Changes in the trade patterns of the UK in a global perspective

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Abstract: The aim of our paper is threefold. Based on the contemporary theories of international trade we analyze the integration of the United Kingdom to the European Union from the aspect of merchandise trade. We use disaggregated data (6-digit, HS, CEPII BACI) on bilateral trade flows of the UK with the EU14(13) in the timeframe of 1996-2016 to show the changes on the extensive and intensive margins (à la Kehoe and Ruhl, 2013) and also that of vertical and horizontal intra-industry trade. The analyses of the changes allow us to make conclusions about the possible effect of Brexit on the intra-European trade, while we also extend our calculations to the dynamics of global patterns in intra-industry trade. The latter topic to our knowledge has not been thoroughly examined since the seminal paper of Brülhart (2009). [2]

JEL Codes: F14, F15

Keywords: Brexit, Intra-Industry Trade, Extensive and Intensive Margins of International Trade

Introduction

Since 23 June 2016 instead of focusing on further enlargement of the European Union people have turned their attention on the UK's withdrawal from the EU (Brexit). As this kind of disintegration process is unprecedented and large effects[3] are expected, several studies have

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[3] The United Kingdom has one of the biggest economies within the European Union and is substantially although decreasingly exposed to trade with EU(14) countries. The trade share of EU(14) in UK's overall export was 54.69% in 1996 and 42.58% in 2016 while that in UK's overall import was 53.64% in 1996 and 47.51% in 2016 (Author's calculations based on CEPII BACI database).

been already conducted to predict the extent to which EU-UK economic and trade relations can be hit by different possible Brexit scenarios.

Our empirical research aims to contribute to the better understanding of the possible changes. The first part of the paper gives some insights to the most recent literature of the possible effects of different Brexit scenarios. The second part presents our calculations of the UK's intra-industry trade as a measure of demand- and supply-side similarity of the country with the EU(13-14)[4] at the same time we also report intra-industry trade measures for the total world merchandise flows for the selected years. The third part gives an analysis of the dynamics of UK-EU(14) bilateral and total trade from the aspect of extensive and intensive margins. The fourth part concludes.

Possible Effects of Brexit on EU-UK trade – Brief Review of the Recent Literature

As of the end of December 2019 we are getting a more precise insight on how exactly the UK will leave the EU. Previously, two main types of Brexit have become parts of conventional wisdom: a soft and a hard one. The former and more favorable one would involve some kind of agreement between the UK and the EU, and most likely this would mean Norway-type relations to be maintained. Even in this case non-tariff barriers will be somewhat raised in the form of rules of origin requirements and anti-dumping duties enhancing trade costs by approximately 3% (Dhingra et al., 2017). The latter scenario, on the other hand, would leave the parties without any specific agreement (beyond the normal WTO-relations) causing more serious damage on the British and other European economies. Most Favored Nation tariffs will be introduced and other barriers to trade will be also increased[5]. Furthermore, direct trade effects will be exacerbated by a considerable fall of FDI inflows to the UK (Bruno et al., 2016) and decreasing long-term productivity (Campos et al., 2015).

Different empirical attempts have been made to evaluate the main impacts of Brexit. All estimates suggest massive negative effects on the British and slightly smaller but still negative

[4] In our paper we use (EU13-14) for the EU partners of the UK that originally formed or joined the EU until 1995. Since our database contains joint statistics for Belgium and Luxembourg, when we use EU(13-14) or simply EU(14) we refer to the following trade partners of the UK: Austria, Belgium—Luxembourg. Denmark, Finland, France, Germany, Greece, Ireland, Italy, the Netherlands, Portugal, Spain and Sweden.

[5] According to Dhingra et al. (2017) and Felbermayr et al. (2018) non-tariff barriers will be enhanced by about 9%.

effects on other EU members' economy through rising trade costs. The first type of studies utilizes input-output general equilibrium models to have a look at possible welfare effects of a British exit. Based on a New Quantitative Trade Model analysis conducted by Dhingra et al. (2017) trade intensity between the UK and the EU will fall back in the short run by 22-25% in case of a soft and by 38-43% in case of a hard Brexit causing a drop of 1.3% and 2.7% in the UK's income per capita, respectively. Similar predictions can be found in Vandenbussche et al. (2019) where the authors use an input-output model with country-sector linkages. According to this study the GDP of the UK will drop by 1.21% if the optimistic scenario happens while the loss in income can be up to 4.47% in the most pessimistic case. In addition, due to the closely integrated cross-country production networks there will be a loss of 0.38% or 1.54% in EU27 income in case of the two possible Brexit ways, respectively. Apart from the UK, Ireland, Belgium and the Netherlands are among the countries affected the most. The former will suffer not just because of the strong economic but also the historic and cultural ties. According to Brakman et al. (2018) France can also be a big loser due to a significant (7%) reduction in its value-added trade.

Another group of papers combines general equilibrium analysis with gravity models. To evaluate possible trade and welfare effects of a British withdrawal trade elasticities estimated from a structural gravity model are built into the GE model. Felbermayr et al. (2018), Mayer et al. (2019) and Campos–Timini (2019) are among the most recent and influential papers in this regard. All of them conduct a counterfactual analysis that is they investigate what would happen in case of a disintegration process in the European Union utilizing the trade effects of past trade agreements. Felbermayr et al. (2018) find that among the integration levels the breakdown of the single market what the UK is now probably ahead of would have the biggest impact on trade flows among the members causing a drop of 25-30% in exports. Moreover, according to their robustness analysis if the UK leaves the EU its income per capita will be reduced by 2.3%. Mayer et al. (2019) also emphasize that the biggest welfare losses for the UK may come from leaving the Single Market and not from introducing higher tariffs. According to the authors the drop in the UK's income can be up to 1.1% and 2.8% in a soft and a hard case, respectively. Campos-Timini (2019) focuses on changes in trade and migration flows of the UK due to Brexit and find that the UK's trade activity will shrink by 10-30% depending on which scenario is considered.

Another counterfactual analysis using the gravity model was made by Brakman et al. (2018) which suggests that not just the gross but also the value-added exports of the UK will be hit

massively if the Kingdom leaves the EU. The most interesting point of this study is that there is no significant difference between the trade reducing effect of a hard and a soft Brexit. In the first case, the UK's value-added export will fall by 39%, while in the latter case it will be still decreased by 32%.

The role of trade in value added and that of global and European value chains are emphasized by other studies, as well. Namely, effects of Brexit on international trade and welfare is dependent on the UK's participation in GVCs. The closer links the country has to European countries in terms of vertical production networks the more harmful the British exit can be for its economy. Ferrarini (2013) for example argues using his bilateral network trade indices that the UK plays a marginal role within the Single Market trade network which is mostly dominated by Germany and its relations with the neighbors. Much stronger connections can be found to the USA. In case of the automotive industry, however, the author finds strong European cross-country linkages. Meng et al. (2019) also find closer links to the United States when it comes to complex GVC trade activities that is when intermediates cross borders multiple times. Their network analysis based on input-output data suggests that the Brexit shock can be attenuated in certain industries by the strong trade networks between the UK and the USA. With our results we would like to contribute to this part of the literature. Analyzing intra-industry trade indices for the UK and changes of the UK's trade on the extensive and intensive margins allows us to evaluate the pattern and evolution of the UK-EU14 trade network on highly disaggregated product level leading to useful consequences regarding possible Brexit effects on the UK.

The role of intra-industry trade in the UK--EU14 relation

Intra-industry trade (IIT) has gained growing importance since the initial empirical findings of Verdoorn (1960), Balassa (1966) and Grubel (1967). New trade theories based on the seminal foundations in Krugman (1979) and Helpman–Krugman (1985) have showed how countries having similar factor endowments tend to trade goods within rather than between the industries. Globalization of the world market and consumers' love for variety have led to two-way flows of the same products. While Grubel–Lloyd (1975) developed a measure (GL index) to assess the role of intra-industry trade in total trade, Fontagné–Freudenberg (1997) and Fontagné et al. (2006) refined the methodology pointing to the importance of one-way and two-way intra-industry trade. The former implies trade of goods that mostly flow into one direction in the

bilateral trade relationship, while the latter one refers to the exchange of varieties of the same goods of the same quality (horizontal IIT) although different by any other relevant characteristics perceived by the customers, or varieties of the same product that are of different quality (vertical IIT).

In our analysis we consider 5 different types of intra-industry flows. On the one hand we distinguish between one-way and two-way trade using the formula in equation (1) defined by Fontagné – Freudenberg (1997) and Fontagné et al. (2006):

$$\frac{Min(X_i;M_i)}{Max(X_i;M_i)} > \gamma, \tag{1}$$

where we use a 10% threshold for γ similarly as Fontagné et al. (2006) and most other studies calculating FF indices. Thus we consider trade flows as that of two-way type (true intra-industry trade) if the value of the smaller flow (for example export of good *i*, X_i) is at least one tenth of that of the larger flow (for example import of good *i*, M_i). A ratio smaller than 0.1 means that the bilateral flows of the product in question are not of an intra-industry nature, thus they fall under the label of one-way trade (OWT).

Two-way trade flows are further divided to horizontal and vertical two-way trade (flows of intra-industry nature) using another formula (2) of Fontagné et al. (2006):

$$\frac{1}{1+\alpha} \leq \frac{UV_i^X}{UV_i^M} \leq 1+\alpha, \tag{2}$$

where UV^X and UV^M equal to the unit value of the elementary flows (export and import, respectively) good *i*, and α is set at 0.15. If this formula holds, i.e. there is a maximum of 15% difference in the export and import unit value of the same good, the flow is considered as horizontal IIT (HTWT). Otherwise vertical IIT (VTWT) is observed. Finally, we have a category for those two-way trade flows where we have at least on missing quantity value either on the export or the import side making impossible to classify these flows, thus these will be labeled as of non-specified two-way trade type (TWTNS).

The ratio of IIT flows of total trade flows (i.e. the Fontagné-Freudenberg index, FF) is calculated all the 4 categories described above according to equation (3):

$$FF_i^Z = \frac{\sum_{k=1}^{m}(X_{ik}^Z + M_{ik}^Z)}{\sum_{k=1}^{m}(X_{ik} + M_{ik})}, \tag{3}$$

where *Z* refers to the type of trade flow (OWT, HTWT, VTWT, TWTNS). Our selection of α=0,15 or 15% is based on the proximity of the UK to her EU14 trading partners and the effect of the European Single Market to the price convergence[6].

Data and Results

Our calculations were based on the CEPII BACI: International Trade Database at the Product Level (Gaulier—Zignano, 2010), using the HS92 nomenclature to be able to span our investigation for a long timeframe. In this phase of our project we calculated the values for five different years, 1996, 2001, 2006, 2011, and 2016. Before turning to our results, we also share some important data in our appendix. In Appendix "A" EU (14) partner's share in the exports and imports of the UK, and percentage point change from 1996 to 2016 can be followed. In Appendix "B" report the UK's export and import price indices, since throughout all our paper we work with data in current USDs according to the requirements of the methods and the database we use. Furthermore, we must mention that we have not excluded any data in this phase of our calculations, unlike Fontagné et al. (2006, pp. 464-465).Our results are shown in Table 1.

The UK's trade patterns in terms of OWT and TWT are significantly different from the pattern of total world trade. TWT is dominant as expected. On a bilateral basis TWT is highly dominant (share of OWT is low) in the trade relationship with BEL-LUX, FRA, GER, IRL, ITA, NLD. TWT with IRL decreased spectacularly by the end of the period. Shares of HTWT, which are showing similarities of the demand side of the economy are the highest although slightly changing by the end of the period with BEL-LUX, GER, FRA and IRL (in both latter cases with a huge drop by 2016). VTWT shares are high with the exceptions of FIN, GRC, and POR, all in these cases OWT is dominant over TWT. The lack of dramatic changes refers to a well-established structure of trade patterns throughout the 1996-2006 timeframe, while we can suspect, that at the level of world trade with the strengthening role of North-South trade which became the leading relationship, the growth of TWT-share (intra-industry trade) reported by earlier studies seems to have stopped.

[6] In most of the empirical works authors use either a 15% or a 25% threshold as a subjective value for disentangling horizontal and vertical two-way (intra-industry) trade.

Table 1: Shares of Trade Types of the UK with the EU14, and Shares of Trade Types of the total World Trade, 1996, 2001, 2006, 2011, 2016

	1996				2001				2006				2011				2016			
	OWT	HTWT	VTWT	TWTNS	OWT	HTWT	VTWT	TWTNS	OWT	HTWT	VTWT	TWTNS	OWT	HTWT	VTWT	TWTNS	OWT	HTWT	VTWT	TWTNS
AUT	0.58	0.04	0.37	0.00	0.48	0.03	0.41	0.07	0.53	0.04	0.43	0.00	0.53	0.06	0.41	0.00	0.48	0.08	0.44	0.00
BEL-LUX	0.25	0.20	0.41	0.14	0.30	0.12	0.58	0.00	0.36	0.21	0.44	0.00	0.39	0.25	0.37	0.00	0.28	0.18	0.54	0.00
DNK	0.53	0.08	0.38	0.00	0.55	0.06	0.39	0.00	0.43	0.06	0.51	0.00	0.40	0.33	0.27	0.00	0.48	0.10	0.42	0.00
FIN	0.72	0.06	0.22	0.00	0.71	0.07	0.22	0.00	0.74	0.04	0.22	0.00	0.71	0.04	0.26	0.00	0.74	0.04	0.22	0.00
FRA	0.24	0.25	0.50	0.01	0.28	0.16	0.56	0.00	0.28	0.19	0.52	0.01	0.26	0.24	0.49	0.01	0.28	0.12	0.60	0.01
GER	0.18	0.18	0.64	0.01	0.21	0.13	0.66	0.00	0.26	0.18	0.56	0.00	0.28	0.28	0.44	0.00	0.23	0.23	0.54	0.00
GRC	0.82	0.05	0.13	0.00	0.73	0.01	0.26	0.00	0.68	0.15	0.17	0.00	0.66	0.02	0.32	0.00	0.67	0.04	0.29	0.00
IRL	0.33	0.21	0.46	0.00	0.35	0.11	0.54	0.00	0.34	0.09	0.57	0.00	0.30	0.12	0.58	0.00	0.22	0.14	0.64	0.00
ITA	0.37	0.11	0.51	0.00	0.40	0.08	0.52	0.00	0.41	0.09	0.50	0.00	0.39	0.12	0.49	0.00	0.39	0.07	0.54	0.00
NLD	0.29	0.13	0.57	0.01	0.29	0.16	0.54	0.00	0.34	0.14	0.53	0.00	0.30	0.22	0.48	0.00	0.31	0.15	0.54	0.00
POR	0.68	0.09	0.23	0.00	0.64	0.05	0.32	0.00	0.71	0.10	0.20	0.00	0.61	0.04	0.35	0.00	0.65	0.02	0.34	0.00
ESP	0.42	0.12	0.46	0.00	0.40	0.24	0.36	0.00	0.34	0.15	0.51	0.00	0.49	0.09	0.41	0.00	0.41	0.10	0.49	0.00
SWE	0.46	0.12	0.42	0.00	0.49	0.09	0.43	0.00	0.47	0.12	0.42	0.00	0.45	0.06	0.49	0.00	0.49	0.05	0.46	0.00
EU14	0.31	0.17	0.50	0.02	0.33	0.13	0.54	0.00	0.34	0.15	0.51	0.00	0.34	0.21	0.45	0.00	0.31	0.15	0.54	0.00
WtW	0.61	0.08	0.27	0.04	0.59	0.10	0.30	0.01	0.63	0.11	0.25	0.01	0.67	0.09	0.22	0.01	0.63	0.09	0.27	0.01

Note: Aggregated indices (EU14 and World to World /WtW/) are calculated by adding up bilateral data to avoid geographical bias

Quantification of the extensive and intensive margins in the UK-EU14 trade

Based on the initial models of Krugman (1981), Eaton—Kortum (2002) and Melitz (2003) recent theoretical explanations on international trade and the growth of international trade have shown that firms producing on the markets are heterogeneous meaning that at given trade costs only some of them are capable of shipping their goods abroad. In case of international market integration and declining trade costs, however, exporting becomes profitable for more and more producers. Therefore, international trade volumes are enhanced partly because of new entrants to international markets (Chaney, 2008; Helpman et al., 2008). Thus, the source of trade growth between two countries is not only the result of rising export volumes of products previously exported (intensive margin) but also the appearance of goods that countries had not exported before (extensive or new goods margin).

To evaluate the market integration between the UK and the EU14 we calculate the extensive and intensive margins of trade through the period of 1996-2016. We are interested in how much of the UK's trade growth has been occurred on the new goods margin.

The methodology for the calculation of the margins is based on Kehoe—Ruhl (2013). Therefore we also define the least-traded goods category by determining individual relative thresholds instead of fixed minimum values such as $0 in Feenstra (2004) or $50,000 in Evenett–Venables (2002) to collect all the goods that are not traded between the countries in the beginning of the period. We order the goods by their value of export (import), and form ten equal sets based on their cumulated value. Goods being part of the first set (representing one tenth of total export /import/ value altogether) are regarded as nontraded or least-traded goods. Thus, we will get a threshold $\bar{x}_{i,t}$ which is the trade value of the last good belonging to the first set. When defining threshold values we would like to avoid possible biases therefore we follow Kehoe—Ruhl (2013) with a minor difference: while they use average flows of the base year and the following two years, we calculate the mean of the base year, the base-1 year and base+1 year.

For the decomposition of overall trade growth (γ) we follow Kehoe–Ruhl (2013) and utilize equations and labelling of Cho–Díaz (2018). The growth on the intensive margin can be defined as (4):

$$1 + \gamma_{IM} = \frac{\sum_{i \in G_T} x_{i,s}}{\sum_{i \in G_T} x_{i,t}}, \tag{4}$$

while the growth of the extensive margin is determined by equation (5):

$$1 + \gamma_{EM} = \left[\frac{\sum_{i \in G} x_{i,s}}{\sum_{i \in G} x_{i,t}}\right] / \left[\frac{\sum_{i \in G_T} x_{i,s}}{\sum_{i \in G_T} x_{i,t}}\right], \quad (5)$$

where the trade (import or export) volume of good *i* between a given country pair in year *t* or *s* (s≥t) is labelled by $x_{i,t}$ or $x_{i,s}$, respectively. G means the set of goods examined. $G_T(t)$ is a subset of goods having a trade value greater than the threshold $\bar{x}_{i,t}$in year *t*, while $G_T(s)$ is a subset of goods that have a trade value greater than the threshold $\bar{x}_{i,t}$ in year *s*. Thus equation (4) shows the growth rate of trade in the goods that are not part of the least traded goods in either periods – $G_T=G_T(s) \cap G_T(t)$ –, while equation (5) defines the growth rate of trade in least-traded goods. Accordingly, γ_{IM} and γ_{EM} are the percentage growth rates of trade on the intensive and the new goods margins respectively. Taking logarithms of (5) yields:

$$\gamma \cong \gamma_{IM} + \gamma_{EM}, \quad (6)$$

Data and Results

Another novelty of our approach is that instead of utilizing the SITC classification as in Kehoe–Ruhl (2013) and recently in Cho–Díaz (2018), we define a good at the HS92 6-digit level, being able to consider 5039 goods in our sample, allowing us a deeper analysis of the margins. The data are once again from the CEPII BACI database. Tables 2 and 3 present our results as far as the extensive and intensive margins are concerned following Kehoe-Ruhl (2013) /K&R/, however we include the results à la Feenstra (2004) /Feenstra/ and Evenett—Venables (2002) /E&V/, as well. Annex D comprises the changes in the share of the least traded products in the different relations, once again, based on the study of Kehoe—Ruhl (2013).

Table 2. Extensive and Intensive Margins of the UK's Exports with the EU(14), 1996-2016

		K&R		Feenstra		E&V	
	Total	Extensive	Intensive	Extensive	Intensive	Extensive	Intensive
AUT	44.5	-3.4 (-9.3)	49.5 (109.3)	-4.8 (-13.5)	51.8 (113,5)	-0.4 (-1.22)	45.1 (101.2)
BEL-LUX	34.3	2.0 (6.8)	31.7 (93.2)	2.8 (9.4)	30.6 (90.6)	-0.1 (-0.18)	34.3 (100.18)
DNK	17.6	-5.3 (-33.3)	24.1 (133.3)	-3.2 (-20.1)	21.4 (120.1)	-0.2 (-1.2)	17.8 (101.2)
FIN	-36.3	-32.0 (-85.5)	-6.4 (-14.5)	-21.4 (-46.6)	-18.9 (-53.4)	0.4 (0.9)	-36.5 (100.9)
FRA	-4.4	-9.3 (-217.5)	5.4 (117.5)	-2.6 (59.5)	-1.8 (40.5)	0.0 (0.0)	95.6 (100)
GER	27.5	-8.5 (-36.5)	39.3 (136.5)	-2 (-8.1)	30 (108.1)	0.0 (-0.1)	27.5 (100.1)
GRC	-33.4	-15.1 (-40.3)	-21.5 (-59.7)	-5.2 (-13.2)	-29.7 (-86.8)	0.4 (1.0)	-33.7 (-101.0)
IRL	53.5	-7.5 (-18.1)	65.9 (118.1)	-2.5 (-5.8)	57.3 (105.8)	-0.1 (-0.1)	53.6 (100.1)
ITA	-12.0	3.1 (23.9)	-14.6 (-123.9)	-3.5 (-28.1)	-8.7 (-71.9)	0.0 (0)	-12.0 (-100)
NLD	42.6	-2.6 (-7.5)	46.5 (107.5)	-3.9 (-11)	48.3 (111)	-0.1 (-0.1)	42.7 (100.1)
POR	-9.8	-15.2 (-159.8)	6.3 (59.8)	-7.5 (-75.3)	-2.5 (-24.7)	0.0 (0.4)	-9.7 (-99.6)
ESP	22.0	-7.0 (-36.3)	31.1 (136.3)	0.4 (2.1)	21.5 (97.9)	0.0 (-0.2)	22.1 (100.2)
SWE	-3.7	-10.9 (-304.5)	8.0 (204.5)	-6.8 (-185.3)	3.3 (85.3)	0.0 (0.3)	-3.7 (-99.7)
EU14	18.1	-7.1 (-44.4)	27.1 (144.4)	-1.8 (-10.9)	20.2 (110.9)	0.0 (0.0)	18.1 (100)

Note: Numbers mean growth of the UK's export to the partners in percentages. Numbers in brackets are contributions of the margins to total in percentages, as well.

Table 3. Extensive and Intensive Margins of the UK's Imports with the EU(14), 1996-2016

		K&R		Feenstra		E&V	
	Total	Extensive	Intensive	Extensive	Intensive	Extensive	Intensive
AUT	148.0	6.4 (6.9)	133.1 (93.1)	-2.8 (-3.2)	155.3 (103.2)	-0.6 (-0.6)	149.5 (100.6)
BEL-LUX	141.9	-2.9 (-3.3)	149.1 (103.3)	0.4 (0.4)	141.1 (99.6)	-0.1 (-0.1)	142.2 (100.1)
DNK	43.6	-6.1 (-17.5)	53.0 (117.5)	-8.6 (-24.8)	57.1 (124.8)	-0.2 (-0.4)	43.8 (100.4)
FIN	-25.1	-6.3 (-22.3)	-20.1 (-77.7)	-9.8 (-35.7)	-17.0 (-64.3)	0.1 (0.3)	-25.2 (-100.3)
FRA	34.5	-6.1 (-21.3)	43.3 (121.3)	-3.1 (-10.6)	38.8 (110.6)	0.0 (-0.1)	34.6 (101.1)
GER	122.3	1.4 (1.8)	119.2 (98.2)	-1.1 (-1.3)	124.7 (101.3)	0.0 (0.0)	122.4 (100.0)
GRC	77.9	-5.6 (-10.1)	88.6 (110.1)	-18.6 (-35.7)	118.6 (135.7)	-0.8 (-1.5)	79.5 (-101.5)
IRL	62.0	-0.4 (-0.7)	62.5 (100.7)	-2.0 (-4.1)	65.2 (104.1)	-0.1 (-0.2)	62.1 (100.2)
ITA	61.0	-3.9 (-8.4)	67.5 (108.4)	-2.1 (-4.5)	64.5 (104.5)	-0.1 (-0.1)	61.1 (100.1)
NLD	143.5	8.3 (9.0)	124.7 (91.0)	-1.8 (-2.0)	147.8 (102.0)	-0.1 (-0.1)	143.7 (100.1)
POR	42.6	50.3 (114.8)	-5.1 (-14.8)	11.5 (30.6)	27.9 (69.4)	-0.2 (-0.5)	42.8 (100.5)
ESP	153.2	5.3 (5.5)	140.5 (94.5)	-0.9 (-1.0)	155.6 (101.0)	-0.2 (-0.2)	153.7 (100.2)
SWE	13.4	7.3 (56.4)	5.6 (43.6)	-1.8 (-14.4)	15.5 (114.4)	-0.1 (-0.4)	13.4 (100.4)
EU14	90.3	-5.3 (-8.4)	100.8 (108.4)	-2.4 (-3.8)	94.9 (103.8)	0.0 (0.0)	90.3 (100.0)

Note: Numbers mean growth of the UK's import from the partners in percentages. Numbers in brackets are contributions of the margins to total in percentages, as well.

As we can see in Table 2, the extensive margin plays a negligible or a negative role in the exports of the UK to the EU(14), even in the cases, when the growth of trade from 1996 to 2006 was relatively higher. In the imports side we can find some exceptions for the favor of the extensive margin, in the cases of AUT, NLD, ESP, SWE, and especially POR. Charts of Annex D show the growth of the share of the least traded products by 2016 in every case. The most striking increases can be observed in the imports of the afore-mentioned countries from the UK. To our best current knowledge these results mostly seem to be in line with those regarding the intra-industry trade, in most of the cases showing well-established trade patterns throughout the 1996-2016 period.

Conclusions

Most of our results support the notion of well-established trade patterns of the UK with the EU(14) in the last two decades suggests that the possible disruptive impacts of Brexit will be significant. This proposition seems to be in line with the existing research identified in the first part of our paper.

All our calculated measures support that the strongest effects of Brexit can be expected on the economies of BEL-LUX, FRA, GER, IRL, NLD. On the demand side these come from the loss of consumer welfare due to smaller number of horizontally and vertically differentiated product varieties, while on the supply side from the disruption of GVCs.

Out of many, there remain two especially interesting questions to be observed or predicted by further research: in most of the cases, the enlargement of the EU resulted in the increase of two-way trade of the members' trade with each other. Does this mean, that we can count on reverse processes after Brexit? On the other hand – accepting the smooth adjustment hypothesis, at least for the horizontal two-way trade – is it possible that the adjustment costs of the partners with high two-way trade, especially larger shares of horizontal two-way trade will be relatively lower to the remaining EU(14) members? This means that on the long run the smooth adjustment hypothesis (SAH) can be empirically tested in an unprecedented retrogressive way.

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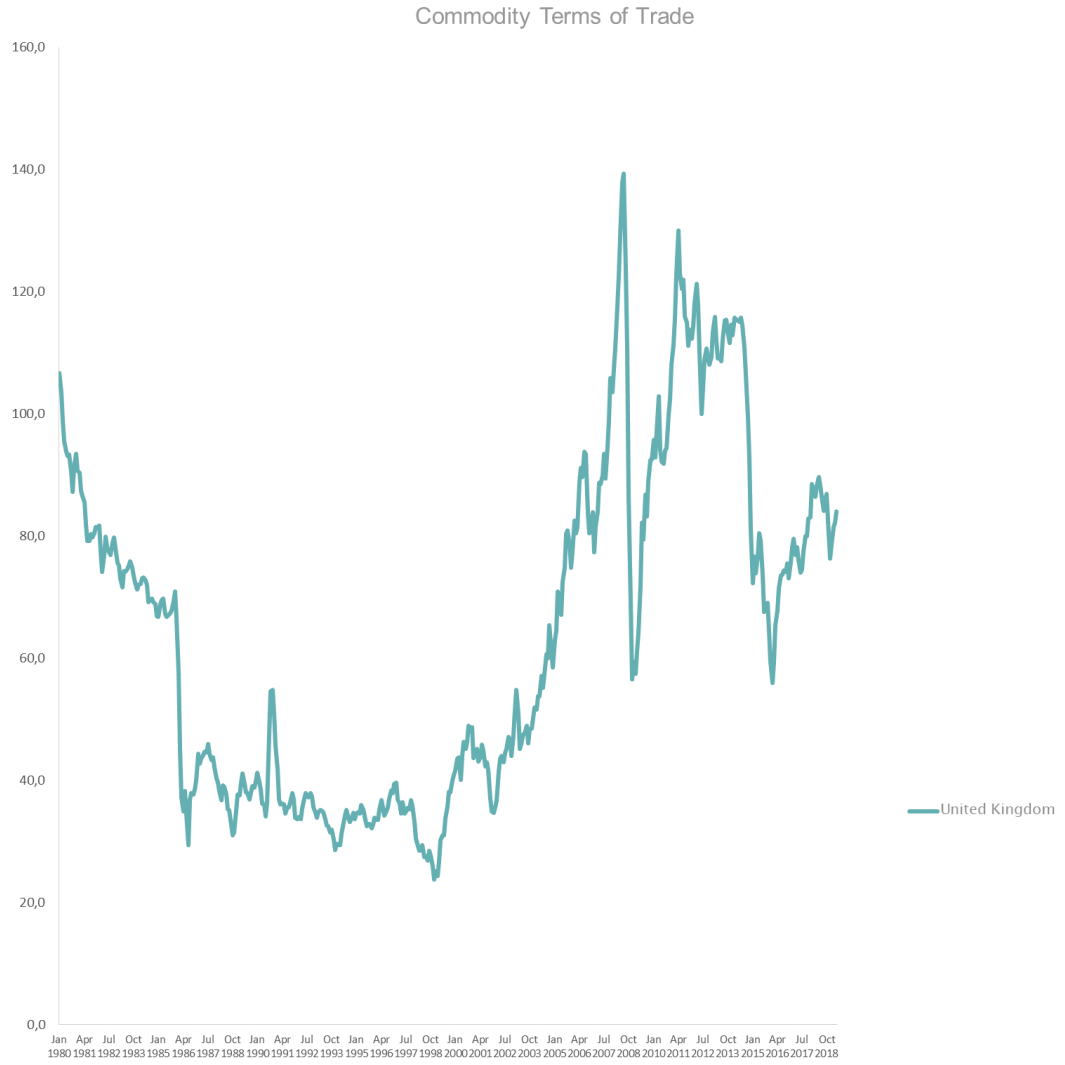
Appendices

Appendix A: EU (14) Partner's share in the exports and imports of the UK, selected years and percentage point change from 1996 to 2016

Partner	REX1996	REX2001	REX2006	REX2011	REX2016	RIM1996	RIM2001	RIM2006	RIM2011	RIM2016	REX(2016-1996)	RIM(2016-1996)
Austria	0,82	0,71	0,69	0,59	0,78	0,64	0,93	0,84	0,75	0,74	-0,04	0,10
Belgium-Luxembourg	5,29	5,64	6,22	6,36	4,68	4,69	5,21	5,29	4,89	5,28	-0,61	0,59
Denmark	1,21	1,33	1,21	1,31	0,94	1,44	1,27	1,45	1,55	0,96	-0,27	-0,48
Finland	1,09	0,84	0,84	0,56	0,46	1,37	1,31	0,95	0,65	0,48	-0,63	-0,89
France	9,47	8,74	8,66	6,97	5,97	9,24	8,42	7,13	5,88	5,79	-3,50	-3,45
Germany	11,29	11,72	12,24	12,02	9,49	14,00	13,33	13,68	12,71	14,49	-1,80	0,49
Greece	0,79	0,52	0,63	0,39	0,35	0,23	0,23	0,23	0,17	0,19	-0,44	-0,04
Ireland	5,02	7,20	6,78	5,37	5,08	3,93	4,34	3,44	3,19	2,96	0,06	-0,97
Italy	5,51	4,60	3,98	3,33	3,20	5,25	4,69	4,33	3,62	3,93	-2,31	-1,32
Netherlands	6,39	6,24	5,84	7,27	6,01	6,41	6,68	6,76	6,86	7,26	-0,38	0,85
Portugal	0,94	0,77	0,69	0,60	0,56	0,94	0,73	0,91	0,45	0,62	-0,38	-0,32
Spain	4,13	4,21	4,53	3,28	3,32	2,90	3,08	3,46	2,96	3,42	-0,81	0,52
Sweden	2,75	2,11	2,03	2,23	1,74	2,60	2,07	1,93	1,87	1,37	-1,00	-1,23
EU(14)	54,69	54,63	54,33	50,29	42,58	53,64	52,32	50,40	45,55	47,51	-12,11	-6,14

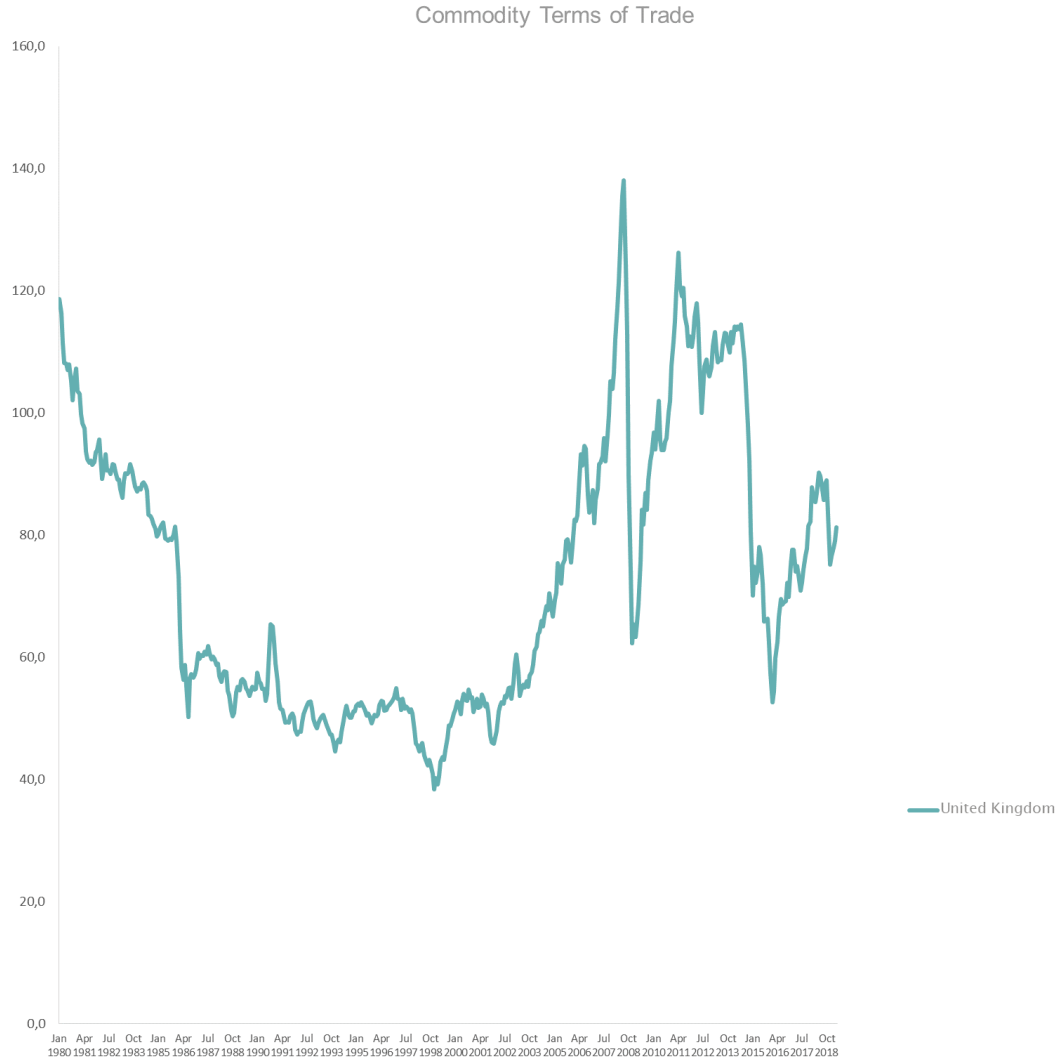
Appendix B

Appendix B1: UK Commodity Export Price Index (Individual Commodities weighted by Ratio of Exports to Total Commodity Exports)



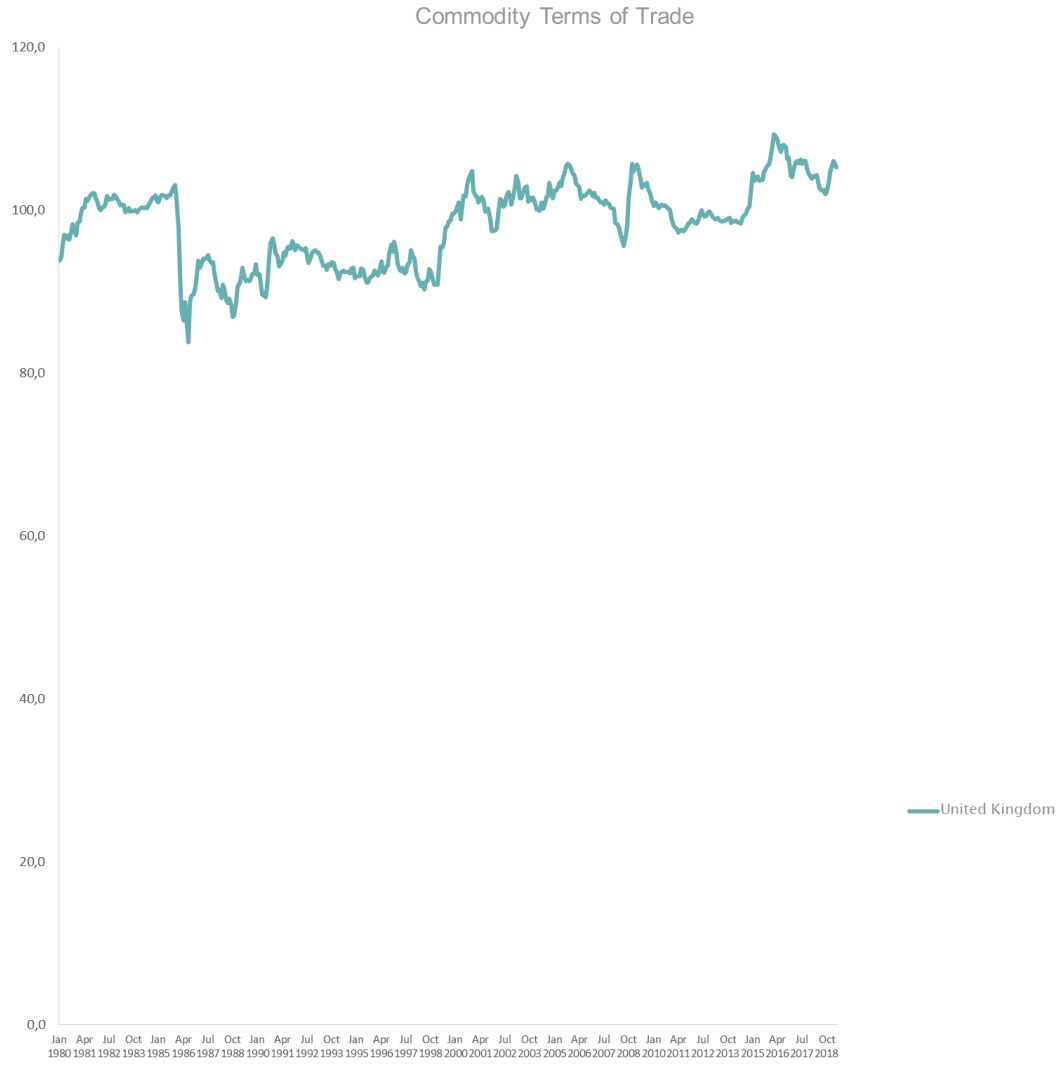
Source: IMF International Financial Statistics (IFS)

Appendix B2: UK Commodity Import Price Index (Individual Commodities weighted by Ratio of Imports to Total Commodity Imports)



Source: IMF International Financial Statistics (IFS)

Appendix B3: UK Commodity Net Export Price Index (Individual Commodities weighted by Ratio to Total Commodity Trade)

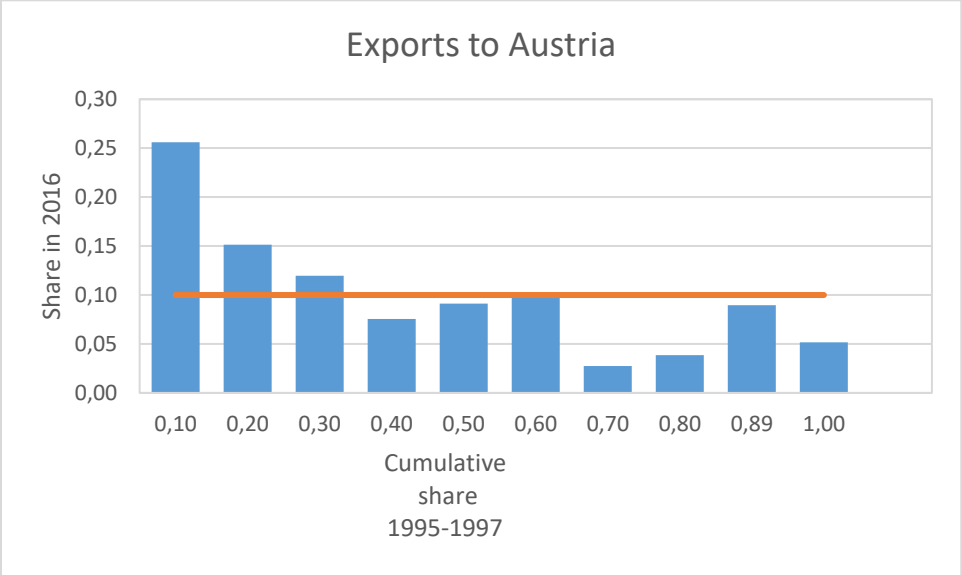


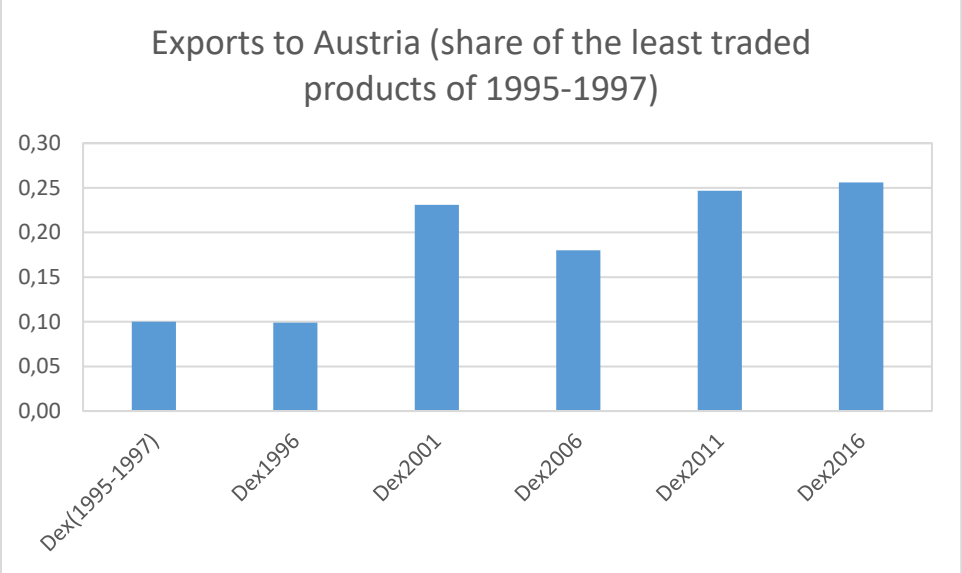
Source: IMF International Financial Statistics (IFS)

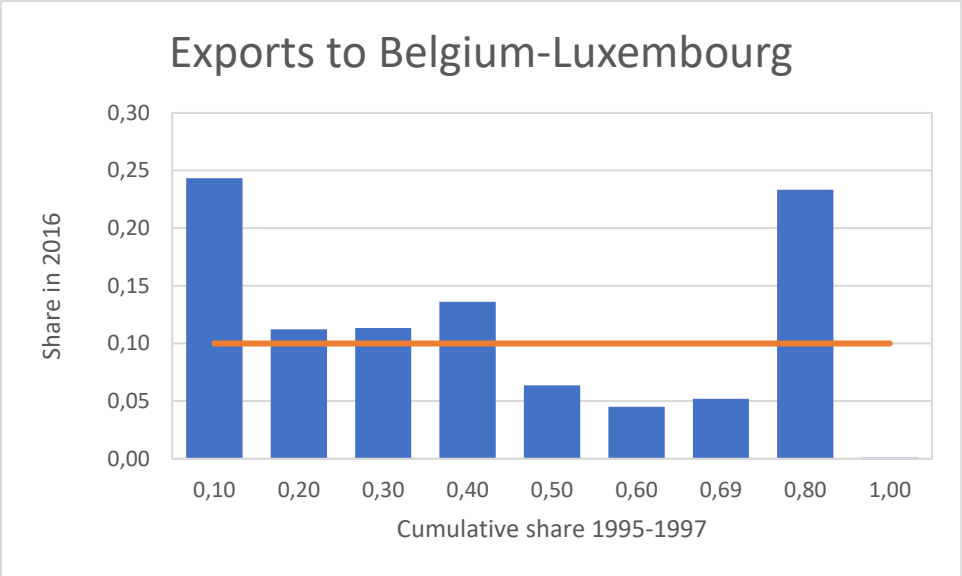
Annex D

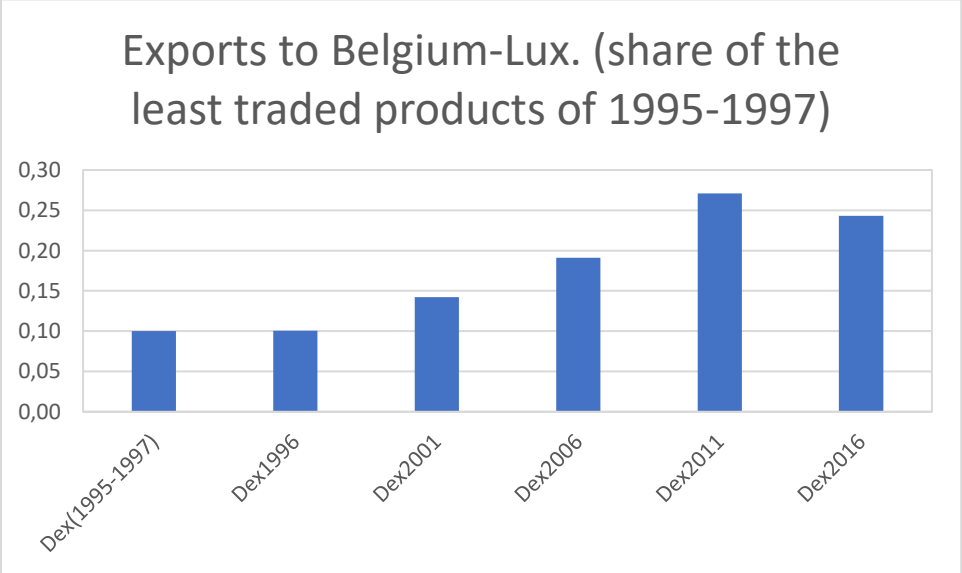
Source of all charts: Authors' calculations based on CEPII BACI data

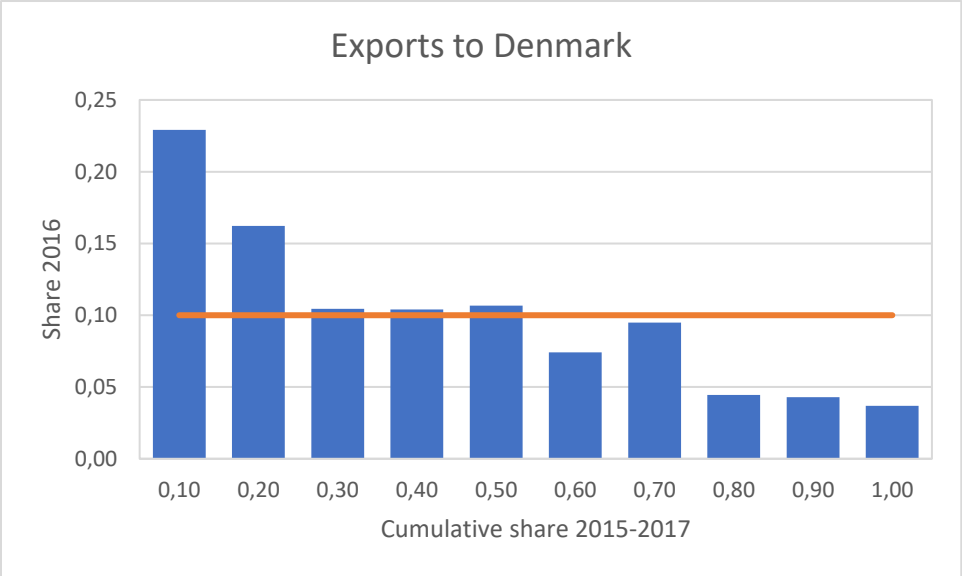
Note: the Reporter in all cases is the UK

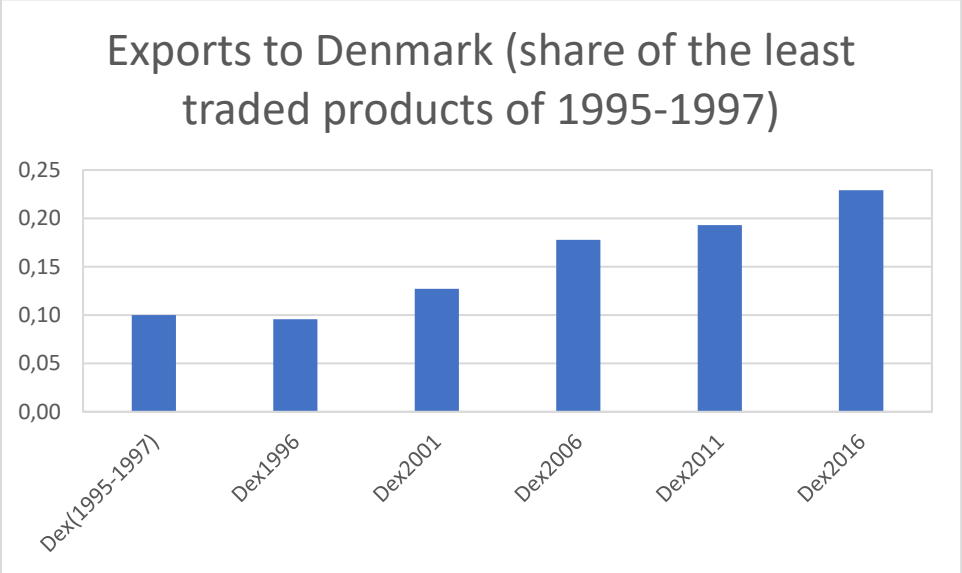


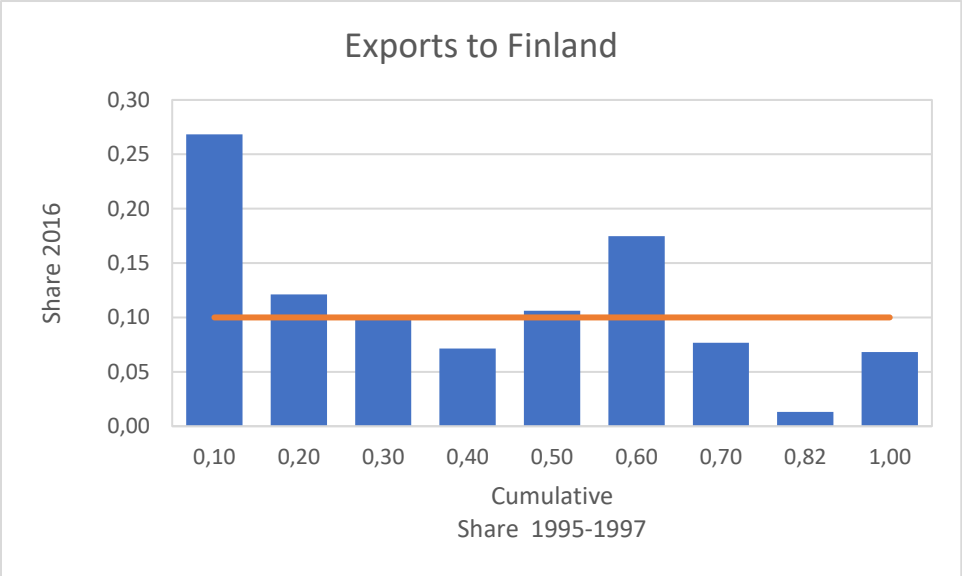



Exports to Belgium-Luxembourg
Share in 2016
0,30
0,25
0,20
0,15
0,10
0,05
0,00
0,10
0,20
0,30
0,40
0,50
0,60
0,69
0,80
1,00
Cumulative share 1995-1997

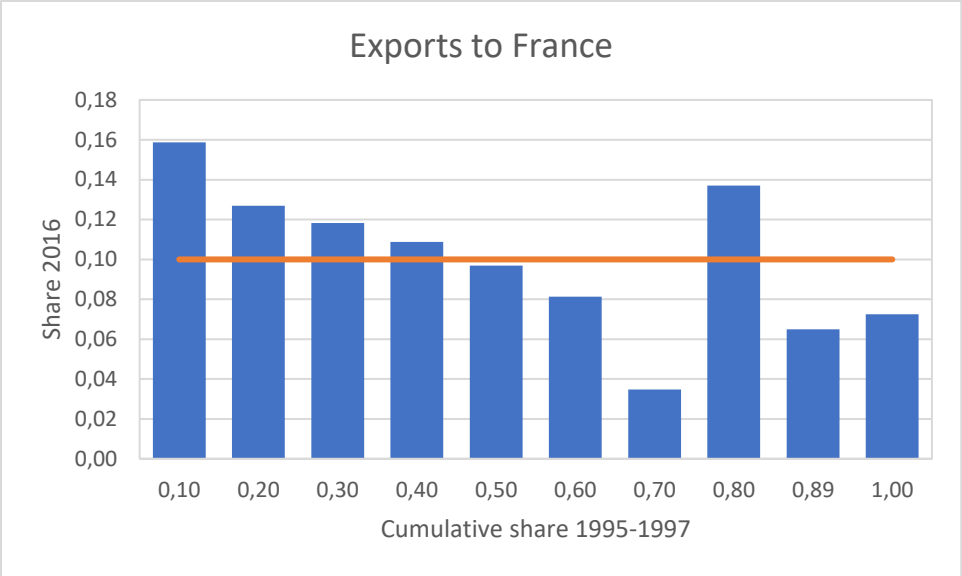

Exports to Belgium-Lux. (share of the least traded products of 1995-1997)
0,30
0,25
0,20
0,15
0,10
0,05
0,00
Dex(1995-1997)
Dex1996
Dex2001
Dex2006
Dex2011
Dex2016

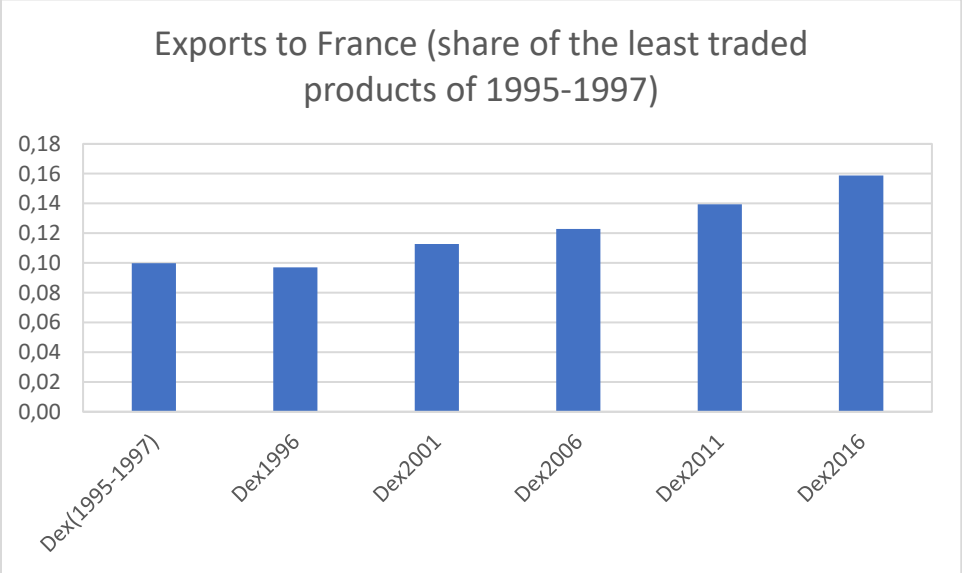

Exports to Denmark
0,25
0,20
0,15
0,10
0,05
0,00
Share 2016
0,10
0,20
0,30
0,40
0,50
0,60
0,70
0,80
0,90
1,00
Cumulative share 2015-2017

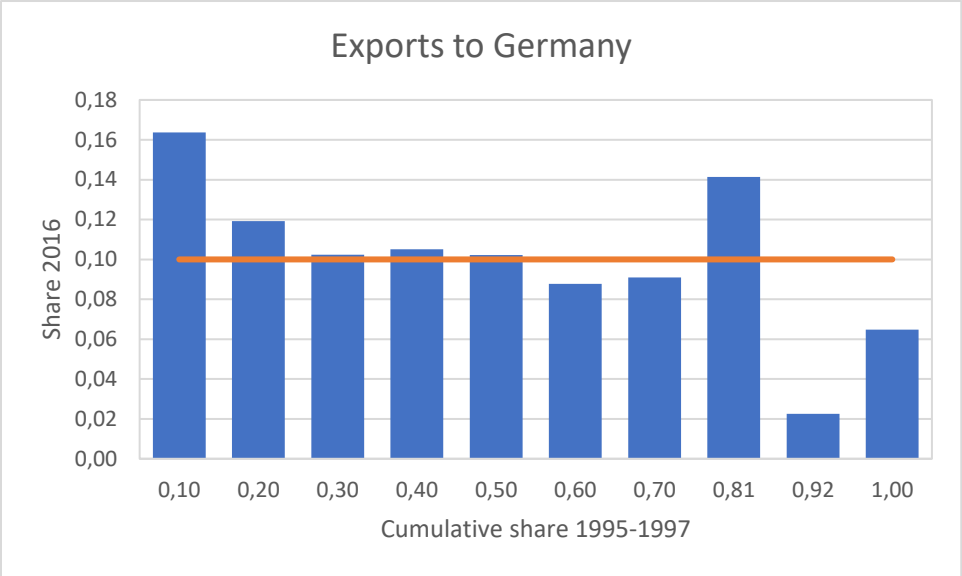

Exports to Denmark (share of the least traded products of 1995-1997)
0,25
0,20
0,15
0,10
0,05
0,00
Dex(1995-1997)
Dex1996
Dex2001
Dex2006
Dex2011
Dex2016

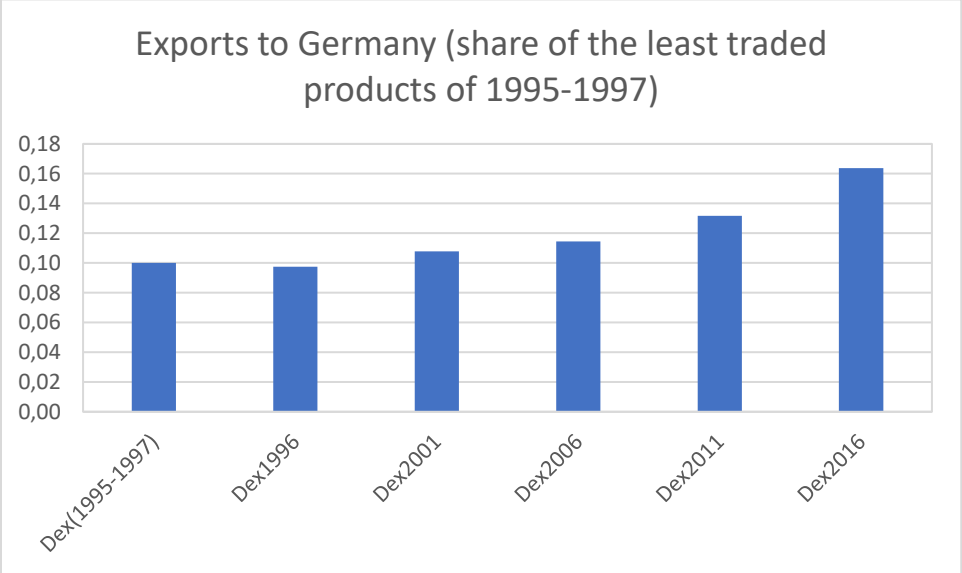

Exports to Finland
Share 2016
0,30
0,25
0,20
0,15
0,10
0,05
0,00
0,10
0,20
0,30
0,40
0,50
0,60
0,70
0,82
1,00
Cumulative
Share 1995-1997

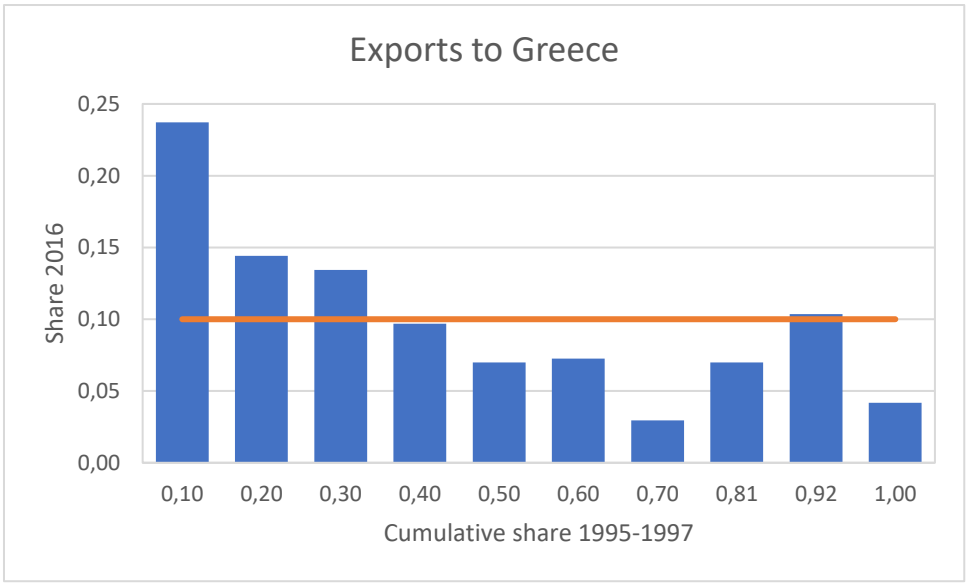

Exports to Finland (share of the least traded products of 1995-1997)
0,35
0,30
0,25
0,20
0,15
0,10
0,05
0,00
Dex(1995-1997)
Dex1996
Dex2001
Dex2006
Dex2011
Dex2016


Exports to France
0,18
0,16
0,14
0,12
0,10
0,08
0,06
0,04
0,02
0,00
Share 2016
0,10
0,20
0,30
0,40
0,50
0,60
0,70
0,80
0,89
1,00
Cumulative share 1995-1997

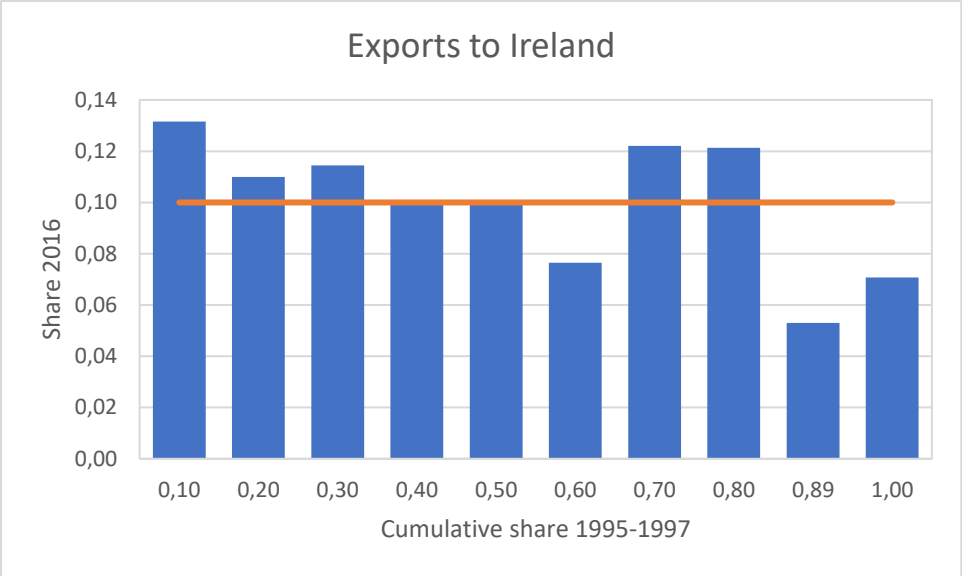

Exports to France (share of the least traded products of 1995-1997)
0,18
0,16
0,14
0,12
0,10
0,08
0,06
0,04
0,02
0,00
Dex(1995-1997)
Dex1996
Dex2001
Dex2006
Dex2011
Dex2016


Exports to Germany
Share 2016
0,18
0,16
0,14
0,12
0,10
0,08
0,06
0,04
0,02
0,00
0,10
0,20
0,30
0,40
0,50
0,60
0,70
0,81
0,92
1,00
Cumulative share 1995-1997

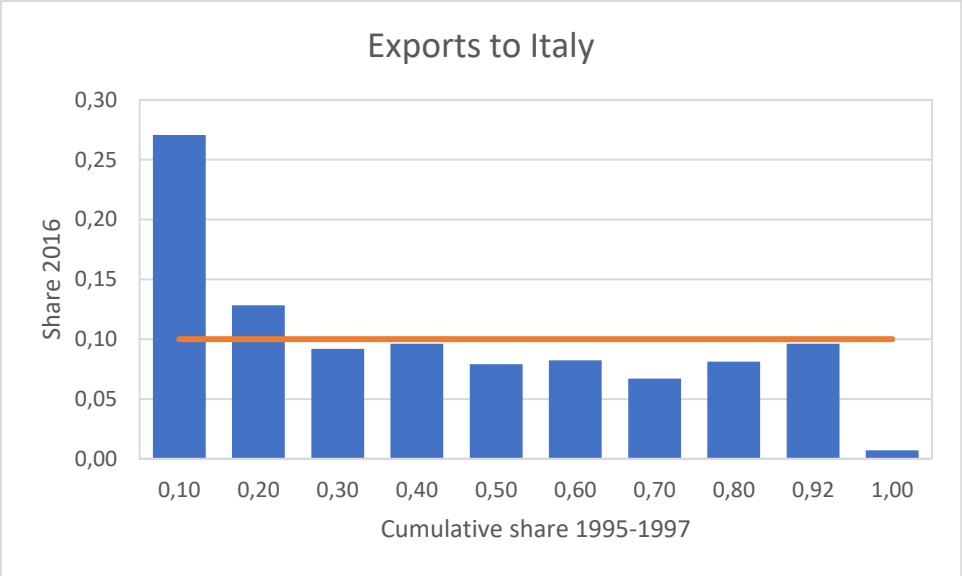

Exports to Germany (share of the least traded products of 1995-1997)
0,18
0,16
0,14
0,12
0,10
0,08
0,06
0,04
0,02
0,00
Dex(1995-1997)
Dex1996
Dex2001
Dex2006
Dex2011
Dex2016


Exports to Greece
0,25
0,20
0,15
0,10
0,05
0,00
Share 2016
0,10
0,20
0,30
0,40
0,50
0,60
0,70
0,81
0,92
1,00
Cumulative share 1995-1997

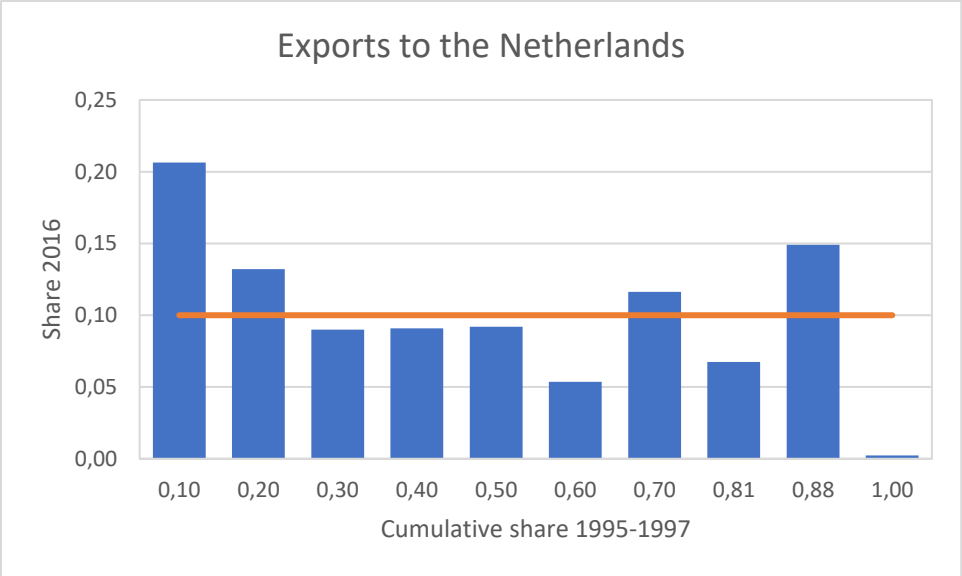

Exports to Greece (share of the least traded products of 1995-1997)
0,25
0,20
0,15
0,10
0,05
0,00
Dex(1995-1997)
Dex1996
Dex2001
Dex2006
Dex2011
Dex2016


Exports to Ireland
0,14
0,12
0,10
0,08
0,06
0,04
0,02
0,00
Share 2016
0,10
0,20
0,30
0,40
0,50
0,60
0,70
0,80
0,89
1,00
Cumulative share 1995-1997

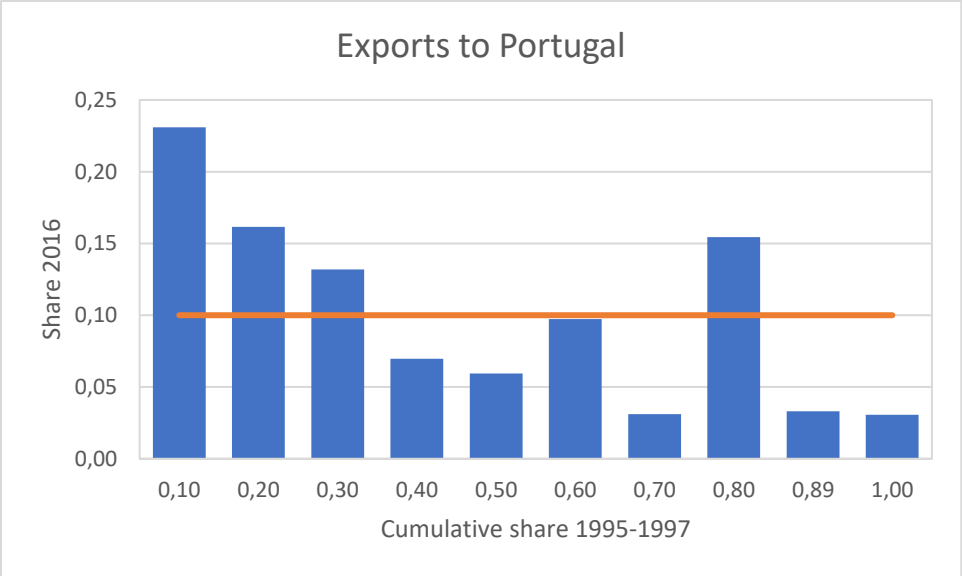

Exports to Ireland (share of the least traded products of 1995-1997)
0,14
0,12
0,10
0,08
0,06
0,04
0,02
0,00
Dex(1995-1997)
Dex1996
Dex2001
Dex2006
Dex2011
Dex2016

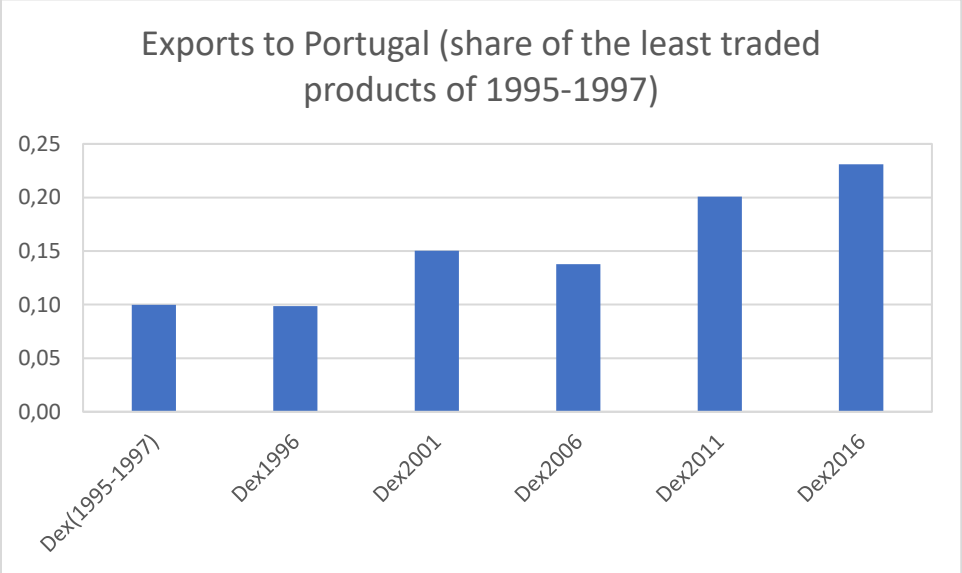

Exports to Italy
0,30
0,25
0,20
0,15
0,10
0,05
0,00
Share 2016
0,10
0,20
0,30
0,40
0,50
0,60
0,70
0,80
0,92
1,00
Cumulative share 1995-1997

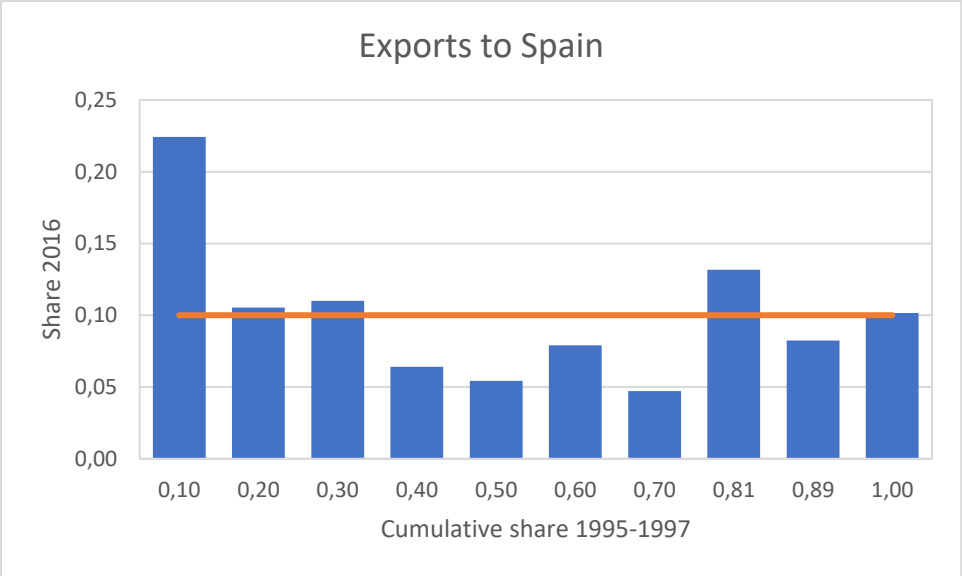

Exports to Italy (share of the least traded products of 1995-1997)
0,30
0,25
0,20
0,15
0,10
0,05
0,00
Dex(1995-1997)
Dex1996
Dex2001
Dex2006
Dex2011
Dex2016

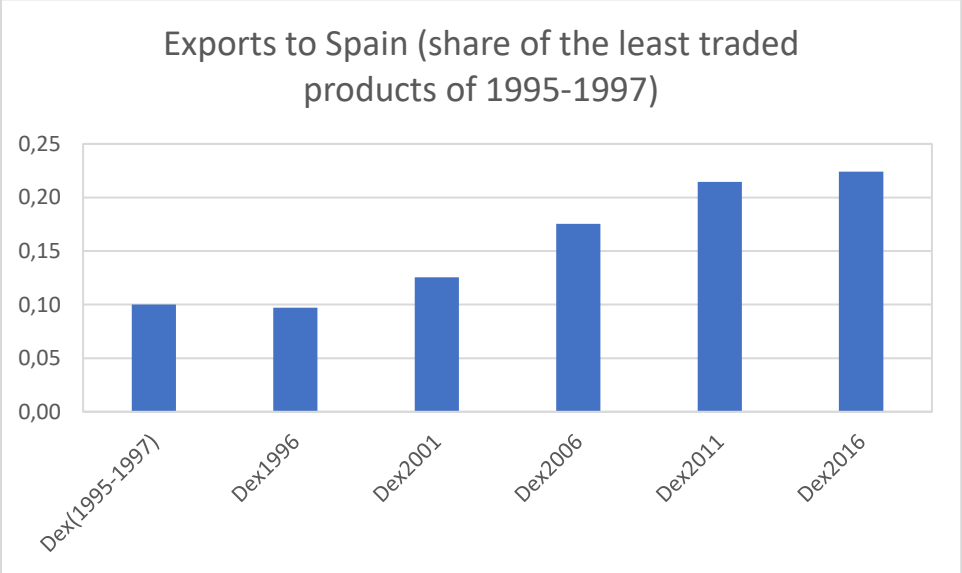

Exports to the Netherlands
0,25
0,20
0,15
0,10
0,05
0,00
Share 2016
0,10
0,20
0,30
0,40
0,50
0,60
0,70
0,81
0,88
1,00
Cumulative share 1995-1997

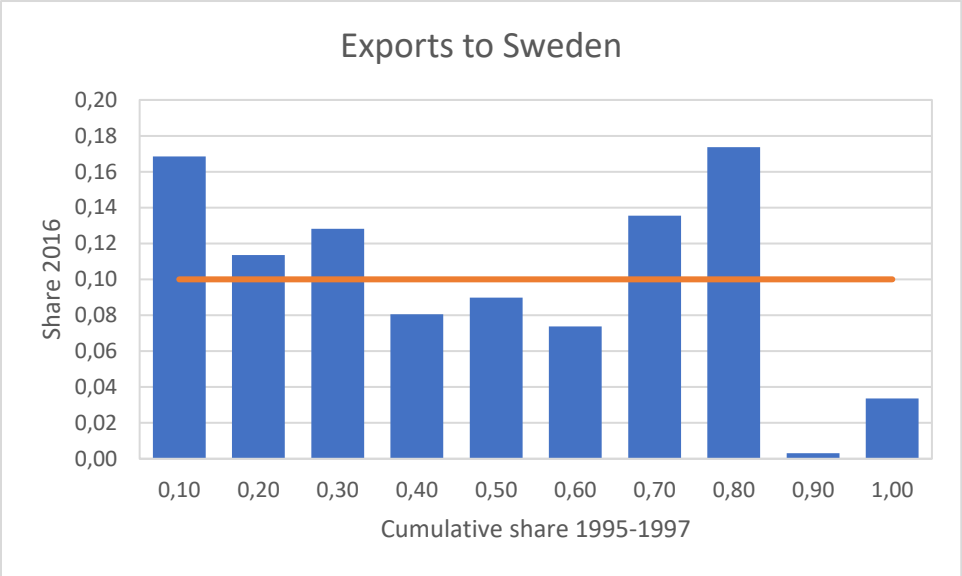

Exports to the Netherlands (share of the least traded products of 1995-1997)
0,25
0,20
0,15
0,10
0,05
0,00
Dex(1995-1997)
Dex1996
Dex2001
Dex2006
Dex2011
Dex2016

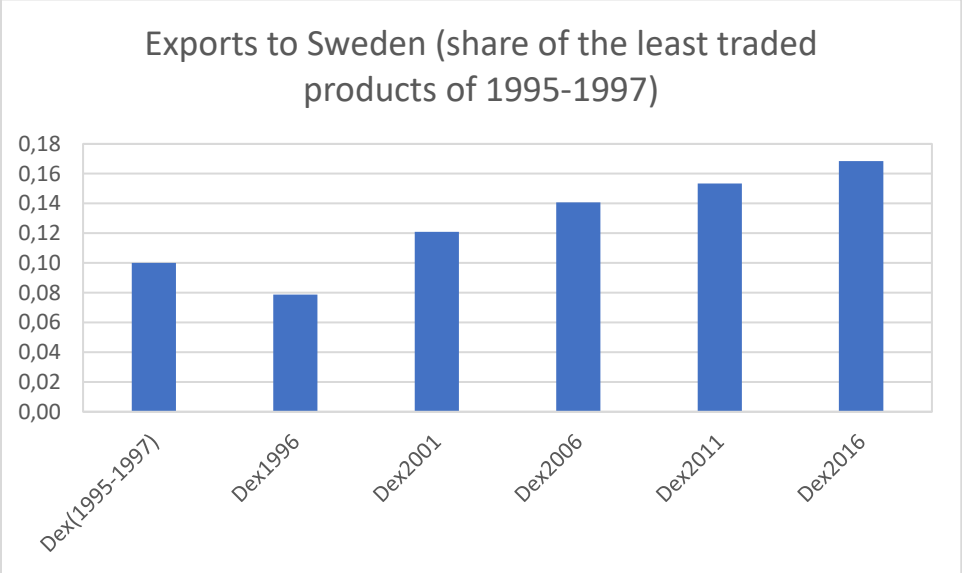

Exports to Portugal
0,25
0,20
0,15
0,10
0,05
0,00
Share 2016
0,10
0,20
0,30
0,40
0,50
0,60
0,70
0,80
0,89
1,00
Cumulative share 1995-1997

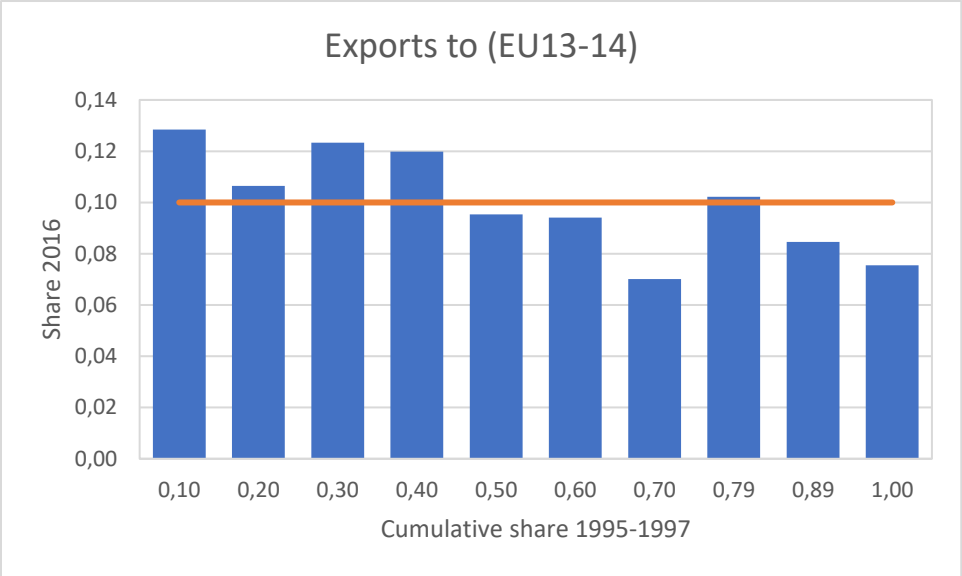

Exports to Portugal (share of the least traded products of 1995-1997)
0,25
0,20
0,15
0,10
0,05
0,00
Dex(1995-1997)
Dex1996
Dex2001
Dex2006
Dex2011
Dex2016

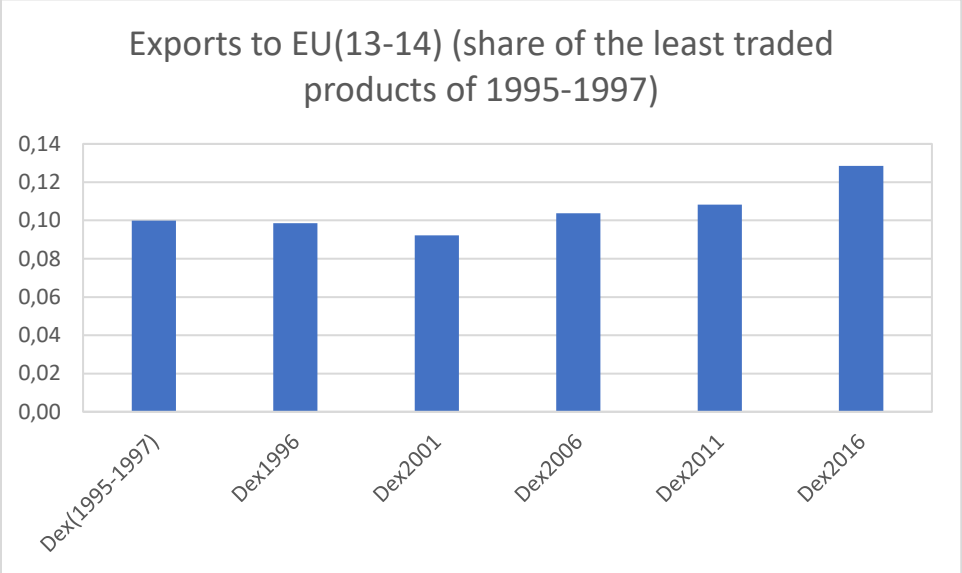

Exports to Spain
0,25
0,20
0,15
0,10
0,05
0,00
Share 2016
0,10
0,20
0,30
0,40
0,50
0,60
0,70
0,81
0,89
1,00
Cumulative share 1995-1997

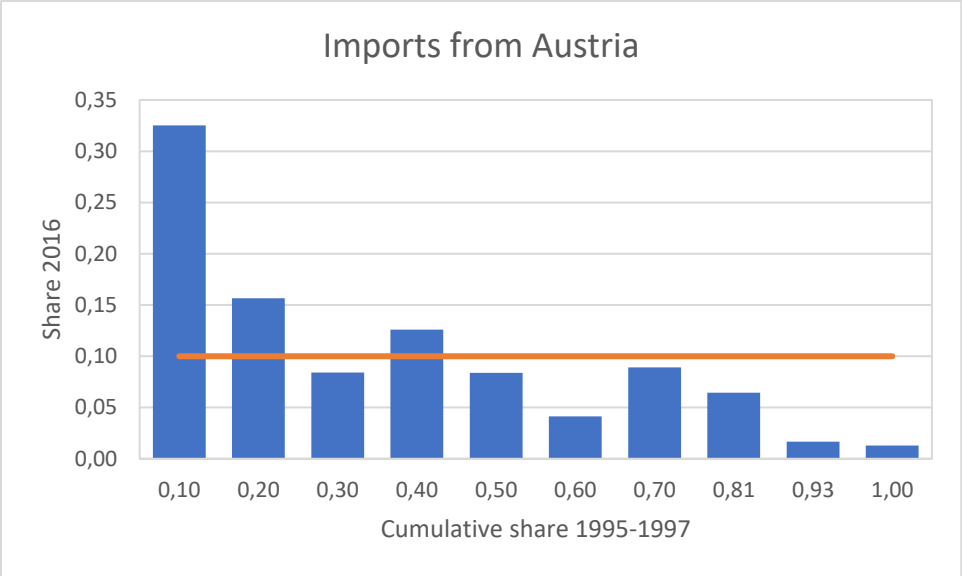

Exports to Spain (share of the least traded products of 1995-1997)
0,25
0,20
0,15
0,10
0,05
0,00
Dex(1995-1997)
Dex1996
Dex2001
Dex2006
Dex2011
Dex2016

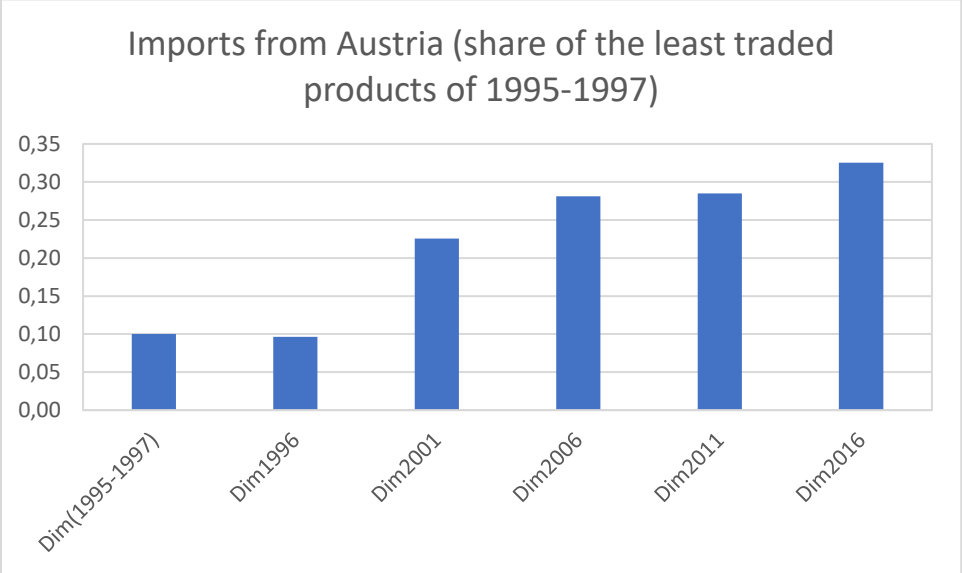

Exports to Sweden
Share 2016
0,20
0,18
0,16
0,14
0,12
0,10
0,08
0,06
0,04
0,02
0,00
0,10
0,20
0,30
0,40
0,50
0,60
0,70
0,80
0,90
1,00
Cumulative share 1995-1997

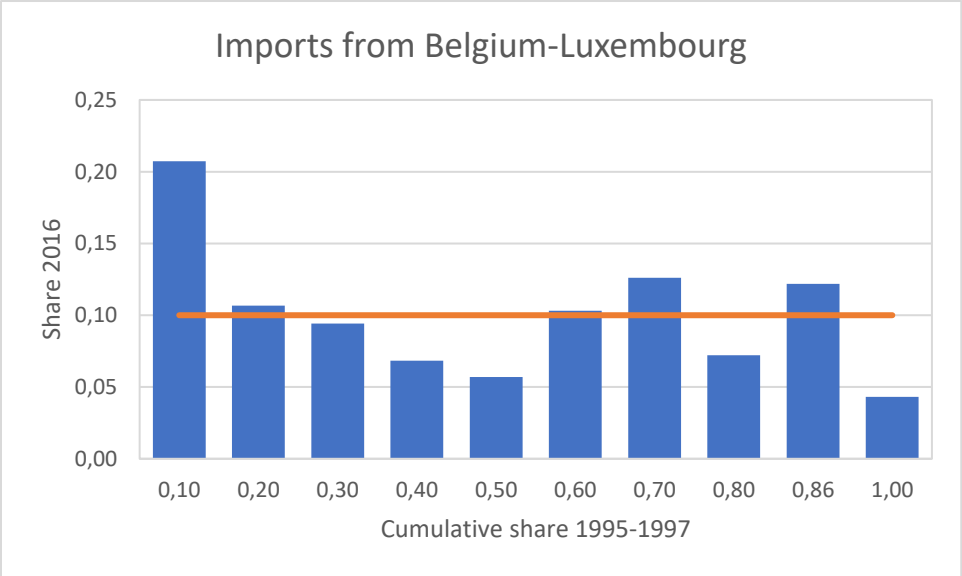

Exports to Sweden (share of the least traded products of 1995-1997)
0,18
0,16
0,14
0,12
0,10
0,08
0,06
0,04
0,02
0,00
Dex(1995-1997)
Dex1996
Dex2001
Dex2006
Dex2011
Dex2016

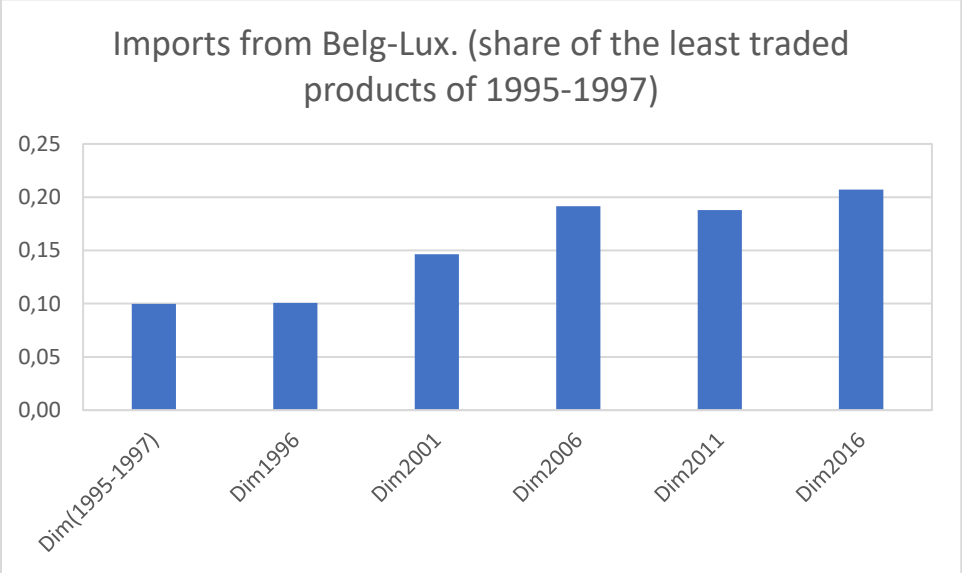

Exports to (EU13-14)
Share 2016
0,14
0,12
0,10
0,08
0,06
0,04
0,02
0,00
0,10
0,20
0,30
0,40
0,50
0,60
0,70
0,79
0,89
1,00
Cumulative share 1995-1997

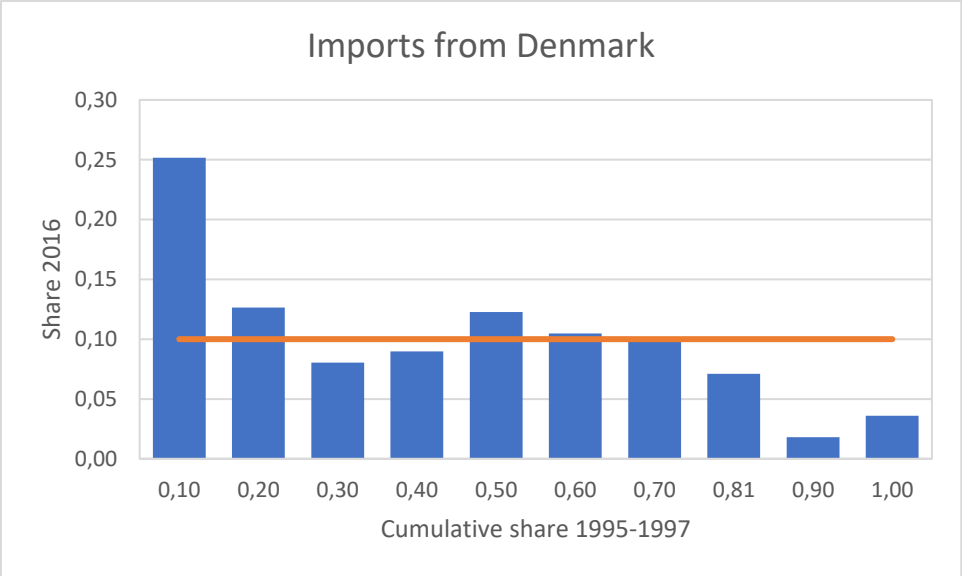

Exports to EU(13-14) (share of the least traded products of 1995-1997)
0,14
0,12
0,10
0,08
0,06
0,04
0,02
0,00
Dex(1995-1997)
Dex1996
Dex2001
Dex2006
Dex2011
Dex2016

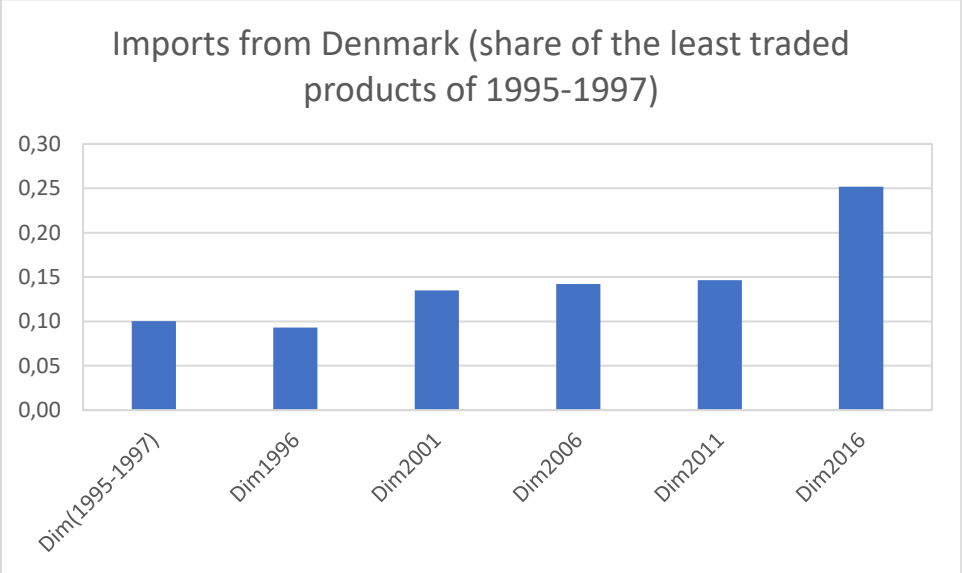

Imports from Austria
Share 2016
0,35
0,30
0,25
0,20
0,15
0,10
0,05
0,00
0,10
0,20
0,30
0,40
0,50
0,60
0,70
0,81
0,93
1,00
Cumulative share 1995-1997

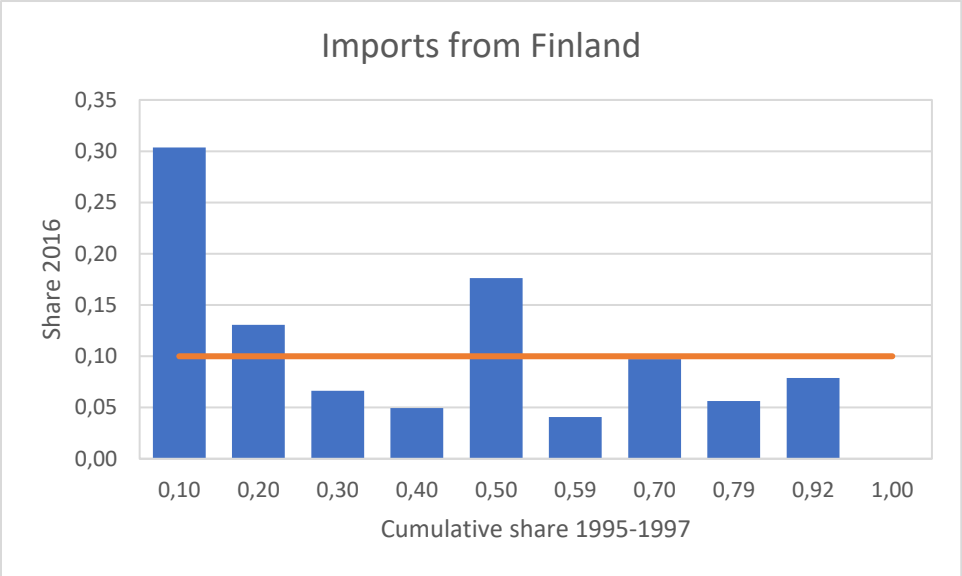

Imports from Austria (share of the least traded products of 1995-1997)
0,35
0,30
0,25
0,20
0,15
0,10
0,05
0,00
Dim(1995-1997)
Dim1996
Dim2001
Dim2006
Dim2011
Dim2016


Imports from Belgium-Luxembourg
0,25
0,20
0,15
0,10
0,05
0,00
Share 2016
0,10
0,20
0,30
0,40
0,50
0,60
0,70
0,80
0,86
1,00
Cumulative share 1995-1997

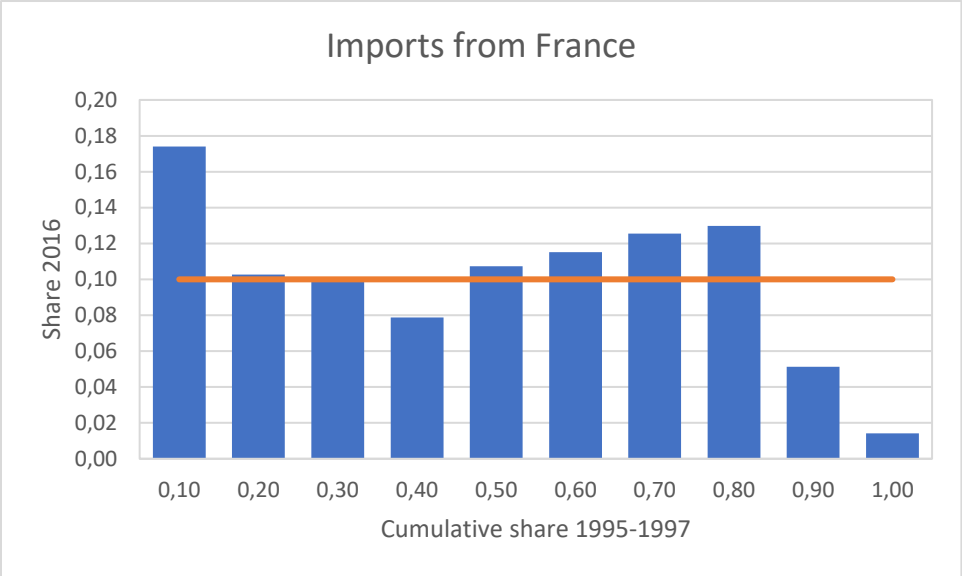

Imports from Belg-Lux. (share of the least traded products of 1995-1997)
0,25
0,20
0,15
0,10
0,05
0,00
Dim(1995-1997)
Dim1996
Dim2001
Dim2006
Dim2011
Dim2016

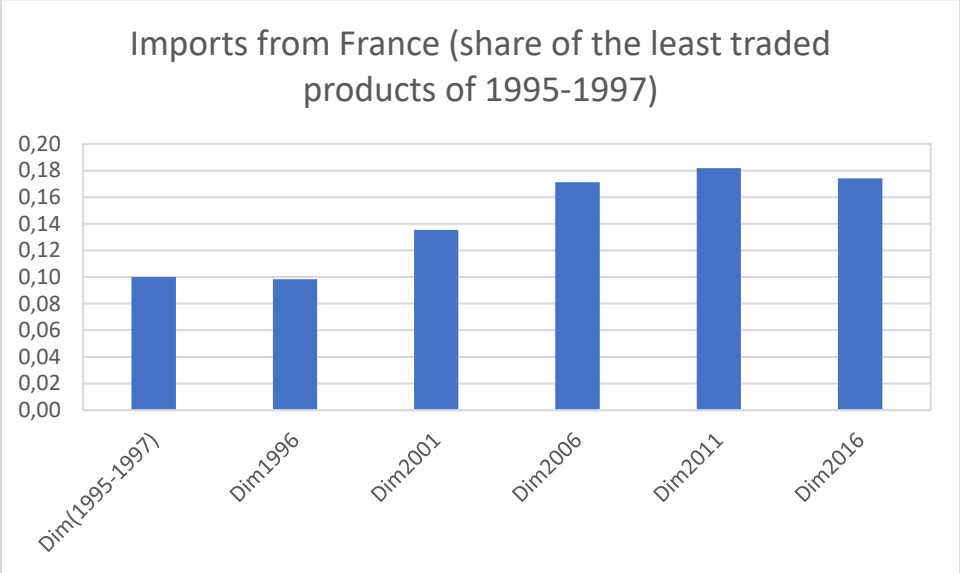

Imports from Denmark
0,30
0,25
0,20
0,15
0,10
0,05
0,00
Share 2016
0,10
0,20
0,30
0,40
0,50
0,60
0,70
0,81
0,90
1,00
Cumulative share 1995-1997

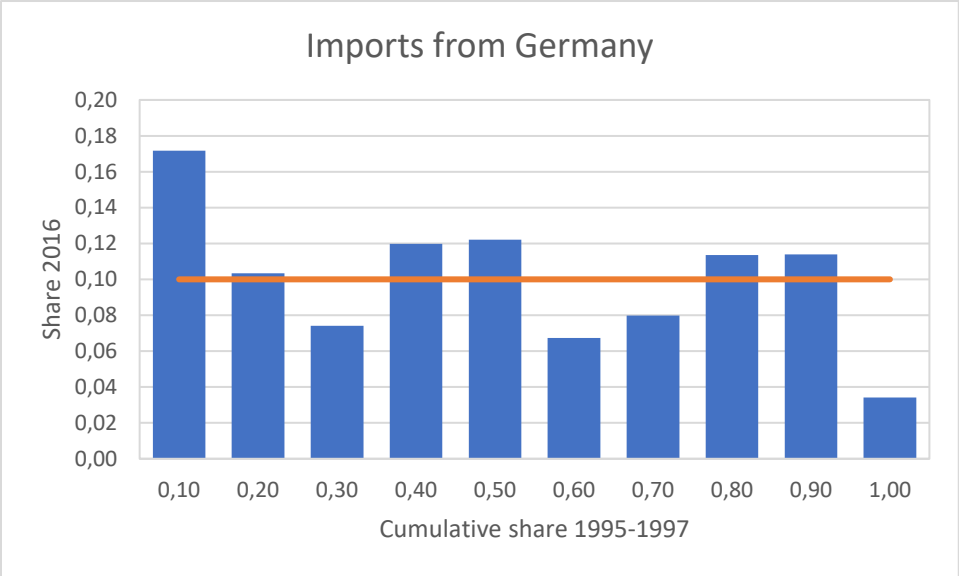

Imports from Denmark (share of the least traded products of 1995-1997)
0,30
0,25
0,20
0,15
0,10
0,05
0,00
Dim(1995-1997)
Dim1996
Dim2001
Dim2006
Dim2011
Dim2016

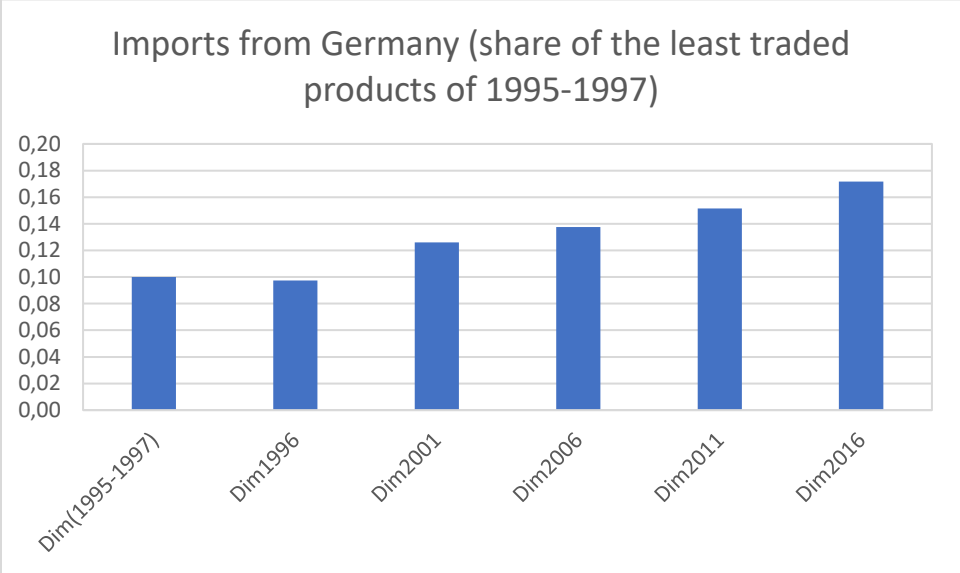

Imports from Finland
Share 2016
0,35
0,30
0,25
0,20
0,15
0,10
0,05
0,00
0,10
0,20
0,30
0,40
0,50
0,59
0,70
0,79
0,92
1,00
Cumulative share 1995-1997

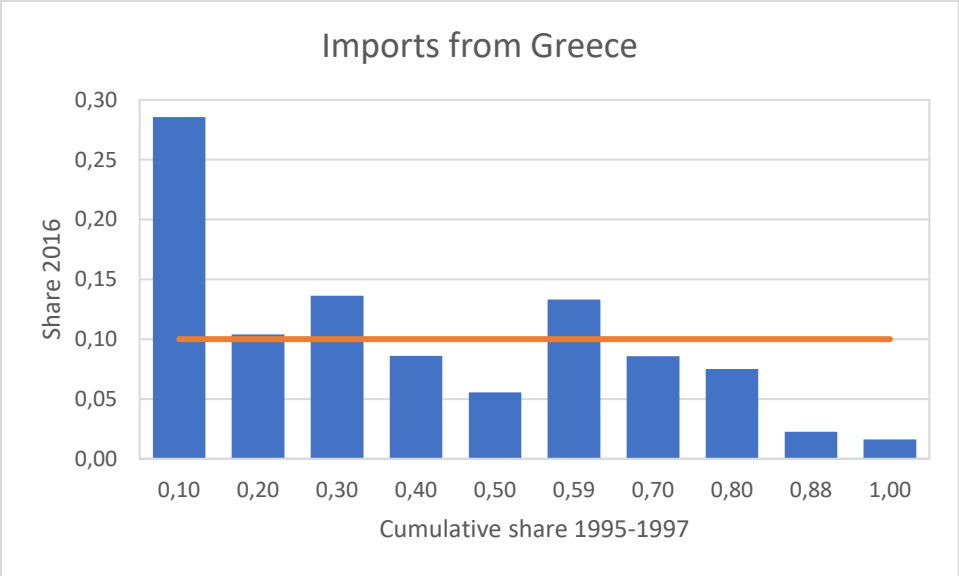

Imports from Finland (share of the least traded products of 1995-1997)
0,35
0,30
0,25
0,20
0,15
0,10
0,05
0,00
Dim(1995-1997)
Dim1996
Dim2001
Dim2006
Dim2011
Dim2016


Imports from France
Share 2016
0,20
0,18
0,16
0,14
0,12
0,10
0,08
0,06
0,04
0,02
0,00
0,10
0,20
0,30
0,40
0,50
0,60
0,70
0,80
0,90
1,00
Cumulative share 1995-1997


Imports from France (share of the least traded products of 1995-1997)
0,20
0,18
0,16
0,14
0,12
0,10
0,08
0,06
0,04
0,02
0,00
Dim(1995-1997)
Dim1996
Dim2001
Dim2006
Dim2011
Dim2016

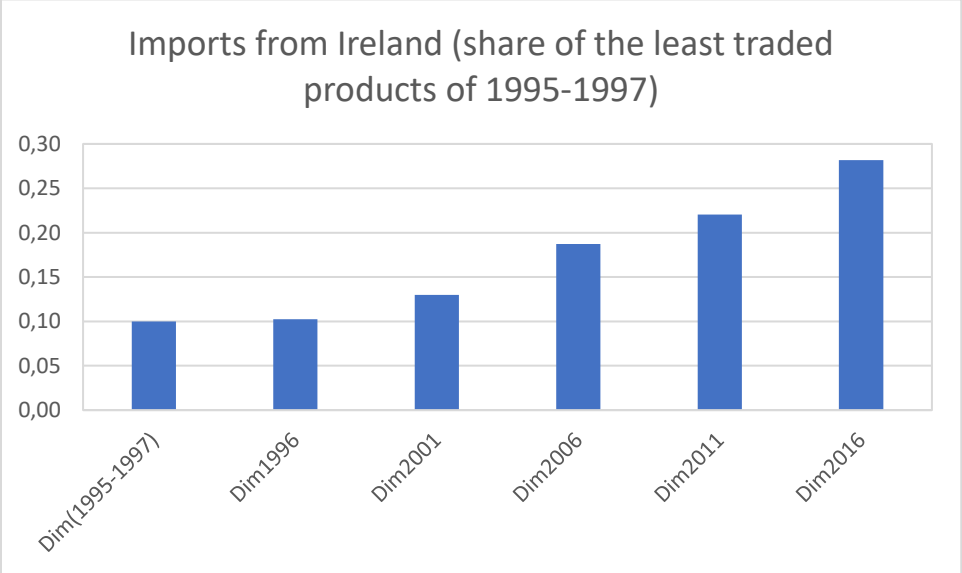

Imports from Germany
0,20
0,18
0,16
0,14
0,12
0,10
0,08
0,06
0,04
0,02
0,00
Share 2016
0,10
0,20
0,30
0,40
0,50
0,60
0,70
0,80
0,90
1,00
Cumulative share 1995-1997

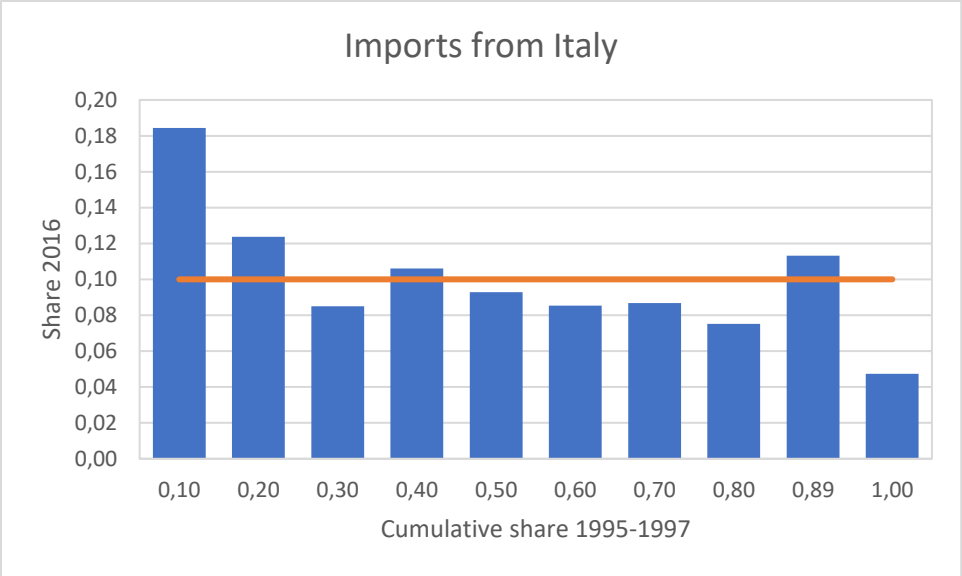

Imports from Germany (share of the least traded products of 1995-1997)
0,20
0,18
0,16
0,14
0,12
0,10
0,08
0,06
0,04
0,02
0,00
Dim(1995-1997)
Dim1996
Dim2001
Dim2006
Dim2011
Dim2016

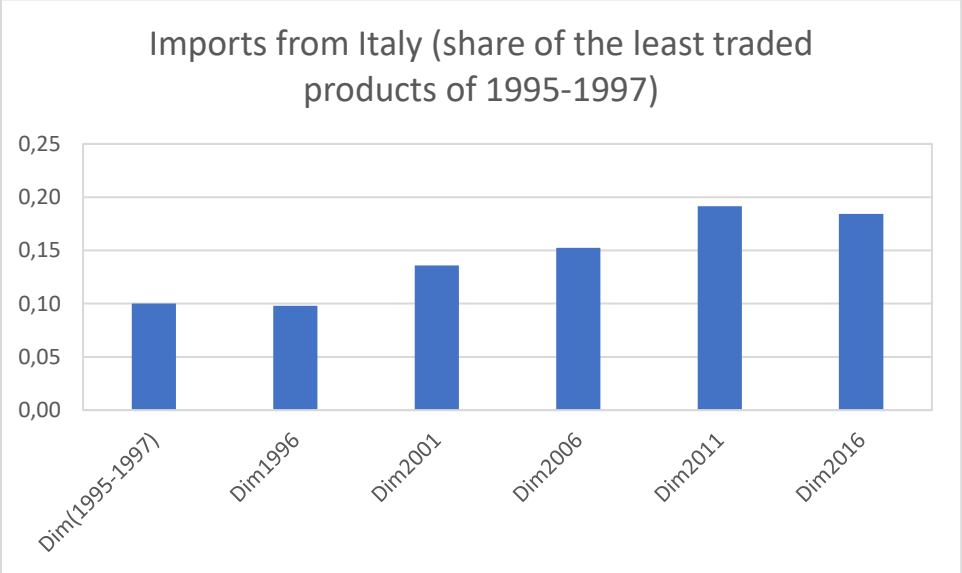

Imports from Greece
0,30
0,25
0,20
0,15
0,10
0,05
0,00
Share 2016
0,10
0,20
0,30
0,40
0,50
0,59
0,70
0,80
0,88
1,00
Cumulative share 1995-1997

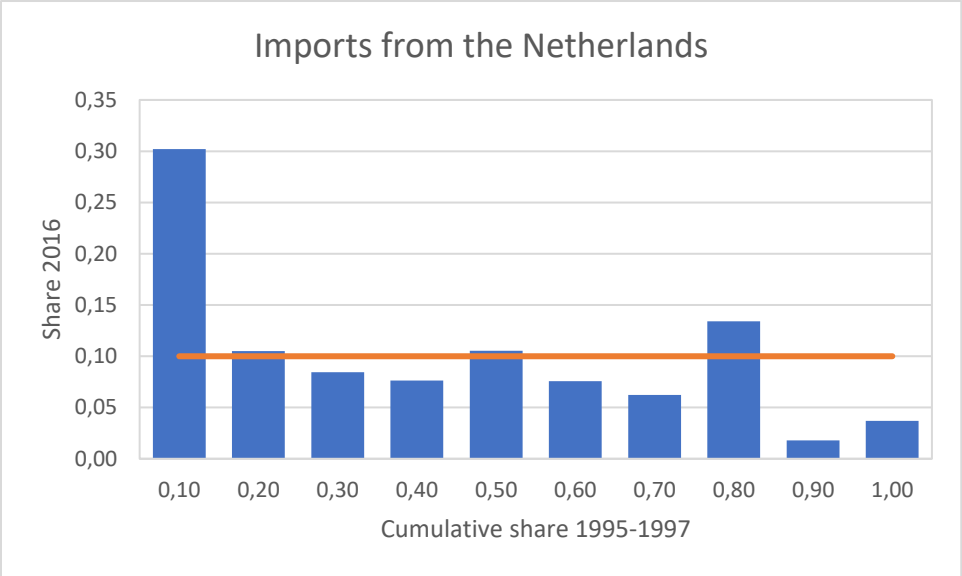

Imports from Greece (share of the least traded products of 1995-1997)
0,30
0,25
0,20
0,15
0,10
0,05
0,00
Dim(1995-1997)
Dim1996
Dim2001
Dim2006
Dim2011
Dim2016

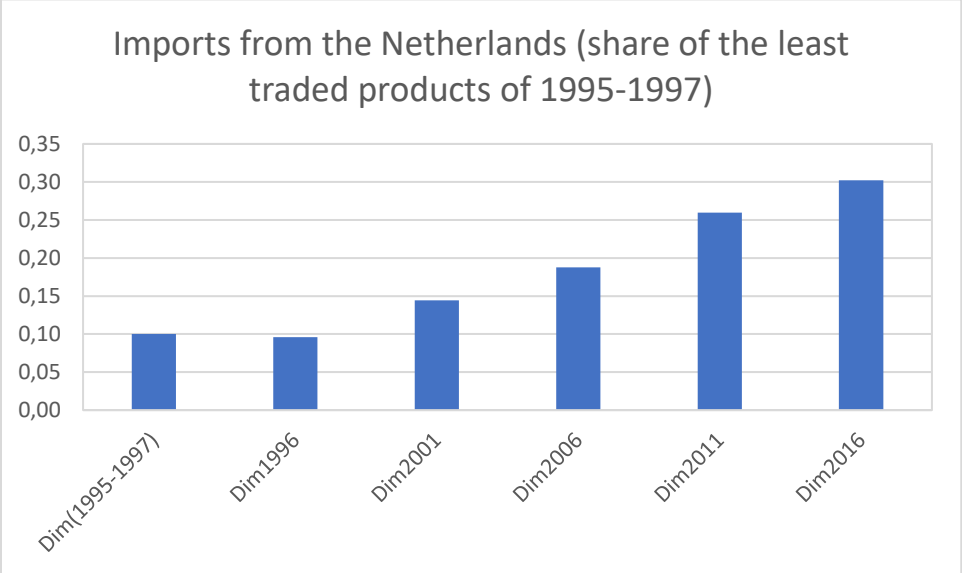

Imports from Ireland
0,30
0,25
0,20
0,15
0,10
0,05
0,00
Cím
0,10
0,20
0,30
0,40
0,50
0,60
0,69
0,81
0,91
1,00
Cím

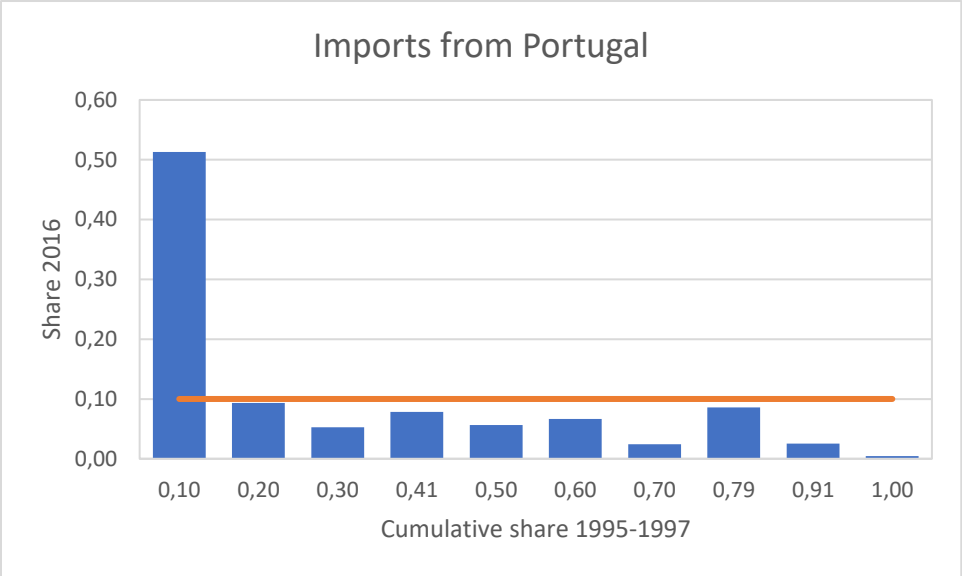

Imports from Ireland (share of the least traded products of 1995-1997)
0,30
0,25
0,20
0,15
0,10
0,05
0,00
Dim(1995-1997)
Dim1996
Dim2001
Dim2006
Dim2011
Dim2016

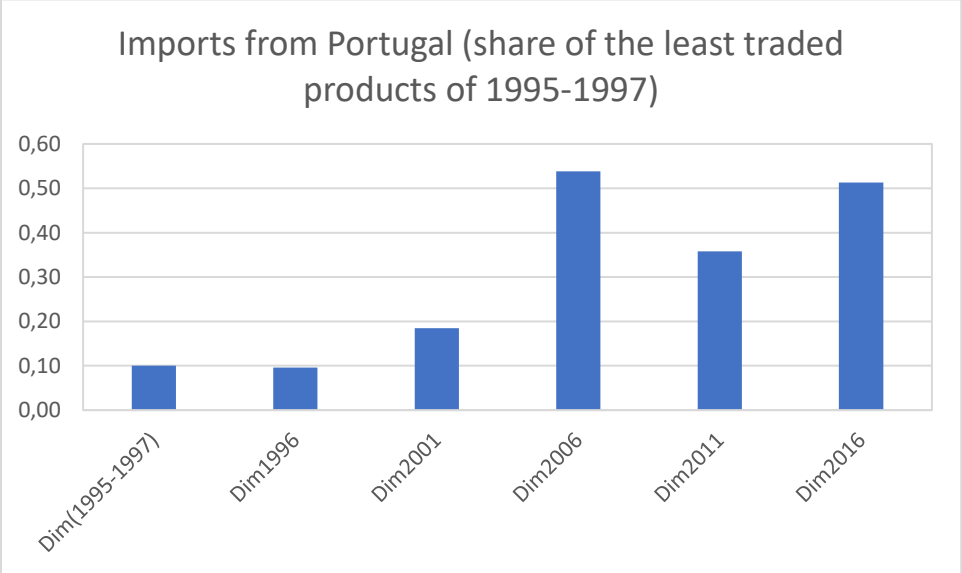

Imports from Italy
Share 2016
0,20
0,18
0,16
0,14
0,12
0,10
0,08
0,06
0,04
0,02
0,00
0,10
0,20
0,30
0,40
0,50
0,60
0,70
0,80
0,89
1,00
Cumulative share 1995-1997

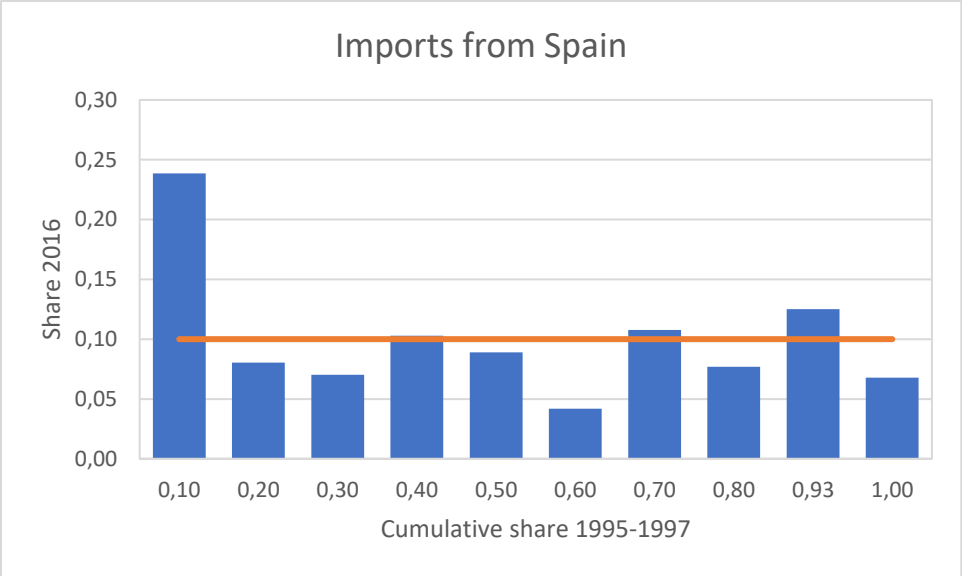

Imports from Italy (share of the least traded products of 1995-1997)
0,25
0,20
0,15
0,10
0,05
0,00
Dim(1995-1997)
Dim1996
Dim2001
Dim2006
Dim2011
Dim2016

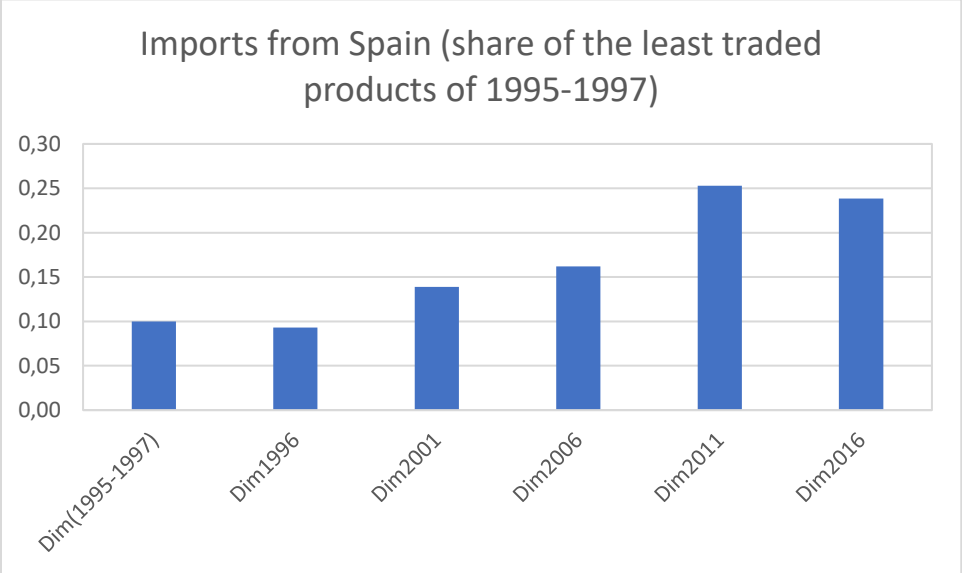

Imports from the Netherlands
0,35
0,30
0,25
0,20
0,15
0,10
0,05
0,00
Share 2016
0,10
0,20
0,30
0,40
0,50
0,60
0,70
0,80
0,90
1,00
Cumulative share 1995-1997

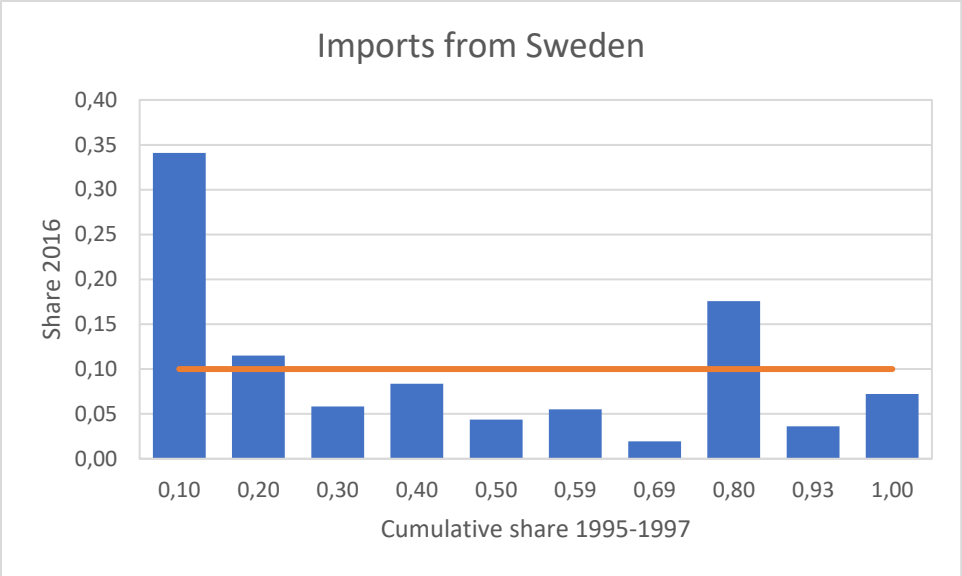

Imports from the Netherlands (share of the least traded products of 1995-1997)
0,35
0,30
0,25
0,20
0,15
0,10
0,05
0,00
Dim(1995-1997)
Dim1996
Dim2001
Dim2006
Dim2011
Dim2016

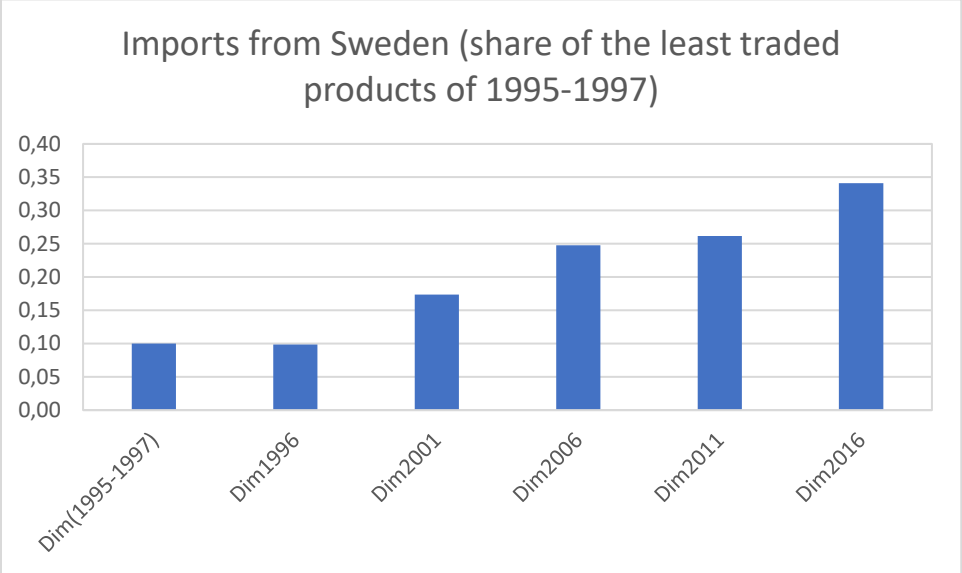

Imports from Portugal
0,60
0,50
0,40
0,30
0,20
0,10
0,00
Share 2016
0,10
0,20
0,30
0,41
0,50
0,60
0,70
0,79
0,91
1,00
Cumulative share 1995-1997

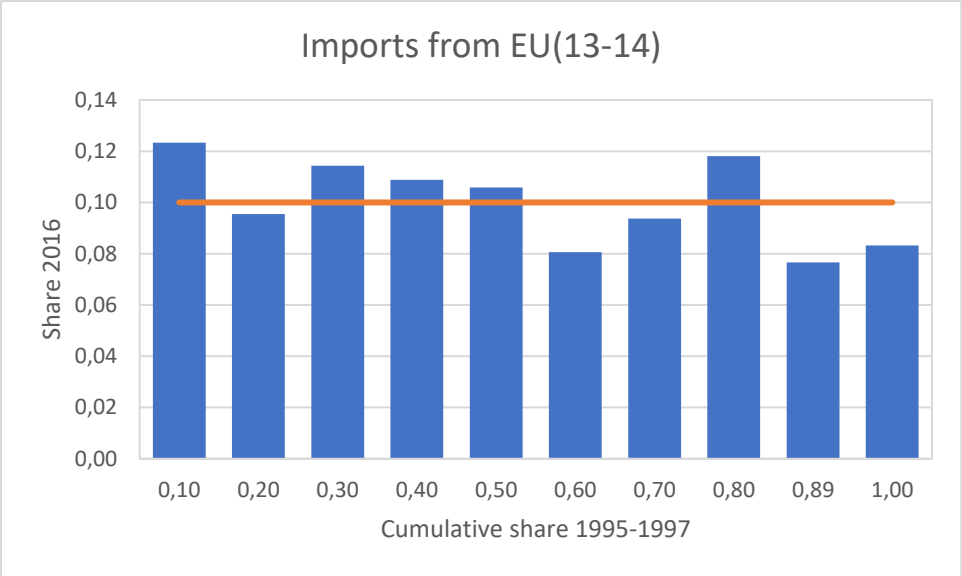

Imports from Portugal (share of the least traded products of 1995-1997)
0,60
0,50
0,40
0,30
0,20
0,10
0,00
Dim(1995-1997)
Dim1996
Dim2001
Dim2006
Dim2011
Dim2016

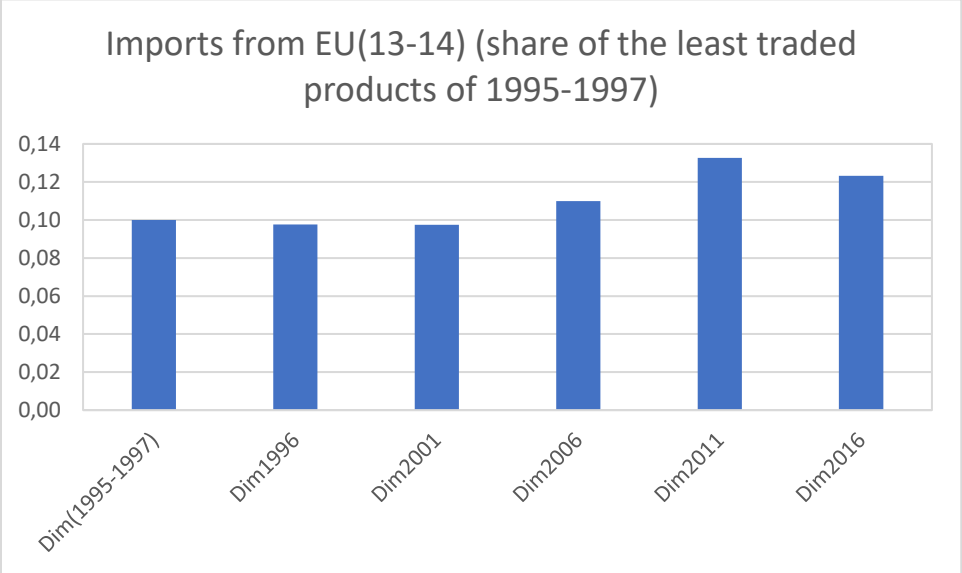

Imports from Spain
0,30
0,25
0,20
0,15
0,10
0,05
0,00
Share 2016
0,10
0,20
0,30
0,40
0,50
0,60
0,70
0,80
0,93
1,00
Cumulative share 1995-1997


Imports from Spain (share of the least traded products of 1995-1997)
0,30
0,25
0,20
0,15
0,10
0,05
0,00
Dim(1995-1997)
Dim1996
Dim2001
Dim2006
Dim2011
Dim2016


Imports from Sweden
0,40
0,35
0,30
0,25
0,20
0,15
0,10
0,05
0,00
Share 2016
0,10
0,20
0,30
0,40
0,50
0,59
0,69
0,80
0,93
1,00
Cumulative share 1995-1997


Imports from Sweden (share of the least traded products of 1995-1997)
0,40
0,35
0,30
0,25
0,20
0,15
0,10
0,05
0,00
Dim(1995-1997)
Dim1996
Dim2001
Dim2006
Dim2011
Dim2016


Imports from EU(13-14)
0,14
0,12
0,10
0,08
0,06
0,04
0,02
0,00
Share 2016
0,10
0,20
0,30
0,40
0,50
0,60
0,70
0,80
0,89
1,00
Cumulative share 1995-1997


Imports from EU(13-14) (share of the least traded products of 1995-1997)
0,14
0,12
0,10
0,08
0,06
0,04
0,02
0,00
Dim(1995-1997)
Dim1996
Dim2001
Dim2006
Dim2011
Dim2016