticity of Italian exports with respect to world import demand of each product

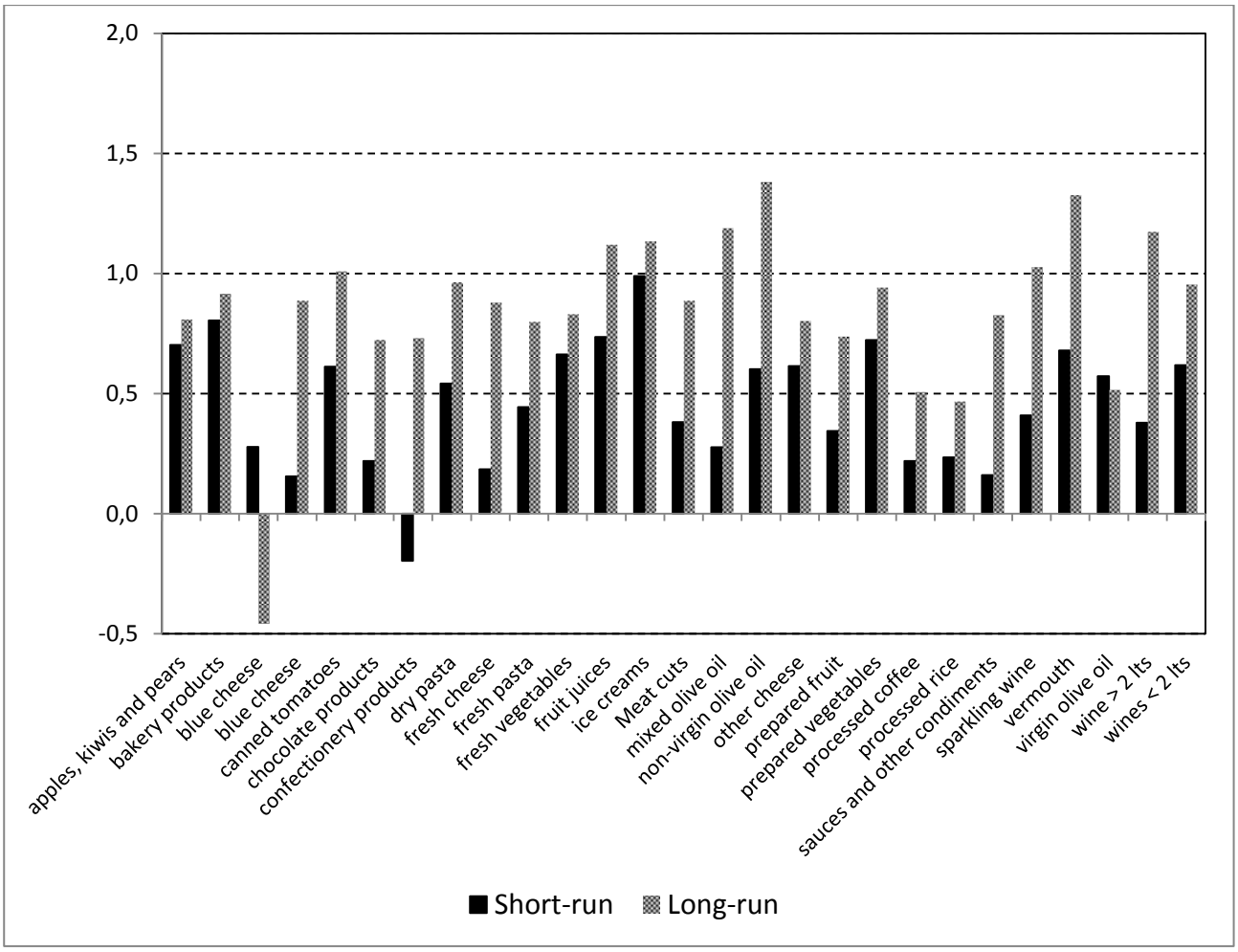


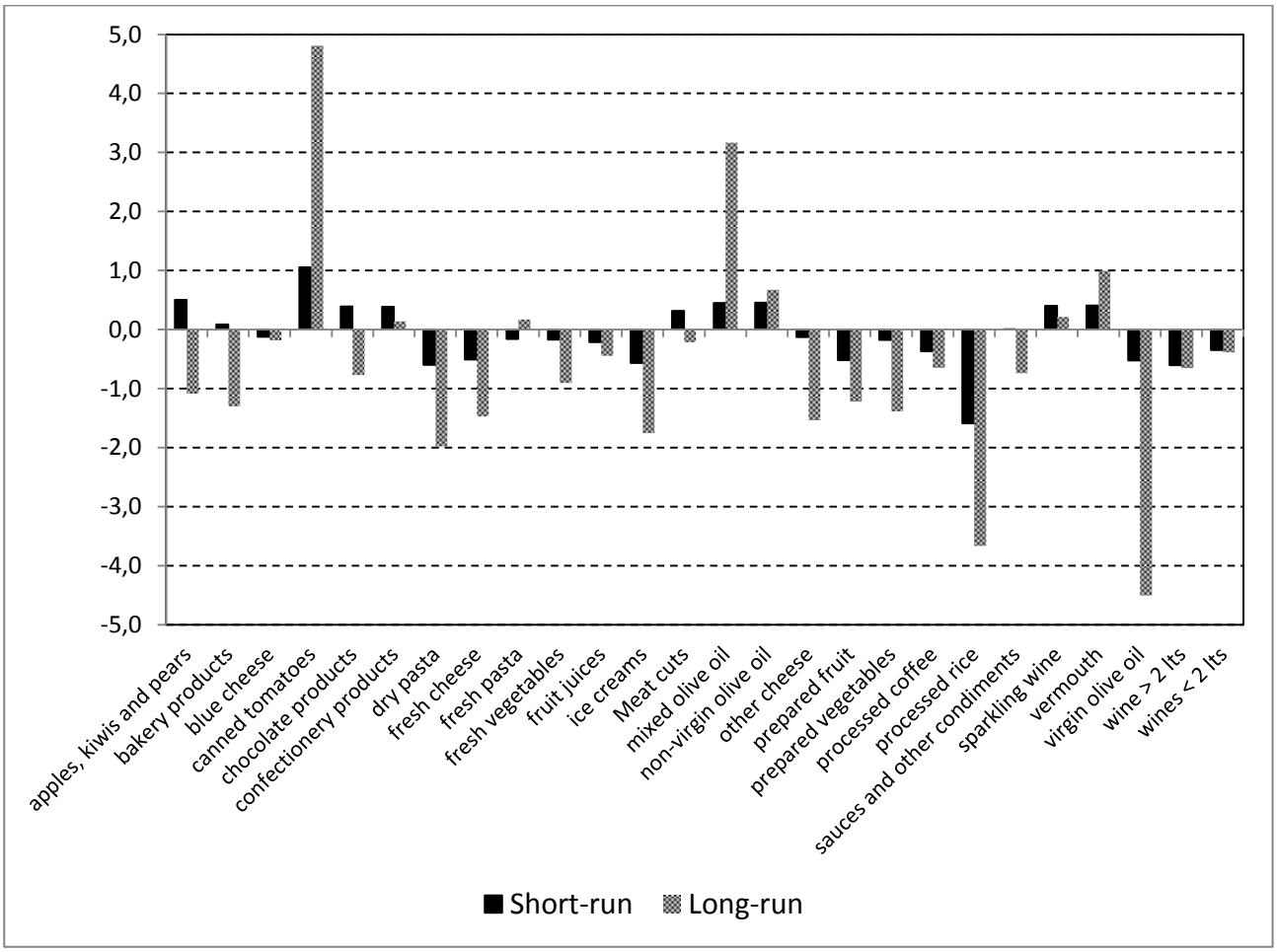

Figure 2 shows the short- and long-term elasticities of Italian exports of MiI agri-food products with respect to export AUVs. In the short-term the average value of -0.09 presented in Table 3 hides quite different trends. Depending on the product, the estimated elasticities range from values well below -1, as in the case of processed rice, to values larger +1, as in the case of *canned tomatoes* and *mixed olive oil*.

For 15 products (including *all cheeses, dry pasta, virgin olive oil* and *wine, except the sparkling ones*) the short-run elasticity to export AUVs is negative. In this case, an increase in export prices results in a more than proportional reduction of the quantities sold abroad, determining a contraction of overall exports revenues. For the remaining 11 products (including *vegetables* and *sparkling wine*) the elasticity is instead positive, indicating that an increase in prices translates into a short-term revenue growth.

In the long-run, elasticities to export AUVs are even more negative, consistent with the hypothesis that over a longer time the market power of exporting firms is weaker, because buyers can change their consumption habits and other exporting countries may adopt more aggressive pricing strategies. Only four products show a statistically and economically significant positive elasticity: *mixed olive oil*, *non-virgin olive oil*, *canned tomatoes* and *vermouth*. Products that suffer most

from a long-run increase in their export price are *virgin olive oil*, *processed rice* and *dry pasta*, followed by all cheeses, but grated ones.

Figure 2 – Elasticity of Italian exports with respect to export AUVs

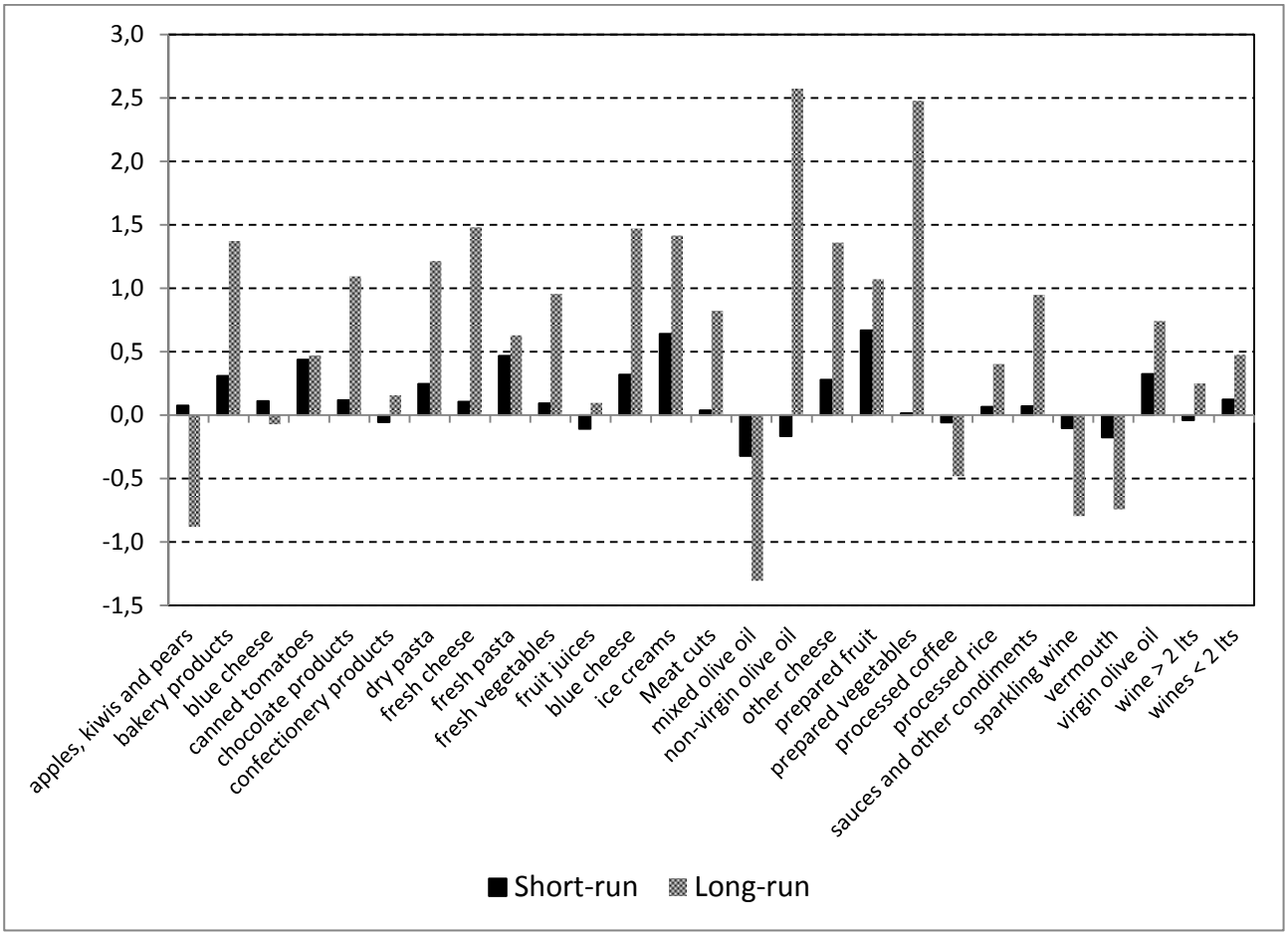



Finally, Figure 3 shows the short- and long-run elasticities of Italian exports of MiI agri-food products with respect to AUVs of imports of the same product by our main trade partners.

Also in this case, the trends are quite different depending on the product considered. In the short-run, values range from -0.4 for mixed olive oil, to a little more than 0.5 for *prepared fruit* and *ice creams*. While a positive value of this elasticity implies that Italian exports are favored by an increase in the prices of imports from our competitors, a negative value indicates that they decrease with the increase in those prices. As expected, for most products the elasticity with respect to the AUVs of imports from our competitors countries is positive or very close to zero.Although less common, negative values are indeed possible. If, for example, the demand for French sparkling wine is particularly unelastic, while familie's total expenditure for sparkling wines is relatively constant, an increase in the price of French sparkling wines would result in a reduction in the consumption of Italian sparkling wines. Similar results hold also in case sparkling wine is considered a luxury good acting like a status symbol, as it will be discussed in the last section.

In a nutshell, our results show that although Italian exporters of MiI agri-food products enjoy some degree of market power, price competition remains a relevant issue, suggesting the existence of a significant trade-off between strategies based on quality and brand recognition and strategies based on prices.

Figure 3 – Elasticity of Italian exports with respect to AUVs of imports of our trade partners




Looking at the long-run elasticities, there are few products showing significant negative values; they are *processed coffee, fresh fruit and vegetables (*excluding *grapes), mixed olive oil, vermouth and sparkling wines*. For many products, the estimated elasticity is positive and larger than unity, indicating a strong ability of our exporters to take advantage from any increase in the price of our competitors and, conversely, the risk of loosing market shares if they reduce their prices. In the long-run, the elasticites are particularly high for non-virgin olive oil, prepared vegetables, cheeses, excluding blue cheese, and ice creams.

Although the relationship between the long-run elasticities of Italy's export AUVs and import AUVs from our competitors is, as expected, negative and statistically significant (since a rise in export AUVs has the same effect of increasing relative prices as a reduction of our competitiors' AUVs), it

is not particularly strong. Similarly weak is the relationship between the short- and long-run elasticities to export and import AVUs.

Finally, the long-run elasticity of exports with respect to import and export AVUs shows no correlation with the incidence of each product on total exports at constant prices. In other words, contrary to what one might expect, the elasticities with respect to AVUs are not higher in absolute value for the products that represent a significant share of our MiI agri-food exports.

### *5. The Sophistication Level of the Made in Italy Exports*

As underlined in the methodological section, the Prody index is a measure of the sophistication level of a good. Table 4 shows, for agri-food MiI exports, the values of the index as well as the rankings built upon these values and the absolute and percentage variations of the index in the period under study.

Table 4 –Prody Index for the *Made in Italy* agri-food products.

| | 1996-97 | | 2010-11 | | variation | |
|---|---|---|---|---|---|---|
| products | ($) | ranking | ($) | ranking | ($) | % |
| herborinated cheese LQ* | 27,759 | 1 | 47,196 | 1 | 19,437 | 70.0 |
| grated cheese | 19,988 | 16 | 40,636 | 2 | 20,649 | 103.3 |
| processed coffee | 19,481 | 17 | 34,534 | 3 | 15,053 | 77.3 |
| fresh cheese | 26,754 | 2 | 34,209 | 4 | 7,455 | 27.9 |
| fresh pasta | 20,548 | 14 | 33,422 | 5 | 12,874 | 62.7 |
| other cheese | 26,742 | 3 | 30,669 | 6 | 3,927 | 14.7 |
| sparkling wine LQ** | 10,732 | 29 | 27,592 | 7 | 16,860 | 157.1 |
| chocolate products | 24,133 | 5 | 27,254 | 8 | 3,121 | 12.9 |
| confectionery products | 21,070 | 10 | 27,497 | 9 | 6,427 | 30.5 |
| bakery products | 24,897 | 4 | 27,216 | 10 | 2,320 | 9.3 |
| Meat cuts | 20,086 | 15 | 26,350 | 11 | 6,263 | 31.2 |
| sauces and other condiments | 21,808 | 9 | 25,873 | 12 | 4,065 | 18.6 |
| ice creams | 23,136 | 7 | 24,994 | 13 | 1,858 | 8.0 |
| virgin olive oil | 19,314 | 18 | 24,045 | 14 | 4,731 | 24.5 |
| apples, kiwi and pears | 23,520 | 6 | 22,906 | 15 | -614 | -2.6 |
| fruit juice | 14,859 | 22 | 21,479 | 16 | 6,620 | 44.6 |
| vermouth LQ** | 18,636 | 19 | 20,118 | 17 | 1,483 | 8.0 |
| fresh tomatoes | 22,971 | 8 | 19,409 | 18 | -3,563 | -15.5 |
| fresh vegetables | 17,284 | 20 | 18,358 | 19 | 1,074 | 6.2 |
| mixed olive oil LQ* | 10,203 | 30 | 17,782 | 20 | 7,579 | 74.3 |
| canned tomatoes LQ** | 15,013 | 21 | 16,818 | 21 | 1,805 | 12.0 |
| non virgin olive oil LQ* | 20,921 | 12 | 16,802 | 22 | -4,119 | -19.7 |
| prepared vegetables LQ** | 13,666 | 24 | 16,583 | 23 | 2,917 | 21.3 |
| wine <2lt LQ* | 20,606 | 13 | 15,827 | 24 | -4,780 | -23.2 |
| mineral water LQ** | 13,202 | 26 | 15,810 | 25 | 2,608 | 19.8 |
| dry pasta LQ* | 13,938 | 23 | 14,201 | 26 | 263 | 1.9 |
| wine>2 lt LQ** | 10,915 | 28 | 13,346 | 27 | 2,431 | 22.3 |
| prepared fruit LQ** | 12,406 | 27 | 11,555 | 28 | -851 | -6.9 |
| grapes LQ** | 13,395 | 25 | 10,237 | 29 | -3,159 | -23.6 |
| processed rice | 21,028 | 11 | 6,065 | 30 | -14,963 | -71.2 |

Source: our elaborations on UN-Comtrade and World Bank data.

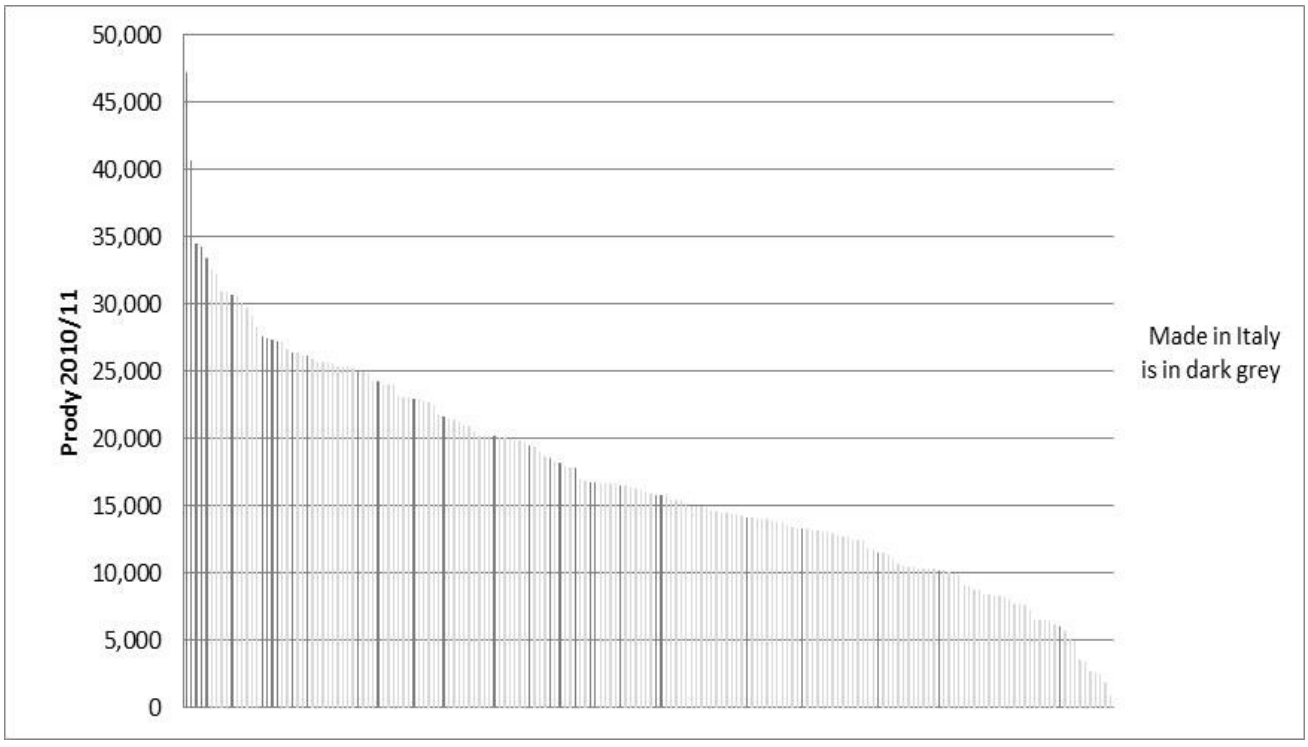
*Low quality products at 2010-11.

** Low quality products both at 1996-97 and at 2010-11.

The index is built using the same export dataset as in other parts of the research and per capita GDP as released by World Bank (Development indicators series) measured in purchasing power parity (PPP) at constant 2005 values.

Focusing on the Prody values at 2010-11, it is easy to see that the range covered is quite wide, spanning from a maximum of about 47,000 USD for herbal cheese, to a minimum of about 6,000 USD for processed rice. Figure 4 shows Prody values for the 95 items of the agri-food exports out of which the 30 MiI were selected. The darker columns in the figure are the MiI exports. From this figure it is possible to gain two important insights. First, it is clear that MiI products embrace almost the entire range of Prody values, in other words, MiI exports show significantly different levels of sophistication compared with the entire agri-food vector of exports. Nevertheless, it is clear that MiI exports are predominantly located in the upper half of the distribution (>15,000 USD). In other words, MiI mostly includes sophisticated agri-food items. Summing-up, the market segments in which these products are competing are high quality and highly differentiated (on the base of all the attributes included in the sophistication concept); however, there are also some products for which price competition is relatively more important.

Figura 4 – Agri-food products' ranking of sophistication and the positioning of Made in Italy




It is interesting to highlight that at the top of the ranking there are highly processed products such as cheese, bakery, sparkling wines, chocolate products, confectionery, processed coffee, and others, for which branding, packaging and market segmentation are all cues of competition. On the contrary, at the bottom of the ranking there are less processed, simpler products such as preparation of fruit and vegetables, fresh fruit, canned tomatoes, olive oils, wine, processed rice, for which sophistication seems to be a less important key to compete in the world markets.

Fully consistent with the observed ranking, it can be observed that at the bottom of the ranking there are many products for which the Italian exports are classified as Low quality according to their AUV (see Section 3. These are, overall, 8 products with AUVs below the world median for the entire period (prepared vegetables, canned tomatoes, grapes and prepared fruits, and also mineral water wine> 2 lt., sparkling wine and vermouth); plus 5 products whose AUVs were above the world median at the beginning of the period and fell under this value at the end of the period (dry pasta, wine< 2 lt., non-virgin olive oil and mixed olive oil, and blue cheese). The tendency of Italian exports to reach world markets at low prices for those products that compete on low sophisticated market segments indicates that Italy is somehow catching up the kind of competition that characterize more the market for these products.

Looking at the variations of the index, the first evidence is that there is a majority of positive signs (23 products) while for 7 products the level of sophistication was reduced over the period. Among the latter there are: processed rice, grapes and tomatoes, processed fruits, non-virgin olive oil and wine in bottles with less than 2 litres. Due to this reduction, these products fall in the lower part of the distribution where the role of lower income countries is increasing and, thus, price competition is more intense and remuneration of inputs tends to be lower. On the other side, the products that met the major increase of the Prody index climbed many positions on the sophistication ranking and are ready to engage competition on quality attributes that better reward inputs.

### *6. Export elasticities and changes in Prody index*

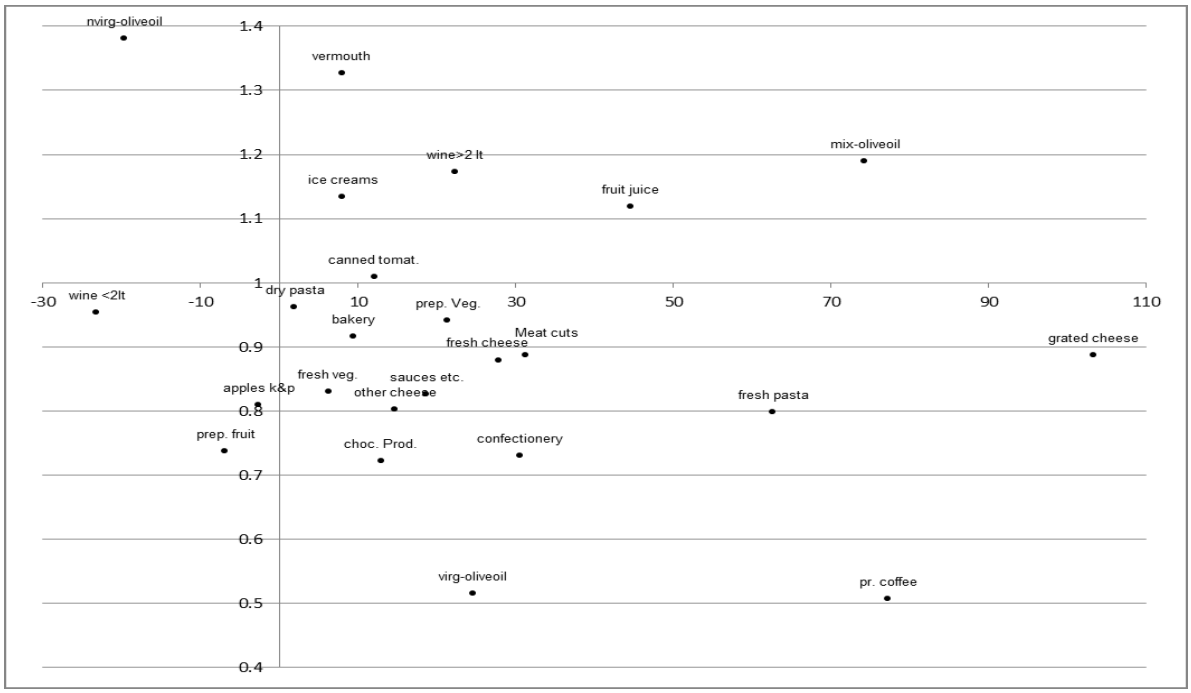
The very different values of the elasticity of demand for Italian exports of MiI agri-food products are due to different factors, such as the degree of substitutability among similar goods in the food consumption basket, the quality of our products, the market strategies of our major competitors, the market power of our exporting companies. These features are also determinants of the Prody index. Indeed, both elasticities and sophistication deal somehow with the nature and intensity of competition: the first refers to the country's exports, while the second refers to overall world exports. It is then interesting to merge the two measures in order to obtain a unified view of the impact of world markets trends for MiI goods and of Italy's position in those markets. This is what we have done comparing the values of the long-run elasticities with the rate of change of the Prody index (Figures 5-7).

At first sight, there seems not to be a simple relationship between these two variables: the coefficient in a cross-section regression is not statistically significant on all three cases considered. However, if we divide each figure into four quadrants, depending on whether the Prody index has grown or decreased over the sample period and on whether each elasticity is greater or smaller than unity in the case of the elasticity of imports to world demand –or grater or smaller than zero in the case of elasticity to AUVs-, we obtain a more nuanced picture where Italian exports performance is compared to global tendencies.

As we have already mentioned earlier, an increase of the Prody index indicates that competition in world markets increasingly relies on quality and product/process attributes, and less on price.

Clearly, a reduction indicates the opposite trend, where price competition becomes more pressing.

Figure 5 – Changes in the Prody index and Long Run elasticity of Italian exports to world demand




**Sparkling wine, processed rice, fresh tomatoes* and *blue cheese* have been remouved from the gaph as they were outliers

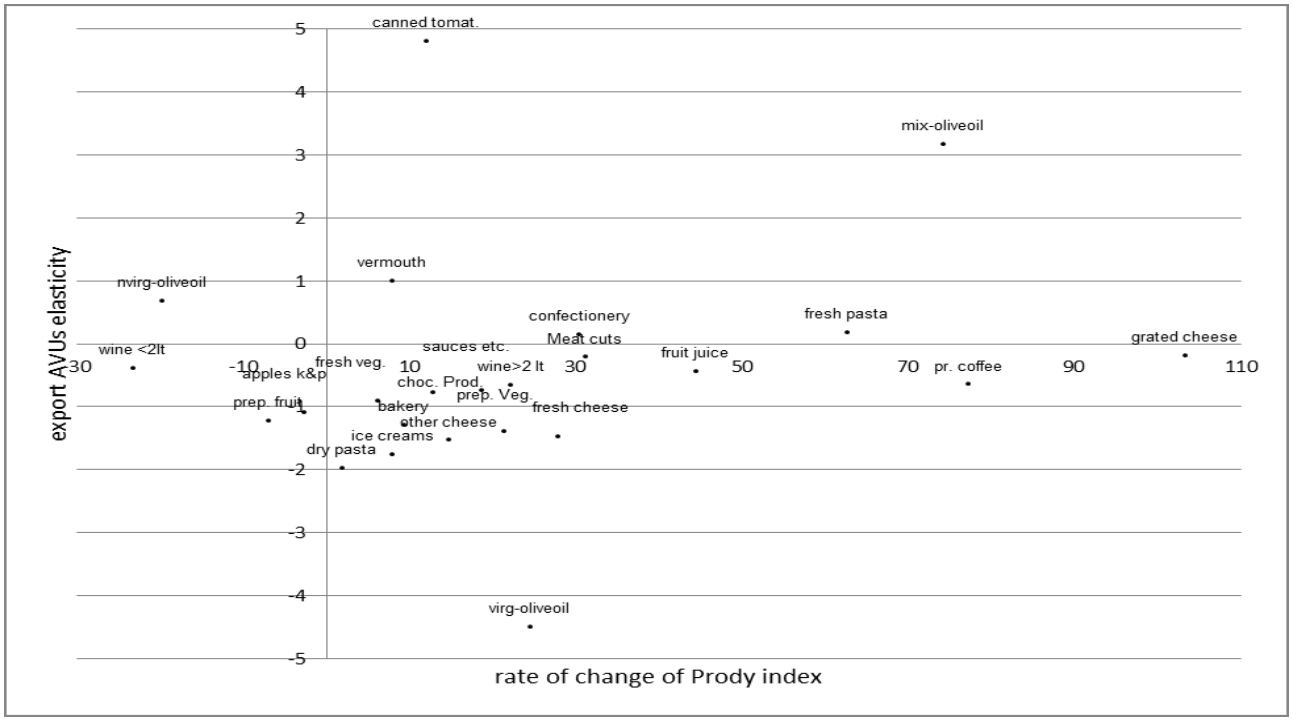
Figure 5 shows that most of the products that have registered an increase of their Prody index show a long-run elasticity of exports with respect to world demand that is smaller than one (e.g., *processed coffee, grated cheese,* but also *confectionery and chocolate products, fresh pasta, meat cuts* and *virgin olive oil*). This means that, while world demand for these products is increasingly sophisticated and therfore should allow higher price/cost margins, Italian exports are not fully responsive to the trends in world demand for imports, and hence Italian firms are unable to fully benefit from the opportunities arising in international markets. Of course, an elasticity lower than one implies at the same time that Italian exporters are better shielded from the negative consequences of contractions of world demand.

For other products (i.e., *mixed olive oil, ice creams, sparkling wines* and *wine in large bottles, fruit juice* and *canned tomatoes*) the increase in the degree of sophistication is associated instead with a high elasticity with respect to the demand for imports. In these cases, Italian exporters are able to exploit the opportunities that come from foreign markets, although this clearly implies that they are more severly affected during downturns.

Coming to the elasticity of demand wih respect to changes in the AUVs of exports (Figures 2 and 6), this is negative for the majority of MiI agri-food exports, showing that Italian exporter have narrow margins to increase their prices. In other words, despite the high reputation commonly tributed to MiI, many of these products are definitely price sensitive. However, it is worth to pinpoint that there is a group of items whose demand is less price sensitive even in the long run,

among these mixed olive oil, canned tomatoes, vermouth, confectionery, fresh pasta and meat cuts.

Figure 6 – Changes in the Prody index and Long Run elasticity of Italian exports to export AUVs*

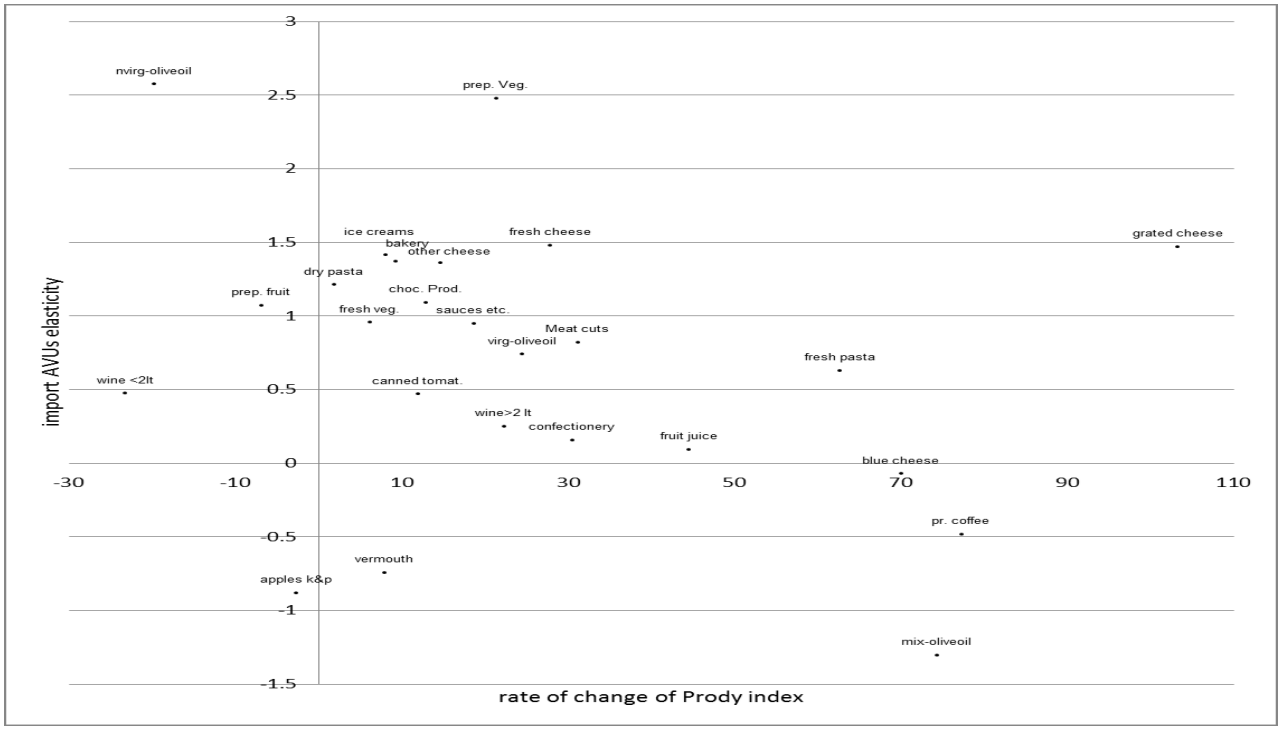



**Sparkling wine, processed rice, fresh tomatoes* and *blue cheese* have been remouved from the gaph as they were outliers

The fact that most of the products that show a rise in their Prody index also have an elasticity of exports with respect to the AUVs of imports from our competitors that is larger than zero (Figure 7) confirms that, even in the higher market segments, price competition is relevant in the long term and that Italian goods not only suffer from other countries' competition but it is also able to take advantage from competitors' lack of price competitiveness.

Finally, some products show very perculiar market trends. Canned tomatoes, for example, have registered a strong increase of the Prody index and at the same time show a high long-run elasticity with respect to export AUVs, a trend that is consistent with a progressive switch towards higher quality and, at the same time, a good export performance. On the contrary, in the case of processd rice, the reduction of the Prody index associated with a low elasticity with respect to both the foreign demand and AUVs suggests that the overall performance is likely to depend on a change in the qualitative characteristics of the Italian product.

Figura 7 – Changes in the Prody index and Long Run elasticity of Italian exports to import AUVs




**Sparkling wine, processed rice* and *fresh* have been remouved from the gaph as they were outliers

## 7. Conclusions

In this paper we have presented an empirical analysis of the export performance of Italian agri-food sector, focusing especially on the so-called Made in Italy products. Our results show that world markets for MiI products are characterized by high quality and sophisticated attributes and that these increased over the observed time span. These markets, indeed seem to remunerate better MiI exports, which seem to be also growing at a constant pace, allowing Italy to be a leading global competitor in world supply, also thanks to its high revealed comparative advantages. Furthermore, these exports show a better performance on more rewarding markets of high Income Countries.

However, it also emerged from our analysis that, out of 30 sectors that comprise the MiI, 8 have an AUV below the world median and another 5 switched from the upper half of the AUV distribution to the lower half. Furthermore, the small values of the long-run elasticities of exports to world demand indicates that Italian agri-food exports are so far on a declining trend as these are not able to fully catch up with the expanding demand, even though the MiI products do better. In addition to that, both direct and cross price elasticities show that even in these partially competitive markets where product quality is key, price competition is still important and affects the competitive dynamic although with varying intensity.

Focusing on a few specific cases can give a better idea of the insights that can be derived from the joint analysis proposed by the paper. To this purpose, here we sum up and comment our results

related to two sectors for which Italy is well renowned worldwide and that are important for the Country's exports: the olive oil and the wine sectors.

The first is represented in our database by three lines of exports: *virgin olive oil, non-virgin olive oil* and *mixed olive oil*. Among these, the first features higher intrinsic quality and is more rooted in the place of production. The analysis shows that competition on international markets for this product is increasingly based on sophistication; that Italy acts in the higher layer of the market (AUV is high) where it has high and increasing revealed competitive advantages. Besides, long-run elasticities show that the Italian product is not well able to benefit entirely from the positive trends in world demand and, also, that it is affected from the concurrence of other countries both when its own exports price increases and when facing changes in the competitors' prices. Thus, *virgin olive oil* well represents the general trends pinpointed for the whole MiI. On the contrary, *non-virgin* and *mixed olive oils* occupy less sophisticated market segments, though the former faces a decline of the sophistication index in the time span observed, while the latter recordsan improvement. Also the positioning of Italian exports flows in these two sectors is different from what we have seen for *virgin oil*: in this case AUV has shifted below the world median and the RCA are smaller and declining even if the value of the long-run elasticity of exports to world demand is higher than what we have found for the virgin olive oil. We interpret this as a consequence of the more stringent conditions on the supply side for *virgin olive oil* that for the other two product types. Also different is the behaviour of exports with respect to AUVs: for both, direct price elasticity is positive, indicating the capability to face price increase with a smaller reduction of sales. This is especially true for *mixed olive oil* where branding is increasingly important; as it is also witnessed by the mentioned improvement in the sophistication ranking. The same line of interpretation may be applied to the negative values of cross-price elasticity for the *mixed olive oil* for which strong market segmentation seems to reduce substitutability.

Summing up, the analysis made it clear that these items represent three well distinct segments in the world's market both from the consumers' perspective and the supply side and also that Italy plays different roles and shows different performances in each of them.

Another example of the potential of the joint methodology when looking at trade dynamics is the wine sector. Also in this case the data set distinguishes three different export flows: *wine in small bottles (< 2lt), wine large in bottles (>2 lt)* and *sparkling wines*, the first being by far the most important for Italian agri-food trade balance (16.4% of MiI exports) and the three of them determining high RCAs for the Country. The three sectors are connected in different respects at the production level via reputational links, scope economies and, often, by joint production. World markets for these three products seem to be influenced by different determinants in the observed time span, with competition driven by higher and increasing sophistication in the *sparkling wine* market; a prevalence of price competition *for wine in large bottles* and a shift from more to less sophisticated markets for *wine in small bottles*. In such a complex global arena Italy is a major player both for the quantity sold and the quality of its products. Actually the low level of the AUVs of its exports in these cases is to be regarded as the mere consequence of its very high shares of world supply. More significant here are the elasticity values that confirm the different behaviours of the three products. Indeed, as expected to some extent, *wine in large bottles*, that is a rather

bulk production, shows the highest value of demand elasticities as a consequence of looser constraints on the production side that allow for easier adjustments to expansion of clients' demand. The values of price elasticities, both direct (positive) and cross (negative), for *sparkling wine* seems to indicate the behaviour of a luxury good signalling a higher status and for which consumers are willing to pay more. This is just the opposite of what holds for the other two wine categories.

As a general concluding comment it can be said that the analysis allows for a comprehensive diagnosis of the international performance of Italian agri-food MiI exports over the last fifteen years. Although the picture is in general good, some shadows emerge. Actually, for some products, quality is still too low to be able to provide strong competitive advantages; for others, in spite of the high quality of our exports, Italy is unable to defend its world market shares. This points to other structural deficiencies of the Italian agri-food system, such as the small size of farms and of processing plants, the low level of internationalization of Italian firms, and also to the scant levels of public and private investments in research and development, which are crucial to increasing the level of sophistication of the MiI agri-food exports.

***References***

Adler, J.H. (1946), The postwar demand for United States exports. Review of Economic Statistics 28, 23-33.

Antimiani, A., Henke, R. (2005), «Struttura e specializzazione degli scambi agri-alimentari tra Italia e Cina», *Rivista di Economia Agraria*, 4.

Antimiani, A., Henke, R., (2007), «Old and New partners: Similarity and competition in the EU foreign agri-food trade», *Food Economics*, 3.

Arellano, M. and Bond, S. (1991), Some tests of specification for panel data: Monte Carlo evidence and an application to employment equations, The Review of Economic Studies, 58, 277 – 297.

Carbone, A. and Henke, R. (2012) Sophistication and performance of Italian agri-food exports, Food System Dynamics, 3 (1), 22-34.

Devadoss, S., Meyers W.H. and Helmar M. (1988), Export Demand Elasticity: Measurement and Implications for U.S. Exports, Proceedings of the NCR-134 Conference on Applied Commodity Price Analysis, Forecasting, and Market Risk Management. St. Louis, MO.

Di Maio, M. and Tamagni, F. (2008),The evolution of world export sophistication and the Italian trade anomaly, Rivista di Politica Economica, 98 (1-2), 135-174.

Hausmann, R., Hwang, J. and Rodrik, D. (2007), What you export matters, Journal of Economic Growth, 12, 1-25.

Hooper, P., Johnson K. and Marquez J. (2000), Trade Elasticities for the G-7 Countries, Princeton Studies in International Economics 87, Princeton University Press.

Horner, F.B. (1952), Elasticity of Demand for the Exports of a Single Country, The Review of Economics and Statistics 34, 326-342.

Istituto di Servizi per il Mercato Agricolo Alimentare (ISMEA) (2012), *La competitività dell'agroalimentare italiano. Check up 2012*, Roma.

Istituto Nazionale di Economia Agraria (INEA) (2009), Il commercio con l'estero dei prodotti agroalimentari, Roma.

Lall S., Weiss, J. And Zhang J. (2006), The "sophistication" of exports: a new trade measure, World Development, 34, 2, 222-237.

Lebre De Freitas, M. and Salvado, S. (2009), Industry similarities and comparative advantages in Portugal: an empirical assessment based on 2005 trade data, GEE papers, 0010.

Mann, C.L. and Plück K. (2007), Understanding the U.S. trade deficit: a disaggregated perspective, in Clarida, R. (ed.), G7 Current account imbalances: sustainability and adjustment, University of Chicago Press.

Minondo, A. (2007), exports' quality-adjusted productivity and economic growth, ETSG papers (www.etsg.org).

Monti, P. (2005), Caratteristiche e mutamenti della specializzazione delle esportazioni italiane, Banca d'Italia, Temi di discussione, 559, Roma.

Reimer, J.J., Zheng, X., Gehlhar, M.J., Marchant, M.A. and Bosch, D.J. (2012), Export Demand Elasticity Estimation for Major US Crops, Journal of Agricultural and Applied Economics, 501-515.

Rodrik, D. (2006), What's so special about China's exports? NBER Working Paper, 11947.

Sawyer, W. C. and Sprinkle, R. L. (1996), The demand for imports and exports in the US: A survey, Journal of Economics and Finance 20, 147-178.