

FRUIT AND VEGETABLE TRADE COMPETITIVENESS OF EUROPEAN UNION COUNTRIES

Štefan Bojnec ^{a,*}, Imre Fertő ^{b,c}

^a University of Primorska, Faculty of Management, Cankarjeva 5, SI-6104 Koper, Slovenia

^b Corvinus University of Budapest, Department of Agricultural Economics and Rural Development, Fővám tér 8, H-1093 Budapest, Hungary

^c Institute of Economics, Hungarian Academy of Sciences, Budaörsi u. 45, H-1112 Budapest, Hungary

Abstract

This paper investigates competition categories in the structure of fruit and vegetable trade in the European Union (EU) countries in the 2000 to 2011 period. Data were obtained on the World Bank's data portal and analyzed using applied trade methodology and duration analysis. The proportion of the competition category with a trade surplus at higher export-to-import unit value was greater among EU countries than the proportion of the competition category with a trade surplus at lower export-to-import unit value. These two competition categories with trade surplus accounted for a larger share than the competition categories with trade deficit at higher export-to-import unit value and with trade deficit at lower export-to-import unit value. For most of the fruit and vegetable products, especially processed ones in the EU countries, greater export than import unit values were ascertained. The smaller proportion was one-way trade with only export or only import.

Keywords: fruit and vegetable, export-to-import unit value, trade competition categories, one-way trade, survival analysis, European Union

* Corresponding author. Tel.: +386 5 610 2046; fax: +386 5 610 2015.

E-mail addresses: stefan.bojnec@fm-kp.si, stefan.bojnec@siol.net (Š. Bojnec), imre.ferto@uni-corvinus.hu; fertő.imre@krtk.mta.hu (I. Fertő).

1. INTRODUCTION

The international trade in fruit and vegetable products has increased rapidly (FAO, 2013), which has motivated our research. This increasing pattern in development of international trade in fruit and vegetable products is a relevant subject for research and practice. First, there is a lack of research on global trade in fruit and vegetable products and its comparative analysis. Second, there is an increasing importance of fruit and vegetable products in international agri-food trade for covering rising demands in consumption. This is a challenging issue for the horticultural sector and its structural changes towards changing trends in nutrition demand in global markets. Changes in global fruit and vegetable markets are developing in direction of fewer and larger horticultural growers and an increasing role of a concentration of the retail pathways on supply side (DEHNEN-SCHMUTZ et al., 2010). The changing complexity of fruit and vegetable market structures might have impacts on fruit and vegetables trade competitiveness and their long-term sustainable development (SANSVINI, 1997).

This paper aims to analyze trade competitiveness for fruit and vegetable products in the European Union's (EU-27) member states on global markets. The EU-27 member states have, with some annual variations, experienced deterioration in the export shares for fruit and vegetable products on the global markets. According to UNDS (2013) data, the EU-27 member states export share in 2011 was 39.6% can this also be expressed in money?. The decline in the EU-27 member states export share has been for major exporting countries of fruit and vegetable products such as for Spain, Italy, France, Belgium, Greece, and a slight decline has been for the Netherlands. A slight increase in the export share for fruit and vegetable products on the global markets has been achieved from relatively smaller EU exporters of fruit and vegetable products such as Austria and Portugal and from some new EU member states such as Poland, Lithuania, Bulgaria and the Czech Republic. The EU-27 member states are importing more than exporting fresh and processed fruit, particularly tropical fruit products. Sentence not clear Trade in fresh and processed vegetables has been rather balanced with trade surplus or positive trade balance (export minus imports) of vegetables from Mediterranean countries as well as the Netherlands and Belgium.

The paper presents original empirical results and their cross-country comparisons of price and quality competitiveness for fruit and vegetable products in the EU-27 member states on global markets. The results can contribute to better understanding of fruit and vegetable trade performance and its duration over the analysed period.

2. MATERIALS AND METHODS

2.1. Trade competition categories and one-way trade

Export-to-import unit values are used as proxies for export/import prices to study which fruit and vegetable product markets are dominated by price or non-price factors. Export unit value for a given fruit and vegetable product is calculated as a ratio between its value of exports in US dollars and its quantity of exports, while import unit value for a give fruit and vegetable product is calculated as a ratio between its value of imports in US dollars and its quantity of imports. Quantities of export/import are expressed in a physical unit, e.g. in kilos for a given fruit and vegetable product.

Trade balances for net directions of trade in matched two-way trade are used to disentangle between successful bilateral trade with trade surplus when total or export to import unit export value is greater than import value and unsuccessful bilateral trade with trade deficit when export value is smaller than import value for a given fruit and vegetable product. Matched two-way trade for a given fruit and vegetable product means that this product is simultaneously exported and imported. Otherwise, in a case of unmatched or one-way trade, a given fruit and vegetable product is either only exported or only imported.

We combine a given fruit and vegetable product trade balance for direction of trade (trade surplus or trade deficit) and export-to-import unit values to classify price competition and non-price competition categories in trade data. More specifically, we use unit values of export and unit values of import as proxies for export-to-import price difference for a given fruit and vegetable product with its trade balance for direction of trade to categorize success or unsuccess of trade flows. They were used for assessing product price competition and product quality competition in two-way matched trade in four competition categories (Gehlhar and Pick, 2002)

Category 1 – Successful price competition. Trade surplus is achieved with lower export price than import price. A successful means a positive net trade flow, because total export value is greater than total import value. This trade surplus was achieved at lower export price than import price.

Category 2 – Unsuccessful price competition. Trade deficit is achieved with higher export price than import price. Unsuccessful means for direction of trade flows, rephrase because value of export is smaller than value of import. Unsuccessful price competition means that its? higher export price than its import price reduces price competitiveness, which in turn leads to trade deficit.

Category 3 – Successful quality competition. Trade surplus is achieved with higher export price than import price. Successful means again for direction of trade flows rephrase, because export value is greater than import value. Successful quality competition means that a country is able to achieve trade surplus at higher export price than import price. Therefore, term *quality* does not mean quality in technological terms, but in economic term as higher price is assumed to reflect higher quality.

Category 4 – Unsuccessful quality competition. Trade deficit is achieved with lower export price than import price. Unsuccessful means again for direction of trade flows, because export value is smaller than import value. Unsuccessful quality competition means that a country achieves trade deficit at lower export price than import price. Term *quality* is again used in economic term as lower price is assumed to represent lower quality.

Finally, we classify the one-way trade with only export or only import, when the net direction of trade is either surplus or deficit (BOJNEC and FERTŐ, 2008b, 2012a): only export category or only import category. In this case export-to-import unit values cannot be calculated. It can be calculated only export unit value in the case of the one-way export or only import unit value in the case of the one-way import.

2.2. Duration analysis

Duration analysis of Categories 1 and 3 in the EU-27 member states is estimated by the survival function using the nonparametric Kaplan-Meier product limit estimator (e.g. CLEVES et al., 2004; BOJNEC and FERTŐ, 2008a, 2012b, 2014a, 2014b). The Kaplan-Meier estimator of the hazard function is the fraction of spells that fail after t periods of all spells that have survived t periods. The survivor function is the share of spells that survives at time t , but this time is cumulative of all preceding time intervals. The episodes of uninterrupted Categories 1 and 3 are the primary unit of analysis. The STATA, data analysis and statistical software, was used in the empirical analysis of the Kaplan-Meier survival rates (CLEVES et al., 2004).

3. DATA

The empirical analysis of the price competition and quality competition categories is conducted for the EU-27 member states using detailed trade data at the 6-digit World Customs Organization's Harmonized System (HS-6) level by the years 2000-2011. The United Nations International Trade Statistics UN COMTRADE database (UNSD, 2013) is used for the Multi-Lateral Trade Negotiations (MTN-4) codes, which includes three main categories for fruit and vegetable products: MTN 1201 – fruit and vegetables fresh or

dried products (consisting of 87 HS-6 codes of fruit and vegetable product items), MTN 1202 – fruit and vegetables semi-processed products (consisting of 11 HS-6 codes of fruit and vegetable product items), and MTN 1203 – fruit and vegetables prepared or preserved products (consisting of 49 HS-6 codes of fruit and vegetable items).

The UNSD (2013) COMTRADE database is used with the World Bank's World Integrated Trade Solution (WITS) software, which data are freely downloaded from the World Bank's (2013) website <http://wits.worldbank.org/>. The UNSD (2013) concordance between the HS-6 codes and the MTN-4 systems for fruit and vegetable products are used. Table A1 in Appendix describes the concordance between HS-6 and MTN-4 system codes and their product descriptions in order to know which fruit and vegetable products have been included in the study.

The empirical results are presented at the country's aggregated level for all fruit and vegetable products and separately for each of the three analyzed MTN-4 fruit and vegetable product codes. The focus in the presentation of the empirical results is on the single most important trade competition categories in the structure of fruit and vegetable trade to clearly illustrate successful competition or unsuccessful competition in fruit and vegetable trade in the EU-27 member states on the global markets and by main fruit and vegetable MTN value chain groups. We aim to explain the structures of the most important competition categories in the EU-27 member states.

4. RESULTS AND DISCUSSION

4.1. Trade structures for fruit and vegetable products in the EU-27 member states

Figure 1 illustrates the structure of trade for fruit and vegetable products in the EU-27 member states. The structure of trade comprises price competition and quality competition categories and one-way trade. Fruit and vegetable products are classified according to the HS-6 code description, which is presented in Table A1 in Appendix. According to the relative size (percentages) of price competition and quality competition categories and one-way trade in the structure of fruit and vegetable global trade, the EU-27 member states can be divided into four groups of countries.

First, these are countries that have experienced the greater shares of successful price competition and successful quality competition categories. Fourteen of the EU-27 member states have experienced the highest single share in Category 3, followed by Category 1: Austria, Belgium, Bulgaria, Cyprus, Denmark, Estonia, France, Greece, Italy, Lithuania, Luxembourg, the Netherlands, Spain, and Sweden. Four of the EU-27 member states have experienced the highest single share in Category 1, followed by Category 3: Hungary, Ireland, Poland, and Portugal.

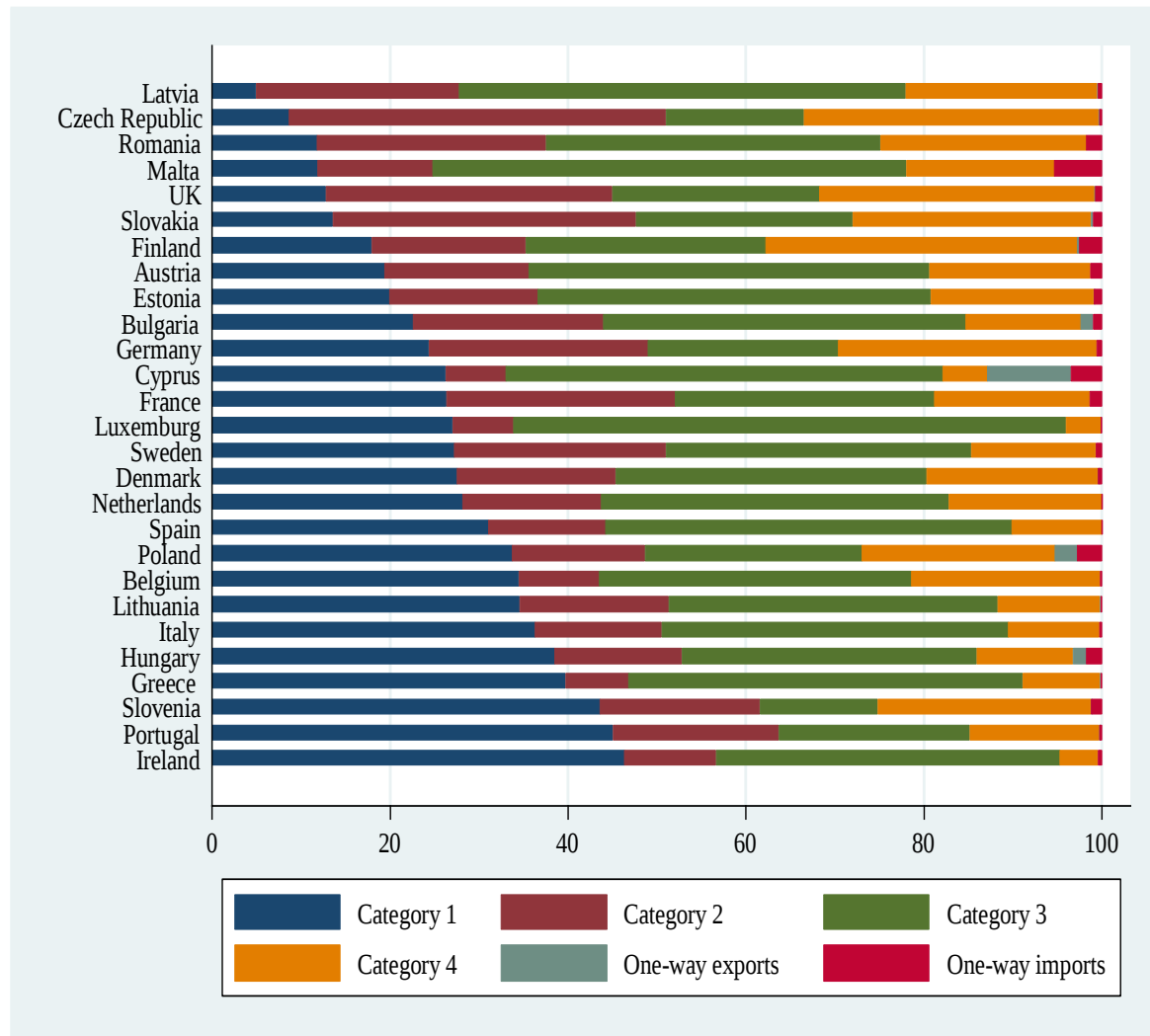
Second, these are countries with successful price competition or successful quality competition category, and then followed by unsuccessful price or unsuccessful quality competition category. Latvia and Romania have experienced the highest single share in Category 3, followed by Category 2, while Slovenia in Category 1, followed by Category 4.

Third, these are countries with unsuccessful price competition or unsuccessful quality competition category, and then followed by successful price competition or successful quality competition category. Finland and Malta have experienced the highest single share in Category 4, followed by Category 3. The Czech Republic, Slovakia, and

the United Kingdom (UK) have experienced the highest single share in Category 2, followed by Category 4.

Finally, this is a country with both unsuccessful price competition and unsuccessful quality competition categories. Germany has experienced the highest single share in Category 4, followed by Category 2.

Figure 1. Price competition and quality competition categories and one-way trade for fruit and vegetable products in the EU-27 member states (structures in %, mean values, 2000-2011)



Note: Category 1 – successful price competition, Category 2 – unsuccessful price competition, Category 3 – successful quality competition, and Category 4 – unsuccessful quality competition.

Source: Authors' calculations based on UNSD (2013) COMTRADE database with World Trade Integration Solution (WITS) software (The World Bank, 2013).

To sum up, the results clearly indicate similarities and differences between the analyzed EU-27 member states. While the first category contains the most successful

group of the EU-27 member states according to the trade competition categories in the two-way matched trade for fruit and vegetable products, the last group with Germany indicates the worst performing EU-27 member state according to the trade competition categories. Should these facts be discussed – reasons- consequences?

Finally, to summarize the results by competition categories, Category 1 has the lowest single share for Latvia and the greatest single share for Ireland, Category 2 for Cyprus (lowest) and the Czech Republic (highest), Category 3 for Slovenia (lowest) and Luxembourg (highest), and Category 4 for Luxembourg (lowest) and Finland (highest). The share of only one-way export flows is relatively the highest for Cyprus, while the share of only one-way import flows is relatively the highest for Malta.

4.2 Trade structures for fruit and vegetable products in the EU-27 member states for the MTN-4 code groups

The results for the *MTN 1201* – fruit and vegetables fresh or dried products are rather mixed (Figure 2). The first group of countries consists of those EU-27 member states with the greatest single shares of successful price competition and successful quality competition categories. Seven of the EU-27 member states have experienced the greatest single share of Category 3, followed by Category 1: Belgium, Cyprus, Greece, Ireland, Lithuania, the Netherlands, and Spain. Four of the EU-27 member states have experienced the greatest single share of Category 1, followed by Category 3: Denmark, France, Hungary, and Italy.

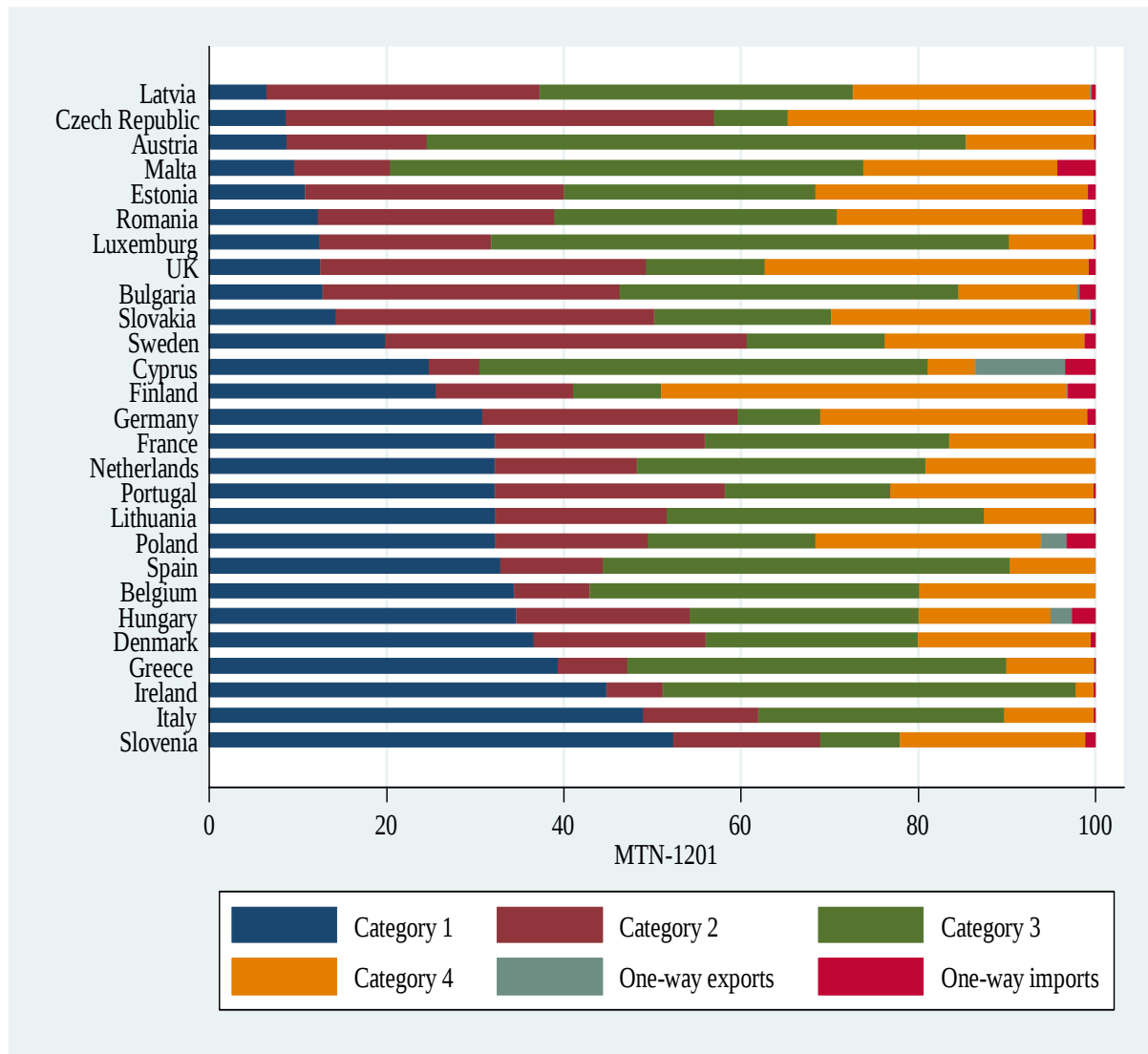
The second group of countries consists of those EU-27 member states with successful price competition or successful quality competition category, followed by unsuccessful price competition or unsuccessful quality competition category. Austria, Bulgaria, Latvia, and Luxembourg have experienced the greatest single share of Category 3, followed by Category 2. Germany, Poland, and Slovenia have experienced the greatest single share of Category 1, followed by Category 4; Portugal the greatest single share of Category 1, followed by Category 2; Malta and Romania the greatest single share of Category 3, followed by Category 4.

The third group of countries consist of Finland, which has experienced the greatest single share of Category 4, followed by Category 1.

Finally, the group of the EU-27 member states with unsuccessful price competition and unsuccessful quality competition categories. The highest single shares of unsuccessful competition categories are for the Czech Republic, Slovakia, Sweden, and the UK, which have experienced the highest single share of Category 2, followed by Category 4; and Estonia with the highest single share of Category 4, followed by Category 2.

According to the four competition categories, Category 1 has the lowest single share for Latvia and the highest single share for Slovenia; Category 2 for Cyprus (lowest) and the Czech Republic (highest); Category 3 for the Czech Republic and Austria; and Category 4 for Ireland and Finland. The one-way export share is relatively the highest for Cyprus and the one-way import share is relatively the highest for Malta.

Figure 2. Price competition and quality competition categories and one-way trade for MTN 1201 – fruit and vegetables fresh or dried products of the EU-27 member states (structures in %, mean values, 2000-2011)



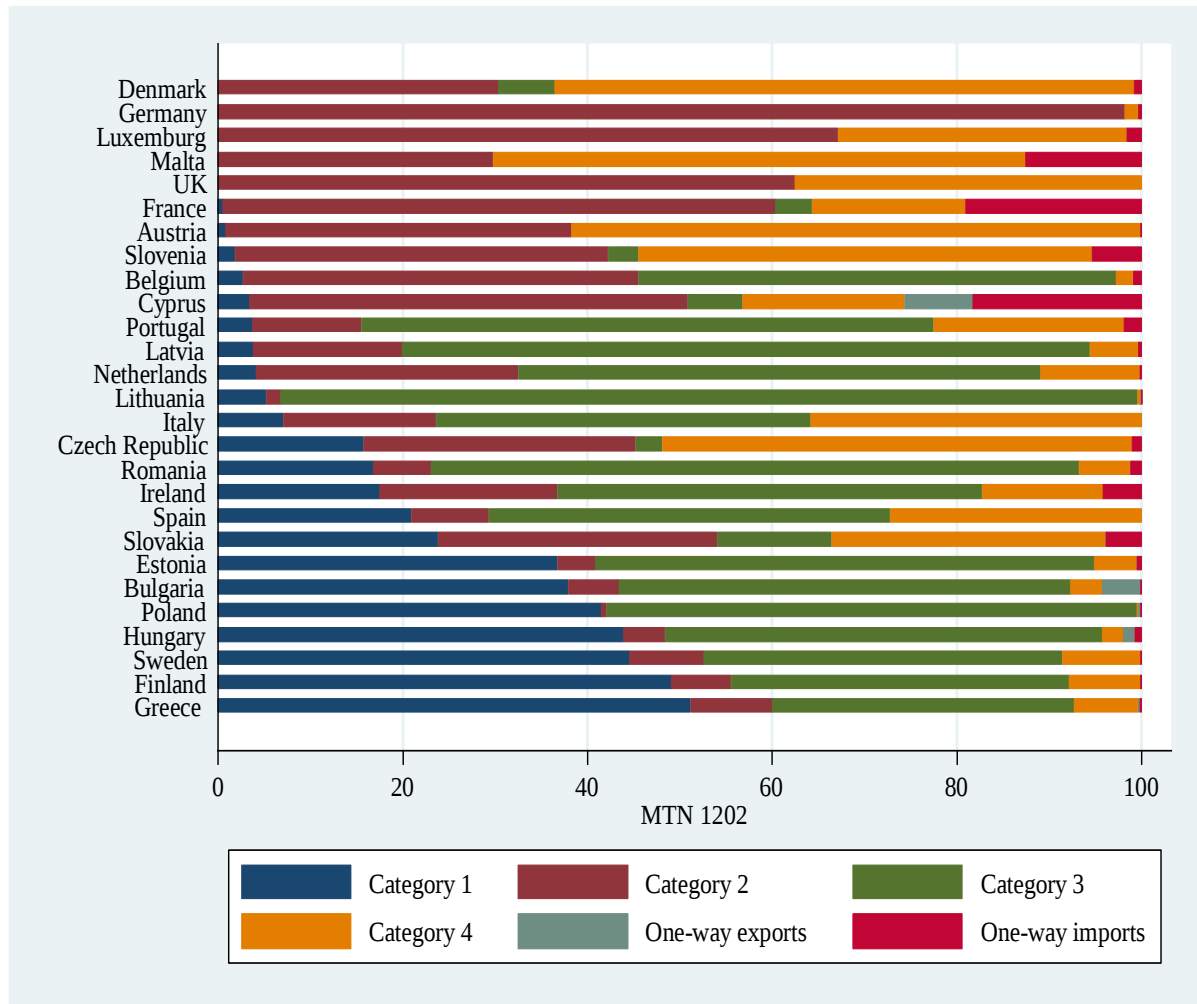
Note: See Figure 1.

Source: Authors' calculations based on UNSD (2013) COMTRADE database with WITS (World Trade Integration Solution) software (The World Bank, 2013).

The results for the *MTN 1202* – fruit and vegetables semi-processed products are also mixed among the EU-27 member states (Figure 3). The first group of countries consists of those EU member states with the greatest single shares of successful price competition and successful quality competition categories. Six of the EU-27 member states have experienced the highest single share of Category 3, followed by Category 1: Belgium, Estonia, Hungary, Lithuania, Poland, and Romania. Three of the EU-27 member states have experienced the highest single share of Category 1, followed by Category 3: Finland, Greece, and Sweden.

The second group of countries consists of those EU member states with the greatest single share of successful price competition or successful quality competition category, followed by unsuccessful price competition or unsuccessful quality competition category. Belgium, Ireland, Latvia, and the Netherlands have experienced the highest single share of Category 3, followed by Category 2, while Italy, Portugal, and Spain the highest single share of Category 3, followed by Category 4.

Figure 3. Price competition and quality competition categories and one-way trade for MTN 1202 – fruit and vegetables semi-processed products of the EU-27 member states (structures in %, mean values, 2000-2011)



Note: See Figure 1.

Source: Authors' calculations based on UNSD (2013) COMTRADE database with WITS (World Trade Integration Solution) software (The World Bank, 2013).

Third, not any EU-27 member state is with the greatest single share of unsuccessful price competition or unsuccessful quality competition category, followed by successful price competition or successful quality competition category. Finally, the fourth group of countries consists of those EU member states with unsuccessful price and unsuccessful quality competition categories. Within this group of countries, the first group consists of

those EU member states with the highest single share of unsuccessful price competition (Category 2), followed by unsuccessful quality competition (Category 4): Cyprus, France, Germany, Luxembourg, Slovakia, and UK; and the second group consists of those EU member states with the highest single share of Category 4, followed by Category 2: Austria, the Czech Republic, Denmark, Malta, and Slovenia.

Considering the four competition categories, Category 1 has the lowest single share for Denmark, Germany, Luxembourg, Malta, and the UK, and the highest single share for Greece; Category 2 for Poland (lowest) and Germany (highest); Category 3 for Germany, Luxembourg, Malta, and the UK (lowest), and Lithuania (highest); and Category 4 for Poland (lowest) and Denmark (highest). The one-way export share is relatively the highest for Cyprus and the one-way import share is relatively the highest for France.

Most of the EU-27 member states are successful in price competition and quality competition for the *MTN 1203* – fruit and vegetables prepared or preserved products (Figure 4). The first group of countries consists of those EU member states with successful price competition and successful quality competition categories. Category 3 followed by Category 1 are the most important single categories in the trade structure for the following EU-27 member states: Austria, Bulgaria, Denmark, Estonia, Greece, Italy, the Netherlands, and Spain. Seven of the EU-27 member states have experienced the highest single share of Category 1, followed by Category 3: Belgium, Hungary, Lithuania, Luxembourg, Poland, Portugal, and Sweden.

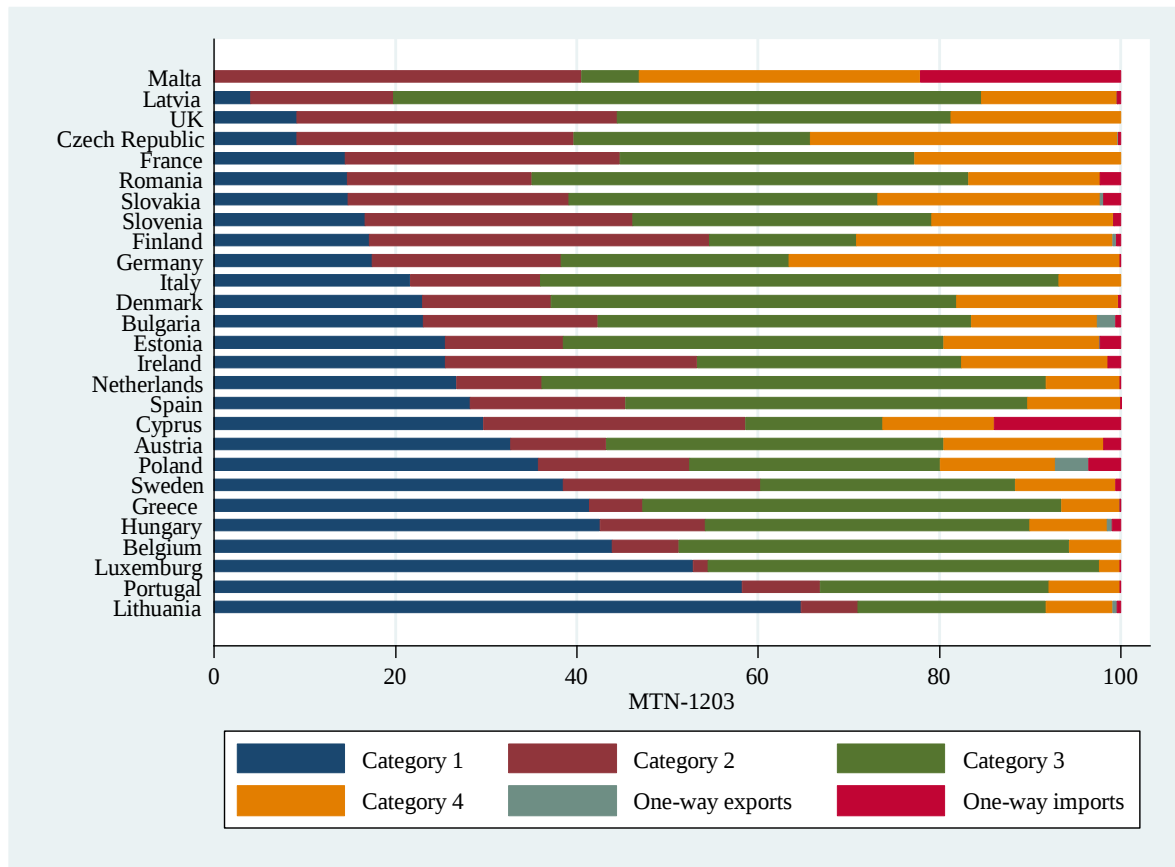
The second group of countries consists of those EU member states with successful price competition or successful quality competition category, followed by unsuccessful price competition or unsuccessful quality competition category. France, Ireland, Latvia, Romania, Slovenia, and the UK have experienced the highest single share of Category 3, followed by Category 2; Slovakia the highest single share of Category 3, followed by Category 4; and Cyprus the highest single share of Category 1, followed by Category 2.

The third group of countries consists of those EU member states with unsuccessful price competition or unsuccessful quality competition category, followed by successful price competition or successful quality competition category. The Czech Republic and Germany have experienced the highest single share of Category 4, followed by Category 3; while Finland and Malta the highest single share of Category 2, followed by Category 4.

Finally, there is no any EU member state with unsuccessful price competition and unsuccessful quality competition categories among two the most important single competition categories for *MTN 1203*.

Considering the four competition categories, Category 1 has the lowest single share for Malta and the highest single share for Lithuania, Category 2 for Luxembourg (lowest) and Malta (highest), Category 3 for Malta (lowest) and Latvia (highest), and Category 4 for Luxembourg (lowest) and Germany (highest). The share of the one-way export is relatively the highest for Poland and the share of the one-way import is relatively the highest for Malta.

Figure 4. Price competition and quality competition categories and one-way trade for MTN 1203 – fruit and vegetables prepared or preserved products of the EU-27 member states (structures in %, mean values, 2000-2011)



Note: See Figure 1.

Source: Authors' calculations based on UNSD (2013) COMTRADE database with WITS (World Trade Integration Solution) software (The World Bank, 2013).

Differences through fruit and vegetable value chains for MTN 1201, MTN 1202 and MTN 1203 between the EU-27 member states have important practical consequences for the analyzed countries. The analyzed countries rely on different factors of trade competitiveness, which can be developed in countries with most successful competition trade categories such as for the Netherlands and Spain or cannot be developed in countries with less successful competition trade categories such as for Malta throughout each stage of fruit and vegetable value chain. This heterogeneity in food supply chain competitiveness suggests that in addition to competitive primary fruit and vegetable production, competitive value chain consists of developed food processing and marketing focusing on quality and/or price, which are demanded and/or willing to pay by consumers.

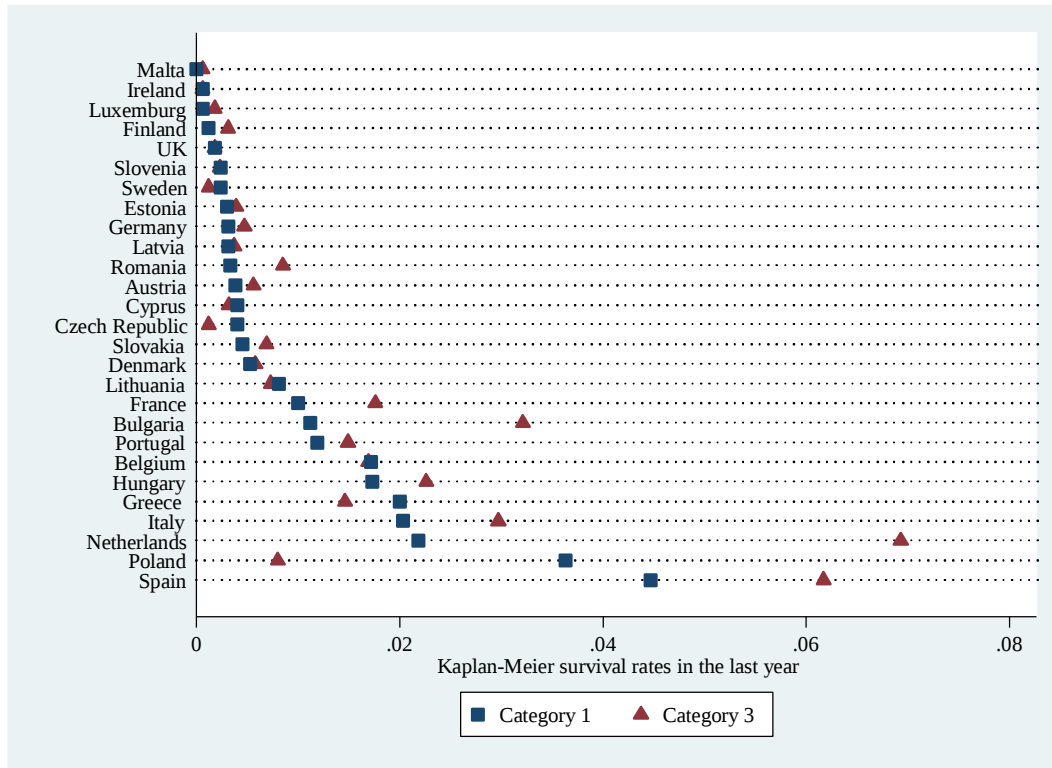
4.3 Duration Analysis of Categories 1 and 3

The successful price competition (Category 1), successful quality competition (Category 3), and one-way exports are important for growth of the fruit and vegetable

sectors. Because the share of one-way exports is negligible for each of the EU-27 member states, thus we focus only on the successful competition Categories 1 and 3. Figure 5 presents the Kaplan-Meier survival rates in the year 12 (2011) for fruit and vegetable products for Categories 1 and 3. The results are illustrated in two ways as a bar graph and as a dot plot. Why both? Which difference can be seen? Otherwise reduce to one. Units on x-axis? The Kaplan-Meier survival rate in the year 12 (2011) for fruit and vegetable products for Category 1 is the highest for Spain and for Category 3 for the Netherlands. This result shows that Spain (followed by Poland, the Netherlands and Italy) in successful price competition and the Netherlands (followed by Spain, Bulgaria, Italy and Hungary) in successful quality competition have experienced the highest survival rates in these categories among the EU-27 member states over the all analyzed years in the 2000-2011 period. This implies that they have experienced relatively strong long-term competitiveness in the global fruit and vegetable markets.

On the other hand, the Kaplan-Meier survival rates in the year 12 (2011) for fruit and vegetable products long-term competitiveness are relatively low for Malta and Ireland as well as for Luxembourg, Finland, the UK, Slovenia and Sweden. This means that these EU member states have experienced relatively weaker long-term competitiveness in the global fruit and vegetable markets.

Figure 5: Kaplan-Meier survival rates for fruit and vegetable products of successful competition Categories 1 and 3 (year 12, 2011)



Source: Authors' calculations based on UNSD (2013) COMTRADE database with WITS (World Trade Integration Solution) software (The World Bank, 2013). Legend of x- axis is missing?

5. CONCLUSIONS

This paper contributes in the field of horticultural international trade. The paper applies advanced applied methodology to explore available data to investigate fruit and vegetable trade competition categories. The study can encourage additional investigation and comparisons of results for other countries and different time periods. The comparisons of the results show heterogeneity in the structure of competition categories and in the survival rates for the successful competition categories among the EU-27 member states. The empirical results have clearly confirmed the increasingly importance of Category 3 that trade surplus was achieved at higher export price than import price. This finding is also consistent with specialization to produce and export higher value-added, relatively more expensive products, which are demanded by consumers on global markets with growth of real incomes. Increases in real incomes of consumers and changes of consumers' habits towards higher quality food in nutrition can cause further diversification of consumption and in structures of trade on global markets towards more valuable and diversified fruit and vegetable products.

As a striking finding is, that heterogeneities in competition categories between the EU-27 member states were greater with higher degree of semi-processing or prepared and preserved fruit and vegetable products for final household consumption. While some differences can be explained by climatic conditions and other natural conditions for primary fruit and vegetable production, these results clearly suggest the importance of fruit and vegetable processing activities, advanced technology adoption and widespread innovation activities in the fruit and vegetable value chains. Advanced international marketing can also require development of storage facilities and innovations in marketing activities and in value chain management to achieve or maintain competitiveness on global markets.

The investigation of determinants of trade competition categories are issues for future research, including similarities and differences between the EU member states and with some other main competitors on global horticultural markets. Among challenging issues are also to study effects of external demands on global markets for fruit and vegetable products value chains. Fruit and vegetable markets have remained sensitive on different shocks and price volatilities in growing external demands on global markets.

Acknowledgements

This publication was generated as part of the COMPETE Project, Grant Agreement No. 312029 (<http://www.compete-project.eu/>), with financial support from the European Community under the 7th Framework Programme. The authors gratefully acknowledge the useful suggestions and comments made by the anonymous journal reviewer and by the journal editor Dr. Monika Riedle-Bauer.

References

- BOJNEC, Š. and FERTŐ, I. 2008a: European enlargement and agro-food trade. *Canadian Journal of Agricultural Economics* 56 (4): 563-579.
- BOJNEC, Š. and FERTŐ, I. 2008b: Price competition vs. quality competition: the role of one-way trade. *Acta Oeconomica* 58 (1): 61-89.
- BOJNEC, Š. and FERTŐ, I. 2012a: Complementarities of trade advantage and trade competitiveness measures. *Applied Economics* 44 (4): 399-408.
- BOJNEC, Š. and FERTŐ, I. 2012b: Does EU enlargement increase agro-food export duration? *The World Economy* 35 (5): 609-631.
- BOJNEC, Š. and FERTŐ, I. 2014a: Export competitiveness of dairy products on global markets: The case of the European Union countries. *Journal of Dairy Science* 97 (10): 6151-6163.
- BOJNEC, Š. and FERTŐ, I. 2014b: Meat export competitiveness of European Union countries on global markets. *Agricultural and Food Science* 23 (3): 194-206.
- CLEVES, M.A., GOULD, W.W. and GUTIERREZ, R.G. 2004: *An Introduction to Survival Analysis Using STATA*. Texas: Stata Press, College Station.
- DEHNEN-SCHMUTZ, K., HOLDENRIEDER, O., JEGER, M.J. AND PAUTASSO, M. 2010: Structural change in the international horticultural industry: some implications for plant health. *Scientia Horticulturae* 125 (1): 1-15.
- FAO 2013: *FAOSTAT Trade database*. Rome: Food and Agriculture Organization of the United Nations. (2013) Available at the website: <http://faostat.fao.org/site/342/default.aspx>.

- GEHLHAR, M.J. and PICK, D.H. 2002: Food trade balances and unit values: what can they reveal about price competition? *Agribusiness* 18 (1): 61-79.
- SANSAVINI, S. 1997: Integrated fruit production in Europe: research and strategies for a sustainable industry. *Scientia Horticulturae* 68 (1-4): 25-36.
- UNSD 2013: Commodity Trade Database (COMTRADE). New York: United Nations Statistical Division.
- The World Bank 2013: Commodity Trade Database (COMTRADE). Available through World Bank's World Integrated Trade Solution (WITS) software at: <http://www.wits.worldbank.org>.

Table A1: Concordance between the MTN-4 code description and the HS-6 code description for fruit and vegetable products

MTN-4 code description	HS-6 code description
1201 - Fruit & vegetables fresh or dried	070110 - Seed
	070190 - Other
	070200 - Tomatoes, fresh or chilled
	070310 - Onions and shallots
	070320 - Garlic
	070390 - Leeks and other alliaceous vegetables
	070410 - Cauliflowers and headed broccoli
	070420 - Brussels sprouts
	070490 - Other
	070511 - Lettuce :-- Cabbage lettuce (head lettuce)
	070519 - Lettuce :-- Other
	070521 - Chicory :-- Witloof chicory (<i>Cichorium intybus</i> var. <i>foliosum</i>)
	070529 - Chicory :-- Other
	070610 - Carrots and turnips
	070690 - Other
	070700 - Cucumbers and gherkins, fresh or chilled
	070810 - Peas (<i>Pisum sativum</i>)
	070820 - Beans (<i>Vigna</i> spp., <i>Phaseolus</i> spp.)
	070890 - Other leguminous vegetables
	070910 - Globe artichokes
	070920 - Asparagus
	070930 - Aubergines (egg-plants)
	070940 - Celery other than celeriac
	070951 - Mushrooms and truffles :-- Mushrooms
	070952 - Mushrooms and truffles :-- Truffles
	070960 - Fruits of the genus <i>Capsicum</i> or of the genus <i>Pimenta</i>
	070970 - Spinach, New Zealand spinach and orache spinach (garden spinach)
	070990 - Other
	071310 - Peas (<i>Pisum sativum</i>)
	071320 - Chickpeas (<i>garbanzos</i>)
	071331 - Beans (<i>Vigna</i> spp., <i>Phaseolus</i> spp.) :-- Beans of the species <i>Vigna mungo</i> (L.) Hepper or <i>Vigna radiata</i> (L.) Wilczek
	071332 - Beans (<i>Vigna</i> spp., <i>Phaseolus</i> spp.) :-- Small red (Adzuki) beans (<i>Phaseolus</i> or <i>Vigna angularis</i>)
	071333 - Beans (<i>Vigna</i> spp., <i>Phaseolus</i> spp.) :-- Kidney beans, including white pea beans (<i>Phaseolus vulgaris</i>)
	071339 - Other
	071340 - Lentils
	071350 - Broad beans (<i>Vicia faba</i> var. <i>major</i>) and horse beans (<i>Vicia faba</i> var. <i>equina</i> , <i>Vicia faba</i> var. <i>minor</i>)
	071390 - Other
	071410 - Manioc (cassava)
	071420 - Sweet potatoes
	071490 - Other
	080111 - Coconuts :-- Desiccated
	080119 - Coconuts :-- Other
	080121 - Brazil nuts :-- In shell
	080122 - Brazil nuts :-- Shelled
	080131 - Cashew nuts :-- In shell
	080132 - Cashew nuts :-- Shelled
	080211 - Almonds :-- In shell
	080212 - Almonds :-- Shelled
	080221 - Hazelnuts or filberts (<i>Corylus</i> spp.) :-- In shell
	080222 - Hazelnuts or filberts (<i>Corylus</i> spp.) :-- Shelled
	080231 - Walnuts :-- In shell
	080232 - Walnuts :-- Shelled
	080240 - Chestnuts (<i>Castanea</i> spp.)
	080250 - Pistachios
	080290 - Other
	080300 - Bananas, including plantains, fresh or dried
	080410 - Dates
	080420 - Figs
	080430 - Pineapples
	080440 - Avocados
	080450 - Guavas, mangoes and mangosteens

	080510 - Oranges
	080530 - Lemons (Citrus limon, Citrus limonum) and limes (Citrus aurantifolia)
	080540 - Grapefruit
	080590 - Other
	080610 - Fresh
	080620 - Dried
	080711 - Melons (including watermelons) :-- Watermelons
	080719 - Melons (including watermelons) :-- Other
	080720 - Papaws (papayas)
	080810 - Apples
	080820 - Pears and quinces
	080910 - Apricots
	080920 - Cherries
	080930 - Peaches, including nectarines
	080940 - Plums and sloes
	081010 - Strawberries
	081020 - Raspberries, blackberries, mulberries and loganberries
	081030 - Black, white or red currants and gooseberries
	081040 - Cranberries, bilberries and other fruits of the genus Vaccinium
	081050 - Kiwifruit
	081090 - Other
	081310 - Apricots
	081320 - Prunes
	081330 - Apples
	081340 - Other fruit
	081350 - Mixtures of nuts or dried fruits of this Chapter
1202 - Fruit & vegetables semiprocessed	071110 - Onions
	071120 - Olives
	071130 - Capers
	071140 - Cucumbers and gherkins
	081110 - Strawberries
	081120 - Raspberries, blackberries, mulberries, loganberries, black, white or red currants and gooseberries
	081190 - Other
	081210 - Cherries
	081220 - Strawberries
	081290 - Other
	081400 - Peel of citrus fruit or melons (including watermelons), fresh, frozen, dried or provisionally preserved in brine, in sulphur water or in other preservative solutions
1203 - Fruit & vegetables prepared or preserved	071010 - Potatoes
	071021 - Leguminous vegetables, shelled or unshelled :-- Peas (Pisum sativum)
	071022 - Leguminous vegetables, shelled or unshelled :-- Beans (Vigna spp., Phaseolus spp.)
	071029 - Leguminous vegetables, shelled or unshelled :-- Other
	071030 - Spinach, New Zealand spinach and orache spinach (garden spinach)
	071040 - Sweet corn
	071080 - Other vegetables
	071090 - Mixtures of vegetables
	071220 - Onions
	071230 - Mushrooms and truffles
	110510 - Flour, meal and powder
	110520 - Flakes, granules and pellets
	110610 - Of the dried leguminous vegetables of heading No. 07.13
	110620 - Of sago or of roots or tubers of heading No. 07.14
	110630 - Of the products of Chapter 8
	200110 - Cucumbers and gherkins
	200120 - Onions
	200190 - Other
	200210 - Tomatoes, whole or in pieces
	200290 - Other
	200310 - Mushrooms
	200320 - Truffles
	200410 - Potatoes
	200490 - Other vegetables and mixtures of vegetables
	200510 - Homogenised vegetables
	200520 - Potatoes
	200540 - Peas (Pisum sativum)
	200551 - Beans (Vigna spp., Phaseolus spp.) :-- Beans, shelled

	200559 - Beans (Vigna spp., Phaseolus spp.) :-- Other
	200560 - Asparagus
	200570 - Olives
	200580 - Sweet corn (Zea mays var. saccharata)
	200590 - Other vegetables and mixtures of vegetables
	200600 - Vegetables, fruit, nuts, fruit-peel and other parts of plants, preserved by sugar (drained, glac, or crystallised)
	200710 - Homogenised preparations
	200791 - Other :-- Citrus fruit
	200799 - Other
	200811 - Nuts, ground-nuts and other seeds, whether or not mixed together :-- Ground-nuts
	200819 - Nuts, ground-nuts and other seeds, whether or not mixed together :-- Other, including mixtures
	200820 - Pineapples
	200830 - Citrus fruit
	200840 - Pears
	200850 - Apricots
	200860 - Cherries
	200870 - Peaches
	200880 - Strawberries
	200891 - Other, including mixtures other than those of subheading No. 2008.19 :-- Palm hearts
	200892 - Other, including mixtures other than those of subheading No. 2008.19 :-- Mixtures
	200899 - Other, including mixtures other than those of subheading No. 2008.19 :-- Other

Source: UNSD (2013)