

Strategic behaviour of Italian fruit and vegetables importers from South Mediterranean Countries faced with food safety standards

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Jel codes: Q13, Q16, L51

1. Introduction

Growing awareness of the role of food quality and safety has led to the rise of national and international laws, often restrictive, that deeply changed production practices and organization of supply chains.

Presence of asymmetric information between production and consumption phases, together with externalities associated to food consumption related to ensure protection of "basic" requirements to consumers, such as health, information, fair trade, justifies public intervention concerning the implementation of regulation on standards and control system. The Public Authority operates through different levels and modes of regulation (mandatory public standards, regional or national certification schemes, etc.), correcting market failures and ensuring the achievement of optimal quality levels. Beside public intervention, we see the development of private initiatives to normalize quality, which aims to guarantee product safety and quality, safeguarding the reputation of companies and, in some cases, providing basis for the achievement of a competitive differentiation advantage in the market (Henson and Reardon, 2005). These actions not only affect the level of quality offered to the final consumer (and, therefore, the effectiveness of public intervention), but also change the inter-

Abstract

The aim of this study was to analyse the heterogeneity of Italian specialized importers in Southern Mediterranean Countries. We analysed a national representative sample and defined a profile of companies according to the safety of fruit and vegetable imports, organization of chain by suppliers and clients and efforts in safety controls. We showed that the type of supply chain affects the importers' strategies encouraging them to implement stricter standards, such as private standards, with respect to public law in order to meet customer needs and provide a sufficient degree of differentiation. These strategies, however, are not always aimed at obtaining a price premium, but are taken above all to ensure the maintenance of the reputation of the companies towards the most demanding customers and stabilize its market share.

Keywords: Food safety, standards, import, international trade, fruit and vegetables, Mediterranean.

Résumé

Le but de ce travail était d'analyser l'hétérogénéité des importateurs italiens spécialisés au niveau des pays du Sud de la Méditerranée. Nous avons examiné un échantillon représentatif et défini un profil des entreprises en considérant la sécurité des importations de fruits et légumes, l'organisation de la chaîne du fournisseur au client et les efforts déployés sur le plan des contrôles sanitaires. Nous avons montré que le type de chaîne d'approvisionnement influe sur les stratégies des importateurs, en les encourageant à appliquer des normes de qualité plus strictes, telles les normes privées, que les normes réglementaires publiques afin de répondre aux besoins des clients et d'assurer un niveau suffisant de différenciation. Toutefois, ces stratégies ne visent pas toujours à obtenir une majoration du prix, mais elles sont surtout adoptées pour maintenir la réputation des entreprises auprès des clients les plus exigeants et stabiliser leurs parts de marché.

Mots- clés: Sécurité sanitaire, référentiels, importation, commerce international, fruits et légumes, Méditerranée.

nal organization of enterprises, imposing significant costs of compliance, which may lead to the exclusion of weaker producers by market transactions (Garcia *et al.*, 2004; Hamoudi *et al.*, 2010).

These initiatives deeply modify the existing organizations within sectors and positioning or repositioning of the strategic players, by strengthening or reversing some balance of power. They also induce the emergence of methods of upstream/downstream contracting and they steer organizations, which have to combine coordination between trade relations and individual strategies in the implementation of systems of control and certification procedures (Demirbas *et al.*, 2006).

Within the normalization of fruit and vegetable supply chains, there is an increasing attention to technical measures (regulation of health security, with regard to the presence of pesticides and definition of maximum residue levels of active principles, as well as labelling requirements or quality standards), which may act both as a barrier to trade like tariffs and quantitative restrictions, and to guarantee the protection of consumer about products health requirements.

Regulatory compliance costs related to information and adaptation to standards and the heterogeneity of quality and safety standards are among the factors that affect strategic choices of operators, especially of importing companies, as responsible for complying with health and quality standards of imported products. Moreover, these factors also affect positively fruit and vegetable exports of producer countries. Some authors show the "effects of inclusion" of opportuni-

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ties for producers of developing countries and the benefits in terms of income and productivity for producers who have achieved compliance (Giraud-Héraud *et al.*, 2011; Lee *et al.*, 2010). It could be the case of the southern Mediterranean exports towards the European Union and Italy.

Mediterranean countries constitute a significant trading partner of the European Union in the fruit and vegetables sector with a 24% share of imports to the EU. Italy imported in 2014 about 630 million euro of fresh vegetables, of which approximately 30% from Southern Mediterranean countries (SMCs), with significant growth in the last 10 years. The main exporting country of vegetables (mainly potatoes, artichokes, fresh vegetables, tomatoes and onions) is Egypt that represents for Italy about 75% of horticultural imports from SMCs, followed by Tunisia and Turkey with 11% and 7%, respectively.

With regard to fresh fruit, Italian imports amounted to about 1.490 million euro of fresh fruit. The main exporting country is Turkey with 68%, followed by Tunisia and Egypt, with 10% and 8% respectively.

The Mediterranean area has regained a central position in global economic and commercial relations, with the evolution of logistics and transport management.

Growing dynamism of imports by the SMCs, combined with an increased level of attention to health benefits conditions by public authorities and Italian and European consumers, require specific organizational procedures and business to all the operators, which conduct business at every stage of the fruit and vegetables supply chain. Researched organisational arrangements should encourage exporting countries to the adoption of production practices that are compatible with the requirements of products health safety and quality. At the same time, traders are encouraged to undertake strategic behaviour (with more or less rigid adoption of a control and certification system regarding quality and health of imported products), depending on type, size, relationship with upstream and downstream operators and the target market of their production.

In most countries of the region (Morocco, Egypt, Tunisia, Turkey), supply chain structures in the fruit and vegetable sector are in a stage of shifting from government-controlled institutions towards increased participation of private structures. Exports are handled mainly through independent commissioners who work on the basis of consignments and operate on spot markets (central wholesale markets), or through larger buying/packing houses (mostly private and co-operative owned), which are focusing on supplying either wholesalers in importing countries or buying centres of retail chains and other large institutional buyers, that apply modern supply chain management methods (Ait Hou *et al.*, 2015).

Those firms are more suitable to integrate in large European supply chain, and to fulfil their high food safety standards, marketing and logistical needs. Requirements concerning certification and application of tracking and tracing techniques, could be thus met by the largest and best organized of those exporting firms, while those operating in a

consignment basis will face increased difficulties to have access to the European retailer chains, which actually impose such requirements (Kalaitzis *et al.*, 2007).

Our analysis concerns quality organization in imported fruit and vegetable supply chains from countries on the southern coast of the Mediterranean, public and private health checks system and coordination forms in commercial relations adopted to ensure products health safety.

The aim is to investigate quality and safety in the sectors of fruit and vegetable imports and, particularly, the role of the strategic behaviour of operators (exporters / importers / wholesalers / big retailers) towards quality and health safety according to the company structure, the supply chain organization and the type of target market. Or better, what factors determine the strategic interest of companies to implement private initiatives for standardisation (market benefit, quality perception by consumers, compliance and coordination costs, etc.)?

The analysis, therefore, identifies different types of "international chains", depending on various factors, and their integration in the strategic behaviour of the operators in the supply chain. In particular, the first part of the work consists of the conceptual framework on the problems concerning the behaviour of importers about aspects of food safety and quality. In the second part we will describe the methodology and the assumptions with which the work is being addressed. Then we will analyse the survey results, carried out on a sample of Italian firms importing fruit and vegetables from the North Mediterranean countries.

The analysis of the sample will be performed starting from some assumptions in this third part of the work, to build an analytical framework on the fruit and vegetable importers heterogeneity, to understand (i) if Italian importers are characterized by different profiles of importers and what are the differences and (ii) if firm's size can or cannot influence safety behaviours along supply chain.

2. Public and private strategies on health safety for imported food products

Food safety and quality standards can be promoted in a variety of institutional forms that differ in the extent, to which users have freedom of choice and action regarding compliance; also they differ in the role of the public and private sectors with the promulgation and / or application of these standards (Henson, 2008).

Reducing the risk associated with food hazards for human health and consumer protection from fraud due to artificial differentiation of products provide the basis for implementation of public standards. With regard to imports of fruit and vegetables, public regulation at European level is mainly based on the presence of active substances and on the level of the minimum residues limit (MRL), applied through inspection and control of imported products (EU Reg. 396/2005). Presence of certain active substances prohibited by European legislation and exceeding the minimum residue limit, prevents the importation of products (EU Reg. 1881/2006).

However, if public standards are ineffective or inadequate for an efficient organization of market and consumer information, companies seek to approved private standards such as alternative means to provide consumers with the desired level of security (Henson and Reardon, 2005).

Regardless of prevalence on public standards, private safety and quality standards have become a predominant basis for product differentiation in markets where competition is increasingly founded on quality. These standards take the form of technical specifications, definitions and principles through which goods are categorized or included in product groupings. The reasons for growth of private standards, therefore reside in mitigating reputational and business risks associated with food safety, partially related to the level and nature of public regulatory requirements, in addition to product differentiation based on quality modes that affect the supply chain (Henson and Caswell, 1999).

These instruments have received a strong impulse in large food distribution chains, both because of their considerable market power and competitive strategies which link reputation and performance of a firm to the quality provided by its products (Bergès-Sennou *et al.*, 2004).

The growth of supermarkets has seen a shift from spot markets toward the use of specialized wholesalers (Berdegué *et al.*, 2007), the increase of coordination system with a dominance of supply chain buyer-driven organization on global scale addressed to the buyers (Gereffi *et al.*, 2003; Hammoudi *et al.*, 2009), and the growth of private quality and safety standards (Pingali *et al.*, 2005).

In a world in which private standards are predominant, the core issue for every operator is gaining access to a supply chain buyer-driven rather than to a specific national market (Dolan and Humphrey, 2000).

Private initiatives are interpreted as "more demanding" respect to public regulation, and this from three different points of view (Henson and Humphrey, 2009):

private standards set a more demanding level for some attributes of the food and / or add to the health security rules (public regulation). For example, standards such as BRC, IFS or ISO 22000 integrates environmental impact and social responsibility matters; Private Field to Fork standard (Marks and Spencer) integrates the 70 pesticides ban regarding fruit and vegetables to be sold fresh (or as ingredients in prepared foods sold for private label brands);

private standards tend to be more "specific" about the means (to achieve objectives) and to the processes than legislation, that often only requires "obligations of result." If legislation merely defines basic parameters of a health security system or prescribes the obligation of a control system, private standards are involved to clarify conditions of effectiveness of such a system or instructions and provide regulatory oversight of specific requirements;

private standards tend to vertically extend legislation coverage. GlobalGap standards, for example, are standard processes aimed at ensuring the compliance of the final

product to a product standard (specifically, the European regulation setting maximum residue limits for pesticides in fruit and vegetables); process requirements specified by private standard are designed to ensure compliance with a health safety standard concerning characteristics of the final product.

Despite differentiation, traders adopt different behaviours in the use of private standards on health safety and supply chain control, based on the brand reputation, size of firm and type of downstream chain.

Rouviere *et al.* (2010) demonstrated that higher turnover of firms adversely affects safety controls in a survey conducted on a sample of fruit and vegetable importers in France. In their empirical setting the authors validate the negative link between firm size and the level of safety effort. Furthermore, they show that public authorities could directly affect firms' behaviour by taking account of their intrinsic characteristics; also they could indirectly influence firms' safety efforts. They could exert pressure on downstream operators who would transfer this pressure to their suppliers.

Importers for large retail chains indirectly increase the firm's safety efforts, and the number of suppliers has a positive correlation in controls by the importer in the procurement of the product. More specifically, the identification of suppliers involves a search of expensive information, in particular if the enterprises require a wide variety of supplies or a high level of health standards. Therefore, companies choose to implement coordinated strategy to monitor the production process along the supply chain. This provides an incentive to the implementation of private standards to reduce transaction costs (Holleran *et al.*, 1999).

Latouche and Rouviere (2011) distinguish two import chains associated with two different types of traders: brokers and retailers. While the first importer allocates the product once imported to different clients by adopting a form of indirect sales channel, retailers buy the products to enter them directly in the final market. Therefore, private standards for retailers would reduce information asymmetries and transaction costs for research and control, in the same way as compliance with public quality standards.

Private standards and certification perform a risk management function and procurement regulation in intermediary market (Giraud-Héraud *et al.*, 2012). The main objective, in this case, is to provide additional security for firms against the risk of food safety failures and the consequent strategic costs (e.g. loss of market share, erosion of brand capital) and operational costs (products recall, customer complaints and penalties from enforcement authorities).

3. Survey design and research methodology

The study was carried out as a part of the Arimnet project. One of the goals of the project was to determine strategic behaviours of fruit and vegetable import from SMCs by three European countries (France, Spain and Italy). In our work, a survey was performed in 2014 among various Ital-

ian fruit and vegetable traders, in order to highlight the heterogeneity of food chains. Particularly the analysis tries to understand the food safety strategies of importers as a function of the size and type of the firm's clients and suppliers; moreover, we have tried to explain the attitudes and behaviours of stakeholders and the constraints imposed by importers to suppliers (standards, obligations imposed upstream on the production, checks on the final product, etc.).

Small importers compose the structure of Italian imports. Many of these importers may not stay on wholesale markets. Nevertheless, the monitoring system is also extremely problematic, given the extreme abundance of national wholesale markets. The attempts at interviews were made on the wholesale markets of Bologna, Rome, Fondi, Naples and Catania. Notwithstanding, this line did not produce any results, due to the importers dimensions and organization: in fact, they often are not able to buy directly from SMCs suppliers, mainly for reasons related to administrative procedures and logistics structure of imports. Indeed, they prefer trading products imported from North Africa, from Spain (Mercabarna Wholesale) and France (Marché de Gros de Perpignan Méditerranée).

Therefore, to be sure to interview the leading importers, our analysis took into account the Fruitimprese database. Fruitimprese is the Italian Association of fruit and vegetables export-import companies; it works with the companies to support and favour their commercial development. Considering the role of Fruitimprese in Italy, we submitted a questionnaire to all the associated companies (100 companies).

The survey was conducted with a questionnaire organized in four parts. Respondents were asked about general information on their company (turnover, main import products, main countries), supplier and upstream relationships, management and quality/health security controls and, finally, customer and downstream relationships. The questionnaire was tested during a specific interview with the director of fruit and vegetable market of Bologna (CAAB) and the director of Fruitimprese.

We submitted the questionnaire by e-mail and later all the companies were called by telephone. The phone calls highlighted that more than half of the companies are engaged in import outside the region of interest (North Africa), in particular the trade of these companies is developed in imports of bananas and other tropical fruits. For this reason we analysed only companies with direct importation from South Mediterranean countries, but among these companies about ten did not answer to the questionnaire.

Hence, the sample includes 23 companies (members of Fruitimprese of the main Italian regions: Emilia-Romagna, Puglia, Campania, etc.) with fruit and vegetable importation from South Mediterranean countries. The limited sources of information to support the analysis were substantially offset by the availability of large number of variables from the questionnaires.

Considering classical method of statistical analysis, sig-

nificant differences in the joint distribution of the items have been tested by means of Pearson χ^2 tests. Moreover, in order to test the differences in average value of continuous variables between sub-groups of observations, T-test have been used.

To analyse the strategic behaviour of Italian fruit and vegetables importers face to food safety regulation we realized a typological analysis of companies in the analysed sample. First, some findings were obtained from the interpretation of the grouped companies by type of first customer and type of first supplier. Then, multiple correspondence analysis was conducted on the dataset: this methodology enables us to reproduce variability (and association) of many initial variables in a smaller number of new variables. We consider a risk-averse importer who is uncertain about the safety of fresh produce he markets and therefore decides to monitor voluntarily some boxes to ensure compliance with a health safety standard and more efficiency along the chain. To do so, he conducts laboratory analyses to check whether there are pesticide residues on produce.

Furthermore, the effectiveness of correspondence analysis is not affected by the small sample size. Relationships among turnover of firms, type of first supplier, type of first client, certification of the company, certification based on customer demand, certification requested to suppliers by companies, and effort on safety have been examined.

4. Results

The sample characteristics are presented in Table 1. The gathered sample includes 23 companies; these companies are mainly importers/wholesalers, furthermore one company in a three is importing almost exclusively, with 70% or more of its revenues derived from import activity.

A percentage of 31% of the sample includes companies with high turnover (100 million Euro or more), 17% of the sample have turnover between 50 and 99 million € and the remaining 52% gains less than 50 million Euro per year. As already mentioned, this structure does not reflect the overall Italian situation because of the selection of importers analysed (companies associated to Fruitimprese).

The composition of the sample by imported quantity shows an equal percentage of firms importing less than 500 tons and between 500 and 5,000 tons (30%), the remaining share imports 5,000 tons or more.

Getting more in depth with the description of the sample, on average 34% of the whole fruit and vegetables imported by firms comes from the Mediterranean area; this evidence reflect the overall Italian share of imports from the Med area. Regarding the total number of companies, 23% of them buy fresh products exclusively from Med Countries. In the collected sample, companies import goods from EU/non-EU countries with similar shares: on average 45% of fruit and vegetables imported by firms comes from intra-European and 55% from non-European countries.

The most mentioned countries from which the companies import are Egypt (44% of the firms has commercial rela-

tionship with this nation), Turkey (39%) and Israel (13%).
 Shifting the focus on products, citrus seem to be imported from Mediterranean by a large number of companies (44%), followed by cherries (22%), strawberries (17%) and potatoes (13%).

Table 1 - Some characteristics of the sample.

	Mean	Median	Minimum	Maximum
Turnover (million €)	91,6	48	1	820
Suppliers (number)	5	4	1	20
First suppl. / total import (%)	56	50	10	100
Imported items (number)	12	5	1	50
Analysis carried out in the last year (number)	132	30	1	900

The nature of traders has been highlighted: nearly 80% of the companies have more than one supplier, on average they have five suppliers per company. The first kind of suppliers is mostly exporters (52%), followed by producers (30%) and foreign wholesalers (13%). The main customers of the importers are big retailers; in particular, 61% of companies sell their products mostly to GMS / HD, 26% sells to national wholesaler, 9% to international and only 4% declare to sell to importers or specialized networks. A percentage of 43% are specialized in terms of range of products, they import only one or two different products (mainly cherries and citrus).

Our survey showed as import chains from MCs in Italy have specific kind of procurement system based on specialized agents. These agents are capable to assure a consistent supply through “preferred suppliers”, producers or “specialized wholesalers”. The type of supply chain also depends on the type of customer (traditional/national wholesalers, international wholesalers or big retailer) (Figure 1).

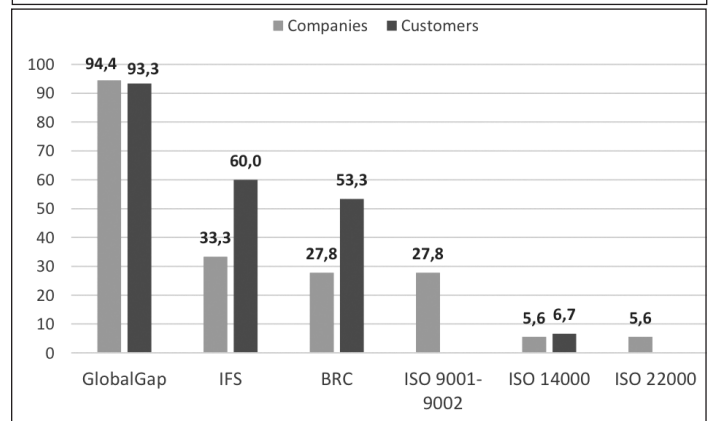
In our study we observed how different is the organization of import chains, as well as different is the strategic behavior that operators put in place to reach the final market. We have national and international wholesalers that provide import to supply the wholesale markets as final destination the small and traditional retail. In this case, imports may have mixed products, in terms of certifications, allowing the needs of the national customer. In chains with supermarkets and hypermarkets, importers adopt voluntary codes of good practices (GlobalGap, BRC, IFN and ISO) for the achievement of this particular group of clients.

A very significant proportion of importers say they are certified (78%), and the same companies ask the certification to suppliers; in fact, 78% of suppliers are certified.

Analysing the type of certification requested by importers to suppliers, we found that over 60% requires more than one certification: in particular, 94% ask for Global-Gap, 33% IFS, 28% ISO 9001 or ISO 9002 and another 28% BRC.

On the other hand, 74% of customers ask to the company certified products, and a percentage of 65% require certification from suppliers. They appear even more demanding than companies about certain certification (Figure 2).

Figure 2 - Type of certification requested to suppliers by companies and customers.



The results across the analysis confirm that companies with a higher turnover realize more analysis, monitoring and contaminant research. We divided the number of analysis made per year in two categories: less than 100 vs 100 or more. It seems reasonable to think that a dependence exists between turnover and effort made in controls: higher turnover often means higher imported quantity, thus the number of controls made should rise proportionally. In fact, we found significant difference in proportion of effort made at different turnover; if the continuous variable of number of analysis is taken into account, also a significant difference in the average in relation to different turnover appears. However, if the number of analysis is divided by tons of import, obtaining the number of analysis per ton of product imported, the relation between this number and turnover class reversed, although it is not significant (Table 4).

Figure 1 - Suppliers' typologies and upstream relations.

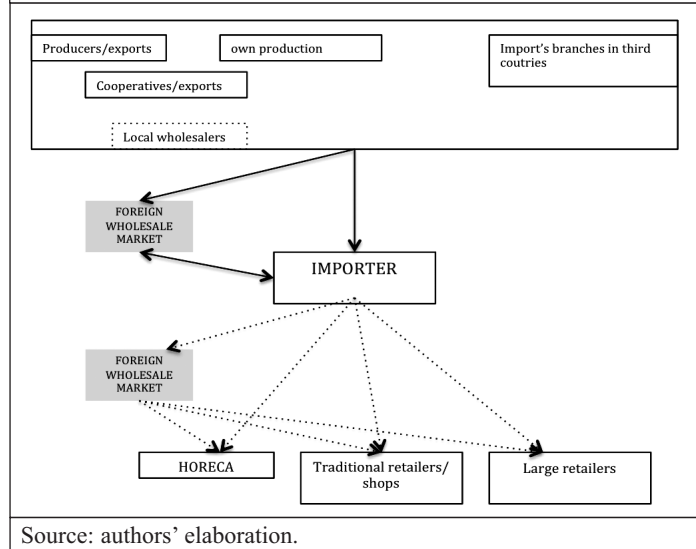


Table 2 - Joint distribution of turnover and effort in analysis.

		Effort				Total	
		Less than 100 per year		100 per year or more		n	%
		n	%	n	%		
Turnover	<50 M	11	73,3	1	12,5	12	52,2
	50-99 M	2	13,3	2	25,0	4	17,4
	100+ M	2	13,3	5	62,5	7	30,4
Totale		15	100,	8	100,0	23	100,0

Table 3 - Pearson χ^2 Test: significant difference in proportion of effort made at different turnover.

Turnover	Effort	
	Chi-squared	8,253
Df	2	
Sign.	,016*	

Table 4 - T-test

	Turnover	N	Mean value	Std. Dev.	T-test
Number of analysis performed in the last year	<50 M	12	22,33	56,24	,019*
	50+ M	11	211,64	252,84	
Number of analysis per tonne imported	<50 M	12	,27692	,49	,118
	50+ M	11	,03447	,05	

Thus, our empirical results suggest that firms' safety efforts are linked to their size: firms with greater turnover perform more controls, although not proportionally to the quantities imported. This means that large firms make of course more controls, but the number of controls per ton imported is lower than the one in smaller firms. Although it is not statistically significant, probably due to the small sample size, our result seems to confirm the evidence obtained by Rouviere *et al.* (2010), showing that French importers adopt differentiated behaviour in terms of food safety efforts: number of analyses on safety standards per million Euro or turnover is lower if the firm is larger. Unlike Rouviere, we decided to use the number of analyses per ton imported, considering it more appropriate to evaluate the effort of firms.

It is worthwhile to remember that if the margin of error and degree of confidence of an estimation is fixed, an increase in the size of population corresponds to a less than proportional increase of the sample size. Thus, for a company importing high quantity of fruit and vegetables, there is no need to increment proportionally the number of analysis to obtain the same precision in estimation of a company importing less.

In terms of downstream operators, the type of the main customer is not significant (Pearson χ^2 Test sign.= 0,147). The propensity for firms to work with supermarkets, hypermarkets and big catering companies do not affect their safety efforts made. Some studies show that big retailers do not explicitly ask for safety and suppliers certify their products regardless (García and Poole, 2004). In all probability if suppliers fail to achieve an agreement with some retailers, they can switch their delivery to other customers (as national wholesalers, in-

ternational wholesalers or Horeca). According to von Schlippenbach and Teichmann (2012) and Russo *et al.* (2014), we can see these aspects in the opposite way; namely, suppliers have in any case high quality standards because if they don't achieve an agreement with the selected downstream firm, they can only sell the products to the other downstream firm.

Besides these results, we have observed from the sample that firms adopt different behaviour in voluntary programmes on food safety based on their specific characteristics and supply chains in which they are.

Distinctions based on type of first supplier and type of first customer are considered below.

Among those who primarily import from producers, there are medium to large companies in terms of turnover; they mainly sell to the GMS; they have a high share of contractual relationships with customers and suppliers (> 50%); 86% indicates that customers require certification.

Among those who primarily import from exporters, we find strong companies in terms of effort (42% make more than 100 inspections per year); they are certified companies and require certification to suppliers (92% in both cases); they sell to national wholesalers; a half has no contractual relationships with customers.

Among those who primarily import from wholesalers, we find small companies; with low effort; not certified; with low share of contractual relationships with suppliers; and who do not require certifications to suppliers and customers do not require it too; they sell to traditional retail and national wholesalers.

A clear distinction appears between companies which sell primarily to national wholesalers and to GMS: in the first group there are small companies with low effort made on controls; they are not certified and do not require certifica-

Table 5 - Type of first supplier.

		Producers	Exporters	Wholesalers	Total
		%	%	%	%
Turnover	<50 M	14,3	66,7	100,0	52,2
	50-99 M	42,9	8,3	-	17,4
	100+ M	42,9	25,0	-	30,4
Number of item imported	1-2	42,9	50,0	33,3	43,5
	3 or more	57,1	50,0	66,7	56,5
Effort	Less than 100 per year	71,4	58,3	100,0	65,2
	More than 100 per year	28,6	41,7	-	34,8
Certified company	No	28,6	8,3	66,7	21,7
	Yes	71,4	91,7	33,3	78,3
Requested certification to suppliers	No	28,6	8,3	66,7	21,7
	Yes	71,4	91,7	33,3	78,3
% contract suppliers	0%	28,6	58,3	66,7	52,2
	1-50%	28,6	8,3	33,3	17,4
	51-100%	42,9	33,3	-	30,4
Type of first customer	National wh.	14,3	33,3	33,3	26,1
	International wh.	14,3	8,3	-	8,7
	GMS	71,4	58,3	33,3	60,9
	Specialized networks	-	-	33,3	4,3
Customers require certification	No	14,3	25,0	66,7	26,1
	Yes	85,7	75,0	33,3	73,9
% contract customers	0%	14,3	50,0	33,3	34,8
	1-50%	14,3	8,3	66,7	17,4
	51-100%	71,4	41,7	-	47,8

tion to suppliers / also customers do not ask for it; they have few contractual relationships with both suppliers and customers; they mainly import from exporters and foreign wholesalers.

Among those who primarily sell to GMS, there are large companies with high effort made on controls; they are certified; they have more than half of the total contractual relationships of suppliers and customers; they mainly import from cooperatives and producers.

		National wh.	Internat. wh.	GMS	Total
		%	%	%	%
Turnover	<50 M	83,3	50,0	35,7	52,2
	50-99 M	16,7	50,0	14,3	17,4
	100+ M	-	-	50,0	30,4
Number of item imported	1-2	50,0	50,0	42,9	43,5
	3 or more	50,0	50,0	57,1	56,5
Effort	Less than 100 per year	100,0	50,0	50,0	65,2
	More than 100 per year	-	50,0	50,0	34,8
Certified company	No	33,3	-	14,3	21,7
	Yes	66,7	100,0	85,7	78,3
Type of first supplier	OP/Cooperatives	-	-	7,1	4,3
	Producers	16,7	50,0	35,7	30,4
	Exporters	66,7	50,0	50,0	52,2
	Wholesalers	16,7	-	7,1	13,0
Requested certification to suppliers	No	33,3	-	14,3	21,7
	Yes	66,7	100,0	85,7	78,3
% contract suppliers	0%	66,7	-	57,1	52,2
	1-50%	16,7	-	14,3	17,4
	51-100%	16,7	100,0	28,6	30,4
Customers require certification	No	66,7	-	7,1	26,1
	Yes	33,3	100,0	92,9	73,9
% contract customers	0%	83,3	-	21,4	34,8
	1-50%	-	50,0	14,3	17,4

Associations between turnover, safety management, type of supplier and client along the supply chain were explored using a multiple correspondence analysis (MCA). The MCA has enabled to analyse 7 variables and 20 associated modality¹.

In particular, we found that two variables are able to reproduce 75% of the total inertia of the initial system.

The output of the correspondence analysis is shown in figure 3, in which three principal groups of companies could be distinguished according to the proximity of the points on the two-dimensional map. We have named these groups as: importers in certified chain (blue circle – Group 1); importers in “differentiating certified chain” (red circle-Group 2); importers in not certified chains (yellow circle-Group 3).

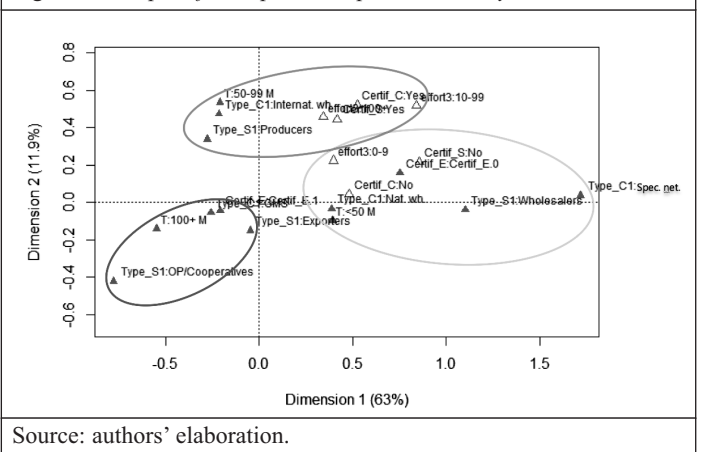
¹ Selected variables and mode are: Turnover (1-49 million EUR; 50-99 million EUR; 100 or more million EUR); type of first customer (GMS, International wholesalers, National wholesalers, Specialized networks); type of first supplier (Producers, exporters, Wholesalers, Cooperatives); Certification of company (yes or no); companies are certified to customer demand (yes or no); Certification of suppliers (yes or no); effort on safety of companies (0-9 analyses per year, 10-99 analyses per year, 100 or more analyses per year). The first three variables were taken as active variables in the analysis, while the other as supplementary variables.

The first type of firms (in certified supply chain), with medium turnover (from 50 to 99 million €), has a well-organized fresh produce supply chain that gives the possibility to meet the offered challenges in European markets and take advantage of the associated opportunities. In particular, these companies are specialized in few imported products, they ask at their supplier specific certifications on the bought products and they offer products at their customers with a high level of certification. In addition, members of this group make high efforts relating to safety controls. In this profile there are mainly importers supplying to large retailers that require the results of pesticides. Integrating backwards with retailer has been probably motivated by a large number of factors; the main ones for retailer being to gain more control over supplies.

Looking at the red circle, we cannot find any modality of variables regarding certification required by customers or required certification to suppliers. Therefore, companies in this group do not show any explicit behavior referred to the chain. In this group there are companies with high turnover (100 million Euros or more), which mainly import from exporters and resell mostly to GMS; they are certified, but there is no clear indication to certified chain. Thus, this group (called “differentiating certified chain”) may contain companies that can afford to change their type of supply chain based on the situation at the time; in addition, these companies do not have a well-defined behavior with regard to effort.

No certified chain. In this group we have companies with smaller turnover that mostly work with wholesalers. These companies are not only certified and do not provide a significant health effort, but also do not work in a certified chain.

Figure 3 - Output of multiple correspondence analysis.



Source: authors' elaboration.

Conclusion

Over the past two decades, developing countries have achieved comparatively significant growth in their exports of fruit and vegetable products. In particular, fresh fruit and vegetables production for export has grown rapidly in a number of North African countries over the past decade. Gereffi (2003) has highlighted the increasing role played by in-

ternational buyers, retailers and companies in the trade of products. In the new international economics literature, there is a burgeoning literature that explores the great role played by intermediaries in the trade process.

With our work we are placed in this field of research with a direct survey carried out on Italian importers. We observed fruit and vegetable international buyers and we could say that the Italian system is characterized from three profiles of importers. We see certified-chain where the level of certification is higher and these enterprises do, in absolute terms, significant efforts in safety controls, but proportionally less according to volume of imports. In this group we have companies with higher turnover.

Differentiating certified chain is characterized from a not formalized chain (unwritten relationship contracts) with first suppliers. They don't have own production in North Mediterranean countries. These companies are certified, differentiated typology of clients and must not provide significant health efforts.

In the last category the companies have smaller turnover and they are not certified and don't provide a significant health effort. They mainly work for national and international wholesalers.

In conclusion, this study focused on differentiated behaviours in terms of food safety efforts within this voluntary programme. We have showed that the firm size influence strategic behaviour of Italian fruit and vegetables importers face to food safety regulation, according to brand reputation and product specialization.

The type of supply chain affects the importers strategies encouraging them to implement stricter standards, as private standards, with respect to public law in order to meet customer needs and provide a sufficient degree of differentiation. These strategies, however, are not always aimed at obtaining a price premium, but are taken above all to ensure the maintenance of the reputation of the companies towards the most demanding customers and stabilize its market share.

Strategic business decisions are based on arbitrage between costs and at the private level benefits associated with implementing additional standards and efforts, while publicly derive from complex trade-off between security imperatives of the consumer, market rules and economic criteria. In the public-private strategic game, in which public authorities and private operators interact in determining the level of quality and safety of products offered to consumers, there is room for different strategies.

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