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How the spatial distribution of the Hungarian TOP 500 companies affects regional development: an examination of income generation at subnational scale

Abstract

The research paper emphasizes the importance of export from the aspect of economic development. In the first part, the theoretical background of the regional development connected to export-led growth is introduced. As a bridge between the theoretical and empirical part, the territorial sense of export data and economic spaces is highlighted. In connection to the research, actual domestic research examining spatial differences and inequalities in Hungary is presented. The reviewed researches (Dusek–Lukács–Rácz 2014, Nemes Nagy–Tagai 2011, Obádovics 2013, Pénzes 2012) concur on the main territorial features in Hungary: territorial hegemony of the capital, increasing differences between the capital and rural areas, emergence of the 'West–East decline', and varied development patterns of micro-regions and settlements. Dusek–Lukács–Rácz (2014) describe the regional disparities in the country on NUTS-2 level, pointing out that Central Hungary is the most advanced region of Hungary, followed by Western Transdanubia and Central Transdanubia, and with significant lag, Southern Transdanubia, Southern Great Plain, Northern Great Plain and Northern Hungary trail the list. In the primary research, the aim is to explore the conditions of export-led growth in Hungary, and through an examination of the spatial distribution of the 500 companies with the best sales performance (TOP 500 list) an attempt is made to demonstrate the reasons for regional inequalities in Hungary. The other scope of the research is to demonstrate the concentration of different sectors in NUTS-3 level, as well as highlighting their export orientation. Furthermore research examines associations between different measures. The pool of data used for carrying out the research is derived from HVG (Heti Világgazdaság – a dominant economic weekly review in Hungary) about the first 500 companies with the best sales performance in 2012 (the TOP 500 companies) and from the Hungarian Central Statistical Office. Our research findings emphasize the importance of export for regional development (export-led growth), and resembles the secondary research outcomes about the development of NUTS-2 and NUTS-3 regions.

Keywords: Regional development, subnational scale, TOP 500 companies (on gross sales value basis) in Hungary, export-led growth.

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Introduction

Focuses of regional development

In today's globalized world, the existence of regional disparities (Dawkins 2003, Kocziszky 2009, Lengyel Rechnitzer 2004, Lengyel 2012 , Lengyel 2010, Magrini 1999), the different development path of countries or even the sub regions (Armstrong 1995, Bhagwati–Krueger 1973, Meyer 2005, North 1955, Simon 2001, Szentes 2011, Tomka 2011), the growing income inequalities within and amongst countries (Dusek–Lukács–Rácz 2014, Magrini 1999, Szentes 2011), the different effects of various economic policies (Bhagwati–Krueger 1973, Murphy–Shleifer–Vishny 1989, Szentes 2011) are the challenges that each decision maker must meet and confront. The different development path of regions, the effect of various economic policies (e.g. import substitution, export promotion, liberalization of markets) on development, persistent differences in social welfare across regions are all research areas of regional science with special attention to regional development (Armstrong 1995, Bhagwati–Krueger 1973, Dawkins 2003, Lengyel 2012, Lengyel–Rechnitzer 2004, Murphy–Shleifer–Vishny 1989, North 1955, Simon 2011, Szentes 2011, Tomka 2011) The conflict within regional development concerns the convergence or divergence of per capita income across regions and over time (1), the assumptions regarding the importance of internal and external economies of scale to regional economic growth (2), the role of space in shaping regional labour market outcomes(3) (Dawkins 2003, Murphy–Shleifer–Vishny 1989, Parikh–Shibata 2004, Szentes 2011) in a historical framework as the factors determining economic development may change over time (Meyer 2005, Szentes 2011).The importance of time on regional development can be readily understood when considering that:

–   in the early stages, the abundance and diversity of natural resources are crucial for territorial development;
–   later on, the existing production structure and agglomerative advantages derived from the concentration of economic players in the same area are significant (the portfolio of economic activity within the region), and their connectivity to each other;
–   finally, as the competition has become global, the capability of income-generation and ability to influence the global demand trends (through innovation, research and development), thus the variety of information and spillovers exiting the given territorial unit are the determinants of regional development.

The reason for the growing attention to regions in the discussion of the persistent differences in levels of social welfare (increasing quantity of material goods, increasing level of incomes, more diversified consumption structure of inhabitants), or social well-being (social welfare adjusted with such problematically measurable or non-material dimensions as happiness or self-satisfaction and the quality of the natural environment) is due to that space has an impact on processes driving innovation and national economic growth (in reference to one of the main statements of regional economics / science, that "space matters"). The factors and conditions differ amongst regions (local natural resources, energy portfolio, local culture, the availability and quality of human resource other location-specific amenities), the economic activity and performance depends on

location, and is strongly related to the shared attraction to the conditions of production, the region-specific so called endogenous technology level, the intra-regional and extra-regional cooperation intensity (enhancing technology-transfer and innovation, and access to exogenous technology) (Dawkins 2003, Lengyel–Rechnitzer 2004, Lengyel 2010, Szentes 2011).

Importance of internal and external scale economies to regional economic growth

Murphy, Shleifer and Vishny (1989) argue that in a closed economy, the rate of economic growth depends on the size of the domestic market; the condition of higher efficiency at large-scale production rather than artisanal production is a large part of the output. Where is it profitable to create large quantities of goods and services? The answer is evident: if the domestic demand is large enough and the income distribution of the population is favourable (the income inequality is moderate) (Major 2013, Murphy–Shleifer–Vishny 1989). As a consequence, economic growth in a closed economy (due to import-substitution economic policy) is the function of the domestic demand and the income distribution patterns, which may lack the effect of economies of scale referring to the diminishing level of per-unit costs due the increased output of a specific commodity (Dawkins 2003, Major 2013, Silberston 1972, Szentes 2011). Furthermore, if an economy is built on import-substitution, various consequences can occur: lack of market pressure on the industry to increase efficiency, accumulating government debt, barriers to benefit from comparative advantage (Major 2013). In contrast, the export-driven growth triggers demand for domestic commodities and supports more efficient manufacturing through economies of scale. The region's specialization based on its comparative advantages may assist stable growth supported by either further gains in efficiency from international competition or the acquisition of 'Learning by doing' knowledge through participation in international production, trade and R&D networks (Dawkins 2003, Major 2013).

Therefore, for regions (agglomeration of enterprises of a specific geographical space), the 'reasons of trade' are benefits from economies of scale, knowledge from international economic relations (Dawkins 2003, Major 2013, Murphy–Shleifer–Vishny 1989). According to Bhagwati and Krueger (1973) if a government intervenes in the market to facilitate economic growth export promotion is more preferable than import-substitution since export promotion leads to higher efficiency due to the higher level of competition. Import substitution applies quantitative and direct intervention measures, while export-oriented strategies entails market-conforming and indirect means of intervention; consequently, the costs of export promotion are more visible to policy-makers than the costs of import substitution (Bhagwati–Krueger 1973, Major 2003). Parallel to the 'reason of trade,' export growth is one of the key determinants of economic growth (export-led growth hypotheses) (Dawkins, 2003, Kimbugwe–Banerjee–Gyawali 2010, Lengyel 2012, Major 2013, Medina-Smith 2001, Murphy–Shleifer–Vishny 1989, North 1955, Silberston 1972, Szentes 2011).

Export Base Theory

D. C. North's Export Base Theory (1955) is a widely accepted economic theory describing economic development through export activity (Dawkins 2003 Kimbugwe–Banerjee–Gyawali 2010).

Figure 1

The Export Base Theory
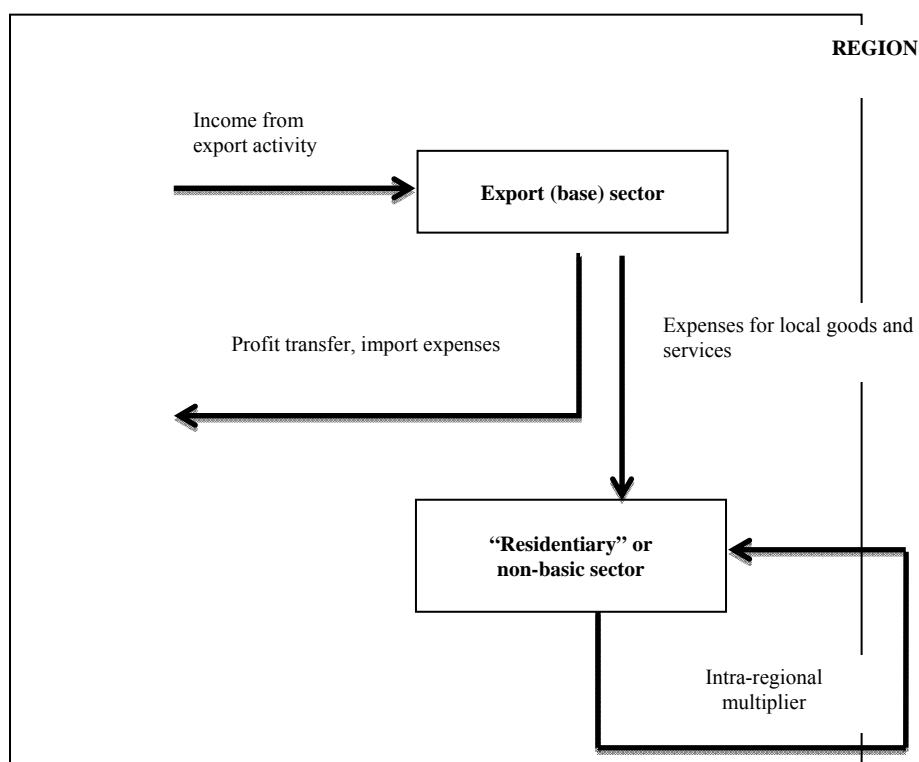
Source: Self-editing based on Kocziszky 2008, Lengyel 2010.

In North's Export Base Theory (1955), two different types of sectors are distinguished:
1. the first is the export (base) sector to which is given prior role in regional growth,
2. the second one, the "residentiary", or non-basic, sector (the term derives from P. Sargent Florence, who used it in National Resources Planning Board mimeographed releases); the term designates such economic activity – production or providing services – which is maintained to satisfy the local demand at that territory where the consuming population resides (North 1955) and its only reason for existence is to serve the basic sector.

As the figure shows, the economic performance of export base is a defining factor to both absolute and per capita income of the region through the connections to

"residentiary" sector. The number of participants of the basic sector impacts the number and diversity of players of the non-basic sector, which refers to how many organizations are in the industrial branch, or service sector. Economic development depends on how regions are able to respond to exogenous global demand, and how the local political, economic, and social institutional structure may cope with the challenges in serving international markets (Dawkins 2003, Lengyel 2010, Lengyel–Rechnitzer 2004, Kimbugwe–Banerjee–Gyawali 2010, North 1955, Pike–Rodriguez-Pose–Tomaney 2006).

According to North's view, growth did not only results from the industrialization; since the export basket of a specific territory may also consist of either semi-finished and finished agricultural- and manufactured goods or services (Dawkins 2003). According to the model, North points out the factors of regional development as follows:

- the more a region is capable of satisfying "non- residential" markets, the more likely it is to grow;
- the more sectors are capable of satisfying the demand from international markets through the expansion of their economic space, the more regional development is triggered;
- the more favourable the economic atmosphere, the more the concentration of organizations can be expected, which can result in the growth of local per capita incomes and emergence of new industries (North 1955).

The Export Base Theory has been criticized for various aspects; C. J. Dawkins (2003) mentions Charles M. Tiebout (1956) 'Exports and regional economic growth' in which Tiebout argues that North's model ignores the importance of various supply-side factors, which affect a region's power to support an emerging export base; Kimbugwe–Banerjee–Gyawali (2010) cites W. Cris Lewis (1976) 'Export base theory and multiplier estimation: A critique', highlighting the model's theoretical flaws; Lengyel (2010) references Pike–Rodrígues-Pose–Tomaney (2006) 'Local and regional development' describing that the export-ability of a region depends on the technological changes and innovations. In less developed regions, the qualification of labour and the preparedness of entrepreneurs can be a barrier to technology adaptation. In addition, they point out that not the supply of the exporting region, but rather, the demand of the importing region is the determining factor for economic development (Dawkins 2003, Kimbugwe–Banerjee–Gyawali 2010, Lengyel 2010).

Besides this, the great contribution of the Export Base Theory to the field of regional development is that it draws attention to the importance of specialization and the impact of external demand for a region's growth (Pike–Rodriguez-Pose–Tomaney 2006). The model emphasizes furthermore that development depends on the cooperative links between enterprises: the external demand is not only beneficial for the exporting enterprise, but also to its business/cooperative partners (Dawkins 2003, North 1955, Silberston 1972). The cyclical flow of income creates a multiplier effect in the region. According to Domanski and Gwosdz (2010) the multiplier effect refers to:

"An increase (or decrease) of one type of economic activity in a given city or region prompts an increase (or decrease) in demand for goods and services, which then triggers the development of other types of economic activity in the same region or city. An increase (or decrease) in income or employment in a local or regional economy triggered by the emergence of a new type of economic activity is called a multiplier effect"

(Domanski–Gwosdz 2010, p. 1). In the Export Base Theory, the multiplier effect is the function of the proportion of locally available/locally produced resources and imported resources (Kocziszky 2009).

The territorial sense of export data and economic spaces

In those studies that concentrate not on a supranational territorial scale, the empirical data collection and analysis can be a sufficient alternative when assessing the differences of export capability amongst smaller territorial units than a national economy. Besides this, we have to be aware that the economic space of actors has more layers; according to François Perroux (1950):

1. the first one "economic space as a field of forces" means the banal space of organizations from which they use resources for their production;
2. the second can be defined by the intra- and extra-sectoral connections and linkages, which the actors utilise in their production and distribution system for value creation and dispatching various goods;
3. finally, the third one is the "economic space as homogeneous aggregate", which refers to relations of homogeneity in specific measures such as products or services, or price-levels (Perroux 1950).

It is important to highlight that simplification is necessary to the examination considering territorial differences of export activities in our case, thus we order an aggregate measure of economic performance (the sales value and the export value in Hungarian Forint, hereinafter HUF) to specific sub-national territory; the value refers to the SUM of those organizations which centre is located at the given territorial unit, although the organization may have further sites within the national economy.

The research

In recent years, a number of papers and publications have examined spatial differences and inequalities in Hungary. Pénzes (2012) summarizes the basic trends of Hungarian spatial development (Cséfalvay–Nikodémus 1991, Rechnitzer 1993, Enyedi 1996, Kozma 1998, Nemes Nagy 1998, Beluszky–Győri 1999, Faluvégi 2000 in Pénzes, 2012): territorial hegemony of the capital ('dominant development' in Pénzes, 2012; 'monocentric character of Hungary' in Nemes Nagy–Tagai 2011); increasing difference between the capital and rural territories (Pénzes 2012, 'divergence between territorial levels' in Nemes Nagy–Tagai 2011); emergence of the 'West-East declination' (Pénzes 2012; 'a distinct regional dimension (west–east)' in Nemes Nagy – Tagai, 2011); variant development patterns of micro-regions and settlements (Pénzes 2012, Obádovics 2013). The status of increasing regional inequalities appears in various research contexts. Dusek–Lukács–Rácz (2014) cites Nemes, Nagy J. (2009 p. 38 in Dusek–Lukács–Rácz, 2014 p. 275): 'in the last two decades, the indigenous territorial development was determined by the growth of inequalities', in connection with their research results on population change (based on a dynamic analysis carried out for the period 1990–2010, the population has decreased in each region of Hungary, except for Central Hungary), labour market conditions (in the examined period, the number of employees was the

highest in Central Hungary due to the largest population size and lowest unemployment rate) (Dusek–Lukács–Rácz 2014). The research highlights that income inequalities in Hungary (measured by the average gross monthly earnings of employees); or more precisely, differences between Central Hungary and other regions has increased (Dusek–Lukács–Rácz 2014). Dusek–Lukács–Rácz (2014) argue that based on the results (1990–2010), Central Hungary is the most advanced region of Hungary, followed by Western Transdanubia and Central Transdanubia, and with significant lag from Southern Transdanubia, Southern Great Plain and Northern Great Plain, with Northern Hungary trailing the list. Obádovics (2013) used population analysis to confirm the increasing regional disparities due to the migration towards large cities and the increasing labour flow from underdeveloped areas to more developed ones. Pénzes (2012) explains the changes in the spatial income with the ability of attracting foreign capital after the regime's change (the main drivers of receiving foreign capital is favourable geographical and market position, the proximity of significant markets with good purchasing power), as a consequence, the increasing regional inequalities are due to the different capability of regions for attracting capital. Nemes Nagy–Tagai (2011) focusing on regional inequalities and regional development evaluates the performance of counties (NUTS-3 level) from GDP per capita changes point of view for the period of 1994 to 2008. By the calculation of GDP per capita in relation to the national average, they assess the period of maximum development levels in Hungarian counties between 1994 and 2008.

Table 1

Period of GDP per capita maximum (1994–2008)

Period	Name of county/NUTS-3 level (NUTS-2 region) in alphabetical order
2006	1: Budapest (Central Hungary)
2002–2005	1: Pest (Central Hungary); 2: Komárom-Esztergom (Central Transdanubia); 3: Zala (Western Transdanubia)
1998–2001	1: Fejér (Central Transdanubia); 2: Győr-Moson-Sopron (Western Transdanubia); 3: Vas (Western Transdanubia)
1994–1997	1: Bács-Kiskun (Southern Great Plain); 2: Baranya (Southern Transdanubia); 3: Békés (Southern Great Plain); 4: Borsod-Abaúj – Zemplén (Northern Hungary); 5: Csongrád (Southern Great Plain); 6: Hajdú-Bihar (Northern Great Plain); 7: Heves (Northern Hungary); 8: Jász-Nagykun-Szolnok (Northern Great Plain); 9: Nógrád (Northern Hungary); 10: Somogy (Southern Transdanubia); 11: Szabolcs-Szatmár-Bereg (Northern Great Plain); 12: Tolna (Southern Transdanubia); 13: Veszprém (Central Transdanubia)

Source: Self-editing based on Nemes Nagy–Tagai (2011).

If we assess the result of Nemes Nagy–Tagai (2011) and Dusek–Lukács–Rácz (2014) we can observe cohesion in the results: Budapest and consequently Central Hungary is the most advanced region, Western Transdanubia, Central Transdanubia are in better position than Southern Transdanubia, Southern Great Plain, Northern Great Plain and Northern Hungary.

Due to the nature and scope of the introduced research,the basis of investigating regional development, regional inequalities were results indicators. Demographic changes, GDP per capita values and income are such indicators which demonstrate the change of welfare from the output side. They are a consequence of various territorial

economic conditions. The research proposes a different approach in investigating regional differences. The aim is to explore the conditions of export-led growth in Hungary, and through the examination of the spatial distribution of the 500 companies with the best sales performance (TOP 500 list) the paper attempts to demonstrate the reasons for regional inequalities in Hungary. It should be noted that economic concentrations are not the product of coincidence their increase is related to historical aspects, abundance of raw materials, infrastructural developments, connectivity to important markets, agglomeration advantages, innovative industrial branches, etc. (Dawkins 2003, Lengyel–Rechnitzer 2004, Meyer 2005). The other scope of the research is to demonstrate the concentration of different sectors in NUTS-3 level, as well as highlighting their export orientation. The last part of the research deals with examining associations between different measures.

The research seeks to find answers to the following questions related to regional development: is there a relationship between the volume of sales achieved by companies and their export performance? What is the distribution of companies in the TOP 500 list with respect to their location, examined on a county level? How do companies export in different sectors? Are there any inequalities (disparities) between the counties and the capital Budapest from an export performance point of view? Can we find a relationship between the spatial distribution of TOP 500 companies, unemployment and nominal income level?

The data used for the study's elaboration comes from a Hungarian weekly – HVG – which annually issues the list of those companies that have achieved the greatest sales value during the previous business year. This list contains the first 500 companies with the best sales performance; consequently the list is called the TOP 500 list. In this list, we can find the names of companies with their total sales value (gross), their sales value from export activities, and the sector they operate in. The weekly provides information about the distribution of companies amongst the 19 Hungarian counties (NUTS-3 level) and the capital of the county. In this research, the same scaling will be used for examination, namely that the capital is separated because of its territorial and economic hegemony in the country (Pénzes 2012, Nemes Nagy–Tagai 2011).

In order to carry out the research based on the printed weekly (published in November, 2013 based on the companies' result in 2012), a database was developed in MS Excel. During its preparation, the reliability of the presented information was regularly verified; with the help of the HVG weekly's analysis, it was possible to compare the territorial total values, furthermore, the total values with respect to economic sectors, confirming the accuracy of the data used for the research. With the help of MS Excel, it was possible to query the spatial distribution of TOP 500 companies and sectors through filtering, and making the necessary calculations for the research. The other data pool used is the database of the Hungarian Central Statistical Office (unemployment rate and nominal income level of the counties and the capital).

Distribution of the participants of TOP 500 list on subnational scale

Examining the regional development connected to the income generation of firms – the sales value – it makes sense to highlight the differences of sub-national units concerning

the number of participants from the TOP 500 list ranked on the basis of sales value. The table below shows the rank of the capital and the counties based on the TOP 500 companies' distribution.

Table 2

Distribution of participants of the TOP 500 companies according to their location, 2012

	Territorial level /Capital, NUTS-3/ and code of NUTS-2	Number of participants from "TOP 500" enterprises	Share from the number of participants, %
1.	Budapest (HU10)	216	43.20
2.	Pest (HU10)	76	15.20
3.	Fejér (HU21)	26	5.20
4.	Komárom-Esztergom (HU21)	26	5.20
5.	Borsod-Abaúj–Zemplén (HU31)	22	4.40
6.	Győr-Moson-Sopron (HU22)	21	4.20
7.	Hajdú-Bihar (HU32)	17	3.40
8.	Bács-Kiskun (HU33)	14	2.80
9.	Csongrád (HU33)	14	2.80
10.	Jász-Nagykun-Szolnok (HU32)	13	2.60
11.	Vas (HU22)	12	2.40
12.	Veszprém (HU21)	9	1.80
13.	Szabolcs-Szatmár-Bereg (HU32)	7	1.40
14.	Heves (HU31)	6	1.20
15.	Somogy (HU23)	6	1.20
16.	Baranya (HU23)	5	1.00
17.	Békés (HU33)	3	0.60
18.	Tolna (HU23)	3	0.60
19.	Nógrád (HU31)	2	0.40
20.	Zala (HU22)	2	0.40
	Total	*500*	*100,00*

Source: Self-editing based on the HVG TOP 500 list (reference year: 2012).

Code of units NUT-2 regions: Central Hungary (HU10); Central Transdanubia (HU21); Western Transdanubia (HU22); Southern Transdanubia (HU23); Northern Hungary (HU31); Northern Great Plain (HU32); Southern Great Plain (HU33).

It can be seen that the differences are quite high between the territorial units in the number of participants of the list, the territorial hegemony of the capital is obvious. The inequalities according to the number of TOP 500 companies are high, more than the half of the companies can be found in the advanced Central Hungary NUTS-2 region.

Total sales value, sales value from export activities by sectors of subnational territorial units

The following section interprets the data used for the analysis both on a territorial level and according to 15 sectors that are represented in the TOP 500 ranking.

Table 3

Distribution of the total sales value and sales vale from export activities by sectors (Electronics industry, Food and tobacco industry, agriculture; Energetics; Construction and materials industries) of subnational territorial units

Territorial level /Capital, NUTS-3/ and code of NUTS-2	Electronics industry		Food and tobacco industry, agriculture		Energetics		Construction and materials industries	
	A	B	A	B	A	B	A	B
Budapest (HU10)	84 092	55 610	596 797	297 568	11 247 833	4 724 833	391 020	818
Bács-Kiskun (HU33)	0	0	170 127	115 375	0	0	69 131	10 970
Baranya (HU23)	0	0	17 369	789	60 905	0	0	0
Békés (HU33)	0	0	32 415	9 618	0	0	20 541	15 321
Borsod-Abaúj-Zemplén (HU31)	432 377	429 667	56 693	6 563	228 060	111	0	0
Csongrád (HU33)	0	0	169 994	51 889	391 092	6	40 664	19 262
Fejér (HU21)	288 661	222 531	133 865	45 675	80 261	2 379	24 828	18 376
Győr-Moson-Sopron (HU22)	0	0	46 730	1 286	92 437	0	50 049	46 352
Hajdú-Bihar (HU32)	130 028	129 271	98 653	22 899	349 280	0	0	0
Heves (HU31)	0	0	0	0	94 083	2	0	0
Jász-Nagykun-Szolnok (HU32)	713 517	621 684	0	0	0	0	20 828	0
Komárom-Esztergom (HU21)	999 761	949 046	63 536	8 371	69 371	12 684	0	0
Nógrád (HU31)	0	0	0	0	0	0	0	0
Pest (HU10)	304 328	193 830	426 301	175 162	112 247	43 591	57 981	4 613
Somogy (HU23)	528 642	480 191	17 656	4 258	136 627	23 419	0	0
Szabolcs-Szatmár-Bereg (HU32)	0	0	27 232	11 542	0	0	0	0
Tolna (HU23)	0	0	23 443	976	184 243	18	0	0
Vas (HU22)	85 361	80 372	22 428	9 011	0	0	49 144	10 476
Veszprém (HU21)	0	0	19 672	2 966	0	0	0	0
Zala (HU22)	0	0	0	0	21 665	7 963	0	0
Total	*3 566 767*	*3 162 202*	*1 922 911*	*763 948*	*13 068 104*	*4 815 006*	*724 186*	*126 188*

Source: Self-editing based on the HVG TOP 500 list (reference year: 2012).

Note: A: Total sales value (gross) in million HUF; B: Sales value (gross) from export activities in million HUF.

Code of NUTS-2 regions: Central Hungary (HU10); Central Transdanubia (HU21); Western Transdanubia (HU22); Southern Transdanubia (HU23); Northern Hungary (HU31); Northern Great Plain (HU32); Southern Great Plain (HU33).

Table 4

Distribution of the total sales value and sales vale from export activities by sectors (Metal working, Machine engineering, Pharmaceutical industry, Automotive industry, Retail, Light industry)) of subnational territorial units

Territorial level /Capital, NUTS-3/ and code of NUTS-2	Metal working		Machine engineering		Pharmaceutical industry		Automotive industry		Retail		Light industry	
	A	B	A	B	A	B	A	B	A	B	A	B
Budapest (HU10)	0		1 570 435	1 526 044	859 094	730 182	89 087	47 103	748 240	3 003	34 199	4 298
Bács-Kiskun (HU33)	0	0	0	0	0	0	307 374	305 356	0	0	0	0
Baranya (HU23)	0	0	30 952	30 716	0	0	0	0	0	0	0	0
Békés (HU33)	0	0	0	0	0	0	40 486	30 279	0	0	0	0
Borsod-Abaúj-Zemplén (HU31)	0	0	68 758	26 862	0	0	193 787	191 468	24 875	0	0	0
Csongrád (HU33)	0	0	20 403	16 906	0	0	0	0	0	0	0	0
Fejér (HU21)	565 046	448 331	19 266	19 039	0	0	492 476	464 637	356 614	347	89 103	71 988
Győr-Moson-Sopron (HU22)	57 674	47 501	0	0	0	0	1 854 356	1 790 860	0	0	0	0
Hajdú-Bihar (HU32)	0	0	31 043	29 630	188 438	173 525	0	0	0	0	0	0
Heves (HU31)	0	0	0	0	0	0	466 727	449 390	0	0	0	0
Jász-Nagykun-Szolnok (HU32)	0	0	433 447	318 340	0	0	52 163	48 975	46 266	0	0	0
Komárom-Esztergom (HU21)	22 807	12 261	181 587	175 602	0	0	578 399	506 085	0	0	0	0
Nógrád (HU31)	0	0	0	0	0	0	33 741	33 464	0	0	0	0
Pest (HU10)	0	0	113 823	105 584	310 732	194 962	264 728	247 920	1 068 900	25 904	66 809	28 750
Somogy (HU23)	0	0	0	0	0	0	0	0	0	0	0	0
Szabolcs-Szatmár-Bereg (HU32)	0	0	0	0	0	0	0	0	40 903	0	16 916	16 628
Tolna (HU23)	0	0	0	0	0	0	0	0	0	0	0	0
Vas (HU22)	0	0	0	0	0	0	369 489	336 478	0	0	0	0
Veszprém (HU21)	32 001	29 868	24 098	21 184	0	0	295 330	292 571	49 397	2 331	0	0
Zala (HU22)	0	0	0	0	0	0	0	0	0	0	0	0
Total	677 528	537 961	2 493 812	2 269 907	1 358 264	1 098 669	5 038 343	4 744 586	2 335 195	31 585	207 027	121 664

Source: Self-editing based on the HVG TOP 500 list (reference year: 2012).
Note: A: Total sales value (gross) in million HUF; B: Sales value (gross) from export activities in million HUF.
Code of NUTS-2 regions: Central Hungary (HU10); Central Transdanubia (HU21); Western Transdanubia (HU22); Southern Transdanubia (HU23); Northern Hungary (HU31); Northern Great Plain (HU32); Southern Great Plain (HU33).

Table 5

Distribution of the total sales value and sales vale from export activities by sectors (Transport; Wholesale; Service industry; Telecommunications and postal services; Chemical, rubber and plastic industries) of subnational territorial units

Territorial level /Capital, NUTS-3/ and code of NUTS-2	Transport		Wholesale		Service industry		Telecommunications and postal services		Chemical, rubber and plastic industries	
	A	B	A	B	A	B	A	B	A	B
Budapest (HU10)	1 256 626	403 679	3 602 686	1 490 207	1 671 418	655 995	1 039 545	114 294	177 125	122 916
Bács-Kiskun (HU33)	0	0	138 110	15 058	27 039	1 714	0	0	38 736	36 619
Baranya (HU23)	0	0	27 519	0	0	0	0	0	0	0
Békés (HU33)	0	0	0	0	0	0	0	0	0	0
Borsod-Abaúj–Zemplén (HU31)	0	0	23 126	3	20 918	0	0	0	813 544	474 639
Csongrád (HU33)	0	0	55 897	25	0	0	0	0	80 501	73 701
Fejér (HU21)	0	0	78 112	16 812	0	0	0	0	162 449	143 293
Győr-Moson-Sopron (HU22)	29 295	14 997	42 259	0	141 773	91 399	0	0	19 307	18 915
Hajdú-Bihar (HU32)	0	0	280 396	23 919	44 433	3 143	0	0	0	0
Heves (HU31)	0	0	21 801	0	0	0	0	0	0	0
Jász-Nagykun-Szolnok (HU32)	0	0	52 314	823	0	0	0	0	0	0
Komárom-Esztergom (HU21)	0	0	54 433	2 123	0	0	0	0	135 434	124 884
Nógrád (HU31)	0	0	25 880	3	0	0	0	0	0	0
Pest (HU10)	69 583	43 541	2 091 863	925 860	402 892	373 068	209 011	2 499	22 542	20 732
Somogy (HU23)	0	0	27 179	0	17 622	0	0	0	0	0
Szabolcs-Szatmár-Bereg (HU32)	0	0	100 099	76 270	26 709	0	0	0	185 670	164 598
Tolna (HU23)	0	0	36 881	4 683	0	0	0	0	0	0
Vas (HU22)	0	0	0	0	17 139	17 139	0	0	48 834	5 305
Veszprém (HU21)	0	0	0	0	0	0	0	0	80 809	0
Zala (HU22)	32 636	28 241	0	0	0	0	0	0	0	0
Total	1 388 140	490 458	6 658 555	2 555 786	2 369 943	1 142 458	1 248 556	116 793	1 764 951	1 185 602

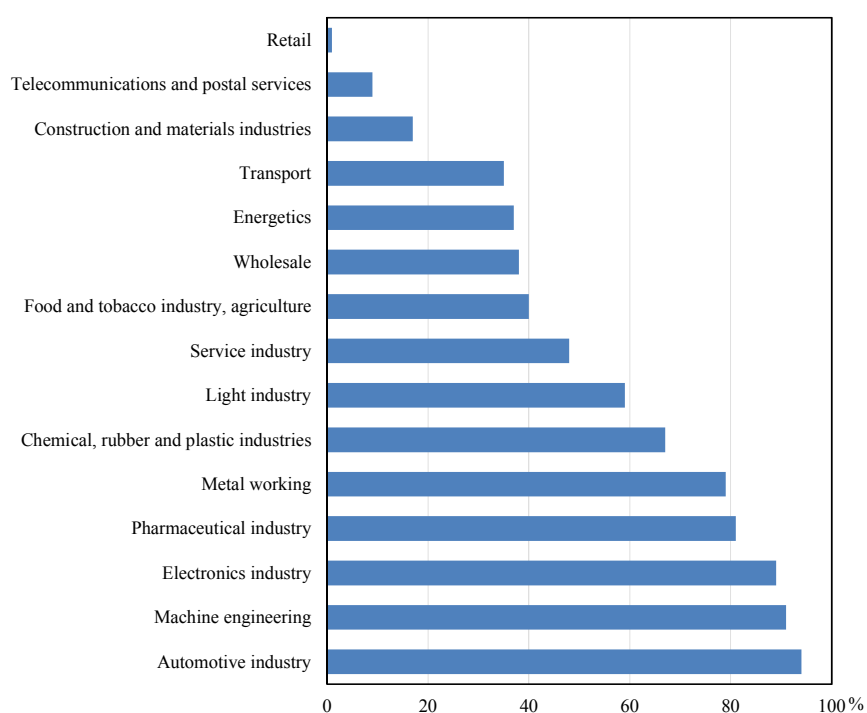*Source:* Self-editing based on the HVG TOP 500 list (reference year: 2012).

Note: A: Total sales value (gross) in million HUF; B: Sales value (gross) from export activities in million HUF.
Code of NUTS-2 regions: Central Hungary (HU10); Central Transdanubia (HU21); Western Transdanubia (HU22); Southern Transdanubia (HU23); Northern Hungary (HU31); Northern Great Plain (HU32); Southern Great Plain (HU33).

Export orientation of sectors

Using the data from Tables 3, 4 and 5, it is possible to calculate how the different sectors are export oriented simply dividing the sales values (gross) from export activities (denoted by variable "B" in the tables) by the total sales value (gross) (denoted by variable "A" in the tables). The following figure shows the rank of sectors from an export-orientation point of view for 2012.

Figure 2

Rank of sectors from export orientation point of view

Source: Self-editing based on the HVG TOP 500 list.

It can be seen that the companies of the TOP 500 list are highly export-oriented, but there are some sectors which are naturally less export-oriented, such as retail or telecommunications. The figure seems to validate the hypothesis that those companies are able to generate high-level income and exceptional performance, whose export-capability is high. The well-known phenomenon, the so called "Red queen hypothesis", which explains that those organizations that have been familiarized with a high level of competition (being the most defining factor of international markets) are more competitive and consequently capable of high income generation seems to be validated (Koós 2008).

Generation of sales value from export activities amongst territorial units, sectors

The next section will examine the territorial differences and sector-oriented differences of export value generation.

Table 6

Distribution of sales value from export activities amongst the subnational regions, share from total sales value from export activity and the cumulative share value

	Territorial level /Capital, NUTS-3/ and code of NUTS-2	Sales value (gross) from export activities, million HUF	Share from total sales value (gross) from export activities, %	Cumulative share, %
1.	Budapest (HU10)	10 176 550	43.93	43.93
2.	Pest (HU10)	2 386 016	10.30	54.24
3.	Győr-Moson-Sopron (HU22)	2 011 310	8.68	62.92
4.	Komárom-Esztergom (HU21)	1 791 056	7.73	70.65
5.	Fejér (HU21)	1 453 408	6.27	76.93
6.	Borsod-Abaúj-Zemplén (HU31)	1 129 313	4.88	81.80
7.	Jász-Nagykun-Szolnok (HU32)	989 822	4.27	86.08
8.	Somogy (HU23)	507 868	2.19	88.27
9.	Bács-Kiskun (HU33)	485 092	2.09	90.36
10.	Vas (HU22)	458 781	1.98	92.34
11.	Heves (HU31)	449 392	1.94	94.28
12.	Hajdú-Bihar (HU32)	382 387	1.65	95.93
13.	Veszprém (HU21)	348 920	1.51	97.44
14.	Szabolcs-Szatmár-Bereg (HU32)	269 038	1.16	98.60
15.	Csongrád (HU33)	161 789	0.70	99.30
16.	Békés (HU33)	55 218	0.24	99.54
17.	Zala (HU22)	36 204	0.16	99.69
18.	Nógrád (HU31)	33 467	0.14	99.84
19.	Baranya (HU23)	31 505	0.14	99.98
20.	Tolna (HU23)	5 677	0.02	100.00
	Total	*23 162 813*	*100,00*	–

Source: Self-editing based on the HVG TOP 500 list (reference year: 2012).
Code of NUTS-2 regions: Central Hungary (HU10); Central Transdanubia (HU21); Western Transdanubia (HU22); Southern Transdanubia (HU23); Northern Hungary (HU31); Northern Great Plain (HU32); Southern Great Plain (HU33).

The above table shows the ranking of the capital and the counties in relation to their sales value (gross) from export activities. The share shows the distribution of the sales value (gross) from export activities amongst the territorial units. The hegemony of the capital can again be seen.. What is further interesting is that the biggest difference of the share value is between the first two rated territorial units. By the cumulative share value, the inequality of the sales value from export activities' distribution can be analysed: nearly 80% of the value is generated by the first six territorial units, therefore, 80% of the sales value (gross) from export activities derive from 30% of the number of territorial units in the research, which indicates significant disparity of sales value from export activities' generation amongst the sub-national units. The counties which represents 80% of the share of the export values from the TOP-500 base are Central Hungary, Western

Transdanubia, Central Transdanubia and Northern Great Plains. The result resembles the results of Dusek–Lukács–Rácz (2014), the most advanced region Central Hungary is the largest exporter followed by Eastern Transdanubia and Central Transdanubia.

Table 7

Distribution of sales value from export activities amongst the sectors, share from total sales value from export activity and the cumulative share value

	Sectors	Sales value (gross) from export activities, million HUF	Share from total sales value (gross) from export activities, %	Cumulative share, %
1.	Energetics	4 815 006	20.79	20.79
2.	Automotive industry	4 744 586	20.48	41.27
3.	Electronics industry	3 162 202	13.65	54.92
4.	Wholesale	2 555 786	11.03	65.96
5.	Machine engineering	2 269 907	9.80	75.76
6.	Chemical, rubber and plastic industries	1 185 602	5.12	80.88
7.	Service industry	1 142 458	4.93	85.81
8.	Pharmaceutical industry	1 098 669	4.74	90.55
9.	Food and tobacco industry, agriculture	763 948	3.30	93.85
10.	Metal working	537 961	2.32	96.17
11.	Transport	490 458	2.12	98.29
12.	Construction and materials industries	126 188	0.54	98.83
13.	Light industry	121 664	0.53	99.36
14.	Telecommunications and postal services	116 793	0.50	99.86
15.	Retail	31 585	0.14	100.00
	Total	*23 162 813*	*100.00*	–

Source: Self-editing based on the HVG TOP 500 list (reference year: 2012).

The table above shows the different sectors contribution to the sales value (gross) from export activities: the energetic sector leads the list with the nearly 21% share from the sales value (gross) from export activities, the second one is the automotive industry. The difference is less between the first and second rated sector than in the territorial ranking. Concerning the inequalities, close to 80% of the sales value (gross) from export activities is generated by the 40% of the sector; the inequality is also less than in the case of the capital and counties ranking regarding the sales value (gross) from export activities.

Furthermore, it is worth comparing the results of the second figure regarding the sectors export-orientation and the sales value rankings. From an export orientation perspective, one which is calculated by the ratio of sales value (gross) from export activities and total sales value (gross) in million HUF, the first in the ranking is the automotive industry, which stands at second place in the actual ranking when we consider the amount of sales value from export activities. Based on this result, it can be stated that this sector creates value mainly for outer-regional (the region in this case

refers to Hungary) demand satisfying purposes. While the sector, which created the largest sales value from export activities in 2012, namely Energetics, its export orientation based on the ratio is less significant. Resembling the sales value from export activity and the ranking from export orientation it can be stated that this sector satisfy both inner and outer-regional demands. This situation, from the regional development point of view, is more preferable since if the outer regional demand patterns alter, it does not means that the sector vitality is questionable. Long term, those sectors presence are preferable for regional development which both satisfies demand in the country where they operates and in international markets, thus maintaining stability.

Correlation analysis

In this part of the study several circumstances on how the performance of companies of the TOP 500 list affects regional development will be tested. At first the correlation between the total sales value and sales value from export activities will be tested, answering the question that from an income generation point of view, how important the export activity is.

The correlation in this case is elaborated on a company level (for better accuracy), using the correlation function of MS Excel, which estimates the correlation coefficient. The correlation coefficient is used to analyse the linear association between two variables – in this case between the total sales value and sales value from export activities. The value set of correlation coefficient is between –1 and +1, where value "1" indicates strong linear relation and "0" indicates no linear relationship, and the plus/minus quality refers to the direction of change.

Table 8

Correlation between the total sales value and sales value from export activities

First variable	Second variable	Correlation coefficient
Total sales value	Sales value from export activities	0.9519

Source: Self-editing based on the HVG TOP 500 list (reference year: 2012).

The correlation of the two variables are considered as strong, positive, linear one, indicating that the success of the income generation of the TOP 500 in Hungary, in 2012 are the function of export activity. The outcome fits the theory of export-led growth, higher efficiency can be reached by increased outputs (economies of scale), and international competition triggers development (Dawkins 2003, Kimbugwe–Banerjee–Gyawali 2010, Lengyel 2012, Major 2013, Medina-Smith 2001, Murphy–Shleifer–Vishny 1989, North 1955, Silberston 1972, Szentes 2011).

Relationship between the sales value (gross) from export activities and unemployment

Table 9

Sales value from export activities of TOP 500 of subnational regions and the unemployment rate

	Territorial level /Capital, NUTS-3/ and code of NUTS-2	Sales value (gross) from export activities of TOP 500, million HUF	Unemployment rate, 2012, %
1.	Budapest (HU10)	10 176 550	9.3
2.	Bács-Kiskun (HU33)	485 092	9.5
3.	Baranya (HU23)	31 505	14.7
4.	Békés (HU33)	55 218	12.0
5.	Borsod-Abaúj–Zemplén (HU31)	1 129 313	17.3
6.	Csongrád (HU33)	161 789	10.6
7.	Fejér (HU21)	1 453 408	10.3
8.	Győr-Moson-Sopron (HU22)	2 011 310	5.3
9.	Hajdú-Bihar (HU32)	382 387	13.5
10.	Heves (HU31)	449 392	14.4
11.	Jász-Nagykun-Szolnok (HU32)	989 822	11.3
12.	Komárom-Esztergom (HU21)	1 791 056	7.8
13.	Nógrád (HU31)	33 467	17.5
14.	Pest (HU10)	2 386 016	9.1
15.	Somogy (HU23)	507 868	10.3
16.	Szabolcs-Szatmár-Bereg (HU32)	269 038	16.2
17.	Tolna (HU23)	5 677	9.6
18.	Vas (HU22)	458 781	6.1
19.	Veszprém (HU21)	348 920	10.9
20.	Zala (HU22)	36 204	11.8

Source: Self-editing based on the HVG TOP 500 list and Hungarian Central Statistical Office's data (reference year: 2012).

Code of NUTS-2 regions: Central Hungary (HU10); Central Transdanubia (HU21); Western Transdanubia (HU22); Southern Transdanubia (HU23); Northern Hungary (HU31); Northern Great Plain (HU32); Southern Great Plain (HU33).

Next, the relationship between the capital and counties' export activity based on the TOP 500 list enterprises and the unemployment rate is examined (the data comes from the Hungarian Central Statistical Office Regional Statistics). If the differences amongst the territorial units' performance concerning the export activity have impact on the unemployment rate, the association is expected to reach the value "1" and the quality of the relation is expected to be reversed.

Table 10

Correlation between the sales value from export activities and unemployment rate

First variable	Second variable	Correlation coefficient
Sales value from export activities	Unemployment rate (territorial)	–0.2814

Source: Self-editing based on the HVG TOP 500 list and Hungarian Central Statistical Office's data (reference year: 2012).

It can be seen that the relationship between the two variables are reversed: the higher level of sales value from export activities results in lower unemployment rate, but the value of the correlation coefficient indicates weak association between the variables.

Based on the data from the TOP 500 ranking, unfortunately, we cannot state that the export activity is a guarantee for reducing unemployment in Hungary.

Relationship between the sales value (gross) from export activities and nominal income level

Table 11

Sales value from export activities of TOP 500 of subnational regions and the nominal income level

	Territorial level /Capital, NUTS-3/ and code of NUTS-2	Sales value (gross) from export activities of TOP 500, million HUF	Nominal income level (net, 2012)
1.	Budapest (HU10)	10 176 550	182 622
2.	Bács-Kiskun (HU33)	485 092	116 078
3.	Baranya (HU23)	31 505	119 803
4.	Békés (HU33)	55 218	105 515
5.	Borsod-Abaúj–Zemplén (HU31)	1 129 313	114 587
6.	Csongrád (HU33)	161 789	119 966
7.	Fejér (HU21)	1 453 408	137 794
8.	Győr-Moson-Sopron (HU22)	2 011 310	145 310
9.	Hajdú-Bihar (HU32)	382 387	119 860
10.	Heves (HU31)	449 392	131 168
11.	Jász-Nagykun-Szolnok (HU32)	989 822	113 239
12.	Komárom-Esztergom (HU21)	1 791 056	139 441
13.	Nógrád (HU31)	33 467	110 457
14.	Pest (HU10)	2 386 016	132 517
15.	Somogy (HU23)	507 868	115 075
16.	Szabolcs-Szatmár-Bereg (HU32)	269 038	105 738
17.	Tolna (HU23)	5 677	129 022
18.	Vas (HU22)	458 781	123 777
19.	Veszprém (HU21)	348 920	120 838
20.	Zala (HU22)	36 204	112 505

Source: Self-editing based on the HVG TOP 500 list and Hungarian Central Statistical Office's data (reference year: 2012).

Code of NUTS-2 regions: Central Hungary (HU10); Central Transdanubia (HU21); Western Transdanubia (HU22); Southern Transdanubia (HU23); Northern Hungary (HU31); Northern Great Plain (HU32); Southern Great Plain (HU33).

One measure of regional development is the income level of the inhabitants from which they can consume goods and services and manage savings. It was for this reason that this dimension was included in the research about the Export Base Theory. The Hungarian Central Statistical Office Regional Statistics provided data for the calculation investigating the relationship of the two variables. We expect that on those sub-national territorial levels where the sales value is at higher level, the nominal income level will be higher amongst the sample.

Table 12

Correlation between the sales value from export activities and nominal income level

First variable	Second variable	Correlation coefficient
Sales value from export activities	Nominal income level (territorial)	0.8740

Source: Self-editing based on the HVG TOP 500 list and Hungarian Central Statistical Office's data.

The correlation coefficient indicates a positive and strong relationship between the two variables: the increase in the sales value from export activities means the increase in nominal income level. The strength of correlation coefficient implies that export activity influence the income level of sub-national regional levels. As a consequence we can acknowledge that export activity is important indeed for economic development, regional welfare (since income level is an important measure of welfare).

Conclusion

Reducing the regional disparities amongst regions with respect to their long-term sustainable growth is nowadays one of the greatest challenges of each national economy. The regions – due to differences in the abundance of natural resources, capital, technology level, human capital and the capability to compete at international markets – reach different levels of social welfare, with the level of it also varying within the region's population. The wide range of regional development theories points out those conditions which enable the economic decision-makers to decrease the territorial disparities. In the European Union, to which economic area Hungary belongs, regional policy aims to simultaneously (1) decrease the disparities by enhancing the economic convergence and cohesion, and (2) support those sectors which enable the EU to participate in transnational competition derived from globalization.

By having answered the research questions, it can be concluded that the sales value achieved by the companies and the export value have a strong a relationship. By analysing the spatial distribution and added value generation capability of the TOP 500 companies, it is possible to observe the territorial hegemony of the capital (Central Hungary), the importance of the Western and Central Transdanubian regions, and the lagging regions in the Eastern part of the country except Borsod-Abaúj-Zemplén county (Northern Hungary), where the number of TOP 500 companies and the added value are significant.

The outcomes of the research indicated that export activity has a large impact on the Hungarian economy. The regional inequalities exist in the country are parallel to the distribution of the largest firms' location and export activity. The analysis has demonstrated that the TOP 500 companies are export oriented to a higher extent, and they are concentrated in the developed regions of the country.

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