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7 Basic taxonomy of exporting activity parameters for Poland and Spain

In the following chapter, various parameters of regions' exporting activity are presented. The diagnosis bears important benefits. It is the sine qua non condition for an effective exports promotion and shows the character of regions' vulnerability. Exports characteristics will constitute a base for taxonomies of regions. Similar regions will be identified. Promotion tools could then be used for those regions, depending on which group they are in. For instance, other tools of promotion are relevant for regions with a high share of FDIs, high-tech industries and high exports per capita; and others for regions with a high share of agricultural products, low-tech products oriented and low exports per capita.

7.1 Geographical structure

As exports are usually analysed at country level, many interesting regional differences in geographical structure are not paid attention to. Both Poland and Spain belong to the largest EU members, with a relatively large number of NUTS 2 regions, having different structural characteristics. Both countries are peripheral in the EU and border a "big" MS (France for Spain and Germany for Poland), which is expected to result in regions' specific geographical structure of exports because gravity forces come to play. For instance, western regions of Poland are expected to have a higher share of Germany in their exports than eastern regions, which shall also be reflected in the overall EU share in exports thereof. The same regularity shall occur for the Spanish regions.

As regards the relations with the EU28 or in fact, with 27 MS of the EU, the highest shares (exceeding 80%) are observed predominantly for Poland's regions (for 9 out of 16) (Table 7.1). The level higher than 80% is observed only for one Spanish region, Extramadura. As for relations with the NMS, regions of Poland show higher shares (than Spanish ones), which reflects the gravity forces as well as the special position of Poland and the other NMS in the cooperation links established by MNEs, predominantly in the automobile industry. For none of the Spanish regions is the NMS share higher than 10%, while Zachodniopomorskie is the only Polish region in which the NMS share is lower than 10% (5.5).

Table 7.1: Regional exports by destinations in 2015

Code	Region name	Share of exports directed in 2015 to						LQ*	
		EU 27	EU 15	NMS	BRU	FAR	REST	EU 27	NMS
PL11	Łódzkie	74.1	54.5	19.6	8.0	4.7	13.1	0.938	1.064
PL12	Mazowieckie	77.1	55.3	21.8	7.2	2.7	13.0	0.976	1.187
PL21	Małopolskie	84.6	60.2	24.3	4.3	2.8	8.4	1.070	1.323
PL22	Śląskie	86.6	64.0	22.6	2.9	2.1	8.4	1.096	1.229
PL31	Lubelskie	81.0	63.7	17.2	6.6	3.7	8.7	1.025	0.937
PL32	Podkarpackie	62.9	50.8	12.1	6.5	4.2	26.3	0.796	0.660
PL33	Świętokrzyskie	80.5	57.1	23.4	5.7	0.8	12.9	1.019	1.274
PL34	Podlaskie	76.2	52.5	23.7	9.8	4.2	9.9	0.964	1.287
PL41	Wielkopolskie	83.9	69.2	14.6	3.5	1.7	11.0	1.061	0.795
PL42	Zachodniopomorskie	65.5	60.1	5.5	2.4	2.4	29.7	0.829	0.298
PL43	Lubuskie	87.8	73.4	14.4	4.3	1.7	6.3	1.111	0.785
PL51	Dolnośląskie	83.2	63.0	20.2	2.4	5.1	9.3	1.052	1.096
PL52	Opolskie	86.4	63.6	22.8	3.7	1.4	8.6	1.093	1.239
PL61	Kujawsko-pomorskie	83.1	69.7	13.3	5.7	2.3	9.0	1.051	0.724
PL62	Warmińsko-mazurskie	77.8	63.7	14.1	4.9	3.9	13.5	0.984	0.765
PL63	Pomorskie	60.4	47.7	12.7	4.1	4.3	31.1	0.764	0.692
ES11	Galicia	75.2	68.8	6.4	0.7	3.2	20.9	1.143	1.091
ES12	Principality of Asturias	53.7	50.1	3.6	0.6	4.2	41.5	0.817	0.617
ES13	Cantabria	70.4	65.1	5.2	0.4	3.1	26.1	1.070	0.898
ES21	Basque Community	64.0	57.7	6.3	0.9	5.6	29.6	0.973	1.077
ES22	Navarre	72.1	63.9	8.2	0.6	3.0	24.3	1.096	1.404
ES23	La Rioja	73.2	68.8	4.4	0.5	2.9	23.4	1.113	0.758
ES24	Aragon	73.0	67.8	5.2	1.0	5.4	20.6	1.111	0.899
ES30	Madrid	57.7	53.8	3.9	0.7	7.0	34.7	0.877	0.664
ES41	Castile-Leon	76.4	66.9	9.5	0.6	5.2	17.8	1.161	1.631
ES42	Castile-La Mancha	74.7	69.8	4.9	1.6	5.0	18.7	1.136	0.845
ES43	Extremadura	80.5	77.5	3.0	1.9	2.5	15.2	1.224	0.518
ES51	Catalonia	65.5	59.6	5.8	0.8	5.7	28.0	0.996	1.001
ES52	Valencian Community	61.3	55.7	5.7	1.3	4.4	32.9	0.933	0.976
ES53	Balearic Islands	79.2	76.2	3.0	0.2	3.7	16.9	1.205	0.516

continued **Table 7.1:** Regional exports by destinations in 2015

Code	Region name	Share of exports directed in 2015 to						LQ*	
		EU 27	EU 15	NMS	BRU	FAR	REST	EU 27	NMS
ES61	Andalusia	61.2	55.0	6.2	0.5	7.4	30.9	0.931	1.062
ES62	Region of Murcia	65.6	61.1	4.6	0.5	9.3	24.5	0.998	0.784
ES63	Ceuta	3.1	3.1	0.0	0.0	58.5	38.4	0.047	0.000
ES64	Melilla	17.9	17.7	0.1	0.0	0.1	82.0	0.272	0.023
ES70	Canary Islands	31.1	30.5	0.6	0.1	8.7	60.1	0.473	0.109

Source: own calculations based on the data obtained from Customs Chamber in Warsaw and Spanish DataComex database (<http://datacomex.comercio.es>).

Notes: Shares are presented in percentages. NMS – new member states of the EU, BRU – Belarus, Russia, Ukraine, FAR – Far East countries, REST – rest of the world. We refer to EU 27 as the country of export's origin is located in the EU.

Relations with BRU are far more important for Poland's regions, which again reflects the gravity forces (proximity and adjacency). Only for four Spanish regions (Aragon, Castile-La Mancha, Extremadura and Valencian Community) is BRU share 1% or more, while for Poland's regions the corresponding shares are much higher, for Podlaskie (situated at the eastern border of Poland), reaching almost 10%. Shares of FAR countries are relatively lower for Polish regions than for Spanish ones. In Spain, Ceuta is an evident outlier, while in Poland the highest FAR share is observed for Dolnośląskie.

Substantial regional differences are identified as regards the importance of REST countries in exports. In Poland, the highest REST shares in exports are for those regions in which the shipbuilding or metal constructions industries are located (Pomorskie, Zachodniopomorskie), and the production is directed towards non-EU countries, such as Norway and flags of convenience countries. Also, for Podkarpackie the REST share is high, as in this region there is an aircraft industry cluster located, which implies strong production/cooperative and trade relations with the US. For Spanish regions, the REST shares are higher, the outlier being Melilla (82%).

Regions' different positions in their relative intensity of geographical trade links can better be captured when the LQ concept is used.

$$LQ_i = \frac{EX_i}{EX_j}$$

Where:

LQ_i – location quotient in region i , representing the role of EU27 or NMS in exports,

EX_i – the share of a region's exports directed to EU27 or NMS in total region's exports,

EX_j – the share of a country's exports directed to EU27 or NMS in total national exports.

Higher dispersion of LQ indices for EU27 is observed for Spanish regions than Polish ones. In the Spanish and Polish regions treated jointly, the lowest LQ is for the EU27 are for Ceuta, Melilla and Canary Islands (which obviously reflects their idiosyncratic character), while the highest is for Extramadura and Balearic Islands. In trade relations with NMS, Poland's regions show higher LQ indices, which again reflects their proximity to the countries forming the NMS group. Much depends, however, on the specific character of the region's exports profile; as, for instance, for Zachodniopomorskie the lowest LQ is observed (0.298), if we do not consider Spanish outliers, such as Balearic and Canary Islands and Ceuta and Melilla.

The above-presented differences in a region's geographic export profile bring important information showing the region's vulnerability for economic and trade shocks if they occur in the MS or outside the EU. They may also be considered if changes in the EU commercial policy are implemented or planned, such as new trade agreements. Also, any potential trade conflicts or disputes between the EU and its trading partners can be analysed in terms of regions' export intensity and the vulnerability thereof.

Regions' export profiles in terms of their geographical links are changing. Firms are searching for new partners and exports markets, market niches are discovered, regional authorities and promotion agencies are using advanced tools to boost exports and direct them to the new destinations. Table 7.2 presents these alterations, expressed in shares and in changes in LQ. The changes shall be monitored. They reflect the changing vulnerability as well as indicate the assistance possibly required by exporting firms in retaining their position in the markets already served or in entering new ones.

Regions' exports geographical profiles can also be described and interpreted in a more detailed way, with the use of information showing the shares of the particular countries in a region's exports. Such a detailed analysis is beyond the scope of the presented inquiry. Only the overall concentration of exports is presented (Fig. 7.1). As can be seen, regions significantly differ in the presented ranking. The lowest share of the three most important countries in exports is observed for the Principality of Asturias and Andalusia, while the highest is for Opolskie, Lubuskie and Extramadura (if outliers such as Ceuta and Melilla are not considered). The above-presented analysis showing the geographical concentration of exports need further, much more detailed analysis at regions' level. Generally, it is difficult to unequivocally judge what better suits regional exports: geographical concentration or diversification. The related discussion showing the pros and cons of concentration is presented for product structure of exports in the next paragraphs.

Table 7.2: Change in the share of regional exports directed to particular destinations in 2005-2015

Code	Region name	Change in the share of exports directed to						Change in LQ*	
		EU 27	EU 15	NMS	BRU	FAR	REST	EU 27	NMS
PL11	Łódzkie	-2.1	-6.5	4.5	-6.1	3.4	4.7	-0.02	-0.02
PL12	Mazowieckie	4.9	2.6	2.4	-7.8	-0.2	3.0	0.06	-0.21
PL21	Małopolskie	2.6	0.3	2.3	-3.9	0.5	0.8	0.03	-0.25
PL22	Śląskie	0.1	-8.0	8.1	0.0	1.1	-1.1	0.00	0.19
PL31	Lubelskie	11.2	6.9	4.2	-8.8	-2.9	0.5	0.14	0.01
PL32	Podkarpackie	-7.3	-2.9	-4.3	-8.5	2.5	13.3	-0.09	-0.52
PL33	Świętokrzyskie	5.3	-3.0	8.3	-5.5	-2.5	2.7	0.07	0.19
PL34	Podlaskie	4.1	-5.6	9.7	-10.5	2.3	4.2	0.05	0.28
PL41	Wielkopolskie	1.0	-2.7	3.7	-2.4	0.6	0.8	0.01	0.01
PL42	Zachodniopomorskie	-11.3	-13.6	2.3	-1.5	0.8	12.0	-0.14	0.07
PL43	Lubuskie	3.7	-1.5	5.2	-4.4	0.5	0.2	0.05	0.12
PL51	Dolnośląskie	-6.2	-12.4	6.2	-0.4	2.2	4.5	-0.08	0.09
PL52	Opolskie	-0.4	-7.6	7.1	-0.8	-0.3	1.5	0.00	0.12
PL61	Kujawsko-pomorskie	5.4	1.1	4.3	-4.8	-1.2	0.6	0.07	0.08
PL62	Warmińsko-mazurskie	-3.7	-7.9	4.2	-1.9	2.8	2.8	-0.05	0.06
PL63	Pomorskie	-1.9	-7.9	6.0	-0.2	1.3	0.8	-0.02	0.21
ES11	Galicja	1.5	-2.1	3.6	0.4	-0.3	-1.6	0.15	0.36
ES12	Principality of Asturias	-20.3	-22.3	1.9	0.4	2.2	17.7	-0.18	0.18
ES13	Cantabria	-3.3	-5.4	2.0	0.1	-0.4	3.6	0.07	0.04
ES21	Basque Community	-7.5	-9.6	2.2	0.4	2.0	5.1	0.01	-0.02
ES22	Navarre	-8.6	-13.4	4.8	-0.1	0.1	8.5	0.00	0.49
ES23	La Rioja	-7.7	-9.4	1.8	-1.5	1.6	7.5	0.02	0.05
ES24	Aragon	-12.1	-14.1	2.0	0.3	4.1	7.7	-0.04	0.02
ES30	Madrid	-12.8	-14.4	1.5	0.1	3.4	9.4	-0.08	0.04
ES41	Castile-Leon	-11.8	-15.5	3.7	0.1	3.8	7.9	-0.03	0.07
ES42	Castile-La Mancha	-7.2	-8.0	0.8	0.4	2.9	3.9	0.03	-0.26
ES43	Extremadura	-9.9	-11.5	1.6	-0.4	1.4	8.9	0.00	0.15
ES51	Catalonia	-9.2	-10.8	1.6	-0.2	2.2	7.2	-0.02	-0.13

continued **Table 7.2:** Change in the share of regional exports directed to particular destinations in 2005-2015

Code	Region name	Change in the share of exports directed to						Change in LQ*	
		EU 27	EU 15	NMS	BRU	FAR	REST	EU 27	NMS
ES52	Valencian Community	-8.8	-9.8	1.0	-0.7	0.7	8.8	-0.02	-0.28
ES53	Balearic Islands	26.8	24.7	2.2	-0.1	-2.6	-24.1	0.50	0.29
ES61	Andalusia	-4.4	-7.7	3.3	0.0	2.8	1.6	0.04	0.28
ES62	Region of Murcia	-2.5	-2.9	0.4	-0.1	1.4	1.1	0.08	-0.34
ES63	Ceuta	-11.8	-11.2	-0.5	0.0	58.5	-46.8	-0.15	-0.15
ES64	Melilla	7.6	14.8	-7.2	-4.2	0.1	-3.5	0.13	-1.95
ES70	Canary Islands	-20.2	-20.1	-0.1	-0.2	4.3	16.1	-0.22	-0.08

Source: own calculations based on the data obtained from Customs Chamber in Warsaw and Spanish DataComex database (<http://datacomex.comercio.es>).

Notes: Changes in shares are presented in pp. NMS – new member states, BRU – Belarus, Russia, Ukraine, FAR – Far East countries, REST – rest of the world.

Figure 7.1: Share of exports to 3-5-10 most important partners

Source: own elaboration.

Information: Shares are presented in percentages. Sh_ex_top3 depicts the share of 3 most important destination countries in total regions' exports. Sh_ex_top5 and sh_ex_top10 denote the share of 5 and 10 most important trade partners respectively.

7.2 Product structure, concentration and revealed comparative advantages

One of the criteria by which to assess regions' exports relates to the product structure. To an extent, it reflects regional production capabilities; however, a region can also perform an intermediary function, which is usually the case in coastal regions or the ones in which transport and logistics hubs are located. Table 7.3 shows the structure of exports by CN sections, which provides a rough view of the characteristics of exports. 21 CN sections were grouped into 11 sections to improve the data visibility and to capture the main structural characteristics and the changes thereof. The highest (above 20%) shares of s1 (live animals, animal and vegetable product, animal and vegetable fats and oils) are observed in exports of Extramadura, Andalusia, Region of Murcia, and Podlaskie, while the lowest (below 5%) for Principality of Asturias, Cantabria, Basque Community, La Rioja, Madrid, Ceuta, Małopolskie, Śląskie, Podkarpackie, Dolnośląskie and Opolskie. The highest shares of particular sections are a characteristic feature of small territories, such as Ceuta and Melilla. However, also for other regions that cannot be treated as outliers, high shares occur. The examples are 50.8% for base metals and articles of base metal in the Principality of Asturias; 39.5% in Podkarpackie, 37.3% in Dolnośląskie, 30.5% in Mazowieckie for electromechanical and precision industry products; 43.8% for vehicles, aircrafts in Navarre and 38.4% in Aragon 36.7% in Castile-Leon and 34.1% in Śląskie.

Table 7.3: Share of exports by CN sections in regions of Poland and Spain in 2015

Region	s1	s2	s3	s4	s5	s6	s7	s8	s9	s10	s11	Bray-Curtis 2005- 2015
(ES11) Galicia	10.0	3.9	9.2	2.5	3.6	26.0	2.1	6.6	7.2	27.9	1.2	0.192
(ES12) Principality of Asturias	3.4	1.4	15.8	1.4	4.9	0.7	2.1	50.8	12.7	5.8	1.0	0.111
(ES13) Cantabria	3.8	11.3	10.8	13.3	1.3	5.0	0.9	23.1	19.5	10.7	0.3	0.216
(ES21) Basque Community	1.5	2.8	13.7	7.1	2.9	0.5	1.5	23.7	21.6	23.7	1.1	0.058
(ES22) Navarre	5.4	6.3	1.7	3.5	3.4	0.3	0.7	8.6	25.5	43.8	0.7	0.076
(ES23) La Rioja	2.1	35.4	4.1	7.9	7.1	15.6	2.0	12.9	5.1	6.1	1.7	0.112
(ES24) Aragon	8.5	2.5	4.5	3.9	3.3	12.6	0.7	4.5	18.2	38.4	3.0	0.181
(ES30) Madrid	3.0	2.1	28.4	5.7	2.2	4.4	5.0	4.2	21.5	21.2	2.2	0.131

continued **Table 7.3:** Share of exports by CN sections in regions of Poland and Spain in 2015

Region	s1	s2	s3	s4	s5	s6	s7	s8	s9	s10	s11	Bray-Curtis 2005- 2015
(ES41) Castile-Leon	7.1	5.6	11.3	5.3	2.1	0.4	1.6	5.2	23.5	36.7	1.2	0.131
(ES42) Castile-La Mancha	17.1	18.0	7.7	9.6	1.8	10.9	4.0	7.6	17.6	2.9	2.7	0.154
(ES43) Extremadura	24.8	33.7	3.8	4.8	7.7	2.2	4.0	11.8	5.7	1.2	0.3	0.163
(ES51) Catalonia	9.1	5.3	22.3	9.2	3.3	8.2	1.6	6.1	15.0	17.5	2.4	0.096
(ES52) Valencian Community	17.2	3.9	11.7	5.0	1.3	7.2	10.5	4.1	10.2	25.9	3.0	0.106
(ES53) Balearic Islands	6.9	1.9	21.6	20.5	0.5	11.6	2.2	1.0	11.4	21.6	0.9	0.452
(ES61) Andalusia	33.9	5.5	20.2	2.5	1.1	1.8	2.6	13.1	10.0	8.4	0.9	0.089
(ES62) Region of Murcia	35.8	11.1	31.8	8.5	0.4	1.6	0.3	4.6	4.1	0.3	1.4	0.237
(ES63) Ceuta	0.0	1.1	20.1	2.1	0.3	10.0	0.8	58.3	6.3	0.2	0.9	0.820
(ES64) Melilla	13.3	0.1	0.5	1.8	0.5	1.7	0.6	1.2	80.2	0.1	0.0	0.564
(ES70) Canary Islands	15.0	2.9	24.4	0.9	2.5	1.6	4.2	2.9	17.2	27.8	0.6	0.466
(PL11) Łódzkie	12.2	6.6	7.8	8.3	4.0	9.3	2.2	13.4	25.3	6.2	4.9	0.212
(PL12) Mazowieckie	12.4	9.0	18.2	6.3	3.3	2.1	1.3	6.3	30.5	4.6	6.0	0.072
(PL21) Małopolskie	4.9	7.4	6.9	11.6	5.1	1.4	2.3	15.4	27.5	14.5	3.0	0.124
(PL22) Śląskie	1.8	2.0	9.0	7.4	1.1	1.5	4.8	16.4	17.7	34.1	4.2	0.158
(PL31) Lubelskie	17.9	7.7	20.2	3.3	3.5	2.3	0.5	7.4	13.0	17.2	7.1	0.152
(PL32) Podkarpackie	2.1	2.1	4.7	9.7	6.9	1.2	2.2	10.5	39.5	16.4	4.5	0.229
(PL33) Świętokrzyskie	5.5	4.9	5.5	3.1	10.8	5.0	19.2	21.3	18.1	3.8	2.9	0.110
(PL34) Podlaskie	34.2	7.0	2.9	7.3	11.3	2.7	1.9	4.7	16.2	4.8	7.1	0.201
(PL41) Wielkopolskie	11.5	5.1	10.6	6.2	4.1	1.9	3.0	5.4	20.5	17.9	13.9	0.172

continued **Table 7.3:** Share of exports by CN sections in regions of Poland and Spain in 2015

Region	s1	s2	s3	s4	s5	s6	s7	s8	s9	s10	s11	Bray-Curtis 2005- 2015
(PL42) Zachodniopomorskie	11.5	6.3	10.3	6.2	10.4	2.3	2.2	8.3	10.3	19.0	13.1	0.117
(PL43) Lubuskie	6.6	1.8	1.5	6.1	14.2	4.4	2.3	12.3	24.5	10.8	15.6	0.235
(PL51) Dolnośląskie	2.0	1.5	3.3	8.4	1.4	2.1	4.9	18.9	37.3	12.5	7.8	0.075
(PL52) Opolskie	3.1	10.9	17.9	8.7	7.3	4.3	1.2	11.9	21.1	10.1	3.4	0.160
(PL61) Kujawsko-pomorskie	6.0	7.4	6.0	13.6	14.6	4.2	0.4	14.7	15.7	5.3	12.0	0.073
(PL62) Warmińsko-mazurskie	10.3	3.9	1.5	29.7	7.3	4.7	2.5	4.9	12.5	4.7	17.9	0.179
(PL63) Pomorskie	11.6	2.9	15.7	3.4	4.9	2.6	0.5	4.9	16.8	33.3	3.4	0.123

Source: own elaboration.

Notes: 21 CN sections were grouped into 11: (s1) live animals, animal and vegetable products, animal and vegetable fats and oils; (s2) food, beverages, spirit and tobacco products; (s3) mineral and chemical products; (s4) plastic, rubber, skins and leather products; (s5) wood and paper products; (s6) textiles and footwear products; (s7) articles of stone, plaster, cement; glass and ceramics, precious metals and articles; (s8) base metals and articles of base metal; (s9) electromechanical and precision industry products; (s10) vehicles, aircrafts, etc.; (s11) miscellaneous manufactured articles. Detailed table of the above classification is available in the annex in the Table A1.

The last column in the table and figure 7.2 present Bray-Curtis index, informing about the intensity of changes in the composition of regional exports between 2005 and 2015. Ceuta, Melilla and the Spanish islands are outliers, being small territorial units, thus witnessing intensive changes. Other regions, which were also between 2005 and 2015 subject to strong structural changes are Podkarpackie, Łódzkie, Lubuskie and Podlaskie. On the other hand, the most stable structures of exports are in Navarre, Andalusia and Dolnośląskie.

Figure 7.2: Intensity of changes in the composition of regional exports between 2005 and 2015

Source: own elaboration.

Notes: Higher Bray-Curtis values indicate more intense amendments in the composition of regional exports at CN section level (1-digit). The value of the index ranges from 0 to 1.

Another aspect of regions' structural differences in exports is the share of agricultural products. The highest shares of agricultural products (above 15% in 2015) are observed in the regions of Murcia, Podlaskie, Andalusia, Extramadura, Lubelskie and Valencian Community (Fig. 7.3). A high share of agricultural products reflects the structure of a region's economy – a high share of agriculture in GDP or employment usually corresponds to a high share of agricultural products in overall exports. It also reflects the character of comparative advantages that a region reveals in exports. The tariffs for agricultural products are higher than for industrial ones, which makes exports from these regions directed outside of the EU face higher protectionism. In regions with a strong industrial base, agricultural products share in exports is usually very low. However – as the example of Mazowieckie shows – in the case of regions which are leaders in exports and represent the strong industrial base, agricultural products' share can be relatively high. It may stem from the role played by the region, having a strong position as an export intermediary platform to BRU countries. In the case of small regions, such as the Canary Islands, high volatility in the agricultural products' share in exports is a result of the possible influence of individual transactions on exports' overall value.

Figure 7.3: Share of agricultural products in total regions' exports (%)

Source: own elaboration.

The concentration of exports depicts specialisation but also vulnerability to the consequences of economic shocks. The fundamental question is what “pays off”, what better contributes to the long-term development of the regional economy: specialisation or diversification of exports? The problem can be interpreted with reference to several theoretical strands: international trade theory, regional economics and investment portfolio (risk diversification). The specialisation is an issue deeply embodied in the international trade literature, corresponding to the division of labour and focusing on the activities in which absolute or comparative advantages are revealed. In the literature (Armstrong and Taylor, 2000; Behrens and Thisse, 2007; Dixon, 1973) the concept of comparative advantages and the related specialisation is discussed in the debate on regional competitiveness. According to Davis, Weinstein, Bradford, and Shimp (1997), predictions of the H-O model (which is a flagship international trade theory) on the character of regional specialisation can be misleading. The problem is the equalisation of regions' factor abundance, stemming from production factors' mobility. On the other hand, Courant and Deardorff (1992) encourage to focus research on a region's exports because regional export specialisation patterns significantly differ from the overall country patterns. Also, NEG brings an interesting insight into the relations between agglomeration, specialisation and exports. When, however, the “old, good” theory of portfolio diversification is applied, regions with the diversified export structure are in a better position, as they are less exposed to structural shocks.

The literature presenting the consequences of regional exports specialisation (vs diversification) is not abundant. Nazarczuk et al. (2018) for Poland's counties

conclude that specialisation (concentration) positively contributes to the value of exports per capita. However, if concentration embraces primary commodities, regions can be more exposed to economic shocks (Herzer and Nowak-Lehmann D., 2006). According to Nazarczuk, Umiński and Gawlikowska-Hueckel (2018), smart specialisation programmes ought to search for new export industries and products, instead of exclusively concentrating on the already existing revealed specialisations. Choosing the former option may increase a regional economy's vulnerability to economic shocks.

Various measures have been used to assess the concentration of exports of Spanish and Polish regions. They are based on 4-digit CN classification. Table 7.4 presents the number of products with RCA indices higher than the chosen thresholds (from 2, 5, 10, 20). The analysis has revealed significant differences among regions thereof.

Table 7.4: The no. of 4-digit CN product groups with high RCA in exports

Region	No. of product groups with RCA higher than								Difference			
	2	5	10	20	2	5	10	20	2	5	10	20
	2005				2015				2015-2005			
(ES11) Galicia	115	53	22	9	131	76	39	13	16	23	17	4
(ES12) Principality of Asturias	81	51	35	22	94	63	43	27	13	12	8	5
(ES13) Cantabria	90	52	33	23	99	61	36	23	9	9	3	0
(ES21) Basque Community	159	61	23	4	152	64	27	9	-7	3	4	5
(ES22) Navarre	91	48	20	8	98	46	22	13	7	-2	2	5
(ES23) La Rioja	80	51	33	17	100	62	43	24	20	11	10	7
(ES24) Aragon	91	37	16	6	122	51	18	10	31	14	2	4
(ES30) Madrid	135	36	15	4	116	35	10	6	-19	-1	-5	2
(ES41) Castile-Leon	102	40	12	8	102	43	19	8	0	3	7	0
(ES42) Castile-La Mancha	146	75	35	14	167	80	39	20	21	5	4	6
(ES43) Extremadura	110	69	45	28	118	74	47	27	8	5	2	-1
(ES51) Catalonia	208	65	13	4	212	63	15	2	4	-2	2	-2
(ES52) Valencian Community	180	92	47	15	170	83	42	15	-10	-9	-5	0
(ES53) Balearic Islands	40	25	15	10	58	30	15	9	18	5	0	-1
(ES61) Andalusia	123	70	37	23	132	65	47	25	9	-5	10	2
(ES62) Region of Murcia	113	67	45	27	110	70	45	24	-3	3	0	-3
(ES63) Ceuta	2	2	2	2	29	21	11	5	27	19	9	3

continued **Table 7.4:** The no. of 4-digit CN product groups with high RCA in exports

Region	No. of product groups with RCA higher than								Difference			
	2	5	10	20	2	5	10	20	2	5	10	20
	2005				2015				2015-2005			
(ES64) Melilla	25	16	13	7	25	18	14	7	0	2	1	0
(ES70) Canary Islands	44	26	21	9	75	38	27	15	31	12	6	6
(PL11) Łódzkie	193	106	62	25	155	76	33	13	-38	-30	-29	-12
(PL12) Mazowieckie	178	80	30	13	151	55	19	3	-27	-25	-11	-10
(PL21) Małopolskie	139	71	36	15	131	70	28	12	-8	-1	-8	-3
(PL22) Śląskie	90	45	22	9	113	47	22	10	23	2	0	1
(PL31) Lubelskie	122	66	36	18	136	57	29	12	14	-9	-7	-6
(PL32) Podkarpackie	124	62	34	15	111	45	20	5	-13	-17	-14	-10
(PL33) Świętokrzyskie	94	57	39	28	100	61	46	29	6	4	7	1
(PL34) Podlaskie	96	54	32	16	131	66	38	14	35	12	6	-2
(PL41) Wielkopolskie	131	54	31	10	144	65	32	10	13	11	1	0
(PL42) Zachodniopomorskie	126	73	42	20	127	68	40	19	1	-5	-2	-1
(PL43) Lubuskie	120	61	39	22	112	63	36	12	-8	2	-3	-10
(PL51) Dolnośląskie	110	46	23	8	108	40	14	7	-2	-6	-9	-1
(PL52) Opolskie	129	66	36	18	132	68	31	12	3	2	-5	-6
(PL61) Kujawsko-pomorskie	146	83	41	16	129	74	42	16	-17	-9	1	0
(PL62) Warmińsko-mazurskie	88	49	30	16	77	46	29	18	-11	-3	-1	2
(PL63) Pomorskie	82	39	24	11	80	41	17	6	-2	2	-7	-5

Source: own elaboration.

For instance, in 2015, the number of product groups with RCA higher than 2 ranged from 25 for Melilla, to 212 for Catalonia. The number is affected by the region size. However, it differs among regions with similar sizes. If RCA=20 threshold is considered, the number of product groups ranges from 2 (for Catalonia) to 29 (for Świętokrzyskie). The RCA matrix reminds us of the logic of comparative advantages. Even though the region does not belong to the most competitive regions, still it has products in which comparative advantages are revealed. Another question is what percentage of the region's exports (in terms of value) is covered by the product groups in which comparative advantages exist. Estimation of it could be an interesting further research direction.

The export profiles of regions are determined by their structural characteristics and industrial base. Thus, they do not fluctuate much, are rather stable. However, it does mean they are constant in time. Their changes are shown in the table as “difference”. For instance, between 2005 and 2015 in Madrid, the number of 4-digit product CN product groups with RCA higher than 2 decreased by 19. These changes shall be subject to an inquiry of the authorities engaged in exports promotion and monitoring of regions’ competitiveness, as well as taken into account while regional smart specialisations are formulated and implemented.

Gini index is often used as a measure of concentration (Fig. 7.4). Its values over 0.5 indicate over-representation of several product groups in total regions’ exports, compared to benchmark distribution in all other regions. Excluding outliers, the highest concentration of exports structure in 2015 was for La Rioja, Warmińsko-Mazurskie, Navarre and Castile-Leon, while the lowest was for Madrid, Mazowieckie and Catalonia. High concentration may stem from several factors, with an idiosyncratic character. Warmińsko-Mazurskie is an interesting case on which to be commented. It belongs to the group of Poland’s less developed regions, with mediocre overall competitiveness. However, the region attracted a big foreign direct investor that operates in the tyre industry, and the related products dominate in exports.

Figure 7.4: Gini index of 4-digit CN groups product concentration

Source: own elaboration.

Notes: Calculations based on 4-digit level CN data for regional exports.

Several alternative measures can be utilised for the assessment of regional exports concentration. HHI index, for instance, shows a slightly different ranking of regions (Fig. 7.5).

Figure 7.5: HHI of product concentration in regions' exports

Source: own elaboration.

As indicated, regions' export structures differ. Consequently, their dissimilarity can be assessed. It has been done for the Polish and Spanish regions treated jointly, with the use of the Hallet dissimilarity index (Fig. 7.6). The minimum value of 0 of the index indicates that the product structure of a region's export is the same as in the whole population of regions. The value of unity represents strong, usually single-product concentration strongly differentiated vs other regions' characteristics.

It is the case of Melilla, Ceuta, La Rioja and the Principality of Asturias. On the other hand, the lowest dissimilarity indices are in the case of Catalonia, Wielkopolskie, Mazowieckie, Valencian Community and Madrid. It shall be noticed that these are the largest contributors to overall exports, which affects their relative smaller dissimilarity.

Figure 7.6: Hallet index of 4-digit product dissimilarity in exports

Source: own elaboration.

7.3 The quality of exports

The role of high-tech products in regions' exports deserves particular attention. High-tech products are often used in competitiveness assessments; however, solid success in exports can also be based on medium high-tech commodities. Building the economic capacity, generating high-tech products capable of competing on the international markets was a challenge both for the Spanish and the Polish economy. For the economy of Poland, it has been a bigger challenge, after decades of the centrally planned economy, isolation from international markets as well as almost non-existing competition. The economic effectiveness in the "economy of shortages" was verified not through confrontation with other enterprises operating on the free market, but rather through checking if the centrally defined production plans were achieved. International trade was carried within the Council of the Mutual Economic Assistance (Comecon), isolated from the economic system in which the most industrialised and competitive nations functioned. The transition to a market economy in Poland was initiated when the preparations to the establishment of the competitive single European market were already proceeding in the EU.

Figure 7.7 shows the share of the high-tech products in the regions' exports of Spain and Poland. The leader in the ranking is Madrid, while Podkarpackie takes the second position. Madrid represents the capital region of Spain, while Podkarpackie position stems from the aircraft industry heavily represented in this region. Also, in

Ceuta and Melilla, the high-tech products share in exports is relatively high. These two small territories are followed by the capital region of Mazowieckie in Poland and Catalonia in Spain.

Figure 7.7: Share of high-tech products in total regional exports

Source: own estimation.

Alternatively, to the share of high-tech products in exports, its quality can be assessed by showing the mean value of 1kg of exports. This approach is used, for instance, in the IIT analysis, broken into its horizontal and vertical components. The mean value of 1kg of exports shows regions' positions in the quality ladder (Fig. 7.8). The leaders in this ranking are Melilla, Dolnośląskie, Podkarpackie, Madrid and Castile-Leon. The lowest values are registered for the Principality of Asturias, Świętokrzyskie, Region of Murcia, Zachodniopomorskie and Andalusia.

7.4 Export intensity

The value of exports per capita is the most frequently utilised measure of openness. As a rule, it is used for countries; however, when applied to regions, it shows interesting regional lumpiness. As mentioned in the literature overview, high openness can be interpreted as proof of high competitiveness; on the other hand, an open economy is vulnerable to economic shocks, which may negatively affect the regional labour market. Among Polish and Spanish regions analysed jointly, the highest per capita exports (above 6k EUR) are in Navarre, Basque Community, Catalonia, Aragon, Galicia and Region of Murcia (Fig. 7.9). The most open of Poland's regions (exports per

capita) are Dolnośląskie, Pomorskie, Lubuskie, Wielkopolskie, Śląskie and Mazowieckie. In the vast majority of regions, between 2005 and 2015, exports per capita increased. It shall be noticed that the differences between regions in their exports per capita are significant, which should be taken into account in the analysis of regional economies' various aspects of vulnerability. Openness needs further, detailed inquiry for particular regions. A regional economy can have extraordinary openness to trade relations with the UK, which makes it highly vulnerable to the consequences of Brexit (Nazarczuk, Umiński and Márquez-Ramos, 2020). Exporters in such a region might need assistance in adjustments to the new circumstances, information about the new rules applicable to trade between the EU and the UK and the new markets alternative to the UK.

In regional analysis, various variables are calculated per km² (Bradley et al., 2017, p. 153; Zaucha and Ciolek, 2014, p. 144). Exports per 1 km² can be interpreted as a proxy showing the “capacity of space” to generate sales demanded by demanding foreign customers. Figure 7.10 shows significant differences between the regions of Poland and Spain. Changes in the values of exports per 1 km² in small territories such as Melilla shall be treated with due caution, as they probably show the effects of individual high-value transactions. If Melilla, as an outlier is excluded, the higher values of exports per km² are in Madrid, Basque Community, Catalonia, Śląskie, Valencian Community, Dolnośląskie, Region of Murcia and Navarre.

7.5 The role of FDI in exports

Poland's transition from centrally planned to a market economy has been facilitated by FDI. Incoming FDI positively affected Poland's competitiveness due to technology transfer, investments in machinery and equipment, and incorporating Poland's firms into international value chain networks. FOEs perform the coordination role in the global value chains (Forsgren, 2008). The literature, however, does not give the simple answer on the nexus between FDI and export performance (Brodzicki, Jurkiewicz, Márquez-Ramos, and Umiński 2019). Much depends on the character of FDI (vertical vs horizontal), the motivation of investors in particular regions and regions' characteristics (proximity to big, absorptive markets, transport infrastructure, accessibility, institutional quality, metropolitan status). As pointed by Nazarczuk and Umiński (2018a), FOEs play a crucial role in determining the spatial distribution of exports in Poland. According to Nazarczuk, Umiński and Brodzicki (2019), FOEs compared to domestic (Polish) owned exporters, in their locational preferences pay special attention to proximity to infrastructure, agglomeration externalities and the vicinity of metropolises.

As the data for Spain is not available, the share of FOEs in the value of exports is presented only for Poland (Fig. 7.11). In six regions (Śląskie, Lubuskie, Dolnośląskie, Łódzkie, Podkarpackie and Wielkopolskie) the share is higher than 60%, the lowest

Figure 7.8: Mean value of 1kg of exports (in EUR)

Source: own estimation.

Notes: Data for the Balearic Islands were excluded in 2005 due to credibility concerns.

(below 40%) is in Podlaskie and Pomorskie. Pomorskie is an interesting case, showing that low participation of FOEs is accompanied by high exports per capita and high exports share in GDP. Thus, export success results from the activity and competitiveness of domestic-owned enterprises. Part of this success probably also stems from an intermediary function of the region. Its harbours and logistic facilities link other regions' exporters with foreign markets. The regional level analysis enables us to capture interesting changes that often are hard to notice. An example is a decrease in FOEs' share in exports in the Podlaskie region between 2005 and 2015. The reasons for this kind of changes shall be subject to thorough inquiry by regional authorities; they may indicate serious structural problems and changes as well as competitiveness deterioration. Please bear in mind that in Poland, FOEs – generally – positively contribute to exports of regions (Brodzicki et al., 2018; Komornicki and Szejgiec, 2015; Nazarczuk and Umiński, 2018a).

7.6 Intensity of IIT

The regional heterogeneity presented so far encourages us to refer to a region as an SOE concept and assess the IIT intensity. The reasons why IIT intensity of regions' foreign trade deserves attention have been described by Brodzicki, Jurkiewicz, Márquez-Ramos, and Umiński (2019). High IIT intensity proves strong economic integration of trading partners and participation in the global value chains. This is particularly important because IIT assessed at a regional level not only stems from a love for variety, which traditionally in the literature has been treated as a determinant of IIT,

Figure 7.9: Exports per capita (in k EUR)

Source: own estimation.

but also from the fragmentation of production (Yoshida, 2008). One of the main arguments to analyse IIT intensity is that, compared to H-O type of trade, it has less effect on the distribution of income of trading partners. Before IIT index for regions will be presented and interpreted, it shall be mentioned that IIT intensity for regions is lower than for the whole country. The reason is that the probability that an exporter and importer are located in the same region is lower than them being located in the same country. For instance, if an exporter and an importer of product A or its variants are in Pomorskie, exports and imports do overlap – thus IIT is registered. If, however, an exporter is in Pomorskie and an importer in Dolnośląskie, export and import overlap is registered for Poland, but neither for Pomorskie nor Dolnośląskie.

The highest intensity of IIT is observed for three of Poland's regions: Podkarpackie, Pomorskie and Zachodniopomorskie (Fig. 7.12). Their foreign trade is specific, compared to other regions of Poland. EU countries' share in their exports is low, compared to other regions. Also, the structure of exports is specific. Aviation-related products have a high share in the foreign trade of the Podkarpackie region, while in Pomorskie and Zachodniopomorskie trade, maritime vessels and metal constructions are important. Among regions of Spain, the highest IIT intensity is registered for Madrid and Catalonia, and slightly lower for Aragon, Basque Community and Navarre.

IIT characteristics for regions of Poland and Spain were analysed thoroughly by Brodzicki, Jurkiewicz, Márquez-Ramos and Umiński (2019) in a paper presenting the results of the same research project. Attention has been paid to the determinants not

Figure 7.10: Exports per 1 sq. km

Source: own estimation.

only of IIT itself but to its vertical and horizontal components. Several hypotheses were tested by the authors. The main conclusions are that IIT intensity is determined by the size and the distance of trading partners. Smaller distance positively contributes to the intensity of IIT, so does symmetry in partner size. Differences in GDP per capita have a negative effect on IIT. Contrary to expectations, differences in institutional quality have a positive impact on IIT. Metropolitan status of a region, as well as FDI, have a positive impact. IIT was split into horizontal and vertical dimensions, for the differences in determinants of both types of IIT, please refer to Brodzicki et al. (2019).

7.7 Cluster analysis of Spanish and Polish regions' exports

As shown above, on the grounds of the available statistical information, many detailed analyses can be performed. Undoubtedly, they are important for regional or national authorities involved in regional policy, assessments and monitoring of competitiveness as well as exports promotion. The high detailedness however, also has drawbacks, because it makes synthetic, comparative analysis difficult to be carried on. A solution is a cluster analysis, which enables classification of objects (regions) into homogenous groups. One possible variant of this method is the hierarchical agglomerative approach, in which objects are presented in a dendrogram graph. The vertical axis presents the regions; each region is unique. Moving to the right makes the

Figure 7.11: Share of FOEs in the value of exports of Polish regions (%)

Source: own estimation.

Figure 7.12: Intra-industry trade at regional level

Source: own elaboration.

decision threshold lower; therefore, it is possible to decide when regions are joined into clusters. Finally, all the regions can be combined into one.

In the analysis performed, several agglomeration methods and measures of distance were used. Ward's method of classification together with the Euclidean distance approach have proven to be the most effective in the identification of the homogenous clusters. The variables used were standardised, prior to classification. The choice of an optimal number of groups was based on Duda/Hart $Je(2)/Je(1)$ statistics.

The dendrogram presented in figure 7.13 indicates regions grouped by similarity differences. Longer horizontal lines represent greater differentiation.

Figure 7.13: Dendrogram

Source: own elaboration.

The list of the variables used in Ward classification is presented in table 7.5. In our opinion, they constitute the most important statistics that shall be taken into account in the taxonomy of regions, related to their participation in exports.

Table 7.5: Descriptive statistics used in taxonomy

Variable	Description	Mean	Std. Dev.	Min	Max
ex_value	Value of 1 kilo of exports [in EUR]	1.710477	.8438793	.6657239	3.91442
hhi_ex	HHI of exports	.0599396	.0625377	.0112648	.3251462
sh_ht	Share of high-tech products in exports	9.475217	7.785948	1.047045	36.45537

Table 7.5: Descriptive statistics used in taxonomy

continued

Variable	Description	Mean	Std. Dev.	Min	Max
sh_eu	Share of exports sent to EU countries	68.76857	18.61278	3.1	87.8
lit	Intra industry trade index	4.420286	2.905831	1.22	14.76
sh_c_top3	Share of exports sent to 3 most important export destinations	43.80514	13.00303	28.6	97.86
sh_agri	Share of agricultural products in exports	8.7	7.788566	0	33.2
ex_pc	Exports per capita [in EUR]	4140.194	2919.076	81.0544	13416.63
tr_open	Trade openness index = (exports+imports)/GDP *100	49.62117	24.40064	7.903726	115.1515
Standardised values					
z_ex_cost	Value of 1 kilo of exports [in EUR]	9.15e-09	1	-1.238036	2.611681
z_hhi_ex	HHI of exports	-1.27e-09	1	-.7783279	4.240748
z_sh_ht	Share of high-tech products in exports	-8.62e-09	1	-1.082485	3.465237
z_sh_eu	Share of exports sent to EU countries	2.77e-09	1	-3.528143	1.022493
z_iit	Intra industry trade index	2.59e-09	1	-1.101332	3.558264
z_sh_c_top3	Share of exports sent to 3 most important export destinations	-3.46e-09	1	-1.169354	4.157097
z_sh_agri	Share of agricultural products in exports	6.81e-09	1	-1.117022	3.145637
z_ex_pc	Exports per capita [in EUR]	-7.43e-09	1	-1.390556	3.177867
z_tr_open	Trade openness index = (exports+imports)/GDP *100	-6.54e-09	1	-1.709686	2.685599

Source: own elaboration.

With reference to Duda/Hart $Je(2)/Je(1)$ statistics, six clusters of regions were established. Their detailed statistics are available in tables A.2 and A.3 in the appendix.

Cluster 1 consists of 10 Polish and Spanish regions: (ES11) Galicia, (ES21) Basque Community, (ES22) Navarre, (ES23) La Rioja, (ES24) Aragon, (ES41) Castile-Leon, (ES51) Catalonia, (PL12) Mazowieckie, (PL41) Wielkopolskie and (PL51) Dolnośląskie. Compared to other clusters, its characteristics are high value of 1 kilogram of exports, high product concentration of exports (measured by HHI), the moderate share of high-tech products, the high share of EU in exports, low IIT intensity, the medium

share of exports sent to the three most important destinations, low share of agricultural products in exports, very high exports per capita and high trade openness index.

Cluster 2 consists of Polish regions only: (PL11) Łódzkie, (PL21) Małopolskie, (PL22) Śląskie, (PL42) Zachodniopomorskie, (PL43) Lubuskie, (PL52) Opolskie, (PL61) Kujawsko-pomorskie, (PL62) Warmińsko-mazurskie. Its characteristics can be described as follows: the low value of 1 kilogram of exports, low product concentration of exports (HHI), low share of high-tech products, the highest share of EU in exports, high IIT intensity, the medium share of exports sent to the three most important destinations, low share of agricultural products in exports, moderate level of exports per capita and moderate trade openness index.

Cluster 3 is composed of three regions: (ES30) Madrid, (PL32) Podkarpackie and (PL63) Pomorskie. Its features are high value of 1 kilogram of exports, the highest product concentration of exports (HHI), the highest share of high-tech products, relatively low share of EU in exports, very high IIT intensity, low share of exports sent to the three most important destinations, very low share of agricultural products in exports, moderate level of exports per capita and very high trade openness index.

Cluster 4 includes: (ES13) Cantabria, (ES42) Castile-La Mancha, (ES43) Extremadura, (ES53) the Balearic Islands, (ES70) the Canary Islands, (PL31) Lubelskie and (PL33) Świętokrzyskie. Its characteristics are the low value of 1 kilogram of exports, low product concentration of exports (HHI), low share of high-tech products, moderate share of EU in exports, low IIT intensity, medium share of exports sent to the three most important destinations, relatively high share of agricultural products in exports, low exports per capita and low trade openness index.

Cluster 5 is composed of: (ES52) Valencian Community, (ES61) Andalusia, (ES62) Region of Murcia, (PL34) Podlaskie. Its characteristics are very low value of 1 kilogram of exports, low product concentration of exports, very low share of high-tech products, moderate share of EU in exports, low IIT intensity, low share of exports sent to the three most important destinations, very high share of agricultural products in exports, moderate exports per capita and moderate trade openness index.

In cluster 6 there are two Spanish regions: (ES63) Ceuta and (ES64) Melilla. Their features are as follows: very high value of 1 kilogram of exports, very low product concentration of exports, the high share of high-tech products, very low share of EU in exports, very low IIT intensity, the very high share of exports sent to the three most important destinations, moderate share of agricultural products in exports, very low exports per capita and very low trade openness index.

While interpreting the results obtained in the cluster analysis, one must remember that grouping of objects is done according to an algorithm. Accordingly, individual regions were jointed/classified into six clusters. The particular clusters are more or less consistent, which means that the distances of particular regions to the centre of each cluster differ. If in one cluster there are regions that differ in terms of one of the features, it means that the similarity of other features was decisive in classification.

As proved in the above cluster analysis, similar regions' exports characteristics go across countries, as in the case of 4 out of 6 clusters, Spanish and Polish regions are mixed. In cluster 6 there are two Spanish regions, which represent specific cities (administrative units). Particular cluster features shall be useful in addressing the economic policy instruments aimed at exports promotion. They can be a starting point in profiling regions in terms of their export SWOTs.

Appendix

Table A.1: Detailed classification of sectors used in chapter 7

No.	Industry	Sections
1	Live animals, animal and vegetable product, animal and vegetable fats and oils	SECTION I - LIVE ANIMALS; ANIMAL PRODUCTS SECTION II - VEGETABLE PRODUCTS SECTION III - ANIMAL OR VEGETABLE FATS AND OILS AND THEIR CLEAVAGE PRODUCTS; PREPARED EDIBLE FATS; ANIMAL OR VEGETABLE WAXES
2	Food, beverages, spirit and tobacco products	SECTION IV - PREPARED FOODSTUFFS; BEVERAGES, SPIRITS AND VINEGAR; TOBACCO AND MANUFACTURED TOBACCO SUBSTITUTES
3	Mineral and chemical products	SECTION V - MINERAL PRODUCTS SECTION VI - PRODUCTS OF THE CHEMICAL OR ALLIED INDUSTRIES
4	Plastic, rubber, skins and leather products	SECTION VII - PLASTICS AND ARTICLES THEREOF; RUBBER AND ARTICLES THEREOF SECTION VIII - RAW HIDES AND SKINS, LEATHER, FURSKINS AND ARTICLES THEREOF; SADDLERY AND HARNESS; TRAVEL GOODS, HANDBAGS AND SIMILAR CONTAINERS; ARTICLES OF ANIMAL GUT (OTHER THAN SILKWORM GUT)
5	Wood and paper products	SECTION IX - WOOD AND ARTICLES OF WOOD; WOOD CHARCOAL; CORK AND ARTICLES OF CORK; MANUFACTURES OF STRAW, OF ESPARTO OR OF OTHER PLAITING MATERIALS; BASKETWARE AND WICKERWORK SECTION X - PULP OF WOOD OR OF OTHER FIBROUS CELLULOSIC MATERIAL; RECOVERED (WASTE AND SCRAP) PAPER OR PAPERBOARD; PAPER AND PAPERBOARD AND ARTICLES THEREOF
6	Textiles and footwear products	SECTION XI - TEXTILES AND TEXTILE ARTICLES SECTION XII - FOOTWEAR, HEADGEAR, UMBRELLAS, SUN UMBRELLAS, WALKING STICKS, SEAT-STICKS, WHIPS, RIDING-CROPS AND PARTS THEREOF; PREPARED FEATHERS AND ARTICLES MADE THEREWITH; ARTIFICIAL FLOWERS; ARTICLES OF HUMAN HAIR

No.	Industry	Sections
7	Articles of stone, plaster, cement; glass and ceramics, precious metals and articles	SECTION XIII - ARTICLES OF STONE, PLASTER, CEMENT, ASBESTOS, MICA OR SIMILAR MATERIALS; CERAMIC PRODUCTS; GLASS AND GLASSWARE SECTION XIV - NATURAL OR CULTURED PEARLS, PRECIOUS OR SEMI-PRECIOUS STONES, PRECIOUS METALS, METALS CLAD WITH PRECIOUS METAL, AND ARTICLES THEREOF; IMITATION JEWELLERY; COIN
8	Base metals and articles of base metal	SECTION XV - BASE METALS AND ARTICLES OF BASE METAL
9	Electromechanical and precision industry products	SECTION XVI - MACHINERY AND MECHANICAL APPLIANCES; ELECTRICAL EQUIPMENT; PARTS THEREOF; SOUND RECORDERS AND REPRODUCERS, TELEVISION IMAGE AND SOUND RECORDERS AND REPRODUCERS, AND PARTS AND ACCESSORIES OF SUCH ARTICLES SECTION XVIII - OPTICAL, PHOTOGRAPHIC, CINEMATOGRAPHIC, MEASURING, CHECKING, PRECISION, MEDICAL OR SURGICAL INSTRUMENTS AND APPARATUS; CLOCKS AND WATCHES; MUSICAL INSTRUMENTS; PARTS AND ACCESSORIES THEREOF
10	Vehicles, aircraft, etc.	SECTION XVII - VEHICLES, AIRCRAFT, VESSELS AND ASSOCIATED TRANSPORT EQUIPMENT
11	Miscellaneous manufactured articles	SECTION XIX - ARMS AND AMMUNITION; PARTS AND ACCESSORIES THEREOF SECTION XX - MISCELLANEOUS MANUFACTURED ARTICLES SECTION XXI - WORKS OF ART, COLLECTORS' PIECES AND ANTIQUES

Source: own elaboration.

Table A.2: Mean groups' values of standardised variables

Group	z_ex_value	z_hhi_ex	z_sh_ht	z_sh_eu28	z_iit	z_sh_c_top3	z_sh_agri	z_ex_pc	z_tr_open
1	0.641	-0.092	-0.103	0.300	-0.152	-0.131	-0.403	1.116	0.608
2	-0.412	-0.363	-0.328	0.643	0.399	0.104	-0.353	-0.325	0.279
3	0.778	0.002	1.988	-0.453	2.323	-0.592	-0.668	-0.004	0.790
4	-0.696	-0.255	-0.382	0.006	-0.580	-0.173	0.175	-0.733	-1.055
5	-0.831	-0.289	-0.666	-0.145	-0.559	-0.706	1.997	-0.014	0.068
6	1.721	3.503	1.700	-3.131	-0.881	3.230	-0.263	-1.317	-1.259

Source: own elaboration.

Table A.3: Mean groups' values of unstandardised variables

Group	ex_value	hhi_ex	sh_ht	sh_eu28	iit	sh_c_t~3	sh_agri	ex_pc	tr_open
1	2.252	0.054	8.676	74.360	3.980	42.107	5.560	7399.024	64.453
2	1.363	0.037	6.924	80.738	5.579	45.158	5.950	3192.795	56.433
3	2.367	0.060	24.952	60.333	11.170	36.107	3.500	4127.798	68.896
4	1.123	0.044	6.504	68.887	2.734	41.551	10.063	2000.968	23.888
5	1.009	0.042	4.293	66.075	2.795	34.628	24.250	4098.310	51.291
6	3.163	0.279	22.711	10.500	1.860	85.805	6.650	294.901	18.896

Source: own elaboration.