



## **Migration to Germany: Structures, processes, and discourses**

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Taking the example of Germany as a demographically ageing country, this paper starts with the assumption that international migration and a sound long-term integration of international migrants are crucial for sustainable population development. However, owing to the complexity of migration motives and individual migration decisions on the one hand, and the multidimensionality of external causes for migration and political regulations aiming to steer migration, on the other hand, the demand and supply side of migration can vary considerably. This paper reflects on recent important migratory movements to Germany (notably inner-European mobility after the expansion of the European Union (EU), and student and refugee migration in the wake of the economic and financial crisis) and concomitant policy changes. Two main arguments are made along these empirical observations: first, the effective regulation of international migration in Germany as in any other European country can only be derived by harmonising migration regulations on a supranational level, and second, the issue of migration and its regulation touch on crucial topics in European and national public discourse such as the stabilisation of individual and group identities in turbulent times. Thus, as per the arguments put forth by this study, in order to solve actual imbalances in the European migration and asylum system, questions on social justice and common European values will need to be addressed throughout the European countries and at the EU level.

**Keywords:**

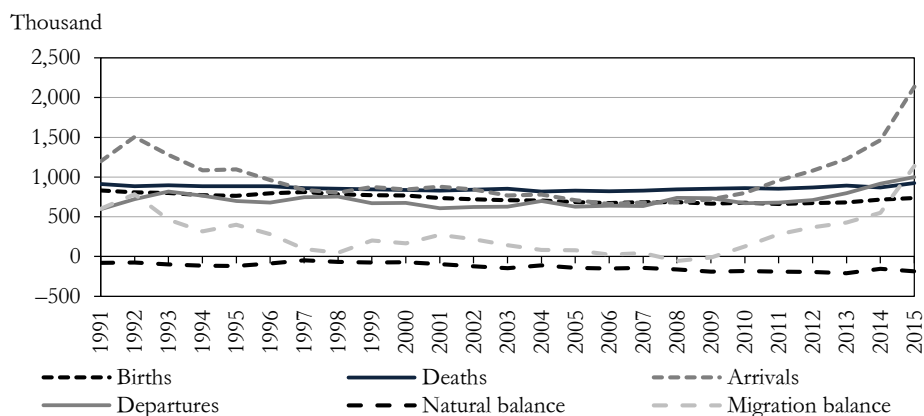
European integration,  
Germany,  
integration,  
migration,  
migration regulation

## Introduction

Like most European societies, the German population went through a demographic transition decades ago, characterised – among other indicators – by declining fertility levels and late births (Van de Kaa 1987, 2001). For a long time, the natural population balance has been negative and the mean age has been increasing, raising concerns about labour force shortages and the lack of sustainability of German social systems. Regarding the population development in Germany since 1990, it is clear that migration is the most important factor in terms of population development, and it is the most variable factor to boot. Declining birth rates and rising death rates amounted to negative natural balances for years, while the migration balance was mostly positive, albeit with high variations: while net gains augmented 400,000 in 1991–1993, the migration balance shrank drastically thereafter until it reached a first minimum of 47,098 in 1998. Since then, net gains ranged between 150,000 and 200,000 for some years, and decreased sharply resulting in net losses in 2008 and 2009. Since 2010, the migration balance has been positive again, with a yearly increase of around 100,000, with the exception of plus 1.1 million in the peak year 2015, when around 2 million people moved to Germany. Among them were almost 1 million asylum seekers. Calculated as an average over the whole observation period 1991–2015, the natural balance was around minus 125,000 p.a., while the migration balance was around 295,000 p.a. Based on the assumption of continued low fertility levels and high longevity, the stability of the German population in terms of age group and population of working age will depend on a continued positive migration balance of between 100,000 and 200,000 persons per year (Statistisches Bundesamt 2015).

Figure 1

### Population development in Germany – births, deaths, immigration, and emigration



Source: Data of the Statistical Office of the Federal Republic of Germany.

Taking the example of Germany, this study explores how migration can support the sustainable population development of a country. Thus, key questions to be explored are, how (and if) the quantity and quality of migratory streams can be regulated, how actual migration processes and the presence of migrants in a country influence policy development and the development of public opinion about migration, integration and related issues.

The study tackles this issue by exploring migration to and from Germany within the wider context of European mobility. Focusing on the post-EU-enlargement period until today, it deals with the main migration flows and their drivers as well as concomitant policy developments and public discourses about migration. Following the introduction, chapter two reflects the main strands of research on German post-war migration and relates it to the wider European context. Chapter three focuses on major mobility transformations since the 2000s, notably on the migratory changes following the EU enlargement of 2004 and 2007, the expansion of student mobility and the increasing migration to Germany as a reaction to the European financial crisis. The chapter not only describes those migratory processes, but also elaborates on the development of policies and public discourses on migration. Chapter four is devoted to the recent large-scale arrival of asylum-seekers in Germany and the consequences of integration management, policy development and public opinion. This paper closes with a final reflection on the general effects of migration on demographic, economic and societal development in Germany, and provides an outlook on issues in this context that need to be tackled at a supra-national level.

### **Main topics and developments in migration and migration research since the Second World War**

As Europe is embedded in the global landscape of migration, changes on a global level affect mobility to and within the continent considerably. At the state level, economic transformations or changes in political regulation schemes translate into changing mobility patterns which also affect neighbouring states or Europe as a whole. In the historical development of migration in Europe after the Second World War, several stages that have influenced European nation states to a varying extent can be identified. For Germany, the repatriation of ethnic Germans had considerable effects in quantitative terms as well as in terms of the social fabric of the population. Between 1950 and 1999, around 2 million ethnic Germans from Central and Eastern Europe migrated to Germany under the ‘Spätaussiedler’ (German resettlers’) migration scheme (Worbs et al. 2013).<sup>1</sup> Although they received German citizenship immediately and were supported financially, a considerable number of inte-

<sup>1</sup> This movement continued and even increased after the end of the Cold War. Until 2012, around 4.5 million ethnic Germans remigrated to Germany (Worbs et al. 2013, p. 28.).

gration and identity problems were noted, especially in the later repatriation waves and partly among the second generation (Kiel 2009, Steiz 2011).

In other European countries, the decolonisation process fuelled immigration. Between 1940 and 1975, around 7 million migrants moved from the former colonies to the United Kingdom, France, Italy, Portugal, the Netherlands, and Belgium (Bade 2000, p. 307.). Consequently, those countries were confronted with questions of ethnic and religious diversity, discrimination and racism, and models of incorporation at a fairly early stage (Balibar–Wallerstein 1990, Entzinger 1998, Pilkington 1988, Solomos 1993).

During the Cold War, migration patterns in Eastern and Western Europe differed considerably. In parts of Western Europe and the Nordic countries, labour migration schemes for the recruitment of so-called ‘guest workers’ were developed since the 1950s, in order to support rapid industrial developments during those times. Around 15 million labour migrants arrived between the 1950s and 1970s, mainly from Mediterranean Europe, and also from the Maghreb countries<sup>2</sup> and Turkey, based on bilateral recruitment schemes (Hammar 1984). Those movements were planned on a temporary base. However, as an effect of economic changes and an unintended consequence of regulatory changes following the oil price crisis, a significant share of temporary migrants became permanent settlers, which significantly changed the social fabric of the societies concerned. In the case of Germany (Federal Republic of Germany [FRG]), the recruitment of guest workers is said to have facilitated the social mobility of indigenous workers, as they took on the least prestigious positions in the labour market (Heckmann 1981). Up until today, guest workers and their descendants account for the largest share of the population with a migration background in Germany, which counteracts the long-held opinion that Germany is a non-immigrant country. In addition, in the German Democratic Republic (GDR), labour migration schemes were developed since the 1950s. Mainly labour migrants from other European socialist countries, but later also from Cuba, Mozambique and Vietnam, were recruited to either work in the big industrial plants in the GDR or receive vocational education. With the breakdown of the socialist regime, most of those labour migrants were forced to return to their home countries (Elsner–Elsner 1994, Jasper 1991).

After the end of the Cold War, a new migration regime came into practice, as citizens from Central and Eastern European countries had the opportunity to leave their countries without travel restrictions. The economic and wage-gaps between East and West were decisive factors for rapidly increasing East-West migration, but legal work opportunities remained scarce (Cyrus 1994, Morokvasic–de Tinguy 1993). Based on bilateral agreements, a significant number of labour migrants headed to Germany and Austria for legal short-term employment in agriculture and con-

<sup>2</sup> Algeria, Morocco, Mauritania, Tunisia, and Libya.

struction; in parallel, irregular labour migrants mostly found work in construction, homes, or as day labourers. The latter group, in particular, often experienced precarious working and living conditions (Düvell 2004, Hofer 1992, Irek 1998).

The EU expansion of 2004 and 2007 again changed the migratory schemes, as the onset of freedom of mobility for the new EU countries offered new forms of mobility and new destinations. Especially the United Kingdom which immediately opened its labour market to citizens of the new EU members, received large numbers of labour migrants, while traditional labour-migration schemes such as the seasonal labour migration scheme between Poland and Germany declined to do so.<sup>3</sup> Many of the ‘new’ migrants developed sophisticated mechanisms of travelling back and forth, facilitated by cheap airlines and easy border-crossings, and thus established transnational and translocal livelihood (Apsite 2010, Drinkwater et al. 2009, Glorius et al. 2013).

In this context, the question of economic consequences gained importance with regard to the source countries of East-West migration. While the positive monetary effects through remittances were out of the question, there was rising concern for the human capital loss owing to the selectivity of migration, which included a large number of young university graduates who had left their countries of origin. Among other aspects, there was a critical reflection of the phenomenon wherein many of those young graduates entered low-skilled positions in the destination countries’ labour markets and thus experienced brain devaluation (Currie 2007).

Meanwhile, owing to relevant changes in the migratory streams, return migration and re-gain of human capital are often debated issues in Central and Eastern European countries (Markova 2010, Mayr–Peri 2008). Research on this subject deals with re-integration of return migrants in the home labour markets, transfer of knowledge and skills, and positive effects for the destination regions of return migration which are usually the capital cities and larger agglomerations (Klagge–Klein–Hitpass 2010, Nadler et al. 2016). This also applies to educational migration. A number of empirical studies have examined the value of studies abroad and the mechanisms of human capital transfer to the Central and Eastern European source countries and stressed the value of transcultural competences and the ability to ‘translate’ knowledge acquired abroad to the home countries’ specifics, practiced by those young returnees (Baláz–Williams 2004, Teichler–Janson 2007, Wolfeil 2013). Recent studies on return migration and its development emphasise the role of social innovation, that is, innovations beyond economic capital, and their contribution to social and economic changes (Grabowska–Engbersen 2016, Grabowska et al. 2017).

<sup>3</sup> While Polish seasonal workers, in the year of Poland’s EU integration in 2004, had the highest share of 86 per cent of the total of 333,690 seasonal workers in Germany, their share dropped quickly to 60 per cent in 2010 which was the last year that seasonal work permits were issued to Polish citizens (BMI 2014).

## Migration to Germany within an enlarged European Union: policies, processes, and discourses

### Development of migration policies

In the wake of the EU expansions of 2004 and 2007, many of the EU15 countries<sup>4</sup> apprehended negative consequences owing to increasing East-West migration, especially where Austria and Germany were concerned, as both countries received significant migration flows from Central and Eastern Europe after 1989/90. As a reaction to these concerns, the implementation of free movement of labour was organised over several stages. During a transitional period of five years, EU members could keep their labour markets closed for migrants from new member states. This period could be expanded to up to seven years, if a ‘serious disorder of national labour markets’ was claimed (Lachmayer–Bauer 2008, p. 693.). While Ireland, Sweden and the United Kingdom immediately opened their labour markets to the new EU members of 2004, most of the other EU countries liberated labour market access after five years. Austria, Belgium, Denmark and Germany made use of the full duration of seven years before granting full freedom of movement to the new EU citizens from Central and Eastern Europe, which was 1 May 2011 for the new EU members of 2004, and 1 January 2014 for the new EU members of 2007 (Bulgaria and Romania).

That is, Germany opted for the most restrictive migration scheme, meaning that until 2011, citizens from new EU countries were treated like third country citizens: the recruitment stop<sup>5</sup> which has been in place since 1973, strongly restricted labour migration. Practically, only labour migrants for low qualification jobs were granted labour market access on a temporary basis (for example, in agriculture or construction). The new migration law of 2004 introduced new regulations for the labour market access of highly skilled or self-employed migrants, but the criteria for labour market access were high, and therefore, only a small number of candidates made use of those new regulations.<sup>6</sup>

In the following years, the criteria for labour market access were alleviated. For example, the income criteria which highly qualified migrants had to meet in order to achieve a residence permit were lowered, and priority checks were partly abolished (BMI 2008, p. 89.). New labour market access rules were put in force for foreign students who graduated from any German university. They could now apply for a 12-months residence permit for the purpose of job search after graduation, which was extended to 18 months in 2012 (§16, 4 AufenthG). In addition, the ratifi-

<sup>4</sup> EU15: Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, the Netherlands, Portugal, Spain, Sweden, the United Kingdom.

<sup>5</sup> For the recruitment stop regulation (Anwerbestoppausnahmeverordnung [ASAV]), see <http://www.aufenthaltstitel.de/asav.html>

<sup>6</sup> In 2006, 10,800 work permits under the new schemes were issued to highly qualified candidates (specialists, academics, managers, etc.), while 320,000 work permits were issued under the conventional scheme for seasonal workers, fairground helpers, or contract workers in construction (see BMI 2008, p. 68.).

cation of the EU Services Directive of 2006 (to realise the full potential of services markets in Europe by removing legal and administrative barriers to trade) and the introduction of the Blue Card EU<sup>7</sup> in 2012 were important innovations with respect to the German migration and residence regulations.

The development of migration and labour market regulations can be interpreted as a paradigmatic shift in German migration politics, turning away from a general migration ban towards a neo-liberal approach of labour migration management. This change was driven by the effects of demographic change and accompanied by the development of a common European migration regulation. Thus, Germany entered a new stage of migration regulation which can be characterized as a ‘battle for the brains’ (Doomernik–Kosłowski–Thranhardt 2009). The following chapters reveal how those changing migration schemes affected mobility processes between Germany and other EU countries.

### **Migration to Germany and labour market integration after EU enlargement**

Especially in the case of the Central and Eastern European accession countries of 2004 (EU8)<sup>8</sup> and 2007 (EU2)<sup>9</sup>, temporary migration dominated for many years, and therefore, relatively low migration gains were recorded (see Figure 2). This can be explained by the continued restricted accessibility of the German labour market which mainly allowed temporary employment, for example, seasonal Portugal and Spain (EU4), migration losses were recorded until 2009, partly owing to the return of guest-worker migrants from the 1960s and 1970s who had reached retirement age.

The increasing number of immigrants from the EU countries to Germany since 2009 can be explained by the economic and financial crisis that affected many European countries severely, while Germany’s economy remained stable. Consequently, especially residents of those Southern European countries that were severely touched by the crisis, started moving to Germany in growing numbers. Furthermore, there was also an ‘evasive’ movement of immigrants from the new EU countries who used to work in other EU countries but had lost their jobs owing to the economic crisis. It is estimated that around three quarters of the immigration increase in Germany can be attributed to such movements (Bertoli–Brücker–Fernández-Huertas Moraga 2013). The fact that the EU8 countries gained full freedom of movement in May 2011 contributed to this increase, as did the EU integration of Romania and Bulgaria in 2007. By the accession year 2007, the number of arrivals from the EU2 countries had doubled and since then has increased annually by 10–20 per cent. However, 2010, 2011 and 2014 witnessed an increase of around 30 per cent compared to the previous year.

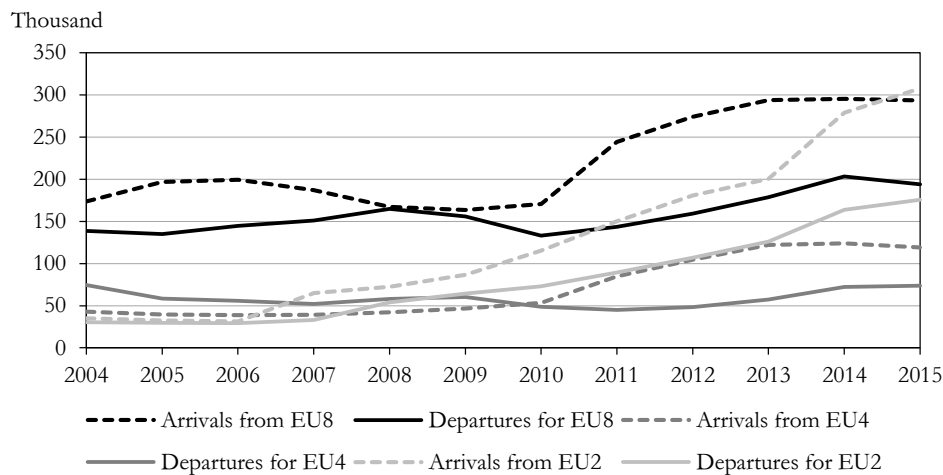
<sup>7</sup> For more information, see <http://www.bluecard-eu.de>

<sup>8</sup> EU8: Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Slovakia, Slovenia.

<sup>9</sup> EU2: Bulgaria, Romania.

Figure 2

### Migration of EU8, EU4, and EU2 citizens to/from Germany



*Note:* EU8 countries: Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Slovakia, Slovenia; EU4 countries: Greece, Italy, Portugal, Spain; EU2 countries: Bulgaria, Romania.

*Source:* Data of the Federal Ministry of the Interior and the Federal Office for Migration and Refugees (Germany).

Considering migrants' qualifications and their labour market integration, the data show a higher rate of migrants from the 'old' EU countries (EU14<sup>10</sup>) aged 25–44 that have undergone tertiary education (46%) in comparison with the German population of the same age (18%). Immigrants from the EU8 and EU2 countries also had a higher academic quota of around 21 per cent (SVR 2013, p. 100). Thus, we can summarise that Germany generally benefits from European free movement in terms of gaining a qualified labour force. However, the share of unskilled immigrants is also higher than in the resident population, reaching 21 per cent among EU14 25–44-year-old migrants, 23 per cent among EU8 migrants and 40 per cent among EU2 migrants.

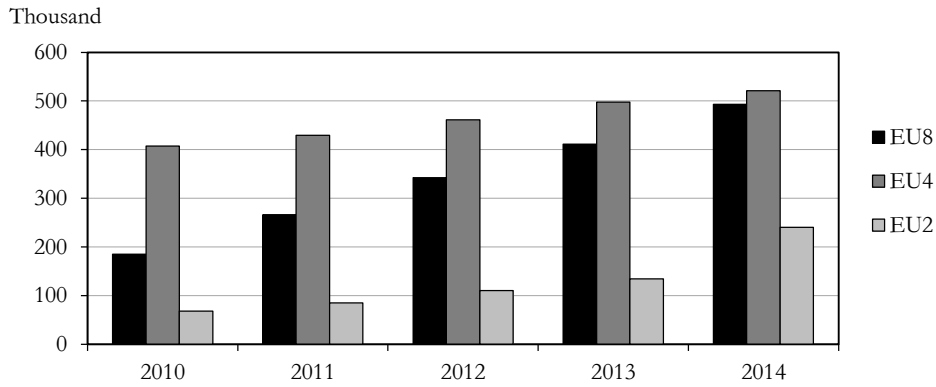
The employment figures for all migrants from the 'new' EU countries (EU8, EU2) and from the Southern European countries (EU4) have significantly increased in recent years (see Figure 3). The abolition of labour market restrictions is clearly visible among the new EU members: employment of migrants from EU8 countries grew by 44 per cent in 2011 compared to the previous year, while employment from EU2 countries rose by 52 per cent between 2013 and 2014. The least significant growth was observed for migrants from the EU4 countries, but their employment was already at the highest among the three groups considered (BA 2014).

<sup>10</sup> EU15 excluding Germany.



Figure 3

EU8, EU4, and EU2 citizens in the labour market of Germany

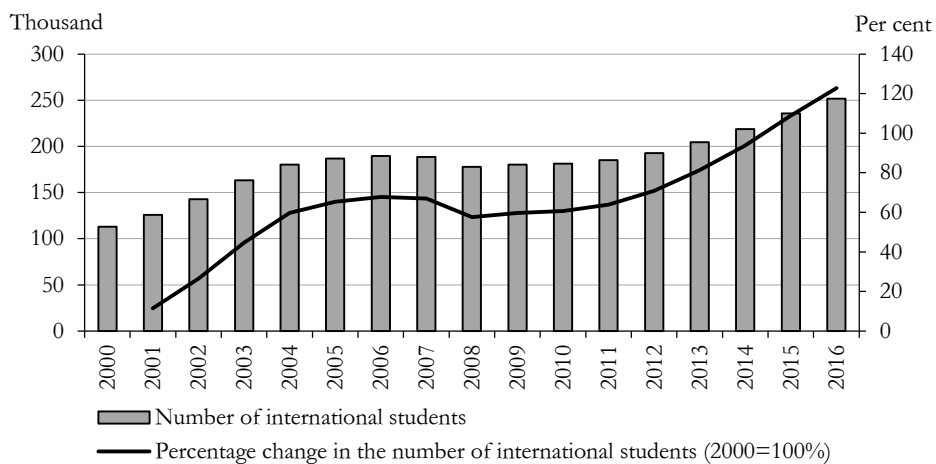


Source: Data of the Federal Ministry of the Interior and the Federal Office for Migration and Refugees (Germany).

The internationalisation of tertiary education has led to increasing mobility of students. Germany is one of the most important destination countries for international students worldwide, ranked five on the global scale (after the United States, the United Kingdom, Australia and France) (DAAD–DZHW 2017, p. 22.). In the period of 2000–2016, the number of international students<sup>11</sup> in Germany more than doubled from 112,883 to 251,542 (see Figure 4).

Figure 4

International students in Germany



Source: DAAD–DZHW (2017).

<sup>11</sup> Those students who obtained their university entrance certificate abroad (DAAD–DZHW 2017).

Among the ‘quantitatively’ most important source countries, China and the Russian Federation have held top positions for years, while India has been the fastest growing source country over the last few years with an increase from 3,821 in 2009/2010 to 13,537 in 2015/2016. EU countries have always been among the top ten countries and thus contribute considerably to the internationalisation of German universities (see Table 1).

Table 1

**Main source countries of the educational migration to Germany**

Position	Winter term 2009/2010		Winter term 2015/2016	
	Country	Number of students	Country	Number of students
1	China	22,779	China	32,268
2	Russian Federation	9,764	India	13,537
3	Poland	8,467	Russian Federation	11,413
4	Bulgaria	8,266	Austria	10,129
5	Turkey	6,635	Italy	8,047
6	Ukraine	6,326	France	7,330
7	Austria	6,209	Cameroon	7,106
8	Morocco	5,533	Ukraine	6,941
9	Cameroon	5,383	Turkey	6,930
10	France	5,324	Bulgaria	6,840

*Source:* DAAD–DZHW (2017).

In the context of a demographically shrinking labour force, there is a growing interest to hold back international students after graduation and motivate them to stay long term. Since the implementation of the new migration law in 2005, regulations have been liberalised considerably, with the possibility to obtain a residence permit for a job search for a period of 12 months after graduation (expanded further to 18 months in 2012). During the initial years after the implementation of this new regulation, this possibility was rarely exploited. In 2006 only 1,954 persons held the residence permit for job search after graduation, while 14,860 third country nationals graduated from a German university in the same year (BMI 2007, p. 63.). Until the year 2015, the number of permits for job search after graduation increased to 7,569, while 32,515 third country nationals graduated in the same year (BMI 2016, p. 79.). However, these numbers do not provide any further information about the biography of the permit holder, and completely leave out information on the mobility behaviour of EU citizens among international students.

Several surveys analysed the stay intentions and mobility behaviour of international students and examined relevant factors that shape those decisions (Hanganu–Heß 2014; Heß 2009; Mayer et al. 2012; FSVR 2011, 2012, 2015, 2017). They all

revealed a high probability of stay after graduation. In 2011, an online-survey among third country students showed that 80 per cent of the master's students and 67 per cent of the PhD students thought about staying on in Germany after graduation; however, this was for a shorter time span of up to five years (FSVR 2012, p. 38.). Almost half of the survey participants expected good opportunities to find an adequate job in Germany. Compared to all survey participants, the 'stayers' were relatively younger, and were already staying in Germany for a comparatively long time, had studied master's programmes rather than PhD programmes and frequently studied the so-called MINT-sciences.<sup>12</sup> The most recent survey conducted was a longitudinal survey which approached international students during and after completion of their studies. The results showed that 70 per cent of the participants planned to stay on in Germany after graduation. Among those, 81.8 per cent still resided in Germany at the time of the second survey, while of those who said they did not plan to stay, 40.2 per cent continued to reside in the country. More than one-third of the survey participants was working at the time of the second survey, while another third was still looking for a job (FSVR 2017).

### **Migratory changes in the course of the European financial crisis**

The European economic and financial crisis has heavily influenced the inner European mobility schemes since 2008. On the one hand, the economic downturn in destination countries caused EU free movers to leave those countries and either return home or look for alternative migratory goals. This is, for example, the case of Ireland which had negative migration balances since 2009 owing to the departure of EU8 citizens who preferred moving to Ireland, the United Kingdom and Sweden since 2004, as those three countries had already opened up their labour markets. On the other hand, countries that formerly were destination countries for labour migration became countries of departure. This was the case of the Mediterranean EU countries that – most notably in the case of Spain<sup>13</sup> – turned from immigration to emigration countries, with a significant share of emigrants heading to Germany (Domínguez-Mujica-Pérez García 2017, p. 28.). Consequently, and after years of very moderate mobility between Southern Europe and Germany with around 40,000 arrivals per year, migration numbers started climbing in 2008 and quickly reached a level of more than 100,000 arrivals in 2012. Since 2013, more than 150,000 arrivals of persons with Greek, Italian, Portuguese, and Spanish citizenship were recorded per year. As the number of departures from Germany only increased slightly, those countries – after years of producing negative balances – produced net migration gains since 2010, with a peak in 2013 of plus 64,794. Regarding the num-

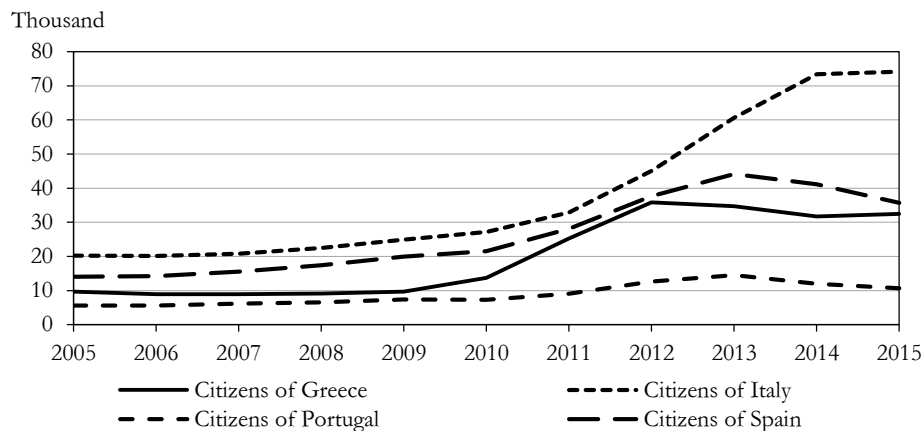
<sup>12</sup> Mathematics, information sciences, natural sciences, technical sciences.

<sup>13</sup> Spain, after years of net immigration, turned to net emigration in 2010. The negative migration balance quickly increased and reached its peak in 2013, when the emigration numbers almost doubled the immigration numbers and led to a net emigration of 251,531 persons (BMI 2016, p. 241.).

bers by country, we observe significant differences in the size and development of arrival numbers (see Figure 5). While Italy during the observation period of 2005–2015 always provided the largest number of migrants (maximum: 74,105 in 2015) and the longest continuous period of increase, the number of Greek immigrants rapidly increased from around 8,000 in the years before 2010, to more than 30,000 since 2012.<sup>14</sup> This is most remarkable if we compare the countries' population numbers which are 11.2 million for Greece compared to 60.5 million for Italy.

Figure 5

### Migration of Southern European citizens to Germany



Source: BMI (2016).

The term 'crisis migration' refers to the main push-factor of the recent movements, notably the effects of the global economic and financial crisis which especially hit the core branches of Southern European countries and caused high unemployment rates, especially among young adults and university graduates who were searching for their first employment opportunity (Hernández Peinado–Montero González 2013). The effects of the economic downturn were felt more acutely in these countries, as prior transformations in the demographic, societal and educational landscape did not result in necessary economic or labour market reforms (Glorius 2015, Glorius–Domínguez-Mujica 2017). However, obviously the described mobility behaviour was not only a result of economic rationality and structural criteria such as freedom of movement, but was also fuelled by soft factors such as existing social networks between Southern European migrants and individuals in Germany, who helped facilitate the move by providing information and practical and emotional support. Those social networks developed prior mobility processes

<sup>14</sup> This reflects the general migratory dynamics from Greece, where departures more than doubled between 2009 (60,363 departures) and the peak year 2012 (124,694 departures) (BMI 2016, p. 241.).

such as the guest-worker movement of the 1960s and 1970s, and owing to student mobility, tourism, short-term internships or jobs abroad.

With reference to the research literature that examined the motivations, expectations and experiences of the Southern European ‘crisis’ migrants, we cannot draw a consistent picture, as there seem to be winners and losers of the migration process (Glorius–Domínguez-Mujica 2017, Lafleur–Stanek 2017). Most studies stressed the significant language barriers which aggravated the labour market and hampered the social integration of Southern European migrants in Germany, causing the return of many of those who arrived around 2009. In addition, the emotional bonds to the home country were a strong incentive to return after some years of working abroad. Similar to the example of student migration, the societal and structural conditions in the EU support multiple mobilities and translocal livelihoods, and therefore, a macroeconomic balance of the long-term effects of labour migration for a given country is difficult.

### Public discourses on migration

The discourses that developed around the crisis migration from Southern Europe to Germany show very well the connectivity between old stereotypes, the structural embeddedness of a discourse and the selectivity of arguments. Owing to geographical similarities, the Southern European crisis migration to Germany was first labelled ‘new guest-worker migration’ (Glorius 2015, Göler–Köppen 2015), but it soon turned out that not only the arriving migrants, but also the institutional regulations and the public discourses differed significantly from the guest-worker recruitment in the 1960s and 1970s. While the guest-worker recruitment was a highly regulated mass migration focusing on a low-skilled labour force, the more recent migrations from Southern Europe were channelled by individual labour market actors such as small and medium sized companies, or chambers of commerce which – owing to labour force shortages – undertook significant efforts to implement recruitment initiatives in Southern Europe (Godenau 2017, Meinardus 2017). They were not only assisted by state programmes that supported the mobility of candidates,<sup>15</sup> but also by public discourses by high-ranking state representatives (such as German Chancellor Angela Merkel, who publicly encouraged Spanish engineers to move to Germany, stressing the positive labour market situation there).

A comparative analysis of media discourses on migration from different European source regions revealed major differences and stereotypes, especially regarding migrants’ labour market integration or dependence on social transfer payment.

<sup>15</sup> For example, the ‘Program for supporting labour migration of trainees and unemployed workers from Europe’ (MobiPro-EU) was put into practice in January 2013. It provided financial support for language training and travel costs for migratory moves, internships, or job interviews in Germany, which attempted to reduce mobility obstacles that usually hindered the intra-European mobility of young adults. The programme had a financial frame of 140 million EUR and was designed to run until 2016 (<http://www.bmas.de/DE/Themen/Arbeitsmarkt/Modellprogramme/mobi-pro-eu.html>).

The media analysis was based on a selection of media articles that were published in the liberal weekly magazine 'Die Zeit' between 2003 and 2014, thus covering the two EU expansions and the onset of the financial crisis which resulted in increasing migration numbers. The selection of media articles was done using the search term 'migration' and the terms 'Poland', 'Romania' and 'Spain', representing the three groups of migration source countries that were discussed in the earlier chapters. The search revealed 97 relevant articles, 22 focusing on Poland, 12 on Spain and 63 on Romania. A comparison of the main arguments used in the articles revealed major differences in the connotation of migration with regards to the three selected countries.

Media articles on Spanish immigration to Germany were firmly linked to the economic and financial crisis as a trigger for increasing migration numbers, and the high percentage of academics among the immigrants was highlighted. One article portrayed the integration path of a young Spanish engineer in Germany and traced not only the individual efforts of integration, but also the high satisfaction of the migrant. The entire article was characterised by a high appreciation of the migrant, as well as the positive impression left by Germany as a host country. Another case report showed the situation of the employer, stressing the high demand for skilled workers, which created the necessity for recruitment strategies abroad. The contributions showed strong discursive entanglements with demographic change in Germany and the resulting shortage of skilled workers. The main concern with respect to the Spanish immigration was that the young, well-educated migrants will not stay permanently in Germany.

Moreover, the media articles on Polish migration depicted a positive picture of the recent migration and gave factual information on migration numbers, stressing the fact that Poland is quantitatively the most important source country for EU internal migration to Germany. The articles presented survey data on the attitude of the Polish population towards the EU, Germany and Germans, or portrayals of Polish migrants in Germany and their integration experiences. Complementary reports on the increasing shortage of skilled labour in Poland in the context of emigration allowed readers to find common ground between the two countries. Freedom of movement was presented as a gain for Germany's labour market, if not as an absolute necessity. In doing so, the media discourse withdrew from earlier fears of a mass migration from Poland and rather raised concerns that the migration will not be enough to fill the demographic gaps.

The media coverage of Romania was completely dominated by debates on the exploitation of German social systems, for which the term 'poverty immigration' was coined. At the turn of 2013/2014 and on the eve of full freedom of movement for Romania and Bulgaria, the number of articles on this topic greatly increased. These articles depicted a strong dominance of political actors, and above all the conservative party Christian Socialist Union (CSU) published a strategy paper on Romanian migration at the beginning of 2014 with the telling title 'If you cheat, you'll be

kicked out!<sup>16</sup> This paper and the accompanying reports reflected the migration discourse in relation to the EU2 countries. The articles published in 2014 reported on the attitude of the parties towards poverty immigration and commented on immigration numbers and the share of migrants receiving social benefits in Germany. There were reports from the major urban destinations of Romanian and Bulgarian migrants in Germany as well as reports that used data and expert statements to contrast the stigmatisation of immigrants from Romania and Bulgaria. All these had in common the use of the term 'poverty immigration' without comment, meaning that this term has already penetrated the public debate so strongly that it has become part of public knowledge and no longer needed explanation. This was contrasted by a very small number of articles that critically reflected the consequences of the poverty debate for the image of Germany as an immigration country, primarily arguing on economic grounds ('economy is annoyed by immigration debate').

The media analysis revealed that there are several stereotypes on migration and migrants in the public discourse, which reflects a hierarchy of immigrants in terms of integration success and economic utility. This hierarchy is deeply connected to old and new stereotypes of the relevant groups and their home countries, and it is also reflected by the migrants, and thus can create incentives to return or move on owing to anticipated xenophobia or discrimination.

### **The 'refugee crisis' of 2015 and its consequences**

Reflecting on recent migration processes to Germany, the arrival of asylum seekers in rapidly growing numbers since 2014 is the most impressive, drastic and consequential migratory movement since the end of the Second World War. It not only changed the ethnic, cultural and religious fabric of places and spaces of arrival, but also triggered an increasingly polemic discussion on security, identity and belonging within German society, which was also reflected by the election results of the parliamentary elections of 24 September 2017.

#### **Dynamics of refugee migration to Germany**

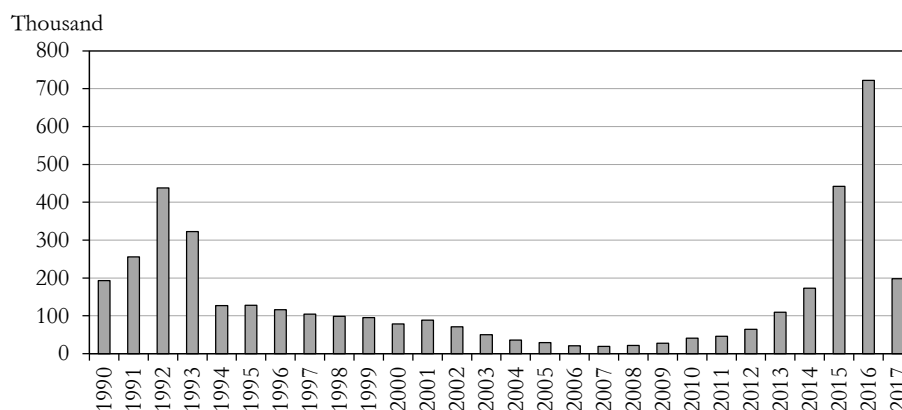
A long-term perspective on the reception of asylum seekers in Germany shows that as early as the beginning of the 1990s there were an exceptionally large number of asylum applications. Many of those were filed by refugees from the Balkan wars and displaced persons from the disintegrating Yugoslav state. This led to severe restriction of the national law of asylum in 1992, which – among other measures – introduced the concept of safe third states and later became part of the EU Dublin regulation. Following these regulatory changes, asylum application numbers dropped rapidly and stayed at low levels of around 20,000 until the early 2000s (see Figure 6). Owing to political conflicts in the Near East and the constant inflow

<sup>16</sup> Original 'Wer betrügt, der fliegt', strategy paper of the CSU meeting held on 7 January 2014.

of refugees via the Mediterranean in the 2000s, countries of arrival such as Italy were facing severe reception and accommodation problems, and refugees started to move onwards, for example, to Germany. Since 2014, refugees from the West Balkans and those travelling over the Balkan route have led to rapidly increasing arrival numbers of asylum seekers in Germany, culminating in a maximum of 890,000 registered entries and 441,899 asylum applications in 2015 (BMI 2016). As the Federal Office for Migration and Refugees fell behind in the registration and application procedures, the number of asylum applications continued to increase in 2016 (around 722,000 first time applications), even though the number of arriving asylum seekers dropped since the closure of the Balkan route in March 2016 (BMI 2016).

Figure 6

### Development of the number of asylum applications in Germany

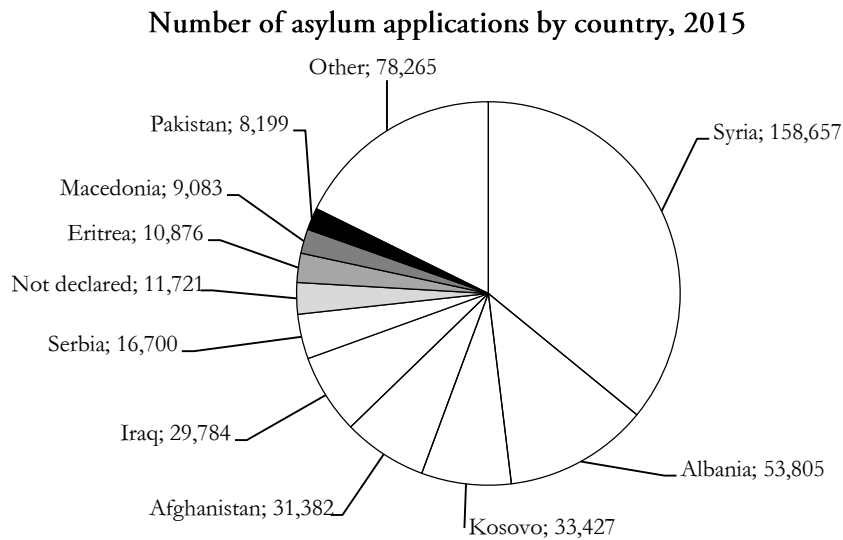


Source: Data of the Federal Office for Migration and Refugees (Germany).

In 2015, the main countries of origin were regions in Europe, Asia and the Near East (see Figure 7). The main source country for asylum seekers was Syria with more than one-third of all asylum applications, followed by Albania (12.2%) and Kosovo (7.6%). Asylum seekers from Afghanistan ranked four (7.1%), followed by asylum seekers from Iraq (6.7%) and Serbia (3.8%). Around 12,000 asylum seekers were stateless, who were mainly Palestinians from Syria. Eritreans ranked eighth in the asylum application statistics (BAMF 2016b, p. 15.). After the proclamation of Albania, Kosovo and Montenegro as safe countries of origin in October 2015, the introduction of border controls along the Balkan route and the March 2016 cooperation agreement with Turkey aiming to sustain irregular migration from Turkey into the EU, resulted in a decline in arrival numbers of asylum seekers and significant changes in the composition of flows. In 2016, the main groups of asylum seekers came from Syria (17.5%), Afghanistan (9.6%), Iraq (8.6%), Eritrea (8.6%) and Iran (4.1%) (BAMF 2016a).



Figure 7



*Source:* Data of the Federal Office for Migration and Refugees (Germany).

However, the influx to Europe remains constantly high, as shown by the rising numbers of those travelling over the Central Mediterranean route and by reports and assessments from Turkey and the North African coasts. Regardless of the development of national and European refugee politics, it can be assumed that the humanitarian obligation to take in asylum seekers in Germany will lead to the inclusion of further asylum seekers in considerable numbers in the medium and long term.

### The asylum procedure in Germany

The asylum procedure starts after crossing the border and claiming asylum with an official authority. This is followed by registration in the so-called EASY system (databank for the initial distribution of asylum seekers), where personal data, a photograph and fingerprints are stored. Asylum seekers receive a registration certificate that is sent to a first reception facility of one of the 17 German federal states. In order to derive a fair distribution, a quota is defined for each federal state, based on the amount of tax revenues and population size. In 2015, North Rhine-Westphalia had the highest quota (21.2%), while the federal state of Bremen took in the lowest quota of asylum seekers (0.9%) (BAMF 2016b, p. 13.).

Asylum seekers are obliged to stay between six and a maximum of twelve weeks in the federal first reception facility so that they are made available at any time during the initiation of the asylum procedure. The reforms of the asylum law of 2016 introduced further restrictions for asylum seekers from safe countries of origin, who are now obliged to stay in the first reception facility for the entire duration of the

asylum procedure. Furthermore, an accelerated procedure was introduced by which an asylum decision should be made within a week (Bundesregierung 2016). By contrast, the average duration of the asylum decision process in the autumn of 2015 was five months, varying over a wide range and depending on the country of origin. Moreover, some asylum seekers had to wait for several months until the Federal Office for Migration and Refugees had the capacity to register their asylum application (Zeit online 10.10.2015). This explains the 63% increase in asylum applications from 2015 to 2016 compared to 2015 (see Figure 6), while the arrival numbers declined in the same period from 890,000 to 280,000 (by 68%).

The asylum claims are decided by the Federal Office for Migration and Refugees based on German Constitutional Law, Asylum Law and the Geneva Convention. There are three different statuses of protection: 1. refugee status (based on Art. 16 Constitutional Law or §3, 1 Asylum Procedure Act), 2. subsidiary protection (§4, 1 Asylum Law) and 3. toleration owing to obstacles towards deportation (§60, 5/7 Residence Act). Owing to the high proportion of refugees from war and crisis areas since 2015, almost half of the asylum decisions of 2015 and 2016 granted refugee status or subsidiary protection (see Table 2).

Table 2

#### Number of first instance decisions on asylum applications by outcome

Year	Total	Refugee status (Article 16 Constitutional Law or §3, 1 Asylum Procedure Act)	Subsidiary protection (§4, 1 Asylum Law)	Toleration owing to deportation obstacles (§60, 5/7 Residence Act)	Negative decision	Formal decision*
2013	80,978	10,915	7,005	2,208	31,145	29,705
2014	128,911	33,310	5,174	2,079	43,018	45,330
2015	282,726	137,136	1,707	2,072	91,514	50,297
2016	695,733	256,136	153,700	24,084	173,846	87,967
2017	603,428	123,909	98,074	39,659	232,307	109,479

\* Decisions based on Dublin regulation; withdrawal of application.  
Source: BAMF (2017).

Persons who are granted refugee status receive a residence permit for a period of at least three years and gain unlimited access to the labour market. Under certain conditions, the residence permit can later be converted into a settlement permit. Persons who are granted subsidiary protection or a temporary toleration status are eligible for a one-year residence permit. This can be repeatedly extended if the reasons for protection, or obstacles to deportation, remain. After a five-year stay, a settlement permit can be obtained. Those applicants whose asylum application is rejected receive an order to leave the country. Under certain conditions, financial

measures to support the return are granted (BMI 2016). In 2016, 54,069 persons left Germany on the basis of federal return aid programmes, and 25,375 were deported. In June 2017, the central register of foreigners consisted of 226,457 persons who were obliged to leave the country, of which 159,678 persons had toleration status owing to deportation obstacles (Deutscher Bundestag 2017).

### Regional distribution of asylum seekers

Within the federal states, the distribution of asylum seekers is carried out on the basis of a distribution key which mainly respects the population structure of the counties and the municipalities' ability to accommodate asylum seekers (Aumüller–Daphi–Biesenkamp 2015, p. 22., IW Köln 2016, p. 27.). The local arrangement of the accommodation is regulated by corresponding country laws and ordinances which contain considerable differences, for example, with regard to institutional responsibilities and administrative arrangements for initial and long-term accommodation (Müller 2013, p. 15). Generally, the main focus of the asylum management and legal regulations during the application and decision process is on the accommodation management, while only some federal laws foresee binding agreements with regard to integration measures or psychosocial care of asylum seekers (Aumüller–Daphi–Biesenkamp 2015, p. 22.). Furthermore, at the local level, civil society organisations and volunteers play a major role in all aspects of integration of asylum seekers.

During the asylum procedure, asylum seekers are obliged to reside at their assigned places of residence and are subject to restrictions of movement which mostly refer to the territory of the federal state they were assigned to, but sometimes is narrowed down to the county of residence. The new Integration Act of 31 July 2016 introduced a three-year residence obligation for recognised refugees who are not able to secure their livelihood by their own means (§2 Integration Act, §12a Residence Act). Since its implementation, it has been a highly contested measure, as opponents argue that residence obligations prohibit social integration and, furthermore, do not comply with EU law (El-Kayed–Hamann 2016).

The increasing numbers of asylum seekers during 2015 challenged the long-standing practice of housing and care for asylum seekers, notably the effort of many municipalities to provide for decentralised housing and sound integration programmes for asylum seekers. Instead, the focus turned to larger housing units and emergency shelters, for example in gyms, abandoned public buildings or warehouses, or container buildings and tent camps. For many municipalities, it has become increasingly difficult to arrive at a socially balanced distribution of asylum seekers across the community, especially while taking into account the needs of the local population for low-cost housing. In some places, discourses on fair distribution of asylum seekers and the availability of social housing have turned into a generalised debate on social justice, and local authorities have to respond to the emer-

gence of social envy (Glorius 2017). Especially in rural areas of Eastern Germany, the mixture of social envy and lack of intercultural competence seems to lead to a hostile attitude towards asylum seekers, which not only prevents integration, but also triggers verbal and physical assaults (Glorius–Schondelmayer 2018).

Evaluating the current practice of regional distribution, many stakeholders are questioning the idea of ‘burden sharing’ on the basis of mere population share and tax revenues. Especially regarding rural regions, the existing infrastructure is often perceived as not being adequate for the reception, accommodation and integration of asylum seekers. Rural areas usually have low levels of diversity and lack important ethnic infrastructure such as food shops or mosques, as well as infrastructure that would be necessary for integration (language teachers, qualification courses or psychotherapeutic offers with multilingual and interculturally trained staff). On the other hand, especially urban agglomerations fear a significant inward mobility of accepted refugees from rural municipalities they were assigned to during the asylum application procedure, owing to better opportunities for labour market access and ethnic networks. In 2017 and 2018, several county capitals, after having experienced relocation of persons with refugee status from the county peripheries to the county capital, claimed that their infrastructure could not integrate more refugees. Thus, as a specific measure of the residence obligation, residence bans (§12a Abs. 4 Residence Act) were introduced in four German cities until January 2018.

## Summary and outlook

An overview of the main migration processes and discourses in Germany have revealed that Germany has a long-standing history of migratory connections, mainly to other European states. Especially in the context of an ageing and declining society, qualified labour migration is seen as a necessity for further economic prosperity and the maintenance of Germany’s innovative potential. However, on the one hand, as the elaboration above has shown, the demand and supply side of migration can vary considerably, owing to the complexity of migration motives and individual migration decisions. On the other hand, the multidimensionality of external causes for migration and political regulations aiming to steer migration, sometimes with unintended consequences, is observed. Looking back, the termination of guest-worker recruitment aiming to reduce the number of migrants in Germany brought about the opposite result, as many of the present guest workers, anticipating that temporary migration schemes were ending, permanently settled in Germany and brought in their relatives via family unification. During the EU expansion of 2004, restrictions for migrants from Central and Eastern Europe somehow collided with the effort to increase high-skilled migration to Germany, and ended with an increase in low-qualified labour migration. Finally, as the most recent refugee migration showed, the abolition of labour migration schemes that used to be in operation between Southern Europe and the Maghreb countries until the 1990s or between

Germany and Yugoslavia until the 1970s prevents the possibility of alleviating the economic pressure in these countries which in particular suffer from high levels of youth unemployment (Little–Vaughan-Williams 2017). Consequently, many migrants from those countries joined the flow of war victims from the Near East and attempted to enter the European Union via the ‘asylum entrance’.

Finally, as shown above, public discourses developing around the migration topic are also highly selective, often stereotypical, and tend to mingle various topics that are currently at stake in order to arrive at simplified solutions. This is the case in the recent debate on refugee migration in Europe, which relates to debates on culture, identity, security, criminality and religion and is increasingly instrumentalised by right wing parties, who collected a considerable share of votes during the last parliamentary elections throughout Europe. Reflecting on those recent developments of public opinion, we must not forget that migration has always been a highly sensitive topic for public debates, as it contests the imagination of national unity based on common values, habits, and on a relatively ethnic homogeneity within the European nation states. The European unification process, having started as an initiative for peace and having developed into a neoliberal economic project, has left out the question of how European citizens may identify with the European idea and find alternatives to re-nationalisation movements in order to stabilise their identity in turbulent times. Thus, in order to solve actual imbalances in the European migration and asylum system, questions of social justice and common European values will also need to be addressed throughout the European countries and at the EU level.

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## Migration to Europe and its demographic background

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Analyses of available data on international migration are becoming increasingly important in demographic projections year after year in the age of human mobility. As Europe experienced an unprecedented mass inflow of refugees and asylum seekers in 2015 since the Second World War, research on the demographic trends of refugees' main countries of origin has also become important. To provide relevant information for this debate, the paper identifies the demographic tendencies of the six main countries of origin in Asia and Africa – Syria, Iraq, Afghanistan, Somalia, Nigeria, and Eritrea – for the EU's 28 member states by the number of asylum applicants between 2008 and 2016. First, basic demographic indicators (e.g. total fertility rate [TFR] and life expectancy) of these six countries are analysed. Then the changing share of the young (15–19) and retiring (55–59) male age groups – referred to as the demographic war index (DWI) – in these six countries and major regions of the world are compared. Finally, by examining the spatial distribution of the global refugee population and armed conflicts, the research aims to reveal the relevance of the DWI.

### **Keywords:**

forced migration,  
refugee,  
European Union,  
demography,  
armed conflict

## Introduction

Initially, population projections focused only on a closed population, which implies that there is no inflow or outflow of immigrants in a certain state. Migration was 'not yet on a large enough scale to merit international intervention' until around 1980. Before that period, governments aimed to convince immigrants not to stay for a long period through strict legislation on migration, rather than understanding these flows and demographic consequences thereof (Booth 1982).

From the late 1970s, the growing impact of human mobility on population dynamics increased the importance of analysing migration data for demographic pro-

jections (Kelly 2000). Since then, migration has become an integrated part of social demography, which tries to explain the impacts and consequences of various demographic indicators such as the dynamics of age and sex structure as well as fertility, mortality, and net migration rates on a given population. Therefore, social demography also employs the theories of other social sciences like sociology, macro and microeconomics, political science, and anthropology. The role of political science in demography is the analysis of the changing legal background and government policies underlying immigration (Borjas 1989, Kelly 2000, L. Rédei 2006).

The challenges of providing accurate population projections include collecting relevant and integrated statistical data on immigration and emigration trends, and the incoherent definitions of what can be considered migration. This is because a change of residence can be permanent, temporary, or circular. Temporary stays are mostly business or tourist trips or short-term studies, which can be extended to a long-term stay through legal (e.g. obtaining a residence permit) or illegal (e.g. overstaying a visa) means. According to the definition by the United Nations, a minimum stay of one year is required for the recognition of a person as an international migrant, although it is not always followed in the national legislation of all countries (Ravenstein 1889, Lee 1966, Kraly–Gnanasekaran 1987, Zolberg 1989, Willekens 1994, Kelly 2000). However, the 1951 Refugee Convention does not fit this definition, as the status can be given within a year after fulfilling all criteria<sup>1</sup> mentioned in the Convention during the asylum decision process. This means that refugees are counted as international migrants regardless of the length of their stay in the country of asylum. The main demographic difference between these involuntary or forced movements and economic migration is that all age groups and families are affected by armed conflicts; thus, not only young men (who are the majority of most first-generation economic migrants) are seeking safety. A significant number of refugees also consider these movements as a temporary change of residence, even if they reside in the country of asylum for years or decades, while economic migrants are more likely to be involved in long-term social inclusion, because their immigration is often based on a long-term or permanent decision (Borjas 1989, Kelly 2000).

Reflecting the main trends in international migration, this research focuses on involuntary migration considering that claiming for asylum is an important but less investigated way of entering the European Union (EU) for third country nationals.

This focus is on the overall number of asylum applicants in the EU by country of origin (between 2008 and 2016)<sup>2</sup>, not on the number of refugees. This is because a significant number of asylum seekers leave their reception centres, and in many

<sup>1</sup> According to the most widely accepted definition in the 1951 UN Convention and 1967 Protocol, the three main criteria for the recognition of someone as a *refugee* are the following: those who have left their country of origin (meaning that internally displaced people [IDPs] are not considered refugees), because of the fear of being prosecuted for racial or religious reasons or being a member of a social or political group (not because of economic or environmental reasons), and are unable or not willing to accept the protection of that country because of their fear (UNHCR).

<sup>2</sup> No sufficient and coherent Eurostat data are available for all EU member states prior to 2008.

cases, the given member state without official documents while their asylum application process is still ongoing. Since they often remain invisible to the state authorities, their movements cannot be tracked within the Schengen Area. However, their economic impact – especially on the black market – is significant, for example in Almeria (Spain) or Sicily (Italy). On the other hand, many are given other forms of humanitarian status. For example, in Hungary, subsidiary or temporary protection is not counted in the overall number of recognised refugees. These forms of humanitarian statuses and given rights vary between the member states. In addition, some illegal border-crossers detected and registered by European border guards may not apply for asylum, but reside in the EU (GMDAC 2018).

Previous research focused on internal demographic pressure from the viewpoint of host countries, analysing the demographic trends of immigrants. However, this research aims to identify and analyse the tendencies of the main countries of origin for asylum applicants from Asia (Syria, Iraq, and Afghanistan) and Africa (Somalia, Nigeria, and Eritrea) to measure the external pressure on the EU.

Since both high and low variant scenarios of population projections are equally possible, data for a medium variant projection are used as an average. Forced migration flows are highly related to armed conflicts; therefore, the relevance of the DWI in the main sending countries is examined. This ratio tries to explain the risk of violence stemming from fewer resources and job opportunities (Heinsohn 2003, 2017a, 2017b).

### **Migration to Europe: Refugees and asylum seekers**

Before exploring the demographic characteristics of the main countries of origin, changes in the trends of refugee and asylum seeker migration in the past decades from the perspective of Europe must be identified.

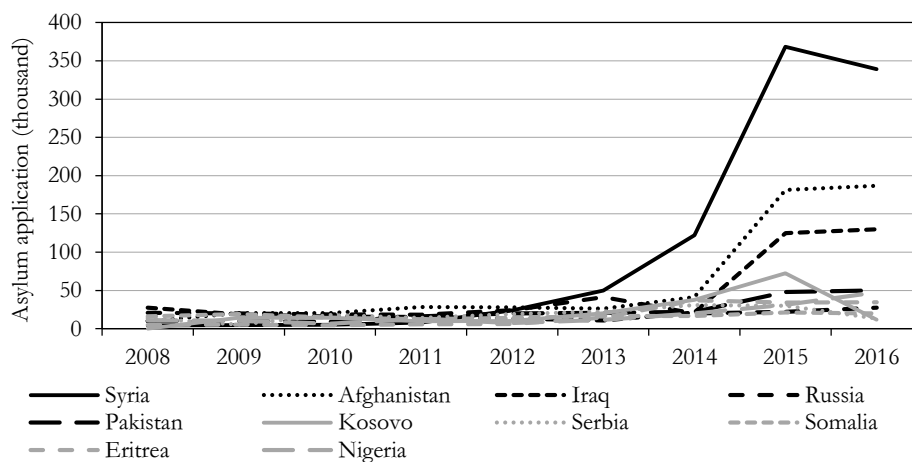
According to the United Nations High Commissioner for Refugees (UNHCR), approximately 22.5 million recognised refugees (including 5.3 million Palestinian refugees under the mandate of the United Nations Relief and Works Agency for Palestine Refugees in the Near East) and 2.8 million asylum seekers were living worldwide in 2016. This is a relatively stable and small proportion of the 258 million international migrants, the number of which increased from 173 million in 2000 (Ekéné Zamárdi–Dövényi 2010, L. Rédei 2014, Abel–Sander 2014, United Nations 2017). Furthermore, the overall number of IDPs was around 40.3 million, meaning that more than 65.6 million people have been forcibly displaced from their homes or countries of origin worldwide, which has led to an unprecedented crisis. This is significant growth in barely two decades from 33.9 million people in 1997. The globally displaced population increased rapidly after the outbreak of the Syrian civil war in 2011, but other escalating conflicts in Iraq, Yemen, the Democratic Republic of Congo, Sudan, South Sudan, and the Central African Republic have also played a significant role in today's global refugee crisis (UNHCR 2017).

As mentioned, it is more effective to study the number of asylum applicants rather than refugees because of the special trends of forced migration in the EU to measure each origin country's impact on migratory tendencies in the last decade.

Between 2008 and 2016, more than 4.9 million people were seeking asylum in the EU member states combined, of which more than half (2.5 million people or 51%) arrived in 2015 and 2016. In addition to almost 1 million forcibly displaced Syrians, there were more than 0.5 million Afghani asylum seekers and hundreds of thousands of people from Iraq, Russia, Pakistan, Kosovo, Serbia, Nigeria, Eritrea, Somalia, Albania, and Iran. Registered applications from these country nationals vary between 378,000 and 141,000 (Kocsis et al. 2016, Eurostat). (See Figure 1.)

Figure 1

### Number of asylum applications in the EU, by main countries of origin



Source: Own calculation based on Eurostat data.

Figure 1 shows that there was no major inflow of asylum seekers prior to 2013. After that, Syrian, Afghani, and Iraqi citizens began moving into Europe through Turkey on the Western Balkans migratory route in large numbers, surpassing 100,000 people each year. There was also a significant outflow from Kosovo through Serbia to Hungary<sup>3</sup> in the beginning of 2015, followed by increased movement from Pakistan and Nigeria. Except for Kosovo, these main countries of origin have struggled with increasing political instability and escalating civil wars or other forms of armed conflicts for years or decades (in the case of Afghanistan or Pakistan) (Eurostat).

<sup>3</sup> On their way to Austria and Germany, thousands of these applicants stayed in the main railway stations in Budapest, Hungary. This led to the start of a political debate on immigration in Hungary and the decision to erect a border fence on Hungary's borders with Serbia and Croatia to manage the mass inflow of asylum seekers (Pap-Reményi 2017). Meanwhile, the inflow of regular economic migrants stayed stable in Hungary causing the political debate to focus mostly on refugees and asylum seekers at this time (Kincses 2015).

Before 2014, Russian, Afghani, and Somali asylum seekers mostly used the migratory routes to Europe. Since then, military operations against the Islamic State (IS) and other militant groups in Syria and Iraq, as well as the deepening instability in Afghanistan, have led to an unprecedented refugee crisis in the Middle East (predominantly in Turkey, Lebanon, and Jordan) and the EU (mainly in Germany and Sweden) (Eurostat). (See the table.)

**The five main countries of origin of EU's asylum applicants\***

2008	2009	2010	2011	2012	2013	2014	2015	2016
Iraq	Afghan.	Afghan.	Afghan.	Afghan.	Syria	Syria	Syria	Syria
Russia	Russia	Russia	Russia	Russia	Russia	Afghan.	Afghan.	Afghan.
Somalia	Somalia	Somalia	Pakistan	Syria	Afghan.	Kosovo	Iraq	Iraq
Serbia	Iraq	Iraq	Iraq	Pakistan	Serbia	Eritrea	Kosovo	Pakistan
Nigeria	Kosovo	Kosovo	Serbia	Serbia	Pakistan	Serbia	Albania	Nigeria

\* Data for 2017 will be available later in 2018. However, between January and November 2017, the highest number of those crossing the border illegally registered at the external borders of the EU were from Nigeria, Syria, Cote d'Ivoire, Guinea, and Iraq (Frontex).

*Note:* Afghan. – Afghanistan. Asian countries are indicated in green, European countries in blue and African countries in brown.

*Source:* Own elaboration based on Eurostat data.

This study analyses the demographic trends of the six main countries of origin for asylum applicants from Asia (Syria, Iraq, and Afghanistan) and Africa (Nigeria, Somalia, and Eritrea). Furthermore, differences between major regions in terms of the changing share of the young (15–19) and retiring (55–59) male age groups are studied. The main countries of origin for European asylum applicants (Russia, Kosovo, Serbia) are not analysed, because of their low recognition rate and the fact that the demographic characteristics of these countries is similar to the European average.

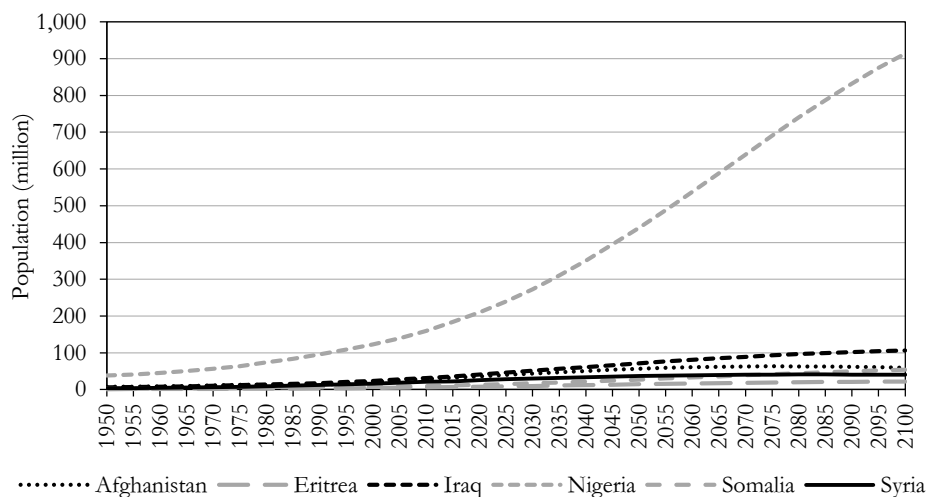
### Demographic trends of the main countries of origin

Before analysing specific demographic indicators, it is important to know how the projected population of these six countries might change by 2100. As Figure 2 shows, it is expected that these countries will have a much larger and younger population. The number of inhabitants in Syria and Afghanistan are projected to double, and the populations of Eritrea and Iraq are expected to triple. However, the populations of Somalia and Nigeria will likely increase five times by the end of the century (United Nations). As such, Nigeria is projected to be the third most populated country in the World behind India and China with almost 1 billion inhabitants, making it not only the 'giant' of Africa, but also of the world in terms of population.

Among others, the country's higher rate of urbanisation due to internal migration from arid rural areas, the growing size of the young middle-class population and the development of the IT and communication sector will likely increase the interstate and intercontinental mobility of Nigerians and middle-aged or young inhabitants from other countries of the global South. In parallel with these increasing populations, the impact of violent non-state actors on refugee migration is becoming more significant (Kasakoff–Adams 1995).

Figure 2

### Previous and projected population in the main countries of origin of EU's asylum applicants



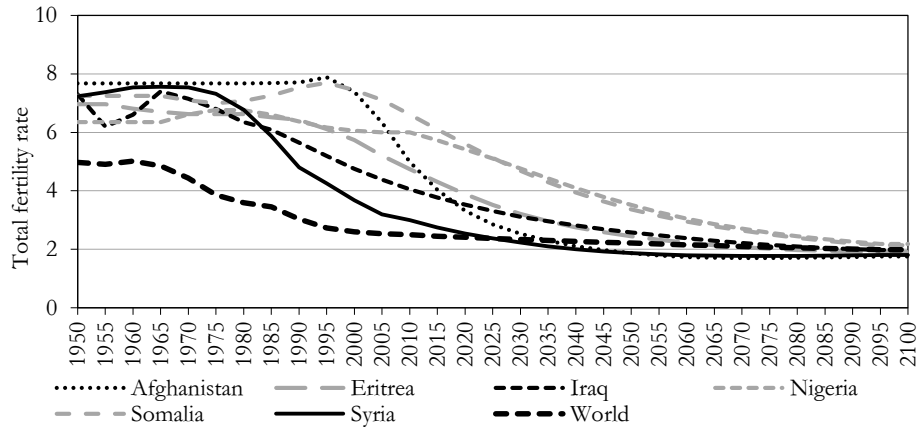
Source: Own calculation based on United Nations data.

Currently, these countries of origin have a TFR much higher than the world average (varying between 3.7 and 6.1), except for Syria. Syria was expected to reach this average around 2020, but this seems unrealistic after the outbreak of the civil war in 2011. The rates for the other countries might also decrease, and in the fourth period of the demographic transition, may reach the world average later – between 2035 (Afghanistan) and 2060 (Eritrea, Iraq) – or remain above it, even at the end of the century (Somalia, Nigeria) (United Nations). (See Figure 3.) All these countries house a very young population with a median age lower than 25 years (CIA). This implies that a need for new jobs in the major cities of these countries will constantly increase, as they struggle with higher rates of population growth because of rising internal migration from rural areas. The lack in new positions due to this population growth could increase pressure on people to seek better life opportunities outside their countries.



Figure 3

Total fertility rate in the main countries of origin of EU's asylum applicants

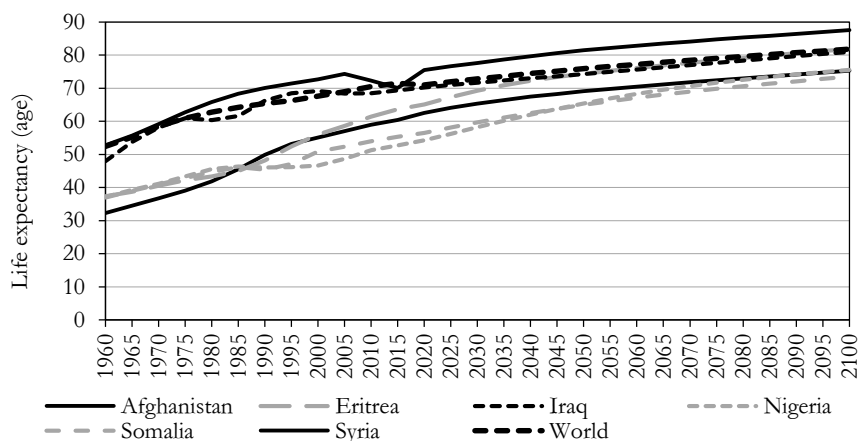


Source: Own calculation based on United Nations data.

Furthermore, the life expectancy of the main countries of origin, as in other countries worldwide, will increase in parallel with the world average from 65 to 80 years by the late years of the century. The life expectancy in Syria has significantly dropped since the start of the civil war. Because of the harsh living conditions, the medium variant data provided above is likely high, and a low variant scenario may be more realistic for life expectancy (United Nations). (See Figure 4). However, this suggests that more people may remain in the job market and work until their late 50s or early 60s.

Figure 4

Life expectancy in the main countries of origin of EU's asylum applicants



Source: Own calculation based on United Nations data.

Considering this and a lower mortality than birth rate, it is expected that the populations of these countries at least will double before peaking, as mentioned.

### **The demographic war index and relevance thereof**

Many aspects of the demography behind conflicts remain under-examined. In this regard, Brunborg–Tabeau (2005), Brunborg–Urdal (2005) highlight five important research fields: the intersection of demography and conflict studies, demographic indicators and factors and their role in conflict, impact of violent militant activities on demography, methodology and data to be used, and coherence of the demography behind special cases ranging from gang violence through terrorism to genocides. This paper connects previous research (Choucri 1974, Cincotta–Engelman–Anastasion 2003, Randall 2005) to analyse the share of certain age groups in the total population to emphasise the impact of demographic pressure on the social risk of armed conflict. The dependency ratio is often used to measure the pressure on a productive population. However, this paper underlines the demographic role of these to enter the job market, as they are the young population who would likely protest economic and political problems, which could lead to increased violence.

The DWI<sup>4</sup> was created to analyse the possibility of increased violence for fewer resources and jobs per capita while comparing the rate of the younger (15–19) age group of males entering the job market with those (aged 55–59) leaving it in the same year, in a specific year and state. For example, a rate of 2.5 indicates that 2,500 young men are willing to get a job for every 1,000 men retiring that year. A rate below 1.0 indicates that countries with an ageing population are in need of a labour force, while a rate higher than 2.5 shows a higher risk of social and economic crisis, which can lead to political, religious, and ethnic conflicts (Heinsohn–Steiger 1977, 1979a, 1979b, 1980, Heinsohn 2003, 2017a, 2017b). According to the ‘Youth Bulges Theory’, a 3.0 value is considered critical. Just as in the previously cited research, the rate of 2.5 is used in this paper, as it can already be considered demanding because of the significant growth in population expressed in absolute numbers (Urdal 2005, 2006, Nordås–Davenport 2013).

Another reason why DWI is used in this research is that the issue of global refugee migration and forced displacement is highly related to armed conflicts for various political, ethnic, religious, etc. purposes. The research reported in this paper aimed to measure the relevance of the theory of demographic pressure on the labour market and social system using the DWI from a geographic perspective, analysing both the spatial distribution of displaced populations and armed conflicts. Economic indicators and other changes in economic conditions cannot be projected as accurately as the population dynamics in a certain country. The lack of, or extra

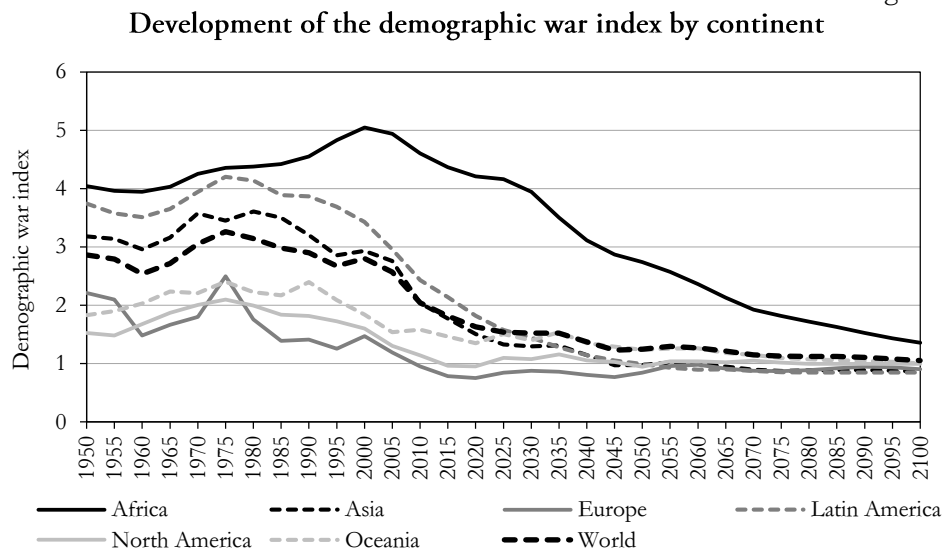
<sup>4</sup> The authors considered calling it the demographic crisis/conflict index or social tension index, but the original term is used in this paper.

foreign direct investment, local company competitiveness, stronger role of ruling governments, environmental degradation, etc. can also worsen or improve circumstances (Collier–Hoeffler 1998, Collier 2000). Therefore, the results presented in this section are representative of a theoretical approach.

Regarding continental differences in the DWI, these major regions already have a rate lower than 2.5, except for Africa with a value of 4.4 (Heinsohn 2003, 2017a, 2017b). (See Figure 5.) This means that considering only demographic factors, Africa will likely be the most affected region in the case of armed conflicts. This statement is strengthened by the fact that people forced to leave their homes mostly reside in their own country in another region or along the border zone of neighbouring countries. However, significant population growth will still increase the number of those seeking refuge in countries further away. This will retain the constant pressure on Europe from the waves of migration due to economic, political or social reasons.

In 2017, 88 countries housed approximately 1.7 billion inhabitants and had an index higher than 2.5, while in 2030, 66 countries will have a total population of 2.2 billion and an index above this rate (Heinsohn 2003, 2017a, 2017b).

Figure 5



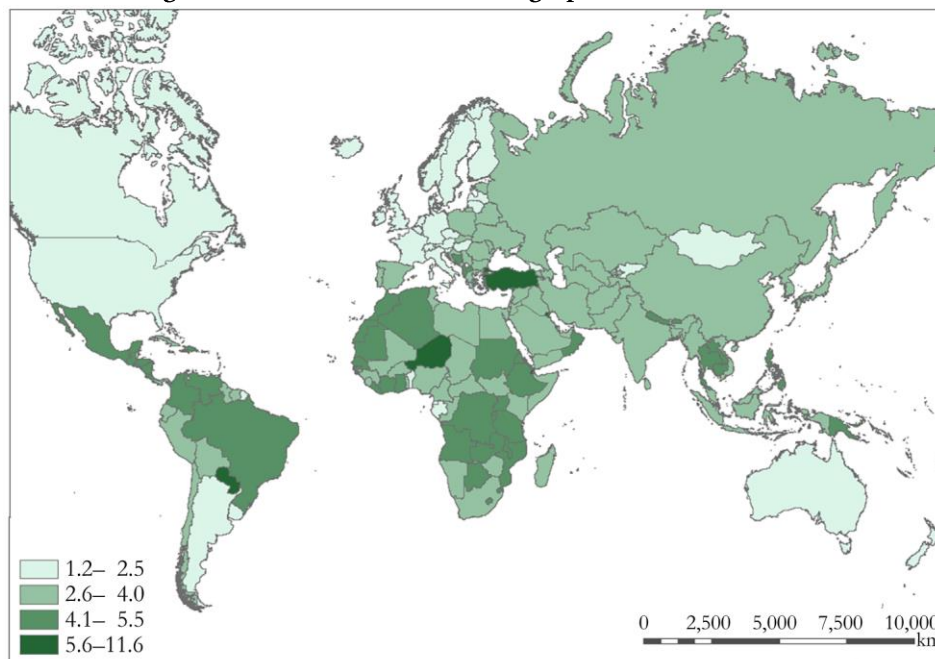
Source: Own calculation based on Heinsohn (2003, 2017a, 2017b) and United Nations data.

A further examination of regional differences reveals constantly changing differences between major regions. In 1950, developed Western and Northern European as well as North American countries along with Italy, Hungary, Australia, New Zealand, Argentina, and Uruguay were below the DWI value of 2.5. Only a few countries had a very high rating (Niger, Turkey, Paraguay), indicating that the

demographic transition was in an early stage in the developing world that year and the risk of violence caused by demographic issues was moderate (Tabutin–Schoumaker 2004, Tabutin–Schoumaker et al. 2005, Heinsohn 2003, 2017a, 2017b). (See Figure 6.)

Figure 6

### Regional differences in the demographic war index, 1950

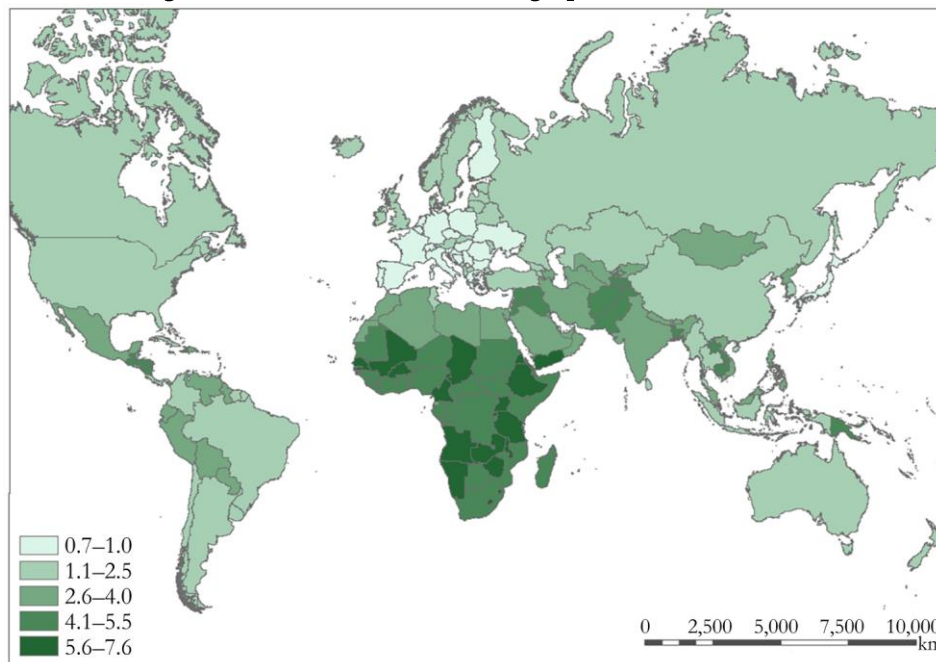


*Source:* Elaboration of Simon, B. and Farkas, M., based on Heinsohn (2003, 2017a, 2017b) and United Nations data.

These differences became more visible by 2010: almost all of Africa and some Middle Eastern (Syria, Iraq, Yemen), Southern and Southeast Asian (Afghanistan, Pakistan and Bangladesh), and Central American countries had the highest values, while large parts of Europe and Japan decreased below the rate of 1.0, indicating a shrinking population. The number of countries below the critical rate of 2.5 increased as Eastern and Southern Asian (including China and Indonesia) and South American countries (including Brazil) reached that value (Lesthaeghe 2010, N. Rózsa 2012, Heinsohn 2003, 2017a, 2017b, Demény 2016). (See Figure 7.)

Figure 7

## Regional differences in the demographic war index, 2010

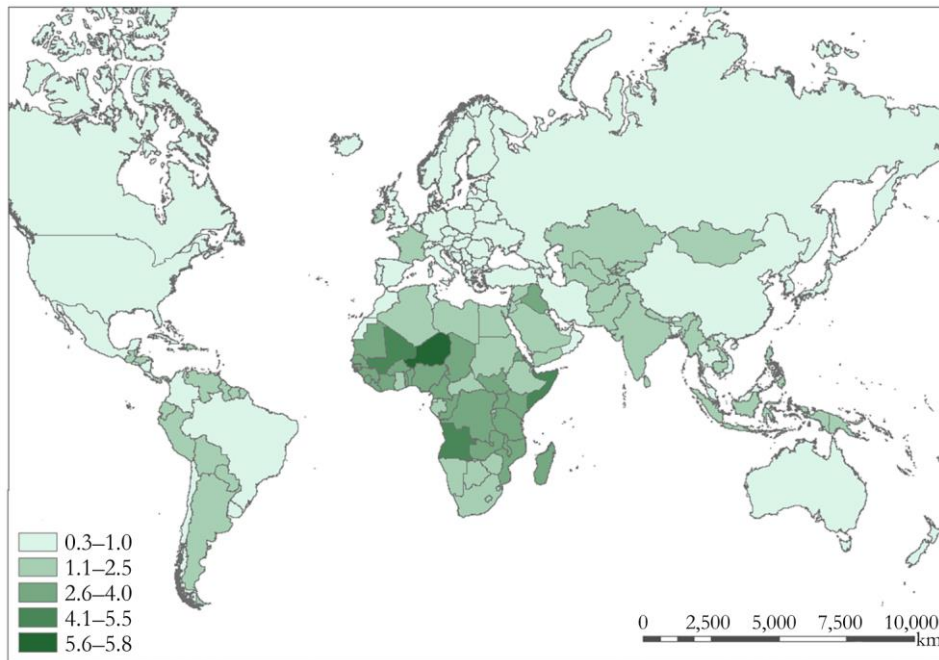


Source: Elaboration of Simon, B. and Farkas, M., based on Heinsohn (2003, 2017a, 2017b) and United Nations data.

Furthermore, notable or significant changes are expected to occur until 2050. Africa will still have the highest values (with Morocco and Tunisia the exceptions), as almost all countries (except for Iraq) with a value higher than 2.5 will be located on that continent. The differences between generations will be most significant in Nigeria, Somalia, Mali, and Angola. Regions with a shrinking population – including already China, Brazil, the United States, etc. – will be more widespread as the number of developed countries grows (Heinsohn 2003, 2017a, 2017b, Tarrósy 2017). (See Figure 8.)

Figure 8

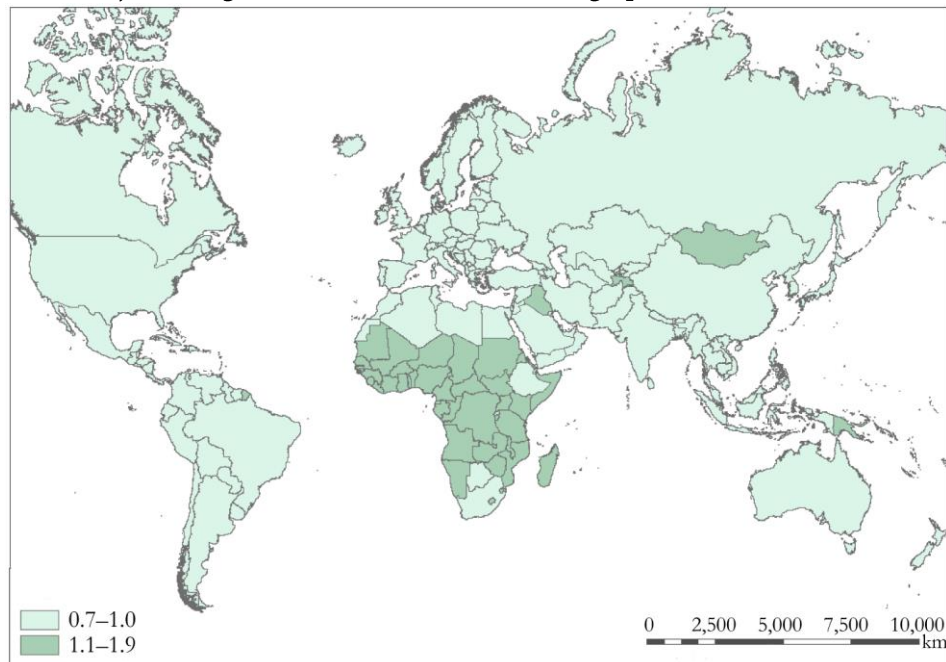
## Projected regional differences in the demographic war index, 2050



Source: Elaboration of Simon, B. and Farkas, M., based on Heinsohn (2003, 2017a, 2017b) and United Nations data.

However, no major difference is projected by the United Nations for the end of the century. A stable demographic makeup of the global population is expected on average, which might indicate a significantly shrinking population in developed regions (Heinsohn 2003, 2017a, 2017b). (See Figure 9.) Considering the natural increase in the birth rate after armed conflicts, the high variant scenario could represent a more accurate projection. However, these differences may fluctuate because of significant social, political or economic changes that cannot be predicted now.

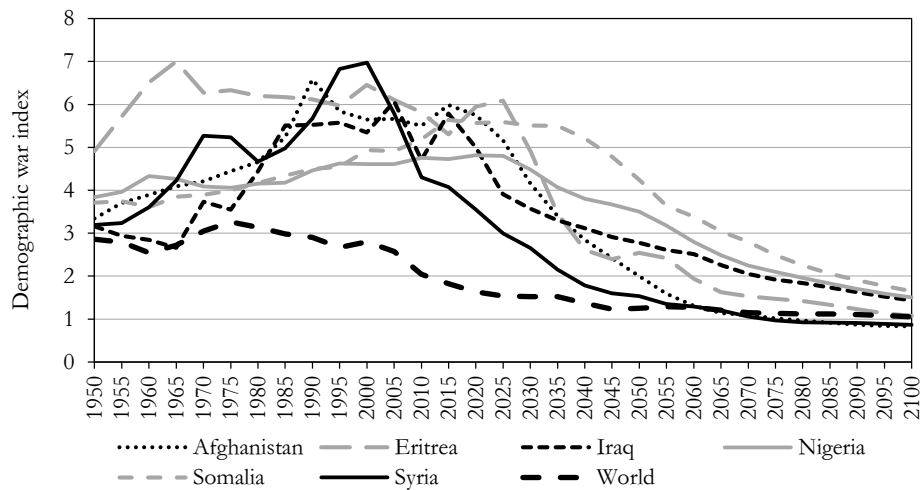
Figure 9  
Projected regional differences in the demographic war index, 2100



Source: Elaboration of Simon, B. and Farkas, M., based on Heinsohn (2003, 2017a, 2017b) and United Nations data.

Between 2025 and 2035, it is expected that the DWI value will decrease yearly in all six main countries of origin, scoring the mentioned 2.5 value only around 2055 to 2065. The DWI will remain higher than the world average for most of the six countries by the end of the century (Heinsohn 2003, 2017a, 2017b). (See Figure 10.) However, significant population growth and increasing life expectancy will exacerbate the risk of conflicts, even after reaching the world average.

Figure 10  
 Development of the demographic war index in the main countries of origin  
 of EU's asylum applicants



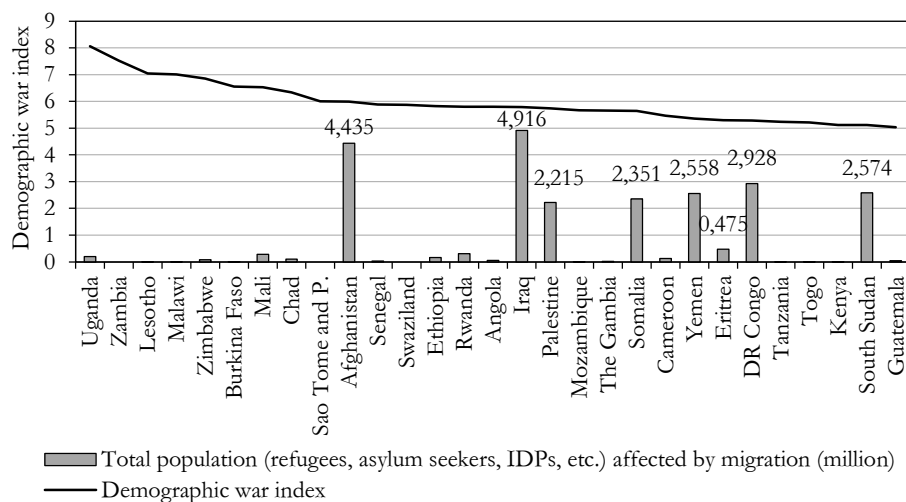
Source: Own calculation based on Heinsohn (2003, 2017a, 2017b) and United Nations data.

To examine relevance of the DWI, hereinafter countries with the highest DWI values and the overall number of refugees, asylum seekers, IDPs, and other people affected by migration from these countries are compared.

Most of these countries with the highest values are in Africa, and 7 of the first 30 countries with more than 1 million inhabitants are affected by forced displacement. Although major refugee-sending countries like Syria and Sudan are not included among those with the highest DWI values (Heinsohn 2003, 2017a, 2017b, UNCHR). (See Figure 11.) Overall, this means that most countries involved in considerable armed conflicts (such as Uganda, Chad, Ethiopia, or Kenya, which host a large South Sudanese, Sudanese or Somali refugee population) are struggling with a demographic problem, and it is likely that their neighbouring countries also have higher risks. These forced migrants compete with the native population for fewer positions in the labour market, which, in major cities, increases the segregation of those unable to find employment.



Figure 11  
Countries of origin with the highest demographic war index and their total population affected by migration, 2015



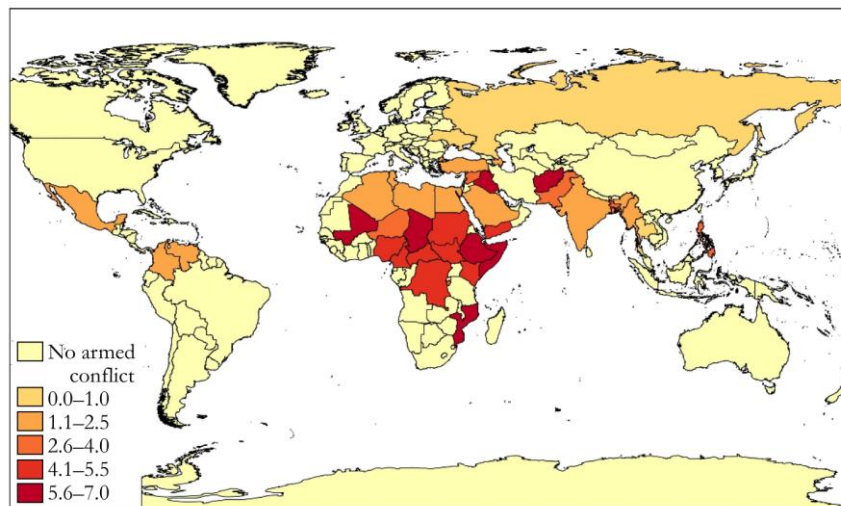
Note: Sao Tome and P. – Sao Tome and Principe; DR Congo – Democratic Republic of Congo.

Source: Own calculation based on Heinsohn (2003, 2017a, 2017b) and UNHCR (2017) data.

Considering all countries with notable ongoing violent military operations<sup>5</sup>, Africa is highly represented. In addition, only slightly more countries have high DWI (>2.5) values than those with low or middle DWI (<2.5) values. At the national level, a continuous conflict-affected region exists from Mali to Myanmar. The only interruption is Iran, suggesting that North, Central, and East Africa, the Middle East as well as South Asia and parts of Southeast Asia are highly affected by violent militant activities and demographic problems. The most peaceful regions are developed countries with shrinking or stable populations such as Europe, North America, most parts of South America and Southeast Asia, Australia, and New Zealand. South Africa and most Western African countries are also relatively peaceful compared to other parts of the continent, although these countries also have a large young population (Heinsohn 2003, 2017a, 2017b, HIIK, UCDP). (See Figure 12.)

<sup>5</sup> Considered as at least a level 3 (*violent crisis*) armed conflict by the Heidelberg Institute for International Conflict Research (HIIK), which has caused combined fatalities of more than 100 people in 2016 according to the Uppsala Conflict Data Program (UCDP).

Figure 12  
Demographic war index of the countries involved in considerable  
armed conflicts, 2016



Source: Own elaboration based on Heinsohn (2003, 2017a, 2017b), HIIK and UCDP data.

In general, this does not mean that demographic issues are the only factors causing armed conflicts or population displacement. Eritrea is situated in the middle of this continuous region, as are Djibouti, partially Israel, and Jordan. The case of Eritrea shows that political reasons can cause significant refugee migration. In addition, a stable or shrinking population cannot prevent a nation from being involved in some form of violent militant activity (for example, Russia or Ukraine). This only implies that the risk of a violent conflict is higher in countries where the DWI value is more than 2.5, such as in most parts of Africa. Handling these conflicts appropriately is essential, as they slow demographic transition in the involved countries, deepening complex political and socio-economic crises.

## Conclusions

The integration of recognised refugees and asylum seekers will remain a highly debated issue in international politics in the coming years. These conflict-affected zones are in the most underdeveloped or politically unstable regions, and it is expected that the average literacy rate of these areas is lower than the national average. Thus, the most significant refugee-sending sub-state areas of South Sudan, Afghanistan, Pakistan, Sudan, or Nigeria, for example, are likely to have illiteracy rates higher than 50–60%, the national average of these countries (United Nations). The social inclusion of refugee populations from underdeveloped regions in the highly

developed countries of the EU will take decades, even if there is a clear need for a new labour force in each member state.

Meanwhile, the role of the EU as a destination area for forced migrants is still significant. The increasing number of global refugee and displaced populations, dynamic political changes, armed conflicts in countries of origin, and migratory routes of transit states are causing complex global challenges. Between 2008 and 2016, 4.9 million asylum applications were registered by the EU member states, and new conflict zones were added to the list of countries of origin yearly after the 'Arab Spring'. Following the EU-Turkey agreement in March 2016 and strengthened border control by the Libyan and Italian authorities, these numbers started to stabilise in 2017, but as discussed in this paper, demographic pressure and risk of violent armed conflicts will stay high or increase.

This study aimed to measure the demographic risks of violence and its connection with refugee migration, highlighting a link between armed conflicts and the share of the young (15–19) versus retiring (55–59) male age groups (called the DWI). As such, 7 of the 30 countries with the highest rates also have a forced displaced population totalling more than 1 million people, and other countries hosting millions of refugees like Uganda, Chad, Ethiopia, and Kenya are at a higher risk of involvement in the spill-over effect of neighbouring armed conflicts. This is also due to the demographic facts that TFR will remain higher in these areas than the European average, while increasing life expectancy will retain the DWI values above the critical level of 2.5 in most countries of origin for decades. Therefore, there will be a growing need for new positions in the labour market. This means population growth in all countries of origin, among which Nigeria will house more people than the population of all European countries combined by the end of the century.

The consequences of this demographic pressure cannot be predicted accurately in the decades to come. However, the abovementioned facts compared to the low fertility rates of an ageing Europe highlight the increasing importance of monitoring migration flows and migratory routes to the EU in the 21st century.

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## The spatial peculiarities of economic and social convergence in Central and Eastern Europe

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This study examines the convergence and catch-up effects of the economic and social (well-being) performance of the NUTS 2 regions of Central and Eastern Europe between 2004 and 2014. The separate management of these two development dimensions is justified by the fact that they have no clear relationship. In the study, the theory of closed economies is abandoned and, thus, the performed regression analyses include spatial interactions and spillover effects. As the applied regressions provide only an average picture about the studied phenomenon, the authors also present the individual paths for each region.

The results confirm the theory of absolute convergence for both the economic and social convergence. Thus, regardless of any other explanatory factor, less developed regions tend to converge with the more developed ones. The traditional examinations and those that assess spatiality aspects point to a faster annual convergence rate of well-being, so the two phenomena have different dynamics. This is partly supported by the individual regional catch-up paths. Furthermore, it clearly complements the mathematical-statistical results. The novel results highlight the catching up of the 'local dimension' that puts the regions along the two dimensions as 'catch-up not complete' and 'catch-up complete'. The authors' results suggest a non-parallel way of achieving social and economic cohesion.

**Keywords:**  
convergence,  
catch-up effect,  
economic performance,  
well-being,  
spatial econometrics

### Introduction

Our study discusses the spatial peculiarities or chances of convergence in Central and Eastern Europe in the European Union (EU). Convergence and equalisation between regions strongly affects, and is clearly associated with, the main political

goals of the EU. Article 130a of the Treaty of Rome (1957) clearly states that ‘In order to promote its overall harmonious development, the Community shall develop and pursue its actions leading to the strengthening of its economic and social cohesion. In particular, the Community shall aim at reducing disparities between the levels of development of various regions and the backwardness of the least-favoured regions...’ This statement was confirmed later in the Single European Act (1987). Then, in 2012, the Treaty of the European Union added a new (territorial) attribute to the existing economic and social attributes, highlighting the importance of territorial convergence.

The different interpretations of convergence are, at least partly, evident from the following. On the one hand, it is considered a set of efforts to reach a reference point and, on the other hand, it is a set of attempts for approximation and to reduce inequalities (Ferkelt–Gáspár 2008, Oblath–Szörfi 2008). Kotosz and Lengyel (2017) and Paas et al. (2007) use three categories to characterise convergence processes. In the *absolute convergence* hypothesis, less developed regions tend to converge with more developed ones, regardless of any other influential factor, and all individual regional units converge to the same equilibrium. The steady-state equilibrium is a reasonable assumption in the case of a homogeneous sample of countries or regions (e.g. EU regions, US states, OECD countries, etc.; Mankiw et al. 1992). According to the *conditional convergence* hypothesis, reaching the equilibrium may be linked to other control variables (e.g. human capital, institutions, population growth rates, health status, etc.), although the differences between individual regions may remain constant. In other words, equilibrium differs by region and each particular economy approaches its own income level. The *club convergence* (based on Baumol 1986) hypothesis proposes that the territorial units belong to a particular group- or club-specific equilibrium. For instance, regions of the EU converge with the EU average, while other regions approach other averages, if at all. The initial conditions of each individual group determine the convergence processes.

In terms of territorial units, methods, and indicators, convergence studies vary considerably (e.g. Rey–Montouri 1999, Oblath–Szörfi 2008, Goecke–Hüther 2016, Kotosz 2016, Yang et al. 2016).

The primary focus of our study is to test the hypothesis of absolute convergence in the study region. The starting point of neoclassical theories is the paper published by Solow in 1956. Despite its numerous criticisms and amendments (Romer 1986, Mankiw et al. 1992, Lengyel–Rechnitzer 2004), the theory describes an existing phenomenon and has been still widely used as a framework for territorial catch-up and convergence analyses (Rey–Montouri 1999, Konya–Guisan 2008, Oblath–Szörfi 2008, Vojinovic et al. 2009, Viegas–Antunes 2013, Bucur–Stangaciu 2015, Goecke–Hüther 2016, Tóth 2016).

The role of spatiality clearly gained importance in convergence studies (Rey–Montouri 1999, Baumont et al. 2001, Paas et al. 2007, Kocziszky 2013, Czaller 2016,



Benedek–Kocziszky 2017). In other words, authors tend to abandon the theories of a closed economy that is independent of its surrounding regions and to account for interactions between regional economic actors. The resulting models assume that the impact of externalities between regions is similar to that of technology diffusion, while the regional transmission of accidental shocks plays only a negligible role in the long-term growth process (Kocziszky 2013). The notion of external impacts referred to in economics and territorial economics literature can be clearly attributed to Marshall (1920). The external economic impacts caused by agglomeration, result from the division of input and labour markets and from knowledge spillover (Varga 2009). The new economic geography provides a framework to interpret spatiality and economic growth; accordingly, the location of a region plays a major role in its economic activity. In other words, the economic situation of a region greatly depends on its actual location and neighbours. Therefore, poorer regions are better positioned to develop when they are located adjacent to richer regions (Baumont et al. 2001). The theory highlights the role of agglomeration externalities due to the spillover effects and interactions Marshall described. However, as far as the new economic geography is concerned, there is a general pessimism with regard to convergence and the core-periphery phenomenon seems to emerge due to increasing returns (Paas et al 2007).

### **Spatial interactions and convergence mainly in the Central and Eastern European countries**

In the Central and Eastern European (CEE) region (Czech Republic, Poland, and Hungary), Herz and Vogel (2003) find no evidence of absolute convergence at the NUTS 2 level between 1991 and 2002. According to their study, the economic catch-up was explained only in certain conditions (unemployment, sectoral employment) at the initial development level. Spatiality is expressed by country-specific factors (dummy variables) that are responsible for institutional and political impacts. In the ten new CEE member states, Smętkowski and Wójcik (2012) demonstrate unconditional convergence at the NUTS 3 level between 1998 and 2005. Although this finding is supported by the observation of catch-up at the macro level, there is also a clear evidence of polarisation within the individual countries. Spatial autocorrelation confirms the theory of growth poles for this period, meaning that city regions and their immediate vicinity represent growth centres; however, regional inequalities are also widening simultaneously. The poorest regions also show convergence, but at a very low speed, and a clear backwardness is indicated by the distance in economic catch-up. These two types of regions form a separate convergence club in the study period. Hegerty (2016) studies, in terms of the main economic sectors, the catch-up chances of the eleven new CEE member states at the NUTS 3 level between 2000 and 2013. The study included the industrial, construction, finance (Umantsiv–Ishchenko 2017), insurance, and real estate sectors as well as gross value

added. The absolute beta-convergence analysis produced significant results only in exceptional cases. Although convergence could be found in agriculture and construction (Hungary), construction and industry (Croatia and Slovenia), and construction (the Baltic states), no overall convergence could be identified in a territory consisting of 233 NUTS 3 regions. High growth hot spots, identified with Getis-Ord local  $G$  statistics, were present in the Baltic states, Bulgaria, and Romania, while cold spots could be detected in Poland and Croatia. Using the  $\sigma$ -method, Kotosz (2016) studies local convergence in the V4 countries at the NUTS 3 level between 2000 and 2013. According to his conclusion, areas of permanent divergence occur most frequently, while areas of permanent convergence are rare. As Kotosz and Lengyel's (2017) analysis demonstrates, the V4 countries show no significant beta-convergence at the NUTS 2/3 level between 2000 and 2014, while national divergence is present, again in terms of growth. The authors clearly show the positive impact of agglomeration benefits on economic growth and the twin-peaks phenomenon of convergence clubs in their study area. Benedek and Kocziszky (2017) also study the convergence trends of the V4 countries at the NUTS 2 level in terms of economic performance and social well-being. According to their findings, the convergence or divergence trends are strongly linked with regional polarisation and peripheralisation. Their calculations prove the emergence of convergence clubs. In the lack of sigma- and beta-convergence, local convergence exists within the clubs of the NUTS 2 regions. The findings confirm that peripheral regions are stuck in a lower development phase: they show convergence within the convergence club but their position has not improved considerably in the long run.

### Study questions

As the Treaty of Rome already set forth the importance of reaching economic and social cohesion, our study deals with convergence along the lines of these two dimensions. Apart from the politically declared dual-target scheme, treating economic and social cohesion separately is also justified by the fact that there is no straightforward relationship between economic and social development (UNDP 2010, Rodríguez-Pose–Tselios 2015). Furthermore, our study abandons the theory of closed economies and focuses on regional correlations, including spatial interactions.

In view of the foregoing, our study questions are as follows:

- How do economic and social convergence occur at the regional level in Central and Eastern Europe?
- How do spatial interactions contribute to the convergence of social and economic development?
- What are the differences between economic convergence and social convergence?
- What are the local peculiarities of catch-up for the two dimensions?

## Materials and methods

The mathematical-statistical framework of our study relies on the absolute convergence test. Based on Barro and Sala-i-Martin (1990) and Vojinovic et al. (2009), we study cross-sectional data through the absolute ( $\beta$ -) convergence hypothesis with the following regression equation:

$$\frac{1}{T} \ln \frac{y_{i,T}}{y_{i,0}} = \beta_0 + \beta_1 \ln y_{i,0} + \varepsilon_i, \quad (1)$$

where  $\ln y_T$  and  $\ln y_0$  are the natural logarithms of the convergence index in region  $i$  during the first and last study years,  $\beta_0$  is the constant,  $\varepsilon_i$  is the residual, and  $T$  is the time of observation. We use the following formula to estimate the  $\beta$  coefficient, which shows the speed of convergence.  $\beta$  on the right side of the formula comes from the above regression equation and indicates the steepness of the function curve ( $\beta_1$ ).

$$\beta = -\frac{1}{T} \ln(1 + \beta_1 T) \quad (2)$$

We can also use this value to determine the half-life of convergence; that is, the time required to cover half the road leading to full convergence within the study region if the speed of convergence remains unchanged (Oblath–Szörfi 2008). We can measure the half-life of convergence using the formula  $\tau = \frac{\ln 2}{\beta}$ .

We supplement the performance convergence test with an analysis of the inequalities of development variables. Our purpose is to demonstrate that beta-convergence is coupled with a decrease (sigma-convergence), stagnation, or increase in (territorial) differences. Some authors (Barro and Sala-i-Martin 1990, Oblath–Szörfi 2008) claim that beta-convergence and sigma-convergence are interrelated, and that beta-convergence is a necessary, but not sufficient, condition for sigma-convergence. However, Quah's (1993) findings show, sigma-convergence may emerge even without the presence of beta-convergence. Sigma-convergence is shown through the population-weighted coefficient of variation.

As traditionally beta-convergence tests fail to account for spatiality (Kotosz 2016), we supplement our analyses with this aspect. We express this with the help of Global Moran's  $I$ . We use the global autocorrelation test to study spatial dependence and use the global approach to reveal the average performance and growth patterns of the study regions.

$$I = \frac{n}{2A} \frac{\sum_{i=1}^n \sum_{j=1}^n \delta_{ij} (y_i - \bar{y})(y_j - \bar{y})}{\sum_{i=1}^n (y_i - \bar{y})^2},$$

where  $n$  is the number of spatial units,  $y_i$  and  $y_j$  are variables in the individual spatial units,  $\bar{y}$  is the arithmetic mean of the relevant variable,  $A$  is the number of contiguities, and  $\delta_{ij}$  is 1 when  $i$  and  $j$  are neighbours, and 0 otherwise (Tóth 2014).

In order to avoid inconsistent estimates, we use the ordinary least squares (OLS) regression as well as the maximum likelihood spatial error (ML SEM), maximum likelihood spatial lag (ML SLM), and spatially weighted least squares (SWLS) models for our absolute convergence tests (Anselin 2005, Kelejian–Prucha 2010, Chasco 2013). We conducted the spatial econometric examinations using the GeoDa 1.12 and the GeoDaSpace 1.0 software packages.

Based on the average convergence of the overall study territory, we also wish to show the individual paths of the various regions. We can calculate and interpret the speed of convergence not only for the overall study territory, but also for each region (Oblath–Szörfi 2008). First, we describe the narrowing of the development gap (i.e. the rate of progress of the relevant region towards the established target value) for 2004–2014, and then we determine the individual half-life convergence values.

We measure the narrowing of individual development gaps (i.e. the annual speed of convergence) as follows:

$$\beta = \frac{\ln \left[ (1 - RY_{t_1}) / (1 - RY_{t_0}) \right]}{T},$$

where  $RY_t = (TD_{t,i}) / (TD_{t,j})$ .  $TD$  (territorial development) is the regional development index, while  $i$  is the given region and  $j$  is the reference region.  $t_0$  and  $t_1$  represent the base period and current period, respectively.  $T$  indicates the number of years (Oblath 2014). With the individual  $\beta$  parameter and the same formula above, we calculate the half-life of the convergence by region (Oblath–Szörfi 2008).

The base data needed for the tests were made available by Eurostat. For our analyses, we use economic development indices (gross domestic product [GDP] per capita, purchasing power parity [PPP]) and the human development index (HDI), which considered one of the main indicators of social development. HDI, which is also a tool to express regional well-being, consists of four indices: household income per capita (expressed as purchasing power consumption standard [PPCS]), population share of only primary education, population share of tertiary education, and life expectancy at birth (Bubbico–Dijkstra 2011). Bubbico and Dijkstra (2011) provides the method to edit an index. We supplement this know-how with the use of fixed minimum and maximum values to enable time-based comparisons (see Trabold–Nübler 1991). Our choice is justified by the fact that the applied base di-

mensions have different content and that the minima and maxima applied in the global analyses cannot be used in more developed regions.<sup>1</sup>

Our tests cover the period of 2004–2014, so our findings are formulated based on the changes observed during this period.

The observation area is Central and Eastern Europe, which includes the NUTS 2 regions of Poland, the Czech Republic, Slovakia, Hungary, Slovenia, Romania, Bulgaria, Germany, and Austria according to our definition. We include the last two countries because they act as the gravity centres and main economic and financial partners for the new member states (Kőrösi 2015). Furthermore, as Tagai (2004), (2011) and Balogh (2017) state, Germany has an outstanding role with regard to the interactive processes of Central and Eastern Europe. Due to its vicinity to the region, Germany has such a compelling economic weight – perceived as outstanding from the CEE’s point of view – in the modelled system of spatial interrelations, which rarely concedes its primacy to local actors.

Within the framework of our study, EU membership represents, at least partly, the requirement of ‘homogeneous spatial units’. Furthermore, the group treatment of the study region is justified by the common history, the resulting current relationships, and the spatial structure links (Gorzela 2001, 2006, Rechnitzer–Smahó 2011), as well as the joint opportunities for transnational development projects (Strategy for the Danube Region and Central Europe programmes [Interreg VB]).

## Results

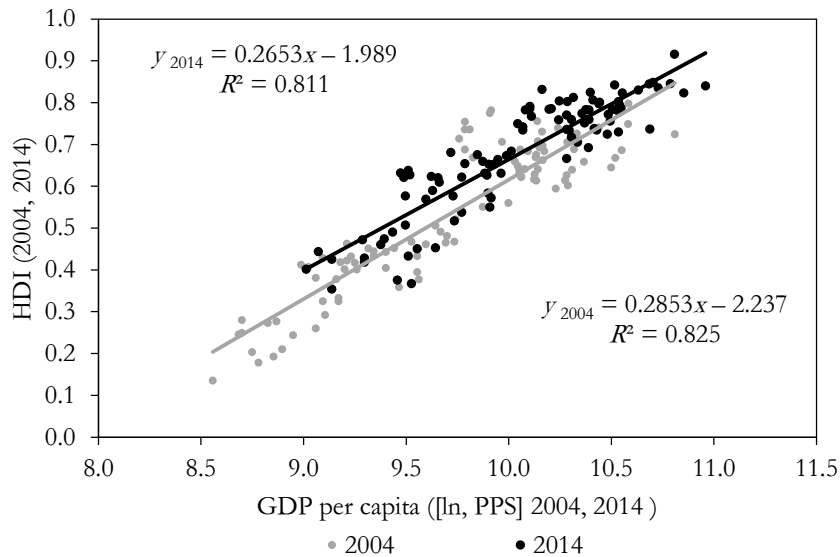
First, we analysed the economic and well-being interrelations prevailing in the first and last years of the study period (see Figure 1), both of which show a strong and positive relationship between the economic and social dimensions, with the coefficients of determination ranging from 81.1% to 82.5%. This means that a higher GDP per capita is associated with a similarly high social development value. As a shrinking range for 2014 occurs at higher levels in Figure 1, we can assume a catch-up for both variables. Based on our preliminary results, we may accept McGillivray’s (1991) criticism, which was among the first to challenge the usefulness of HDI on the grounds of its close relationship, with GDP per capita (which was still included in the index in 1990), among others. The author claims that the well-being index is just another redundant index that cannot produce a more refined picture of development than that obtained with the traditional economic performance index.

<sup>1</sup> Applied minimum and maximum values: household income per capita: 2,500–25,000 PPCS; population share of only primary education: 2.0–40.0%; population share of tertiary education: 5.0–40.0%; life expectancy at birth: 65–85 years.

$$\text{We calculate the education index as follows: } I_{\text{education}} = \frac{1}{3}(1 - I_{\text{low education}}) + \frac{2}{3}(I_{\text{higher education}}).$$

We calculate HDI using the geometric mean based on the UNDP (2016).

Figure 1  
Regression relationships between economic production and social well-being



*Note:* Here and in the following figures and tables, HDI – human development index; GDP – gross domestic product; PPS – purchasing power standard.

To find more detailed relationships, we describe the correlation coefficients of the base data required for the beta-convergence tests on the basis of Pearson coefficients (see Table 1). We supplement them with the components of HDI. The matrix shows the extent of joint movements both for the initial development levels and for the growth rates. The static correlation coefficients (above the main diagonal) show clearly significant and unidirectional relationships between economic and social development and the components of the latter. This means that the social and economic characteristics we review strengthen each other and that there is a strong relationship between them, except between GDP per capita and the education index.

The dynamic relationships (below the main diagonal) show similar directions: the growth of one factor moves together with that of another, but the strength of the relationships is more diverse and can produce a more sophisticated picture. There is a strong synergic correlation in most cases, although there is only a weak/average dynamic link between education and income indicators. We must highlight the relationship between income indicators and life expectancy at birth growth. Additionally, the household income per capita shows a stronger relationship than GDP per capita does. This confirms Stiglitz, Sen and Fitoussi's (2009) claim that household income is a better proxy for quality of life than GDP.

Table 1

Correlations between initial development levels (2004) and growth rates  
(2014/2004)

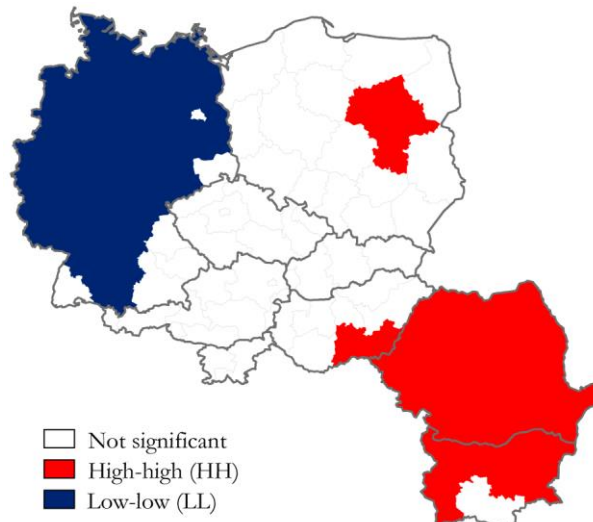
Denomination	HDI	Income per capita	Life expectancy	Education index	GDP per capita
HDI	–	0.939**	0.935**	0.880**	0.895**
Income per capita	0.876**	–	0.947**	0.705**	0.948**
Life expectancy	0.826**	0.740**	–	0.734**	0.884**
Education index	0.705**	0.431**	0.587**	–	0.691**
GDP per capita	0.739**	0.895**	0.651**	0.382**	–

*Note:* The correlation coefficients of the static indicators (initial level) are shown above the main diagonal of the correlation matrix, while those of the dynamic indicators (growth rate) are displayed below the main diagonal. \*\* stands for a significance level of 0.01.

We now lay the foundation for the findings of our absolute convergence tests. We start by analysing the convergence relationships by running an OLS regression. Once we test the spatial dependence of random errors (Moran's  $I$ ), we supplement each regression with the spatial features of the required specification. At the start of our spatial econometric assessment, we need to define the spatial structure of the CEE territory. In particular, we must specify the regions and their direct neighbours (Váry 2017). We use the following to select the appropriate spatial weight matrix. For the dependent variables (growth rates), we run Moran's  $I$  index with the use of various distance matrices. We apply first-order queen, and 175, 200, and 225 km distance spatial weight matrices.

According to our analyses, spatiality is best described by the first-order queen contiguity because Moran's  $I$  shows the highest and the most significant value here: 0.830 for HDI and 0.694 for GDP per capita growth. The high and significant values of Moran's  $I$  confirm the strong nature of spatial autocorrelation, which means that spaces of similar growth rates form clusters within the territory. Figures 2 and 3 show the spatial growth relationships between spaces by HDI and GDP per capita. Based on the growth indices, the figures indicate the phenomenon of East-West dichotomy. As to HDI, we see consistently continuous and significant low-low (LL) spaces (having low HDI growth just as their direct neighbours do), representing mostly the German regions. The eastern part of the territory displays a similarly continuous high-high (HH) cluster (the spaces belong to which and their neighbours show high HDI growth) consisting of Romania as a whole, Bulgaria excluding Yuzhen Tsentralen (Southern Central Planning Region), the Southern Great Plain of Hungary, and the Mazowieckie (Warsaw) Region of Poland.

Figure 2  
Spatial autocorrelation pattern of the HDI growth by Moran's  $I$ , 2004–2014



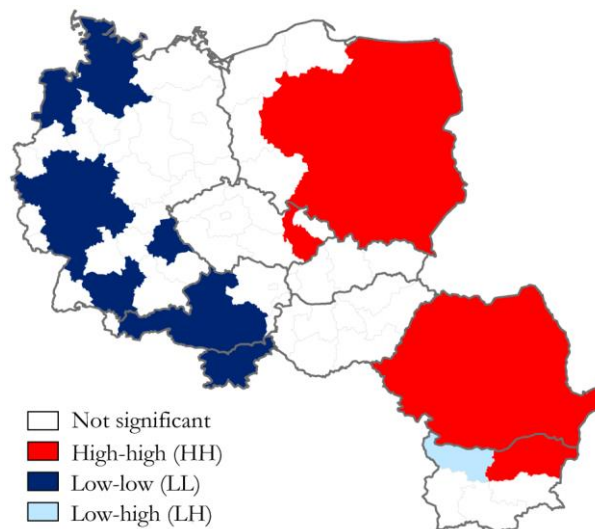
The picture is similar for economic growth as well: the East-West division is evident. Western spaces are less homogeneous: Germany's northern, central, and southern regions are displayed as an independent cluster centre joined by several Austrian spatial units and two Slovenian regions. The eastern part shows an HH cluster consisting of Romania as a whole; Severoiztochen and Severen Tsentralen of Bulgaria; Poland excluding Zachodnio-Pomorskie, Lubuskie, Dolnoslaskie, Podkarpackie, and Pomorskie; and Střední Morava of the Czech Republic. Having the lowest community GDP per capita (30% of the EU average at 2014 PPP), Severozapaden (Northwestern Planning Region) of Bulgaria is a low-high (LH) spatial outlier; that is, it has low economic growth, while its direct neighbours show high economic growth. This phenomenon indicates a halt of the catch-up process in the study period.

A similar study by Rodríguez-Pose and Tselios (2015), dealing with social well-being in the regions of Western Europe, explains the significant spatial autocorrelation with the 'traditional' social-economic interactions (knowledge and information technology spillover, trade, movement of labour and capital, economies of scale, transfer payments, etc.) taking place between the regions. According to the same study, the strong congruity may be further explained by such other factors as the roles of national cultures, institutions, and macro level policies. The spatial characteristics of these roles are also evident in the results of our spatial analyses regarding economic growth and social development. This means that, under the conditions of our current analyses, we may also calculate the differentiating impacts of national factors on convergence spatiality.



We continue our analyses using this first-order queen weight matrix. Although we tried to run our regression analyses with several other matrices, they did not lead to any real change in the main parameters. According to our results in Tables 2 and 3, the CEE region shows unconditional convergence during the study period.

Figure 3  
Spatial autocorrelation pattern of the GDP per capita growth by Moran's  $I$ ,  
2004–2014



The regression  $\beta$  coefficient indicating convergence is negative for both indices, meaning that the less developed regions show higher growth rates and vice versa. The strength of the relationships varies greatly for the OLS regressions (48.9% vs. 90.5%). As to HDI, the slope is steeper and, consequently, the convergence is stronger. According to the findings of our global autocorrelation test (Moran's  $I$ ) performed on residual errors, the models still hold a lot of information. We use Lagrange multipliers to provide information for the regressions supplemented with spatial characteristics. Accordingly, we supplemented the regressions with the spatial lag errors of the OLS regression for social development change and with the  $n$  values of the dependent variable for GDP per capita. In other words, we used the spatial error model (SEM) for the former and the spatial lag model (SLM) for the latter (for details of the decision process, see Anselin 2005, p. 218.).

Table 2

**Absolute convergence of HDI by traditional (OLS) and spatial regressions**

Denomination	OLS	ML SEM	SWLS (HET)
Constant	0.201*** (35.336)	0.185*** (21.354)	0.187*** (12.831)
HDI (ln, 2004)	-0.044*** (-30.447)	-0.040*** (-18.415)	-0.040*** (-11.186)
$\lambda$	–	0.735*** (9.821)	0.741*** (7.986)
$R^2$	0.905	0.947	0.906
MCN	20.070	–	–
Log likelihood	370.069	390.575	–
Akaike information criterion	-736.137	-777.150	–
Breusch–Pagan-test	4.002**	23.837***	–
Likelihood ratio test	–	41.013***	–
LM test (error)	45.151***	–	–
Robust LM (error)	25.916***	–	–
LM test (lag)	23.628***	–	–
Robust LM (lag)	4.393**	–	–
Moran's $I$ (residuals)	0.455***	0.018	–
Speed of convergence (%)	5.830	5.080	5.160
Half-life (year)	11.890	13.640	13.430

*Note:* Here and in the following table(s), OLS – ordinary least squares; ML SEM – maximum likelihood spatial error model; SWLS (HET) – spatially weighted least squares (robust inference of the estimator covariance matrix in presence of both spatial heteroskedasticity and autocorrelation); MCN – multi-collinearity condition number; LM – Lagrange multiplier. \*\*\* and \*\* indicate significance at 0.01 and 0.05, respectively. The spatial weight matrix is based on first-order queen contiguity. See the  $t$ - (OLS) and  $z$ -score (ML, SWLS) values in parentheses.

For the maximum likelihood regressions, we obtain information on model suitability, not only from the  $R^2$ , but also from the log likelihood (higher values are better) and Akaike information criterion (lower values are better). Accordingly, adding congruity values improves the explanatory power of the models for both dependent variables. The likelihood ratio test, which is used to test spatial dependence (i.e. the applied weight matrix), demonstrates that the processes in neighbouring regions significantly affect the strengthening of the two phenomena. Due to the heteroscedasticity of the residuals in the case of HDI convergence, we use a robust estimation of the covariance matrix here (SWLS HET, Kelejian–Prucha 2010, Chasco 2013). When supplemented with spatiality, the models provide a more balanced picture in terms of explanatory power (for the SWLS regression, only the  $R^2$  provides information on the best fit). Therefore, we can conclude that convergence does not depend only on the initial conditions. In fact, it is also clearly influenced by phenome-

na occurring in the neighbouring regions or in the countries encompassing a given region (spillover effects). These phenomena affect not only economic convergence but have an obvious impact on social development as well.

Table 3

**Absolute convergence of GDP per capita by traditional (OLS)  
and spatial regressions**

Denomination	OLS	ML SLM
Constant	0.206*** (11.503)	0.059*** (3.253)
GDP per capita (ln, 2004)	-0.018*** (-9.586)	-0.005*** (-2.995)
<i>W</i>	-	0.729*** (10.248)
<i>R</i> <sup>2</sup>	0.489	0.704
MCN	15.550	-
Log likelihood	313.561	333.163
Akaike information criterion	-623.121	-660.326
Breusch-Pagan-test	5.073*	6.068
Likelihood ratio test	-	39.205***
LM test (lag)	28.108***	-
Robust LM (lag)	26.254***	-
LM test (error)	9.230***	-
Robust LM (error)	7.445***	-
Moran's <i>I</i> (residuals)	0.207***	-0.021
Speed of convergence (%)	1.950	0.520
Half-life (year)	35.620	132.790

Note: ML SLM – maximum likelihood spatial lag model; *W* – spatially lagged dependent variable. \*\*\* and \* indicate significance at 0.01 and 0.10, respectively. The spatial weight matrix is based on first-order queen contiguity. See the *t* (OLS) and *z*-score (ML) values in parentheses.

Tables 2 and 3 list the annual speeds of convergence and the half-life figures based on the regression  $\beta$  values calculated for the individual models. Although the regression  $\beta$  values have negative signs, the speeds of convergence (and the half-lives computed from them) show different patterns. The average growth in social development looks better: the annual speed of convergence always exceeds 5% and the half-life never exceeds 15 years. Economic performance is coupled with a much lower speed of convergence (approximately 2%, which is almost the same as the estimate obtained using Mankiw et al.'s (1992) methodology for OECD countries or Dedák and Dombi's (2009) estimate for CEE counties), but it drops to one quarter of its original value (while the half-life increases in parallel) when spatiality comes into the picture. The neighbourhood effects lead to a downward adjustment in the

original OLS model in both cases, while for economic development, the phenomena occurring in directly neighbouring regions are more pronounced.

Several prior studies highlight the presence of national differentiation in the CEE convergence process (Herz–Vogel 2003, Hegerty 2016, Kotosz–Lengyel 2017) and, in particular, the great differences both between and within the countries in this regard. Our study focuses on nine countries. However, introducing that many (eight) convergence club dummy variables produced severe multicollinearity. Thus, we created two dummy variables ( $d_{2004}$ ,  $d_{2007}$ ), indicating the accession date in the EU accession function, and used Germany and Austria as references.

Table 4

Institutional club convergence		
Denomination	HDI	GDP per capita
Constant	0.175*** (12.609)	0.085*** (2.640)
TD (ln, 2004)	−0.038*** (−11.626)	−0.006* (−1.858)
$d_{2004}$	0.005** (2.406)	0.010*** (3.162)
$d_{2007}$	0.007* (1.798)	0.022*** (4.655)
$R^2$	0.908	0.572
MCN	55.250	78.543
Log likelihood	373.005	323.790
Akaike information criterion	−738.011	−639.581
Breusch–Pagan-test	13.641***	47.336***
LM test (error)	43.126***	23.876***
LM test (lag)	25.998***	27.363***
Moran's $I$ (residuals)	0.445***	0.331***
Speed of convergence (%)	4.780	0.062
Half-life (year)	14.500	111.800

Note: TD – territorial development. \*\*\*, \*\*, and \* indicate significance at 0.01, 0.05, and 0.10, respectively. See the  $t$ -score values in parentheses.

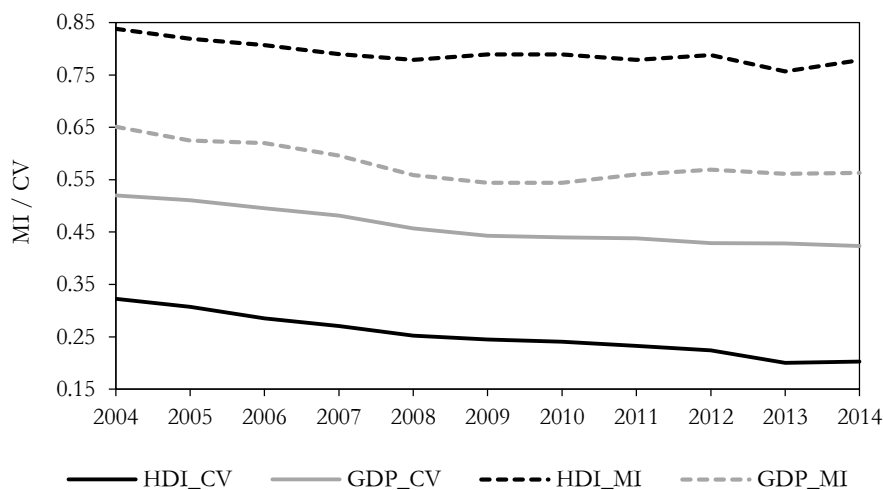
The convergence club approach also provides an opportunity to test the institutional impacts. Zeghni and Fabry (2008) study the role of institutions in human development in the transitional economies of CEE. The authors find a significant impact in countries that joined the EU in 2004 and 2007. They attributed the improvement in human development, achieved through market (creation and regulation) and political institutions (democracy and state federalism), to the application of the 'acquis communautaire' criterion. Therefore, the EU accession date may be

considered an institutional development variable, the impact of which we also test. Our results confirm convergence, and the dummy variables (i.e. institutional clubs) have a significant impact on the growth of our development variables. According to the *t*-scores, this impact is more stable for HDI and GDP in the regions of countries that joined the EU in 2004 and 2007, respectively. Regardless of the significant presence of explanatory variables, the models present several errors. We should first mention the high level of multicollinearity. It actually demonstrates that the dummy variables are ‘superfluous’ because the convergence clubs are inherent in the static (initial) and dynamic data. We find evidence of spatial dependence in the models as well. This reinforces the summary statement of Váry (2017, p. 262.), according to which ‘as all potentially decisive development factors (institutional quality, cultural attitudes, human capital, geographical aspects, etc.) correlate and interact with each other in a complex manner, it is difficult to identify the individual impacts of each explanatory variable on development’. Furthermore, the heteroscedasticity of the residuals compromises the reliability of regression estimates. As to social well-being, the regional dummy variables reduce the speed of convergence and increase half-life. For economic performance, the values are slightly better than those obtained with the spatial lag model. Due to multicollinearity and the heteroscedasticity, we did not run the spatial regressions.

Finally, the population-weighted coefficients of variation (CV) of the two development indices indicate territorial leverage; that is, sigma-convergence is coupled with declining regional differences between 2004 and 2014 (see Figure 4).

Figure 4

**Sigma convergence and spatial autocorrelation of the development variables**



Note: MI – Moran’s *I*; CV – population-weighted coefficient of variation.

For GDP per capita, sigma-convergence shows greater variation and is clearly lower than that for HDI, leading to smaller regional inequalities and more balanced conditions. It is also evident in Figure 4 and from the data that there is a considerable decrease until 2008, followed by a sudden drop in the steepness of the curves, which may be the result of the economic crisis. We use regression trend calculations for both variables in order to determine whether we can consider the direction of regional differences reliable. We apply a logarithmic estimation for both HDI and GDP per capita to explain the trends that decrease with the highest speed/certainty. The coefficients of determination amount to 96.4% (HDI) and 91.5% (GDP per capita), the regression parameters (constant,  $\beta_1$ ) are significant,<sup>2</sup> and the equations reasonably explain the phenomenon of decreasing variation (leverage). In addition to CV, we also analyse the global regional autocorrelation of the development variables to see how the effect of leverage may change the average spatial pattern and how the study area may separate into regions consisting of several sub-regions with different characteristics. The values of Moran's *I* move together with the CV values such that where a variable shows a lower coefficient of variation, there is a higher level of clusterisation (HDI) and vice versa (GDP per capita). The temporal evolution of the regionalisation is significant, with high explanatory power ( $R^2$  is 71.1% for HDI, 60.8% for GDP).<sup>3</sup> In addition, there is another similarity: both CV and significant regionalisation tended to decrease until the start of the economic crisis, but CV decreased thereafter, while the spatial autocorrelation shows stagnation. Smętkowski (2015, p. 545.) calls this phenomenon 'diminishing spatial autocorrelation leading to convergence and mixed hierarchical and contagious diffusion'. This means that we can see both the emergence of hot spots in peripheral areas and contagious diffusion processes in the immediate vicinity of growth poles in the study area. We continue our study with local convergence analyses.

### Local convergence analyses without spatial parameters

The local analyses are suitable for describing the individual paths of the various regions and showing the annual speed of convergence (narrowing in development gap) and the half-life value. Prior to such analyses, we must define a (reference) region for the catch-up target. Instead of choosing a NUTS 2 region, we select Austria's national performance as the catch-up target to achieve (Austria is a leader in the study region on both dimensions).

<sup>2</sup> HDI\_CV = 180.43 – 23.69 ln years,  $t$ -value<sub>constant</sub> = 15.45,  $t$ -value<sub>years</sub> = – 15.43;

GDP\_CV = 155.09 – 20.37 ln years,  $t$ -value<sub>constant</sub> = 9.81,  $t$ -value<sub>years</sub> = – 9.77.

<sup>3</sup> HDI\_MI = 12.06 – 0.006 ln years,  $t$ -value<sub>constant</sub> = 5.04,  $t$ -value<sub>years</sub> = – 4.71;

GDP\_MI = 130.66 – 17.10 ln years,  $t$ -value<sub>constant</sub> = 3.75,  $t$ -value<sub>years</sub> = – 3.74.

Tables 5 and 6 list, by NUTS 2 region, the annual speed of convergence for HDI and economic performance, and the resulting half-lives. The tables contain the extreme values (maxima and minima) of the various countries, organised according to the annual speed of catch-up (the tables exclude regions that already caught up with the reference region). Figures 5 and 6, linked with the calculations, give a better understanding of the spatial peculiarities.

The annual catch-up speeds required to reach Austria's level, vary greatly for both HDI and GDP per capita. Based on the growth in 2004–2014, we can group the individual regions into either the 'catch-up complete' or 'catch-up not complete' category. Just as in the global and spatial convergence analyses, the former indicator displays a stronger narrowing in the development gap. In the study regions, the Mazowieckie territorial unit (including Warsaw) of Poland shows the highest annual speed of convergence (11.6%) and the Jihozapad territorial unit of the Czech Republic has the lowest value (0.7%).

Table 5

**Maximum and minimum values of the local speeds of HDI convergence, and the resulting half-lives, 2004–2014**

Country	Territorial unit	Annual speed of convergence, %	Half-life, years
Bulgaria	Yugozapaden	–4.9	14.06
	Yugoiztochen	–1.5	45.91
Czech Republic	Strední Cechy	–4.5	15.51
	Jihozapad	–0.7	103.91
Hungary	Southern Great Plain	–2.6	26.27
	Central Hungary	–	catch-up not complete
Poland	Mazowieckie	–11.6	6.00
	Kujawsko-Pomorskie	–3.0	23.25
Romania	Bucuresti-Ilfov	–9.8	7.10
	Sud-Est	–2.4	28.42
Slovenia	Vzhodna Slovenija	–3.0	22.99
	Zahodna Slovenija	–	catch-up not complete
Slovakia	Východné Slovensko	–3.1	22.36
	Západné Slovensko	–2.0	33.98
Germany	–	–	–
	Saarland	–	catch-up not complete
Austria	Burgenland	–10.2	6.80
	Steiermark	–	catch-up not complete

With regard to HDI catch-up, we can see a clear East-West dichotomy. For CEE, the eastern part is characterised by convergence, while the western part typi-

cally shows developed spaces categorised either as ‘catch-up complete’ or ‘catch-up not complete’. The new member states, with two exceptions, experienced a strong trend of catch-up mostly in the capitals or in the neighbouring regions of the capitals. The Prague and the Bratislava regions exceeded the average Austrian quality of life in 2011 and 2014, respectively. The annual narrowing in the development gap is strong in the Warsaw (11.6%) and Bucharest (9.76%) regions.<sup>4</sup> With its annual speed of almost 5%, the Sofia region (Yugozapaden) excels among the study regions, while the Polish region including three big hubs besides the capital city (Malopolskie, Dolnoslaskie, and Podlaskie) shows an annual speed above 5%. The higher catch-up rate of the more developed urban areas in these countries indicates a process of divergence.

We can also see the ‘catch-up not complete’ category in the new member states: despite a slight increase, the basic trend shows a downward adjustment from the reference value in Central Hungary and Zahodna Slovenija (Ljubljana). In 2004, the former stood at 90%, while the latter nearly reached the Austrian average, but by 2014, the former dropped to 83% and the latter increased to 98% of the reference value. For the region of Budapest, the relative lag is attributable to the decline in household incomes (alone in the study area), and for Ljubljana, the smallest increase can be observed between 2004 and 2014. In the case of increase in life expectancy, both regions are in the upper third. While the improvement in the education index also represents the best third in the Slovenian capital region, in Central Hungary, there is only a moderate improvement.

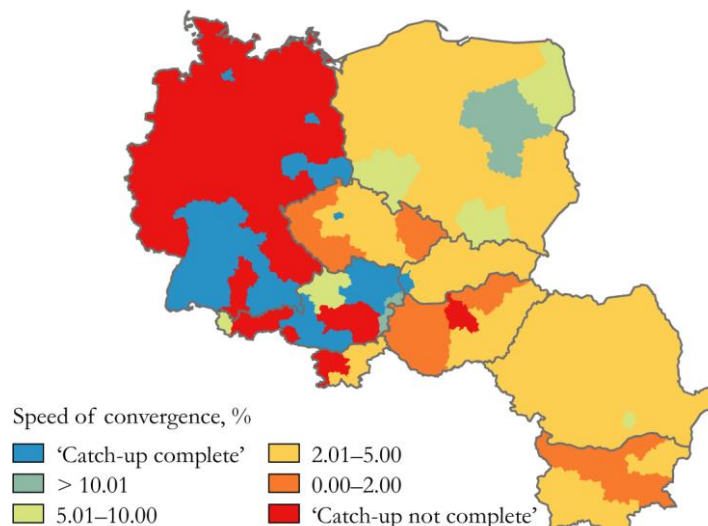
We can see a similar but somewhat different process in Germany and Austria as well. The German and Austrian regions in the ‘catch-up not complete’ and ‘catch-up complete’ categories exceeded the reference value in 2004 but showed a decline in social development in 2014. This phenomenon is typical in some 90% of the territorial units of the German-speaking countries. The only exceptions are Burgenland, Niederösterreich, Oberösterreich, and Vorarlberg: these are the only regions in which we can see convergence. The relative decrease in the majority of the regions is attributable to the lowest growth of all dimensions of HDI between 2004 and 2014.

<sup>4</sup> It is worth examining the delineation of the two regions. The Mazowieckie region represents the classic example of aggregation information loss, the NUTS 2 region consists of eight sub-regions with different levels of economic development. Three out of the eight sub-regions exceeded the 75 percent of GDP per capita (PPP) value of the EU28 average (Miasto Warszawa: 196%; Warszawski Zachodni: 89%; Plocki: 111%), and the remaining ones vary between 50% and 60%. However, Bucharest forms a NUTS 2 region only with the sub-region located in its immediate vicinity (Bucuresti-Ilfov).



Figure 5

Speed of HDI convergence, 2004–2014



Furthermore, the speed of convergence shows a clear-cut differentiation at the national level. This indicates, again, the importance of country-specific effects and convergence clubs. The narrowing of the development gap is fairly high in Poland (4.6%), Slovakia (2.5%), and Romania (4.18%). The Czech Republic, Hungary, Bulgaria, and Slovenia show various catch-up trends. The first three have a low speed of convergence, which strengthens the divergence process in the less developed/depressed regions (Northern Hungary, Southern Transdanubia [Hungary], Severozapaden, Severen Tsentralen [Bulgaria], and Severozápad [Czech Republic]). The phenomenon of club formation is obvious also in Germany: most southern provinces (Baden-Württemberg, Bavaria) show downward adjustment, but maintain their pace. The regions of Berlin, Hamburg, Dresden, and Leipzig are in a similar situation. There is a high performing but relatively lagging convergence club in the central and northern part of Germany. The reference region is not uniform either: Burgenland, Oberösterreich, and Vorarlberg are strongly catching up, while there is a downward adjustment in the Vienna region.

The speed of convergence of GDP per capita also shows both extremes ('catch-up complete', 'catch-up not complete'), but their ratio differs from the HDI figures. The catch-up not complete category is particularly small, which is an evident sign of the division between the two dimensions. When comparing the two figures, this phenomenon becomes especially spectacular in the central and northern part of Germany.

Table 6

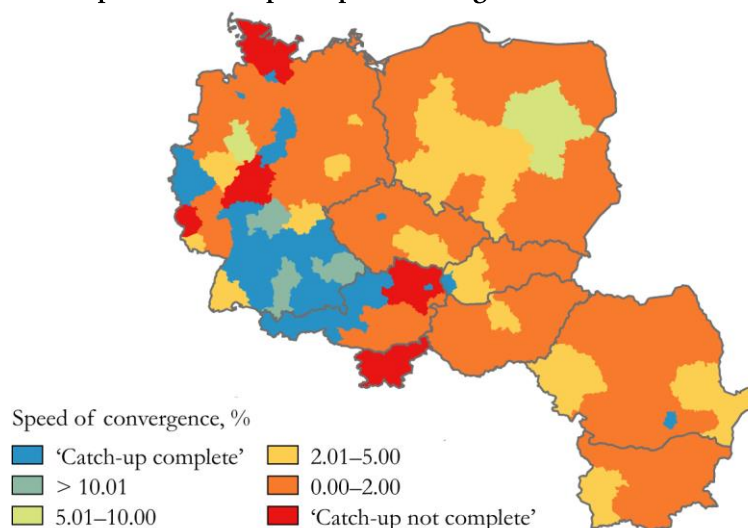
**Maximum and minimum values of the local speeds of GDP per capita convergence, and the resulting half-lives, 2004–2014**

Country	Territorial unit	Annual speed of convergence, %	Half-life, years
Bulgaria	Yugozapaden	–3.5	19.66
	Severozapaden	–0.3	256.29
Czech Republic	Jihovýchod	–2.0	34.39
	Severozápad	–0.3	catch-up not complete
Hungary	Central Hungary	–2.1	32.41
	Southern Transdanubia	–0.2	450.45
Poland	Mazowieckie	–9.9	7.00
	Swietokrzyskie	–1.0	66.56
Romania	Vest	–2.1	33.23
	Nord-Est	–1.0	68.61
Slovenia	Vzhodna Slovenija	–	catch-up not complete
	Zahodna Slovenija	–	catch-up not complete
Slovakia	Západné Slovensko	–2.9	24.11
	Východné Slovensko	–1.2	55.66
Germany	Niederbayern	–11.1	6.24
	Trier	–	catch-up not complete
Austria	Steiermark	–1.9	36.45
	Burgenland	–0.0	1774.10

A Hungarian region (Southern Transdanubia) produces the lowest positive value (0.2%) and again, the Polish capital region (Mazowieckie) is the best performer (9.9%) in the CEE area. The two phenomena are synergistic and moving together in both regions. Just like in the case of human development, Prague and Bratislava exceed the Austrian average in terms of economic performance. However, the two dimensions are not balanced in Bucharest, with the HDI slightly lagging behind.

Figure 6

Speed of GDP per capita convergence, 2004–2014

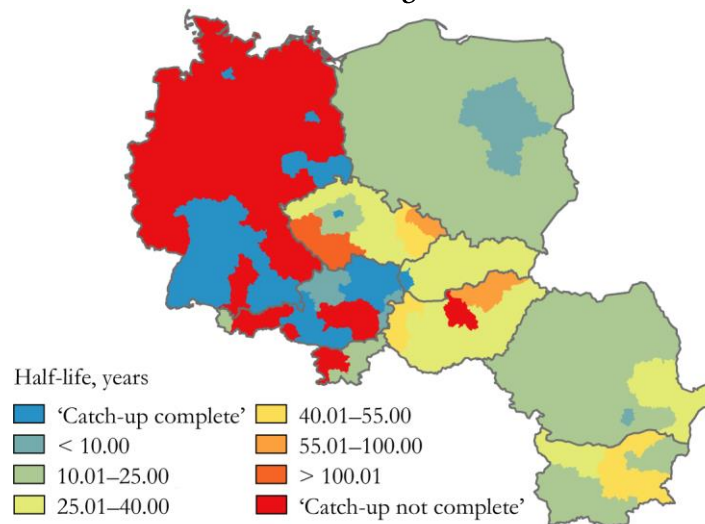


Central Hungary shows an opposite trend: the speed of convergence is positive for GDP per capita but negative for HDI. In the latter two cases, the issue of efficiency is also raised because a one-sided process of complex catch-up seems to favour only the GDP per capita dimension. In view of the growth rates of the 10-year period under review, Zahodna Slovenija failed to reach the reference region (as in the case of HDI). In the Yugozapaden region of Bulgaria, economic performance and human development 'walk hand in hand'. In the eastern territory, the main spaces for economic catch-up, in addition to capital cities, are the regions that include developed cities. In particular, the regions of Poznan, Wroclaw, Katowice, or Lodz (Wielkopolskie, Dolnoslaskie, Slaskie, Lodzkie) in Poland; the region of a major Brno sub-centre (Jihovichod) in the Czech Republic; and the region of Západné Slovensko (Trnava, Trencin, Nitra) adjacent to the capital city in Slovakia show high-level convergence with Austria. Romania's second largest growth pole is the Vest region, which includes MEGA (Metropolitan European Growth Area) (Timișoara, Arad), which has European implications, and the strategically positioned Sud-Est region, which attracts a huge amount of foreign working capital (Allen–Overy 2011). Apart from these regions, the eastern territory shows only low catch-up speeds (0–2% per year). In terms of economic performance, it indicates divergence within the countries. Slovenia is an exception, as even Vzhodna Slovenija shows a downward adjustment. This region is also an exception in that HDI has a moderate catch-up speed, but GDP is relatively lagging behind the Austrian average. Again, it is one-sided progress, but this time it favours HDI convergence.

The southern provinces of Germany again form a well-performing convergence club that includes regions with ‘catch-up complete’ status, downward adjustment, or a high speed of convergence. The German representatives of the ‘catch-up not complete’ category (Trier, Schleswig-Holstein, Giessen, and Kassel) greatly differ from the same categorisation of HDI. Although most cases also show downward adjustment (compared to Austria, Kassel’s position is the same in 2014 as in 2004), unlike in the case of well-being, these regions failed to reach the initial value of the reference region in 2004. In Germany, the behaviour of the central and northern regions is similar to that of the majority of eastern regions where, apart from a few exceptions, the narrowing in the development gap is 0-2% per year, typically coupled with the relative lag in social well-being. Austria is still not uniform: the GDP per capita values of several regions (Vienna, Oberösterreich, Salzburg, Tirol, and Vorarlberg) are higher than the average in 2004, but except for Vienna, there is continuous convergence without any downward adjustment. In the territory under review, the lowest speed of convergence is present in Burgenland (0.036% per year), located in the periphery of Austria. Compared to HDI, progress here is again one-sided: the growth in social development may be attributed to state interventions. Steiermark and Kärnten also show some one-sided catch-up taking place, again in favour of HDI.

Figure 7

#### Half-life of HDI convergence, 2004–2014



Due to the speed of convergence, the half-lives show here – just like for the entire CEE territory – the number of years that would be required, assuming a constant speed of convergence for the 10-year period under review, to cover half of the way to catch-up.

In the case of HDI, the vast majority of the regions show a higher speed of convergence, which we can also see in the half-life values. We see a diverse half-life picture when we omit the non-converging or 'catch-up complete' regions from the analyses (see Figure 7). It takes 6 years for the best-performing Mazowiecki region and as many as 104 years for the Jihozápad region, which has the lowest speed of convergence, to achieve half of the full convergence.

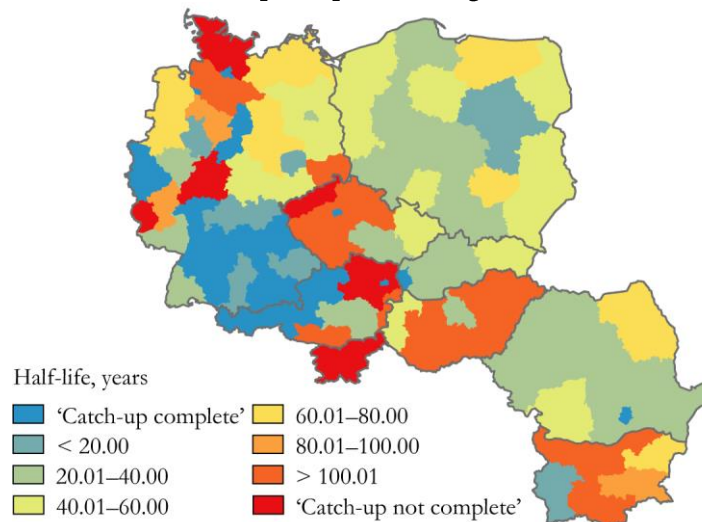
As to the eastern capital city regions that are not lagging, Warsaw and Bucharest would catch up (assuming constant growth) with the reference level within a relatively short time (12-14 years), while the Sofia region would need almost 30 years to do the same. The short half-life of Střední Čechy, the region round Prague, is presumably attributable to the positive effects of being adjacent to the Czech capital city. When put on the map, half-life values – just like catch-up speeds – positively confirm the phenomenon of national convergence clubs, complete with the presentation of gradual progress. Except for one or two regions, Poland and Romania would achieve half of the full convergence within 10-25 years, while Slovakia would need 25-40 years to do the same. In Hungary, most regions are also expected to reach the half-way point within 25-40 years, with the relatively developed Western Transdanubia needing 43.5 years and the least developed Northern Hungary requiring 58 years. The situation is similar in the Czech Republic, where the catch-up target represents an inconceivably long period for the relatively developed Jihovýchod region located in the western part of the country, while the Ostrava region (formerly involved in heavy industry) faces the same half-life as Northern Hungary (which is a not too optimistic this type of region). Except for the above region and the capital city region, the rest of the country would reach the half-way point to the full convergence target within 25-40 years. The spatial pattern of Bulgaria and Slovenia is in line with the respective speeds of convergence; only Yugoiztochen and Severen Trentsalen (Bulgaria) excel, with a half-life of 40-55 years.

When analysing the time requirement for economic catch-up (see Figure 8), we again see clusterisation and club formation – although not as clearly as for social development – in the case of continuous areas, excluding the central and western regions of Hungary, which has a half-life above 100 years (Western Transdanubia excels at 450.5 years); we find similar features in the western part of the Czech Republic (Bohemia) and the entire territory of Slovenia. The one-sided development is most striking in Střední Čechy, with a half-life of 15.5 years for HDI and 226.9 years for GDP per capita. In Poland, the regions including the big hubs already noted are accompanied by regions such as Malopolskie (Krakow) and Pomorskie (Trójmiejski) Regions, where the relatively short half-life is the result of better initial conditions. Slovakian regions also show divergence and the East-West dichotomy is present again, however, unlike in the case of HDI, we expect a faster catch-up in western regions. Except for the capital city region, Bulgaria needs an inconceivably long time to achieve the half-way point of full convergence (Severozapaden, which has the

lowest GDP per capita, would need 256.3 years). Burgenland and Kärnten exemplify the subtle interrelations between social and economic development. In the former region, the half-life is 6.8 years for HDI, and, assuming a constant speed of convergence for the 10-year period under review, 1,774 years for GDP per capita. The latter region shows a downward adjustment in terms of social development, while its half-life for economic convergence amounts to 465 years. The half-life varies widely in the northern part of Germany, but the provinces of the former East Germany are not necessarily worse than the West German regions. The poorest values belong to Hannover (85.2 years), Dresden (193.1 years), and Lüneburg (438.6 years).

Figure 8

#### Half-life of GDP per capita convergence, 2004–2014



### Summary

Our study discusses the convergence of economic and social (well-being) performance in the CEE NUTS 2 regions for the period of 2004–2014. We abandoned the theory of closed economies and, thus used spatial interactions and spillover effects for our study. We drafted four research questions in connection with this theme.

*On the existence of strengthened convergence in CEE, there was a significant absolute convergence in the case of the economic (GDP per capita) and social development (HDI) between 2004 and 2014 in the study area. On regional economic performance, the annual speed of convergence was around 2%, corresponding to the literature and conditional convergence studies, while the human development*

index was much higher, by nearly 6%. So, regardless of any other explanatory factor, less developed regions tend to converge with more developed ones.

*On spatiality, we can consider its dependence and the different interactions as a phenomenon that can be clearly understood in the context of the convergence and catch-up.* We can consider the spatial dependence of growth rates as very strong, and the spatial divisions are heavily tied to the national boundaries, especially in the case of the HDI. Thus, similar to Rodríguez-Pose and Tselios' (2015) study on Western European regions, we can assume that in CEE regions, national institutions and culture have an effect, not only on the traditional neighbourhood relations, but also on the interactions (knowledge, technology, movement of production factors, etc.), which we can attribute to spatial similarity. We prove this in part with the regression analyses that include the variables of institutional development, though, in this case, the role of multicollinearity is significant. Therefore, both static (initial development) and dynamic data (growth rate) carry institutional characteristics (convergence clubs). Global regression models contribute significantly to the incorporation of neighbourhood characteristics. There is a significant and positive neighbourhood effect in both regressions of the developmental variables, and the growth of the two phenomena has a reliable impact on the processes in neighbouring regions. The spatial regression models explain the convergence of the area with very good efficiency. The main indices (log likelihood, Akaike information criterion) show more favourable values than in the OLS regression. We find clear differences between economic and social convergence. On the one hand, in the case of social well-being there are much more balanced relations (spatial autocorrelation, population-weighted coefficient of variation), than in the case of the GDP per capita. In addition, there is a closer correlation between initial development and the growth rate, and the annual convergence rate is considerably faster. The neighbourhood effects downplay the main indicators of convergence: the effects of the processes are more significant in the surrounding regions than it is for economic performance. The annual convergence rate falls to one-quarter of its value, and HDI has only a 12-13 percent relapse. These results highlight the two phenomena and development dimensions, which means that the redundant nature of the indicators does not replace a dynamic approach.

*The global and spatial regressions provide only an average picture of the phenomenon under study, and therefore, we present the individual paths of each region* in terms of Austria as the target region. The local results show the information provided by the global regressions, pointing to a number of unique features. The indicators described in the regressions (annual speed of convergence, so the narrowing in the development gap and the half-lives) are moving on a much wider scale, showing the 'catch-up complete' and 'catch-up not complete' categories. There are also significant differences in social and economic development. Similar to the regression results, social development provides a more favourable picture of catch-up.

At the same time, which mathematical-statistical methods do not show, we find a downward adjustment, which we can call a very characteristic process, especially for HDI. Local convergence and catch-up analyses without adding spatial parameters strengthen the national character of catching up, club formation (club convergence), and the preferences of urban spaces.

Based on our results, it is important to highlight that these studies do not necessarily mean that economic and social convergence and catching up occur simultaneously. Many regions experience one-sided development (e.g. Central Hungary, Vzhodna Slovenija, Burgenland, the northern and central-German regions), which indicates the efficiency of economic performance.

Our analysis cannot be considered without criticism because we study a relatively short period that also experienced an economic crisis. At the same time, this period clearly points to the sophisticated relationships between economic and human development in the examined region.

### Acknowledgement

Supported by the ÚNKP-17-4 New National Excellence Program of the Ministry of Human Capacities.

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## **New trends in the development of Hungarian clusters<sup>\*</sup>: The case of the Southern Great Plain region**

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Most clusters in Europe were established in the late 1990s and the subsequent decade. These network collaborations played a crucial role in the European Union as well as in the economic policies of its member states. Initially, the aim was to catalyse the formation of these clusters and to strengthen their organisational and operational backgrounds. Consequently, several such collaborations were able to serve as the foundation for cluster-based economic development programs. The cluster development process has made great progress in the last 10 years, and the focal points have been rearranged in accordance with emerging global trends and economic challenges. The aim of this study is to provide an overview of these changes and to analyse how the Hungarian clusters adapted to these new trends. The paper is based on in-depth interviews conducted within the clusters operating in the Southern Great Plain region of Hungary, and the results highlight the development processes and some geographical features of these networks. In general, the most important change is that fewer dedicated resources are allocated for the development of clusters, resulting in a shift in emphasis toward support for developed world-class clusters operating in emerging industries. International relations, inter-cluster co-operations, and cluster development, non-financial incentives have all gained increased focus. The clusters in the Southern Great Plain region have partly adapted to these changes, but active participation in international markets remains a major challenge.

### **Keywords:**

clusters, international relations, inter-cluster co-operations, and cluster development, non-financial incentives have all gained increased focus. The clusters in the Southern Great Plain region have partly adapted to these changes, but active participation in international markets remains a major challenge.

<sup>\*</sup> Industrial and service clusters which operating in the Southern Great Plain Region.

## Introduction

In recent decades, the formation and the importance of clusters and their special roles in economic development and innovation policies have received much public attention. The older and more geographically diverse a cluster's operations, the better we can learn its structure, operation, and keys to success.

Clusters play crucial roles in regional economic development and have positive effects on employment, innovation, and knowledge transfer activities. A strong cluster background ensures a favourable environment for the appearance of new regional industries, such as the biotechnology or software industries (Ketels–Memedovic 2008, Delgado et al. 2014). In several industries, such as the automotive industry, small and medium enterprises have become more effective suppliers with the help of clusters. The synergies created by clusters have a favourable impact on the entire region as well (Tiner 2010). The primary effects of clusters on a region's competitiveness include an improvement in productivity, growth in innovation capacity, and the appearance of new enterprises. Clusters also ensure a common forum for universities, research institutes, and enterprises by creating an innovation-subsidising environment in which participants can share information, realise common projects, and contribute to effective knowledge transfers (Lengyel 2006, Ketels et al. 2013). Thus, the role of third-generation universities within the clusters goes beyond the mission of education and research and includes establishing new economic partnerships and absorbing existing knowledge (Kotosz et al. 2015).

The circumstances around the appearance of clusters vary across countries, but in almost every European country, intensive cluster development activities have taken place since the late 1990s. Due to the success of the well-known Silicon Valley and Italian models and given the support of the European Union, member states established national or regional cluster development programs promoting the creation and empowerment of clusters by the end of the 2000s (High Level Advisory Group on Clusters 2007, European Commission 2008).

After this intensive period of support for clusters, European countries, including Hungary, realised that the sustainable development and enforcement of cluster collaborations as dominant players in national and international economics is a major challenge. To ensure the success and long-term sustainability of clusters, these development programs should adopt and define new directions for cluster support. This study focuses on new, emerging directions in European cluster policy and the implementation of these policies in the Hungarian system. The South Great Plain region was chosen as a case study for this analysis due to the large number of clusters that have been created in various areas in this region during recent years. This study has three main parts. The first part is a short literature review showing the variability of clusters following different approaches, and the second part outlines some of the changes to cluster programmes in recent years. Finally, in the third part, the Hungarian cluster support system is described along with some results of

my analysis based on in-depth interviews with cluster managers in the South Great Plain region.

### Literature review

The literature describes several approaches to clusters. The various cultural and economic backgrounds and regulations of different countries, have led to the establishment of clusters in various forms and with diverse characteristics. The early concepts of clusters can be derived from local specialisation activities in accordance with the growing significance of the global-local paradox (Porter 1990, Pyke–Sengenberger 1992).

Almost a decade later, an emerging trend in the relevant literature in both the political and academic fields was to use close-to-synonymous terms, such as ‘industrial district’, ‘agglomeration’, or ‘milieu’ rather than the term ‘cluster’ (Cruz–Teixeira 2010). The best-known definitions of clusters come from Porter and the European Commission, both of who focus on the importance of geographical proximity, strong local collaborations, and complementary expertise (Porter 1998, European Commission 2008); several other authors (Enright 1998, Rallet–Torre 1998, Steiner 1998, Lengyel 2006) share this point of view as well.

In the context of regional development and innovation, it is important to emphasise that industrial districts and regional innovation systems (RISs), which serve the same goals as clusters but in individual ways, can be differentiated according to the level of spatial concentration, business collaborations, policies, and mechanisms. All these concepts have a territorial criterion: industrial districts identify their district members through a sense of belonging, whereas the cluster approach does not have a strictly defined geographic scope. Therefore, the main focus of and success factor for an industrial district is the community of people, whereas the cluster framework focuses on firms, and the only social issue is the success of the associated companies (Ortega-Colomer et al. 2016). The territories of RISs are not limited to certain areas, but are rather integrated into other national and international systems involving more stakeholders. Furthermore, the policies of industrial districts are implemented in predefined areas, whereas the cluster and RIS concepts are incorporated into global production systems (Benneworth et al. 2003, Coe et al. 2004).

Based on Marshall’s analysis, it is widely accepted that agglomeration economies, in which firms are concentrated, have greater social ties and more extensively share information and other assets, in addition to promoting profitability and innovation activity. Up to a certain point, the concentration of a country’s urban system can increase competitiveness and entrepreneurial performance (Marshall 1920, Castells 1996, Komlósi–Páger 2015). Among the success factors of clusters, geographical proximity is considered to play a decisive role, with cognitive proximity having great importance as well. Cognitive proximity supports knowledge transfer activities and the creation of an innovation milieu (Boschma 2005, Broekel–Boschma 2016).

As a result of this diversity of concepts, we can view clusters as umbrella institutions combining different models of co-operation between companies and institutions to establish a single approach promoting innovation and regional development (Porter 1998, Isaksen–Hauge 2002, Ortega-Colomer et al. 2016).

Due to the various concepts and specialties in different local environments, several typologies have been created worldwide. First, we can classify four main concepts: Italian industrial districts, Californian networks, Northern or Scandinavian schools focusing on local knowledge, and Porter's cluster approach based on enterprise-level competitive advantages (Grosz 2005). Many typology theories have appeared based on the extent of clusters' sub- and superordinate relations and the hierarchies or characteristics of co-operation. The lifecycles of clusters also follow many approaches, but they typically undergo the start-up, growth, decay, and transformation steps (Lengyel 2002, Andersson et al. 2004). According to these different approaches, we can differentiate between six cluster types based on corporate co-operation and business environments: vertical production chains, aggregations of connected sectors, regional clusters, industrial districts, local networks, and innovation milieus (Miller et al. 2001). Since the specialties of these organisational structures of clusters differ, the organisational strategies can be heterogeneous as well. A study identified three types of sub-clusters: those influenced by globalisation, those based on politics, and those based on certain resources that are responsible for the highest value-added activities in a given area (Buzás 2000, Andersson et al. 2004).

The Hungarian cluster development process started to bloom in the 1990s due to increasing foreign direct investment from multinational corporations and the support of several top-down approaches. The formation of these clusters was influenced by globalisation and available government resources. Large corporations fostered the establishment of supply chains, and the clusters driven by their interests were vertical collaborations. Consequently, these artificially generated clusters did not foster strong connections between the integrators or other companies (Ricz 2010).

As a result of the growth in newly formed clusters, research in this field became more active as well. The domestic cluster literature mainly focused on evaluating the established clusters, understanding their aims, and mapping the variety of local features, especially for accredited clusters (Lengyel 2010, Lengyel–Rechnitzer 2013, MAG 2012). Several studies considered the related key definitions and trends of clusters, such as spatial proximities, regional competitiveness, knowledge transfers, and agglomeration advantages, typically for a specified territorial scope (Patik 2005, Szanyi 2008). Other authors focused on the special roles and impacts of corporations, universities, and industrial parks in the case of both Hungarian and foreign clusters (Lengyel–Deák 2002a, Kocsis 2012, Lukács 2013, Lippert et al. 2015).

## **Transformation of cluster programs, and development of new focal points**

Several studies have tried to highlight the differences in the structures, sizes, and management of clusters and the most dominant factors in their success (Lämmer-Gamp et al. 2011). Initial financial support was the most dominant means of supporting clusters, but this financial support was not sufficiently effective to form self-acting clusters that were sustainable in the long term. Technical help in the development of management organisations, such as training or coaching, was provided by only half of these programs in 2012, but three years later, these supportive elements could be detected in two-thirds of national and regional programs (Müller et al. 2012, Meier zu Köcker–Müller 2015).

Countries are increasingly including clusters in their policies, and, as a result, cluster programs have visible connections to national or regional specialisation or innovation strategies. Most cluster development strategies focus on the development and international strengthening of existing clusters, although the support of newly formed clusters has recently received some emphasis as well. Within the most important economic sectors, clusters involve dominant actors, and the support of inter-sectoral co-operation between clusters operating in different fields of industry is the focus. Consequently, many cluster programs actively support clusters that catalyse co-operation between fields and provide high value-added services for small and medium enterprises (SMEs) (Lämmer-Gamp et al. 2014).

Internationalisation is presently one of the main goals of cluster programs. Most programs support the development of clusters' international relations and appearances on international markets with targeted aid. Supporting the excellence and well preparedness of cluster management organisations is also important. Cluster organisations are supported by a growing number of programs that offer specific business services to help enterprises successfully face growing market and technological challenges and join emerging industries and inter-sectoral co-operations (Christensen et al. 2012, Kergel et al. 2014, Meier zu Köcker–Müller 2015).

According to a study presented by the European Cluster Observatory in 2015, the major changes and new directions in cluster programs can be summarised as follows (Meier zu Köcker–Müller 2015).

- There are fewer dedicated resources for the support of clusters as clusters play an increasing role in the implementation of development and innovation policies. Consequently, support for clusters themselves has become a less important goal.
- There is more emphasis on support for clusters operating in advanced, world-class, and emerging industries than on support for creating new clusters.
- Support for cluster management excellence is part of nearly every program and has recently become increasingly important.



- Internationalisation has remained a major element of the program, and support activities are assisted by a growing number of actions.
- Many programs have separate budgets for the special support of cluster management organisations in the fields of internationalisation, inter-cluster agreements, and cluster management excellence.
- Non-financial incentives are becoming more common than financial support.
- Most programs fit well and are linked to national and regional specialisation and innovation strategies.

### Cluster development in Hungary

Following international trends, the first clusters in Hungary appeared at the end of the 1990s and at the beginning of 2000s' due to program promoting supplier relationships. Later, the first Széchenyi Plan supported the creation of cluster management organisations (Gazdasági Minisztérium 2000). However, these collaborations did not prove to be strong enough for long-term operations, and, thus, a multi-stage cluster development program was implemented between 2007 and 2013 involving substantial grants. During this period, 191 start-up and 46 emerging collaborations were given financial assistance to the tune of eight billion HUF. By 2015, 34 clusters qualified as accredited clusters, which signified collaborations performing high innovation and export activities and realising important development projects. These clusters involved 1,140 companies, 117,000 employees, and a total revenue of more than 9,500 billion HUF (Nemzetgazdasági Minisztérium Gazdaságfejlesztési Programokért felelős Helyettes Államtitkárság 2013, Colosseum Budapest Kft. 2015).

Studying the structural and operational background of these clusters, we can conclude that Hungary's clusters are quite diverse. In addition to the clusters based on large, dominant enterprises, some clusters rely on co-operation between SMEs. Regional knowledge centres play a key role in the geographical locations of clusters. Many of the member companies of the Accredited Innovation Clusters, for example, operate in a sub-region with an appropriate educational, cultural, and research background for promoting innovation (MAG Klaszterfejlesztési Iroda 2012, Horváth et al. 2013).

The major goal of the cluster development activities from 2007 to 2013 was to support the creation of collaborations that included the most dominant economic and research actors, corporations, and research and higher education institutions. Due to widely available funds, many clusters were founded. Initially, a multi-step support scheme financed the costs of formation, the development of strategies, and management operations. Later, the focus shifted to the implementation of common projects, research, and investment. Based on the European and international trends since 2014, the clear goal is to promote and support international market access for

collaborations that are capable of development and have stable financial and professional backgrounds. The currently available resources aim to catalyse the improvement of cluster management services and promote international market access for these clusters. As an indirect incentive, accredited cluster members are given priority in the evaluation process for economic and research development funds, which means that promoting projects implemented within a cluster is still an important objective.

Since 2006, the European Union has strongly supported its member states in the creation of clusters, and, thus, most member states applied in the economic development and innovation policy the cluster development. The member states' cluster policies vary, but they contain similar elements. Most countries provide financial support, training, and service development subsidies to clusters. The Hungarian cluster development policy contains many similar provisions, but its accreditation, embedded in a multi-stage subsidy system, is exemplary at the European Union level. Due to a strict pre-qualification system, the most important research representatives, innovative SMEs, and corporations can all co-operate in these clusters. These co-operations have effects mainly in knowledge centres, which correspond to the centres of the clusters. The members of these clusters can be rated as more successful and reliable candidates, and the exports and growth potentials of SMEs within these clusters far exceed those of SMEs outside these clusters (European Commission 2008, High Level Advisory Group on Clusters 2007, Colosseum Budapest Kft. 2015).

### **Clusters in the Southern Great Plain region**

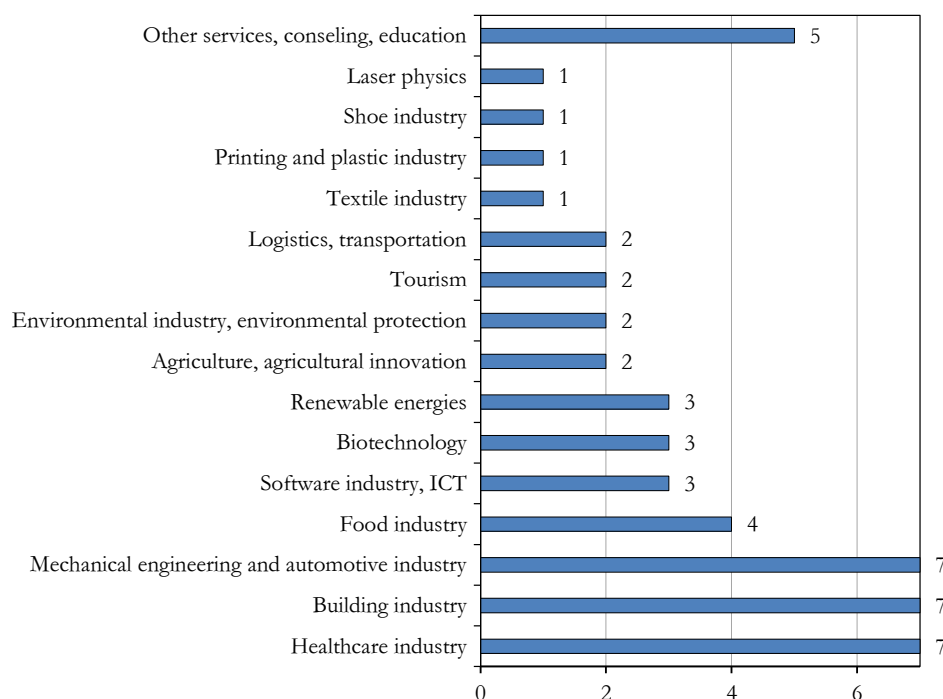
As is the case across Hungary, most clusters in the Southern Great Plain region were created as a result of the Hungarian cluster development programme from 2007 to 2013. New and improving clusters could receive financial support from the Southern Great Plain Regional Operative Programme in 2008 and, again, in 2011. Thus, in 2010, there were 29 clusters in the Southern Great Plain region, above the national average, and 22 new initiatives appeared in this region through 2015. The scientific areas – where the regional higher education and research institutes were based – and the leading industrial sector within the region played significant roles in the establishment of clusters. As Figure 1 shows, the clusters in this region operate in various industries, such as healthcare, the building or automotive industry, and the biotechnology and software industry.

The regional locations and concentrations of clusters also indicate the significant role of each knowledge centre. Most clusters have been established with Szeged as the centre, which is understandable because, in Hungary, larger university towns like Szeged act as islands of modernity. Although such towns have limited spillover effects on their own regions, they provide important knowledge for other advanced regions (Enyedi 2009). In addition to Szeged, Kecskemét and Békéscsaba can be

considered as agglomeration centres. Figure 2 shows the numbers and locations of clusters for cluster centres by sub-region in 2010 and 2015.

Figure 1

**Industrial distribution of the clusters  
in the Southern Great Plain region, 2015**

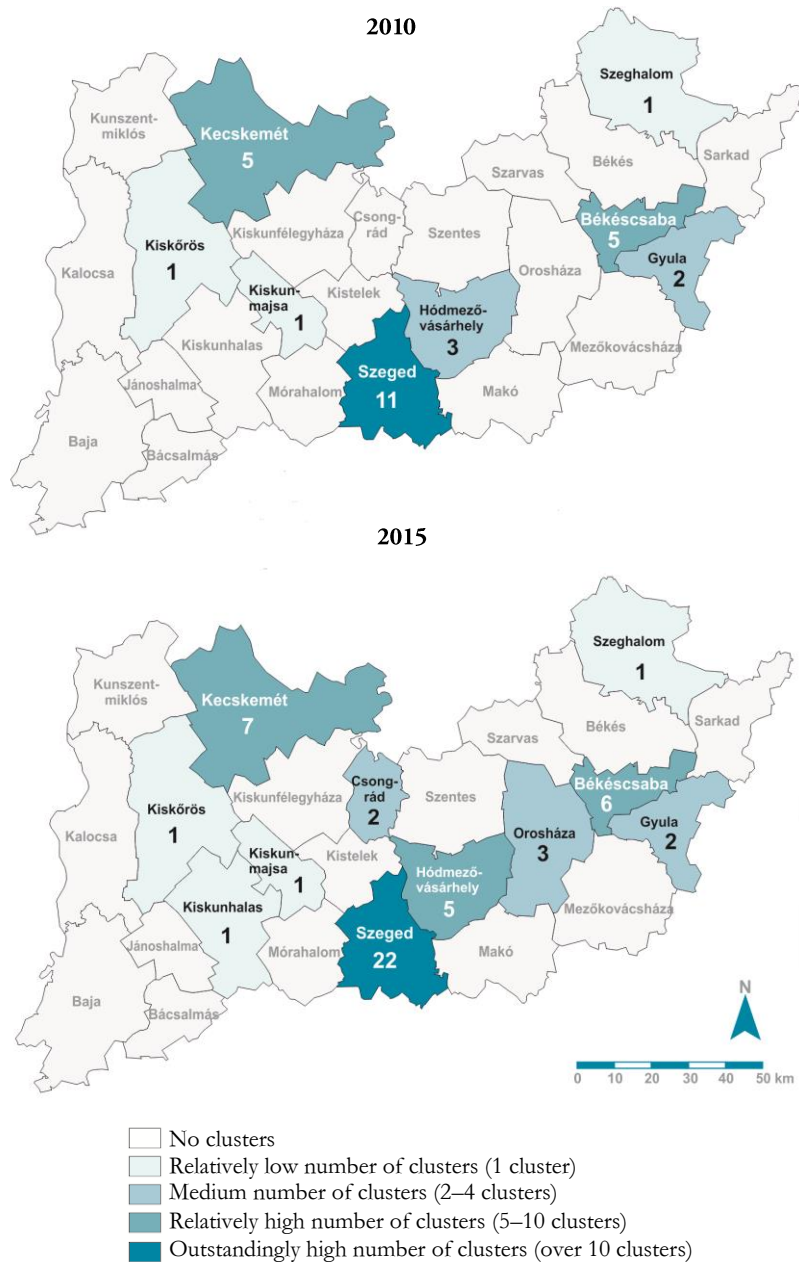


Source: Own calculation based on the database of the South Great Plain Regional Development Agency.

Of the clusters in this region, nine have received the title of Accredited Innovation Cluster. These clusters altogether include 342 members, of which 86% are SMEs. Furthermore, all clusters have a large enterprise as a member. With the exception of two accredited clusters, all of them include different higher education and other research institutions, and local governments work to strengthen inter-cluster knowledge transfers. The net sales turnover in 2013 was 852 billion HUF, of which 34% was generated by SMEs. An important indicator of access to potential external markets is net export sales turnover, which is 287 billion HUF in the case of the accredited clusters in the region. The accredited clusters in this region employ 25,331 people, of whom 2,163 have obtained high-level education. In terms of research and development, 157 industrial properties are under the protection of the clusters, and they employ 45 PhD-level specialists (Nemzetgazdasági Minisztérium Gazdaságfejlesztési Programokért felelős Helyettes Államtitkárság 2013).

Figure 2

**Number and location of the clusters  
in the Southern Great Plain region by sub-region**



Source: Own elaboration based on the database of the South Great Plain Regional Development Agency.

### Analysis of the Southern Great Plain region's clusters

In the course of my qualitative research, I studied the operations, the international and inter-sectoral activities, and the long-term sustainability of the clusters in the Southern Great Plain region with the help of expert interviews. Half-structured in-depth interviews were conducted with 20 cluster managers in 2015. My primary objective in selection was to include networks operating in dominant regional industry sectors or performing innovative activities, and, thus, I interviewed managers from 20 of the 51 clusters in the region. For the purpose of comparison with respect to some aspects of this examination, I also considered my previous in-depth interviews carried out in 2010 among 17 cluster managers in the region.

In my 2015 analysis, I included clusters that were established or strengthened after 2010 instead of clusters that only slightly operated or did not operate at all since the 2010 analysis. The table below contains the list of clusters included in 2010 and 2015.

**Clusters included in the research**

	2010	2015
1.	AIPA Cluster	AIPA Cluster
2.	ArchEnerg Regional Renewable Energy and Construction Industry Cluster	ArchEnerg Regional Renewable Energy and Construction Industry Cluster
3.	South Great Plain Biomass Utilisation Cluster	Biotechnology and Pharmacology Innovation Cluster
4.	South Great Plain Sustainable Development Service Cluster	South Great Plain Regional Food Chain Safety Cluster
5.	South Great Plain Innovation and Consulting Cluster	South Great Plain Thermal Cluster
6.	South Great Plain Transport-Development Cluster	Industrial Research Building, Innovation, and Technological Transfer Cluster
7.	South Great Plain Regional Construction Innovation Cluster	Goodwill Biotechnology Cluster
8.	South Great Plain Regional Textile Cluster	Havaria Environment and Health Technology Cluster
9.	South Great Plain Thermal Energy Cluster	Hírös Supplier Cluster
10.	South Great Plain Green Engineering Technology-development Cluster	HÓD Industrial Cluster
11.	Construction Technology Development Cluster	Körösvölgyi Environmental Technology Cluster
12.	Goodwill Biotechnology Cluster	Hungarian Clinical Study Cluster

*(Continued on the next page)*

*(Continued)*

	2010	2015
13.	Havaria Environment and Health Technology Cluster	Hungarian Open Innovation Cluster for Construction Industry
14.	Hírös Supplier Cluster	'Rose' Southern Great Plain Hungaricum Cluster
15.	HÓD Industrial Cluster	Sárrét Metal Cluster
16.	Software Innovation Pole Cluster	STEPP Hungarian Laser Cluster
17.	3P Plastic, Packaging, and Printing Cluster	Software Innovation Pole Cluster
18.		Zsótér Service Cluster
19.		3D Creative Innovation Cluster
20.		3P Plastic, Packaging, and Printing Cluster

In this study, I focused on the following questions related to benefits of the local environment, added value, cluster management, international activities, and the future plans of these clusters.

*Can the region's clusters rely on the local environmental benefits?*

The surveyed clusters are (relatively) geographically concentrated since, on average, 70% of the cluster members operate in the region, although they cooperate closely and effectively with members outside of the region. Most of the clusters included in this analysis rely on local advantages. They try to involve local business actors, research and educational institutes, and, in some cases, even local governments to embed themselves into the surrounding economic and social environments. Only three cluster managers stated that local relations do not influence their activities, as they are geographically independent and are carried out at a national or international level.

*What added value does a cluster provide its members, and how is this value strengthened by cluster management?*

As Figure 3 shows, according to the region's cluster managers, the major added value of clusters is generating common research and development projects and providing project funds. Furthermore, the managers also appreciate that clusters generate knowledge transfers between members, increase competitiveness, and help members reach international markets and co-operations. Moreover, a national survey found the same result, namely, that according to cluster managers and members, the two most important advantages for cluster participants are the option to co-operate and easier access to tendering resources (Colosseum Budapest Kft. 2015).

Figure 3

**Major added value of the clusters for their members,  
by the number of opinions among the region's cluster managers, 2015**

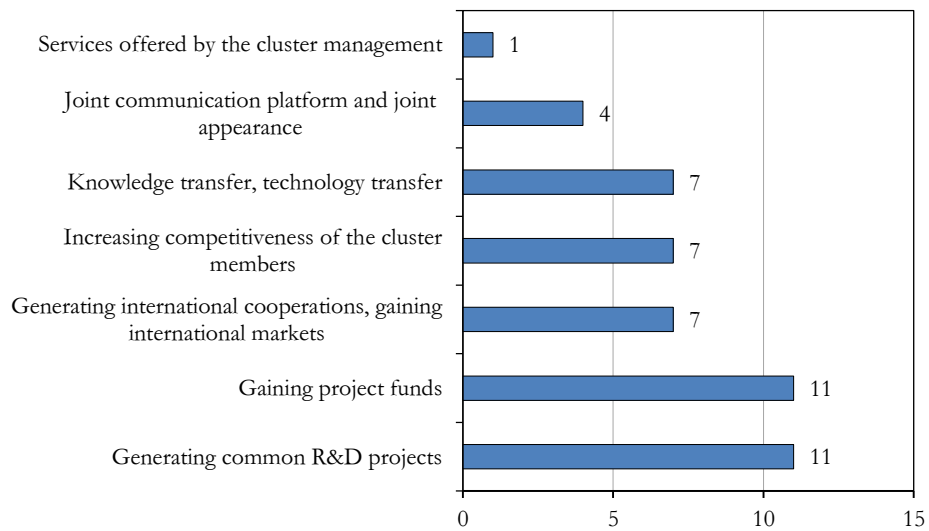


Figure 4

**Services offered by cluster managements**



Cluster management organisations constantly develop services for members by taking members' claims, changing projects, and market conditions into account. According to Figure 4, since 2010, clusters have provided widespread and diverse services for their members, such as organisational and communication tasks, networking, consulting, and fundraising. Since 2010, positive progress has been made in the fields of internal and external communication activities, benchmarking clubs, training programs, and fundraising activities, as clusters are increasingly ensuring these services for their members. The service of international networking was introduced after 2010 and has become increasingly important to clusters. To gain and maintain market advantages, clusters need to concentrate on export markets as well, and they need to understand the models of well-functioning international clusters. The services provided for cluster members in 2010 and 2015 are shown in Figure 4.

Although there are no internal monitoring systems for measuring the performances of cluster organisations, the national accreditation process and the European Cluster Excellence Programme are considered the two most important measurement systems. These systems provide feedback on the performance of the management and the cluster that serves as a guideline for future development. Nine of the clusters examined in this analysis gained accreditation, one achieved the Gold level of the Excellence Program, one achieved the Silver level, and one achieved the Bronze level.

*How typical are inter-sectoral and international co-operations among regional clusters?*

The potential for inter-sectoral or international co-operation is only slightly utilised by the clusters in this region. Thirteen of the clusters involved in this analysis perform no inter-sectoral activities at all, and initiatives in this direction have been made in only seven cases. More than half of the studied clusters have made serious efforts to understand international relations, primarily by following European models initiating the promotion of a cluster and its international relations. Six clusters have foreign relations exclusively due to cluster members, which are not quite as effective on the cluster level, and two clusters have no international relations at all.

*How do the clusters view their future operations and objectives regarding their financing and sustainability?*

Considering the cluster organisations' changes and development, they have clear, well-defined visions of the future. They plan common research and development and innovation projects, and many have set a goal of becoming internationally



visible so that they can implement international projects and enter international markets. Several clusters aim to optimise inter-sectoral and inter-cluster co-operation in order to improve their competitiveness.

With regard to cluster financing, five cluster managers said that, without project funds, the operation of their clusters would not be sustainable. However, most of the interviewees believe that membership fees, revenues from services, and other activities would finance their clusters' operation. However, without external resources, these clusters would be at risk of failing to develop because they cannot achieve self-sufficiency through their own activity and, thus, require external help from both a financial and a professional point of view.

One cluster manager's answer confirmed this statement: *'In case the central support is not available, clusters have to operate on the basis of foreign models. The members have to invest in operations, but an appropriate business plan is needed for that. No evolutionary phases can be skipped, but an external source is needed for that.'*

Some interviewees indicated that cluster maintenance does not depend on direct project resources but on the economic environment and the positive effects of other forms of support: *'The cluster that has viable products will stand on its ground. Support of international presence would be necessary. Clusters are quite varied. Fifty percent function well, have objectives, the other ones are created just to gain funds. That is why non-financial support is preferable, to exclude source hunters.'*

Non-financial support was not listed among the tools of national cluster development programs between 2007 and 2013, although most regional cluster managers would probably appreciate such support. They considered an international presence, networking activities, and a common communication platform to be the most important tools, but their jobs would be significantly helped by the provision of infrastructure, low-interest loans, and operative mentoring activity, too. The clusters' financial statuses are not sufficiently stable, and the major difficulty that the managers face is the creation of a financial background and the maintenance of the constant activities of cluster members. As the generating effect of project sources in the creation of clusters is indisputable, the cluster managers believed that external financial and non-financial support should be provided to achieve successful operations and development.

Unfortunately, the clusters of the Southern Great Plain region do not yet have strong international connections, and, thus, need significant development in this field. As the new trends indicate, one of the most important directions and goals is to reach international markets and to enhance international and inter-sectoral relations. External financial sources very important for this kind of development, but cluster managers are more open to non-financial support, such as services for international relations and networking.

## Conclusions

Clusters have positive effects on regional and economic development and innovation, for which many international examples are available. Because of these examples, most European countries began to develop intensely clusters, and an adequate number of functioning clusters have been established. Beyond enhancing cluster establishment and strengthening clusters, the focus has increasingly shifted towards the support of self-sustaining, internationally competitive co-operations. To achieve this goal, non-financial support, professional management organisations, and the enhancement of internationalisation are of great importance. In Hungary, the same directions can be observed in cluster development programmes; until 2010, these programmes focused on the creation of organisational and operational backgrounds, services, and the initiation of joint projects, whereas, over the next 5-6 years, the focus shifted to ensuring long-term financial and professional sustainability, the creation of international relations, and the achievement of international visibility. In the case of accredited clusters, there is a high expectation for the establishment of professional cluster management to perform high value-added common innovation activities and to shift towards international markets. The examples of the Southern Great Plain region show that the members of the most well-functioning clusters found opportunities through co-operation and that, in accordance with international trends, the project management organisations are trying to enhance their international and inter-sectoral co-operations and will be focusing on these activities going forward.

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## **Spatial inequalities of disadvantage accumulation and their impact on employability in Hungary**

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### **Keywords:**

labour market,  
jobseekers,  
disadvantages,  
multiplication,  
regional inequalities

The aim of this study is to identify how the individual labour market disadvantages limited employment situation and regional employability of jobseekers in the 2007–2015 economic situation. The target groups of the study are long-term jobseekers, those over the age of 50 years, under-educated, disabled, and young entrants. The study follows a dual approach; on the one hand it presents labour market disadvantages in the group of the most disadvantaged jobseekers living in the disadvantaged areas of Hungary, and the types of interactions through which these contribute to the creation and fixation of unfavourable labour market situation of the affected; on the other hand, by analysing the country as a whole, it examines the spatial aspects of the accumulation of labour market disadvantages and the determining dimensions of the problem (multiple, dominant, and secondary disadvantages) in a territorial approach, on a settlement level. The results of the research dealing with the countrywide survey of unemployment show that individual disadvantages influence the opportunities of jobseekers through various mechanisms. These cumulative effects influence different segments of space in different ways and make the primary labour market (re)integration challenging.

## **Introduction**

The 2008 global economic crisis led to a significant increase in unemployment in Hungary, which has made employment disadvantages one of the most serious

socio-economic challenges. With regard to the crisis sector, redundancies have particularly affected the disadvantaged, possibly less competitive people with basic and outdated secondary education. The jobseekers whose employability was hampered by the simultaneous presence of multiple disadvantages (multiplication) were in a particularly unfavourable situation. They form the target group of this study. Their situation is further undermined by the fact that their status has been historically embedded in many cases (long-term jobseekers, labour market hysteresis).

Some of the territorial labour market surveys of recent years point to the factors that significantly influence the development of unemployment in certain areas of Hungary (Siposné Nándori 2016). The other branch of geographic investigations was to define the local labour market catchment areas that could be interpreted as a possible dimension of functional urban areas, in which the authors sought to elicit the flexibility of the units and to cover the entire territory of Hungary, as well as detect temporal changes (Pénzes et al. 2015).

The issue of disadvantaged groups from the labour market perspective has been examined in a number of studies, drawing attention to the wide range of threats affecting jobseekers, mentioning the increased risk of slippage, poverty, and low educational attainment, and in this context, fixation in the jobseeker status (Jószai 1998, Kovács 1998, Csoba 1994). The studies also included entrants, women, low-skilled, people with large families, elderly people, people with reduced abilities, and minorities (Gere 1994, Frey–Gere 1992, Rimler 2004, Muity 2016, Fabula 2009, 2012, 2015, Balcsók 2000, Nemeskéri–Muity 2016, Benke 2006, Váradi 2004, Tésits–Székely 2007a, 2007b, 2007c, Koncz 2010, Ábrahám–Kertesi 1996) and the question of persistent jobseekers (Gere 1994, Laki 1996, Csaba 1999). Some of the works strongly referred to the tensions arising from the accumulation of disadvantages. István Balcsók and Gábor Koncz (2005) emphasise that in the case of the Roma people, the simultaneous presence of poverty and the unemployment trap are particularly present. Erika Nagy, Judit Timár, Gábor Nagy, and Gábor Velkey (2015) have pointed out that social marginalisation is closely related to the accumulation of spatial disadvantages. The deterioration of the position of rural areas also results in weakening the position of the people living there, a phenomenon which can ‘react’ to the decline of the regions as a catalyst, reproducing an unfavourable situation (Nagy et al. 2015). A question arises as to how the cumulative effects can be measured in certain territorial units in the dimension of the labour market disadvantages.

The spatial analysis of the accumulation of disadvantages is given territorial relevance by the fact that, although the greatest downturn in employment due to the crisis in 2008 occurred in manufacturing companies and supply chains concentrated in the northwest of the country, the recession was also tangible in the disadvantaged areas (Lócsei 2009a, 2009b, 2010, 2011). The embeddedness of the position of these

marginalised regions is a complex problem, to which Gábor Velkey (2014) also drew attention through the analysis of multiple dimensions. The problem is reinforced by the fact that the centres of the most disadvantaged areas of our country have a relative disadvantage in terms of their economic competitiveness (Vida 2016), and the weak employability of the free labour force of the examined region may play a role in the fixation of this position. The latter point may be related to the phenomenon of the accumulation of labour market disadvantages increasing the adverse effects of each other.

Although unemployment declined after 2010, the rate decreased to 4.4% in the fourth quarter of 2016 (based on data of the Hungarian Central Statistical Office [HCSO]), and in increasingly more sectors and regions the danger of labour shortage appeared. For a significant number of disadvantaged position jobseekers living in disadvantaged and underprivileged areas, public work programmes could offer job opportunities. The integration of this group into the primary labour market is still to be seen, which is reinforced by the experiences of the reintegration effect of public work programmes (O’Leary 1998, van Ours 2000, Kluve et al. 1999, Planas–Benus 2006, Hudomiet–Kézdi 2008, Csoba 2010a, 2010b, Tésits–Alpek 2014a, 2014b, 2015). This includes the fact that there is limited opportunity of integrating the most disadvantaged position jobseekers into the labour market, in addition to the mass and cumulative disadvantages.

Based on the experience of related work, it has become clear that unemployment is not a temporary problem, and there are strong obstacles for highly disadvantaged position jobseekers to find jobs in the primary labour market to which we have so far failed to find a reassuring solution. A determining part of the problem is formed of the cumulative occurrence of disadvantages in certain segments of space and – in particular, disadvantaged – groups of the society. This issue can become a decisive factor not only for the improvement of employment conditions and for the dynamisation of available human resources, but also for fixing of the problems of marginalised social groups. This work undertakes the analysis of the phenomenon through the settlement basis of our country.

The present study approaches the problem of accumulating disadvantages through the following issues. It outlines an approach on how it is possible to measure the accumulation of disadvantages in relation to individuals (relative disadvantage indicator) and territorial units (multiplication index). Using the elaborated procedure, it examines how the phenomenon of accumulation has prevailed nationwide in the period from 2007 to 2015. Further, it analyses that among the disadvantage accumulated jobseekers living in underprivileged areas, what are the factors that play a role in reducing employability. Finally, using the data of the HCSO, the study examines the extent to which disadvantage accumulation affects certain settlements in Hungary. It also examines the macro-level relationships of the cumulative spatial structure and the patterns of individual disadvantages.



## Research methods

This analysis is based on both primary and secondary sources. Among the secondary resources, the online databases of the HCSO (<https://www.ksh.hu/?lang=en>), the settlement-level registers, labour market, and employment statistics are of utmost importance. The measurement of multiplication at the settlement level and the identification of the spatial structural elements were based on the HCSO data, among which, besides the number of registered jobseekers, the number of jobseekers registered over 180 days ago, long-term unemployed, disabled people<sup>1</sup>, old people over 50 years, people with a primary school or lower level of education, and registered entrant jobseekers<sup>2</sup> were used.

The basis of the primary research, the analysis of the group-specific characteristics of the multiplication, was formed by a complex questionnaire survey that lasted for approximately one year (2016/2017). The target group of the questionnaire was formed from the most disadvantaged micro-regions (HCSO 2007) and from the jobseekers living in the districts to be developed by complex programmes based on the 290/2014 (XI. 26.) Government Decree. The target group of the questionnaire was provided by the highly disadvantaged jobseekers. As the scope of these jobseekers was not defined in the labour statistics, the target group was reached through multiple channels. On the one hand, the questionnaires were filled out by the beneficiaries of the Employment Substitution Grant, a group that met a good approximation of the criteria for the examination. The survey also included people who were formerly employed in public work programmes, but are currently in the jobseeker status. In several cases, the questionnaires were sent to the jobseekers by the staff of the local government. The cover letter and the supplementary telephone calls asked the local authorities to fill out the questionnaires and then return them. The survey was also supplemented by a personal field questionnaire survey, during which the offices assisted in finding the jobseekers. As a result of the survey for approximately 1 year, 579 people filled out the 56-question questionnaire.

<sup>1</sup> The study defines all jobseekers who are deemed by the *m*) point of Article 58 Paragraph 5 of the 1991 IV. Law of promoting employment and providing for the unemployed, as people with reduced working capabilities. According to this, 'a person with reduced working capability: who is physically or mentally disabled or whose employment and job retention chances are reduced due to physical or mental impairment following medical rehabilitation.'

<sup>2</sup> The present work considers all those jobseekers as entrants, who are labelled so by the *k*) point of Article 58 Paragraph 5 of the 1991 IV. Law of promoting employment and providing for the unemployed. According to this, an entrant jobseeker is a person 'who is under the age of 25 – in the case of a person with a higher education under 30 years of age –, who has the conditions required for the establishment of an employment relationship, and who is a jobseeker registered by the Public Employment Service, provided that he or she has not been entitled to an unemployment benefit after completing his or her studies. The person cannot be considered as an entrant jobseeker, who is receiving pregnancy and maternity benefit, infant and child care fees or childcare allowances, is in pre-trial detention, imprisonment, and detention or performing military service and civilian service.'

The multiplication index was developed to measure the accumulation of disadvantages on a territorial basis, which was determined on the basis of the following ratio:

$$\text{Multiplication index (M-index)} = \frac{\text{Merged number of people with disadvantages}}{\text{Number of registered jobseekers}}. \quad (1)$$

The counter of the multiplication index is the sum of the number of people with examined disadvantages per category, and the denominator contains the total number of registered jobseekers (see Table 1).

Table 1

**Number of registered jobseekers in four Hungarian settlements and their M-index, 2015**

Settlement	Number of registered jobseekers (person)						M-index
	registered over 180 days ago	having reduced working capabilities	older than 50 years	with primary or lower education	younger than 18 years (entrants)	Total	
Ipolyszög	26	1	14	33	13	55	87/55=1.5818
Sávoly	22	1	7	26	6	32	62/32=1.9375
Foktő	36	1	16	35	6	82	94/82=1.1463
Martonyi	18	1	4	15	1	24	39/24=1.6250

*Note:* Registered jobseekers may have more than one disadvantage.

*Source:* Own calculation based on HCSO data.

The multiplication index provides an answer, assuming an even distribution of disadvantages, what is the minimum number of disadvantages per registered jobseeker. If the value of the indicator increases, the tensions arising from the accumulation of disadvantages increase in the case of the given territorial entity. The index includes the following five disadvantages:

- jobseekers registered over 180 days ago;
- registered jobseekers with reduced working capabilities;
- registered jobseekers older than 50 years;
- registered jobseekers with primary or lower education;
- registered entrant jobseekers.

The maximum value of the multiplication index is 5, which occurs in the extreme case where each registered jobseeker – at the given territorial level – has all the examined disadvantages. The other extreme is 0. In this case, there is no person among the registered jobseekers with any of the five disadvantages listed above in the given territorial entity.

The relative disadvantage index (RDI) aims to determine the extent of the accumulation of disadvantages for each individual, calculated in the following manner:

$$\begin{aligned} \text{Relative disadvantage index (RDI)} &= \\ &= \frac{\text{Number of disadvantages that are characteristic of the given jobseeker}}{\text{Total number of examined disadvantages}}. \quad (2) \end{aligned}$$

The counter of the RDI indicates that among the examined labour market disadvantages at the time of the questionnaire survey, how many were characteristic of the given jobseeker, while the denominator was the number of disadvantages considered in the analysis. However, in the value of the denominator, only those disadvantages are taken into consideration that may occur simultaneously for the given jobseekers and the mutually exclusive ones are not considered. The present work is based on the questionnaire survey that assesses the following seven disadvantages:

- being over the age of 50 years (the jobseeker has reached the age of 50 years when filling out the questionnaire);
- young people (the jobseeker has not reached the age of 18 years when filling out the questionnaire);
- people with primary or lower qualifications;
- person with large family (being in a relationship or married and raising three or more children) or raising children alone;
- long-term (over 1 year) jobseekers;
- entrants;
- people with bad financial situation.

People with a bad financial situation are classified as individuals who, according to their own admission, typically spend their full monthly income by the end of the month, have a regular problem in paying the utility costs, and often have to postpone the settlement of their accounts. The maximum value of RDI is always 1 and this is when a jobseeker is affected by all the examined disadvantages – taking into account the disadvantages exclusive of each other, six are considered. Accordingly, the RDI takes up a value 1 in the case of those, for example, who are under the age of 18 years and have a maximum 8th grade elementary education, who are simultaneously people with large family or raising children alone, entrants, long-term jobseekers, and in a bad financial situation. The minimum value is 0 and arises in the case of those jobseekers who do not possess even one of the indexed disadvantages.

The study also calculates the dominant and secondary nature of disadvantages. The disadvantage is dominant if most of the time, the number of registered jobseekers was annually the highest of the examined territorial entity during the period between 2007 and 2015. In the case of a secondary nature, the occurrence of the attribute is the second most common. If there were more disadvantages in the given year with the same number of jobseekers in the first and/or second place, a 'mixed' type was identified. The variability of the disadvantages measures what percentage of the examined years were the dominant or secondary disadvantages in the first and second places. In other words, if one of the disadvantages arose five times

in the first place in the investigated territorial entity, its variability was 55.6% (it was in the first place five times during the 9-year time horizon of the study).

The spatial framework of the study is used to reveal the group-specific relationships of the cumulative effects of disadvantages that were formed by the area of the questionnaire survey (the most disadvantaged micro-regions (HCSO 2007) and the districts to be developed by complex programmes based on the 290/2014. (XI. 26) Government Decree), to which the analysis refers to as a disadvantaged area. When analysing the territorial pattern of multiplication, the study covers the whole country. The work addresses the area of the districts developed by the complex programme, which is sometimes referred to as the most disadvantaged and/or peripheral area. By the control group, the study at all times means those settlements based on the 290/2014 (XI. 26) Government Decree that did not fall into areas to be developed by a complex programme.

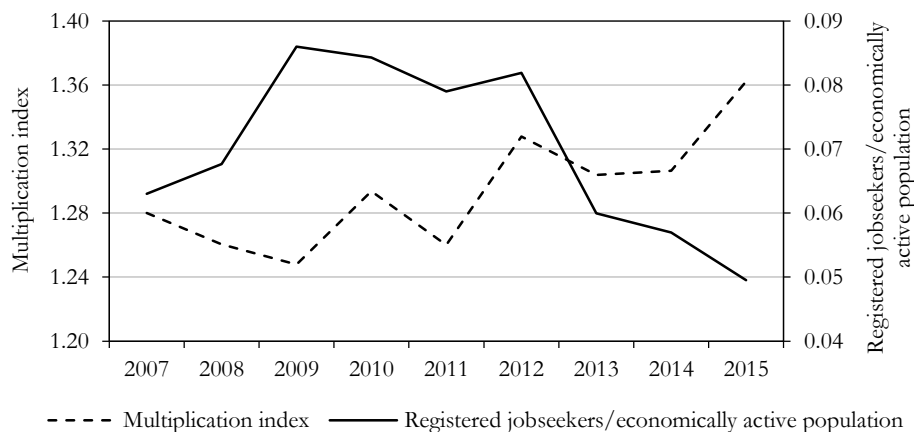
## Results

### National value of multiplication and its relation with unemployment

In 2008, the world economic crisis coincided with the decline in the multiplication index, which resulted in the lowest national value of the examined period in 2009.

Figure 1

#### Multiplication index and the number of registered jobseekers in proportion to the economically active population (aged 15–64)



Source: Own calculation based on HCSO data.

The reason for this was, among other things, that although employers typically prefer to reduce less productive and/or more easily replaceable labour force at first, during recession, those with more favourable labour market opportunities also lose their job at a higher rate (while also increasing their job-seeking time). Their share

within the entire group thereby rises, while in turn reducing the specific weight of those with a disadvantage. This is confirmed by the fact that in 2008–2009, besides a 36% increase in the number of registered jobseekers, the total number of examined disadvantages only increased by 32%.

The system of public work programmes changed in 2011 and 2012 – the National Public Work Programme was launched on 1 January 2011 and the Start Work Model Programmes began.

Public work programmes starting particularly from 2012, in addition to economic prosperity that significantly helped to reduce the number of long-term jobseekers as the organisers of the programmes and the aid system, also provided a strong motivation for the involvement of people who had long since wanted to find a job. Between 2012 and 2015, a decline in unemployment could be observed and this was primarily associated with a significant decline in the number of long-term jobseekers and low-school graduates. As the employment opportunities of jobseekers who were more favoured and less concerned by the accumulation of disadvantages improved, the value of the multiplication index continuously increased, indicating the increasingly limited employability of the still available human base.

By analysing the whole period (2007 to 2015), it is possible to set up the ranking of the disadvantages in terms of the dimension of growth/reduction to observe which group showed what type of exposure, based on which we can conclude the impact of the given disadvantage on employability. If, during the crisis, the number of a disadvantaged group increased significantly, however, at the time of economic prosperity, the decline was lower, we can assume that the employability of the concerned people was at a lower degree. This is particularly true in light of the fact that the number of jobseekers in the whole 2007–2015 period fell below the 2007 value by 2015, namely ‘correction’ took place in this respect. In light of these results, the most serious disadvantage of employability proved to be for those aged over 50 years. While in the case of the other disadvantages, the rate of decline in comparison to the local maximum of the group’s own size ranged from 40 to 60% by 2015, the improvement was only 23% among those over the age of 50 years.

### **Group-specific role of each disadvantage in multiplication**

The following describes the extent to which as well as through what type of cause and effect relationships do the individual disadvantages result in the appearance of cumulative effects for the cumulatively disadvantaged jobseekers living in disadvantaged areas. The results of the questionnaire survey carried out among the most disadvantaged jobseekers living in disadvantaged regions showed that the highest level of occurrence for multiplication is in the case of those aged over 50 years (see Table 2).

This is partly related to the lower level of education, but it also goes beyond the fact that the competitive advantage of secondary school education for the re-

searched people significantly lagged behind as opposed to those aged 18–25 years. The obsolescence experienced in the professions in comparison to the young is a more serious problem for those aged 50 years. This is reinforced by the limitations of local job opportunities as well as the locally available lower incomes, which simultaneously increase the commuting constraint of the region's jobseekers. This is a serious challenge for jobseekers over the age of 50 years, partly because a change in residence can only help the mobility constraint to a limited degree, given that the property in disadvantaged villages cannot be or can only be converted to capital at a low value. Such constraints in the group of people over the age of 50 years – as opposed to the younger age groups – also occurred more strongly. The factors that can be associated with reduced working capability are the highest in this group, which on the one hand have biological causes and on the other hand, results in long-term unemployment being more general in their case.<sup>3</sup> This means that they must endure the detrimental effects for a longer period.

Table 2

**Relative disadvantage index of people with or without disadvantages, 2017**

Disadvantage	Question in the survey questionnaire: 'Do you have any disadvantages listed below?'	
	Yes	No
	Significant relationship ( $p < 0.05$ )	
Registered jobseekers are		
older than 50 years	0.578	0.392
with primary or lower education	0.539	0.357
registered over 180 days ago	0.529	0.349
	Non-significant relationship	
younger than 18 years (entrants)	0.445	0.467
having reduced working capabilities	–	–

Source: Own calculation based on HCSO data.

Low educational attainment with increasing technical standard and expectations of employers makes finding a job less possible. Moreover, the increase in mechanisation displaces a part of the physical labour force. The perception of deteriorating primary labour market opportunities is shown by the fact that, at the time of the survey, respondents considered public work programmes to be a realistic alternative for employment, and they were recently active in this framework. Low educational attainment attracts a number of additional factors based on the experience of the study and reduces the mobility associated with the low degree of flexibility of the group – in respect of sector, working time, pay, and sphere – thus, its multiplication

<sup>3</sup> Pearson's chi-squared test:  $p = 0.000$  at two-sided 0.05 significance levels.

effects are strong. In addition, with a drop in the degree of education, there was less interest in acquiring new qualifications (69.5% of them were willing, while the same proportion in the control group was 78.0%). Those who would undertake acquisition of new skills and qualifications listed in the first place the entrance requirements for the courses, followed by their usefulness and eventually the costs as a limiting factor. In jobs requiring lower qualifications, the expected value of income is also more moderate; 96.0% of the respondents reported public work programme salaries and income around the minimum wage. 73.0% of the respondents considered their financial situation to be bad. In the case of downsizing, unfavourable income and financial situation may soon result in the cumulative appearance of disadvantages considering the fact that from only weak income there is a marginal possibility to form reserves. Alternative sources of income could provide a viable option, but only 10.4% of the respondents had this option.

In addition, the high multiplication value of long-term jobseekers is rather relieved by public work programmes and the phenomenon of labour shortage. The former's impact on disadvantaged areas is greater due to the regional centre of mass of the Start Work Programmes. Among the adverse effects of long-term job seeking, the weakening of labour socialisation and motivation, the disengagement of labour market expectations, and the unfavourable inherited patterns and work culture appeared strongly. In addition to these direct impacts, the interviewees also pointed out indirect factors, such as the development of addictions, the resulting health and financial problems, unemployment becoming a 'lifestyle', as well as settling solely for public work programmes.

The low proportion of disabled people in the sample did not allow the RDI average to be determined in a reliable manner. Thus, in the case of this group, the multiplication examination may be subject to subsequent analyses. In the case of entrants, the multiplication did not show a significant correlation in respect to the RDI.

Based on the above, it was found that among the examined disadvantages, those over 50 years of age finished in the first place, followed by low educational attainment and long-term job seeking, were those job-related disadvantages, which could justifiably make the jobseekers living in disadvantaged areas significantly vulnerable to cumulative effects, thus reducing their employability.

### **Territorial context of the accumulation of disadvantages**

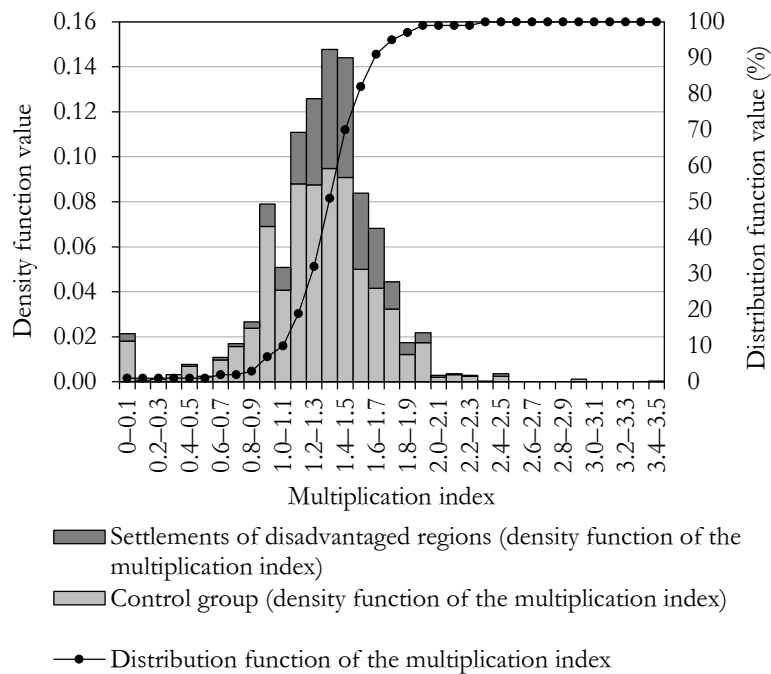
Based on the frequency distribution of the 2015 multiplication index of all the settlements, the spatial structure of the Hungarian labour market shows a spatially variable picture (see Figure 2).

This is also confirmed by the index values and cumulative frequency values calculated per settlement group (settlements in districts to be developed by complex programmes/control group). In all the examined years, among the settlements in

the districts to be developed by a complex programme, the indicator of the inclination was lower than in the control group ( $-0.8199$  in 2007,  $-0.2297$  in 2009,  $0.9546$  in 2015, compared to the  $-0.1449$ ,  $-0.0306$ , and the  $-0.5905$  values of villages and cities without complex classification). In other words, the values of the settlements in the area of the districts to be developed with a complex programme, the centre of mass for the distribution shifted less towards the low multiplication index ranges, the phenomenon of disadvantage accumulation is likely to be stronger here than in the control group.

Figure 2

### Distribution and density functions of the multiplication index of Hungarian settlements, 2015



Source: Own calculation based on HCSO data.

In the case of cumulative frequencies, approximately a quarter of the control group's settlements in 2007 had a multiplication index of 1.0 or less, as opposed to the 5.9% of settlements from districts developed by a complex programme. Although the difference between the two groups of settlements decreased in the years under review to 14.0% in 2009 and to 10.2% in 2015, the settlements of the control group were still more than 17.0% in 2015, while only 7.0% of the most disadvantaged areas had a maximum value of 1.0. This is confirmed by the distribution curve shown in Figure 2, which shows the dispersion of the settlements in districts



to be developed with a complex programme in relation to the multiplication index. The curve reaches an intensive growth rate of approximately 10% and above in the range of 1.1–1.7 as opposed to the control group, where the slope of the distribution curve starts to increase dynamically at the 0.9 index value. The increased accumulation of disadvantages appears above a 1.0 value, and the 1.5 level implies serious tensions, indicating that half of the registered jobseekers have at least two disadvantages if the examined properties are distributed evenly. Therefore, the exposure of the most disadvantaged settlements eased during the examined period, but remained perceptible.

At the national level, with the improvement of the labour market situation, an increase in the proportion of settlements with a high multiplication index of at least 2.0 can be observed. Moreover, in the area of the control group, the proportion is approximately 1% higher (3.1%) than in the less favourable towns and cities from a labour market perspective in 2015. The increment is particularly noticeable given that the same index was only 0.4–1.0% in 2007 and 0.4–0.6% in 2009 in both the areas. This also points to the reduction in the amount of human resource that can still be rationally employed. The reason for this among others is that, in conjunction with the increase in primary labour market demand and the shortage of labour in the individual sectors, employers are increasingly absorbing available jobseekers, which within the group – assuming rational employers – is thereby the principle for the proportion of less-disadvantaged people to decrease, thus increasing the multiplication.

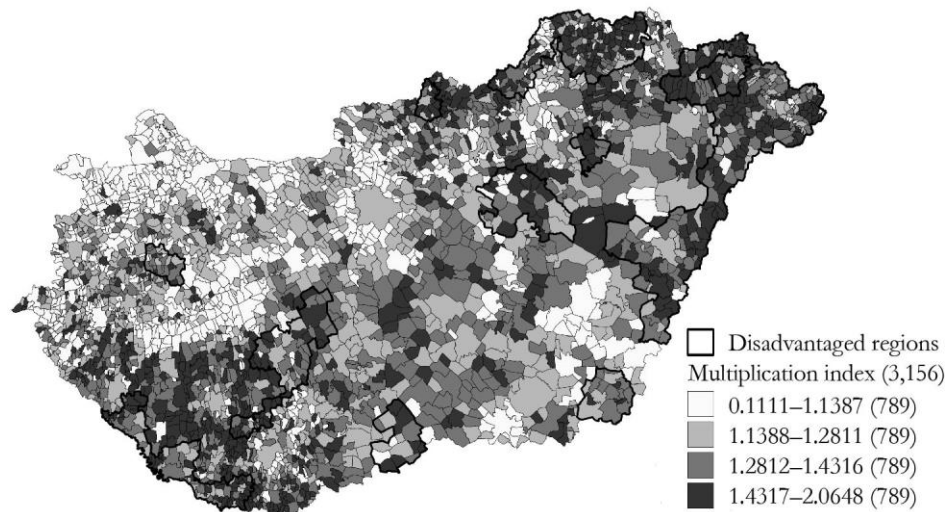
The multiplication spatial structure projected on the entire period from 2007 to 2015, although in the transition zone between the north-western Hungary and the central region with a better labour market and border regions with less favourable rates, is strongly mosaic (settlements with more favourable and less favourable multiplication indexes appear parallel and adjacent to each other) and are divided into three separate districts. These areas can be primarily characterised by high index values, the intermediate zone contains mixed multiplication settlements with a high dispersion, and the stronger labour market position settlement groups are characterised by more favourable cumulative values (see Figure 3), but these regions do not fully cover the ‘classic’ labour market-spatial relationships represented by the relative indicator.

Although the outline of the more favourable employment zones is mapped out, their compactness is damaged, their structure becomes mosaic, and the occurrence of settlements with high multiplication does not necessarily appear in regions with high unemployment. The extent of the areas less affected by cumulative disadvantage effects in the northwest shrinks to the territory of Győr-Moson-Sopron County. The Balaton region is also characterised by settlements with low multiplication index, similar to the better employment opportunity areas of the Southern Great Plains; however, the competitive advantage of Central Hungary can no longer

be clearly distinguished and is typically narrowed down to the settlements around Budapest. The northern part of Bács-Kiskun County and the south-eastern part of Pest County appear new – in the case of disadvantage accumulation – depressed zones. In contrast to the labour market position that can be drawn from the relative indicator, strong multiplication zones also occur in the southern regions of Zala and Fejér County, and in the south-eastern region of Pest County. Although it is lagging behind the more favourable positions of the country in terms of its labour market situation, the involvement of the internal areas of Somogy County are also considerably more serious than the employment condition in terms of multiplication.

Figure 3

**Degree of involvement of Hungarian settlements  
in the accumulation of disadvantages, 2007–2015**



*Note:* See settlement numbers in parentheses.

*Source:* Own elaboration based on HCSO data.

The favourable position of Budapest is related to the employment role of the capital and this can be associated with suburbanisation. It is conspicuous that areas with a favourable relative index in which population growth could be observed over the past 20 years typically had low or average multiplication index values. This is partly due to the fact that the migration component of population growth is likely – in the context of stronger employment situation – to attract groups with better labour market position. The increase of the proportion of young, skilled entrants, and the presence of advanced higher education institutions (HEIs) also contribute to the more favourable value of multiplication. HEIs have a positive impact on the value of multiplication, not only in Budapest, but also in the big cities in rural areas, while the indicators of the biggest rural university cities belonged to the better categories

in the examined period. This finding coincides with the more favourable effects of HEIs on the economy (Kotosz et al. 2016).

It is also true in the case of the north-western Hungary, the Balatonfüred, Balatonalmádi, and Veszprém districts that the differentiated labour demand (also requiring skilled workers and highly qualified professionals) created a favourable position region, enjoying the beneficial effects of the automobile industry and in all the machine industries.

It is becoming most common in the transition zone that the settlements with otherwise more favourable rates – mainly villages – show an unfavourable cumulative structure.

In the transition area, the settlements with more favourable job-seeking rates are becoming most common – mainly villages – to show an unfavourable cumulative structure. Exploring the background effects requires further investigation. However, it can be stated that the labour attracting ability of a more favourable labour market centre is also involved in these. In this case, however, it is important to make a distinction between the aforementioned suburban areas and the other types of zones. The effect mechanism differs in the latter as at this time, there is no new, skilled workforce flowing into the vicinity of the employment centre, but the factories operating there tend to attract jobseekers with a relative competitive advantage in their own village from the partially small village periphery through their commuters. As a result, the proportion of cumulatively disadvantaged unemployed people in the attracted settlements rises, which increases multiplication.

The connected zones with significantly high multiplication index can be found in the districts to be developed by a complex programme. As a result of the unfavourable economic situation and the weaker employment centres here, moving away can be a method to escape unemployment for disadvantaged jobseeker groups. As this will typically be possible for people with better financial standing and mobility, the stationary jobseekers will be more likely to accumulate disadvantages. However, in the examined region, the proportion of the Roma also exceeds the national average, which, in view of the cumulatively disadvantageous situation of this jobseeker group (Kertesi 2000), increases the incidence of people highly affected by disadvantages in the labour supply.

Based on the settlement-level correlation studies, the value of the relative indicator (number of registered jobseekers/economically active population) is the first among the factors that correlate with the territorial features of multiplication, which showed a positive relation with the degree of accumulation<sup>4</sup> in all 3 years. With the intensification of employment depression, the level of disadvantage accumulation is also typically higher at the settlement level. Simultaneously, one can sense the relieving strength of the relation, namely that besides the districts to be developed by

<sup>4</sup> The value of Pearson's correlation was 0.504 in 2007, 0.498 in 2009, and 0.362 in 2015 with a significance level of 0.01.

a complex programme, the areas with more favourable employment ratios are also increasingly affected in the phenomenon of multiplication.

The strongest decrease shown in the strength of the relation, however, was the relationship of multiplication and income position. While a correlation coefficients of  $-0.411$  and  $-0.409$  appeared in 2007 and 2009 respectively, among the total settlement income per capita and the multiplication index, this declined<sup>5</sup> to  $-0.174$  by 2015. Therefore, the phenomenon begins to break away from the problem of the less favourable income situation understood at the settlement-level; jobseekers may also be affected by multiplication in wealthier villages and cities. The correlation between the jobseekers groups was more subtle, the average degree of the financial situation and the accumulation of disadvantages shows a significant relation at the individual level, the average relative disadvantage ratio of people with poor financial standing was  $0.43$ , for the people living in an average financial situation this value was just over  $0.31$ , and in the case of those above the financial average, it is reduced<sup>6</sup> to  $0.29$ .

The spatial structure mostly differed from the pattern concerning the whole period of the survey in the strengthening of the contrasts and the extension of the high multiplication zone in 2015. This was strongly influenced by the decline in the number of jobseekers in parallel to the increase in labour shortages (see Figure 4).

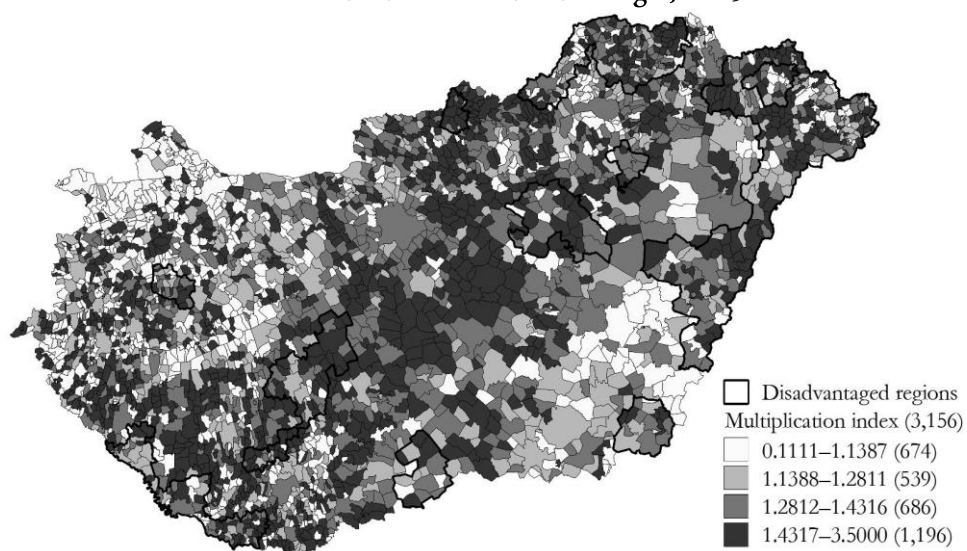
The correlation is supported by the fact that the highest growth rates in the multiplication index were shown by those regions (Central Hungary, Central Transdanubia and Western Transdanubia) where the size of the labour shortage also proved to be in the top three based on HCSO data. Growth was also observed in the relation of cities with larger populations. In this approach, the multiplication index helps to outline the meso- and micro-regions (high M-index value), in which a further increase of employment is particularly challenging and can be increased even more by partly including a bigger proportion of the group of highly-disadvantaged jobseekers. The disadvantaged area becomes more mosaic, but the dominant settlement form remains the highly affected type in respect of accumulation.

<sup>5</sup> Pearson's correlation with a significance level of 0.01.

<sup>6</sup> ANOVA *F*-test: 29.947, significance level: 0.000; value of the Levene-test: 0.440, significance level: 0.644; Kolmogorov–Smirnov-test: 0.180, significance level: 0.000. The condition of normality based on the test is not fulfilled.

Figure 4

Degree of involvement of Hungarian settlements in the accumulation of disadvantages, 2015



Note: See settlement numbers in parentheses.  
Source: Own elaboration based on HCSO data.

Role of individual disadvantages in the development of the territorial image of multiplication

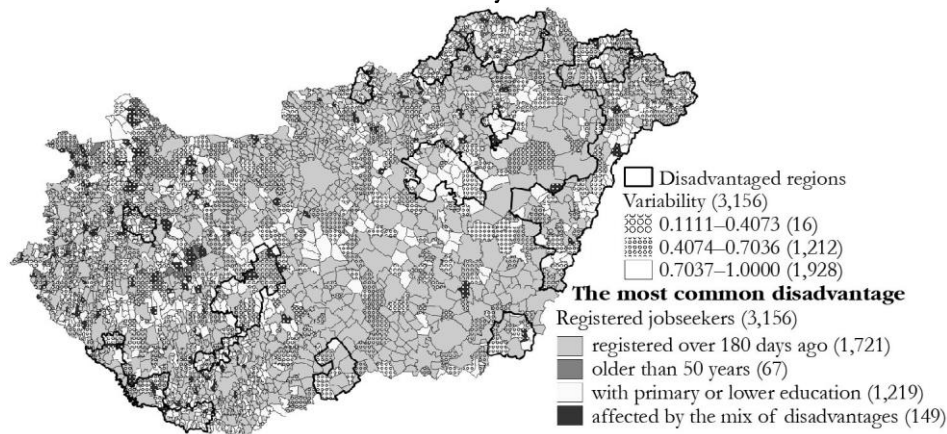
Long-term job seeking appeared almost without exception as a dominant disadvantage in the examined period between 2007 and 2015, with a 55.0% share on the national level, which was followed by the lack of education (38.6%) (see Figure 5).

The range of dominant disadvantages shows a strong deviation in the relation of the districts to be developed by a complex programme and the control group<sup>7</sup>. In the previous region, lack of education is significantly stronger; it is dominant in more than 54% of the settlements as opposed to 34% proportion of the more favourable areas. From the viewpoint of employment, the image of the most disadvantaged areas is determined by this one disadvantage. Apart from the historical embeddedness of the problem, the selective migration affecting the region has a decisive role in its generalisation.

<sup>7</sup> Pearson's chi-squared-test: 97.435, significance level: 0.000.

Figure 5

The most common disadvantage for registered jobseekers  
and its variability, 2007–2015



Note: See settlement numbers in parentheses.

Source: Own elaboration based on HCSO data.

In contrast, the settlements of the control group are more heterogeneous in terms of the dominant disadvantages. The situation of the more favourable north-western, the Balaton, and the central region is particularly specific; a large number of mixed-type settlements can be found among the villages and cities with significant disadvantages.

In 2015, the settlements of the control group were hit harder by long-term job seeking, with nearly 59.0% of the settlement affected as a dominant disadvantage, while in the districts to be developed by a complex programme, this value reached 40.7%. The effect of the Start Work Programmes primarily concentrating on peripheral areas could have played a part in this.

People over the age of 50 years have the third largest occurrence among the prevalent disadvantages, more typical of the settlements with a better labour market position. This disadvantage became dominant due to the fact that, while in the settlements to be developed by a complex programme the age structure is younger, the proportion of elderly people in the settlements of the control group is higher (where age over 50 years proved to be a dominant disadvantage in 2015, the average proportion of elderly people from the general population was close to 44.5%, while it was only 39.0% in the settlements primarily affected by the lack of education)<sup>8</sup>.

<sup>8</sup> ANOVA *F*-test: 130.315, significance level: 0.000; saturation homogeneity condition is not fulfilled; Levene-test: 28.97, significance level: 0.000.

Regarding Hungary as a whole, a further correlation can be observed in the dominant disadvantage and in the dimension of the degree of multiplication as well.<sup>9</sup> The settlements with the highest M-index values are those where the dominant disadvantage is the low level of education (average M-index of 1.376). The emergence of low educational attainment as a major disadvantage at the national level is therefore often accompanied by higher M-index values and thus with multiplication effects. This relationship is also manifested in a regional breakdown; however, in the area of the districts to be developed with a complex program, the contrast between the individual settlement categories is typically smaller than in the control group.

There are significant differences in the character of dominant disadvantages in the village/city relation at the national level.<sup>10</sup> Although the proportion of long-term job seeking is dominant in both settlement types, the cities are almost exclusively dominated by it (80.5% in the first place in comparison to the 51.3% of the villages), and in the villages the lack of qualification and the mixed character is more typical. The latter is almost a unique village feature (5.2% versus 1.1% involvement of cities). Considering territorial breakdown, the above relationships are valid around the same percentage distribution to the settlements of the control group; however, in the case of the districts to be developed by a complex programme, the pattern is different. On the one hand, both in the case of villages and cities falling in the area of the districts to be developed by a complex programme, the proportion of long-term jobseekers is smaller, which may be attributed, among others, to the impacts of the Start Work Programmes, and on the other hand, the lack of education in the cities located there occurred as a more severe challenge (in 35.5% of the cities it was dominant in comparison to 13.6% that is characteristic of the control group). While the mixed character was dominant in the villages of the control group, simultaneously the villages of the districts to be developed by a complex programme, this was hardly determinant (none of the cities and only 4.4% of the villages were dominant). Another feature is that over the age of 50 years appeared almost exclusively in the villages of the control group as a dominant disadvantage.

In respect of variety – that is, how stable was the paramountcy of the disadvantages during the whole period – the degree of heterogeneity was lower in Budapest and in the inner parts of the country. In other words, among other things, significant in regard that a more complex, focusing on more disadvantages and more flexible tools, can be instrumental in remedying the situation in the areas with higher variability, while the solution of the primary problem in less variable parts of the country can result in a similarly powerful improvement.

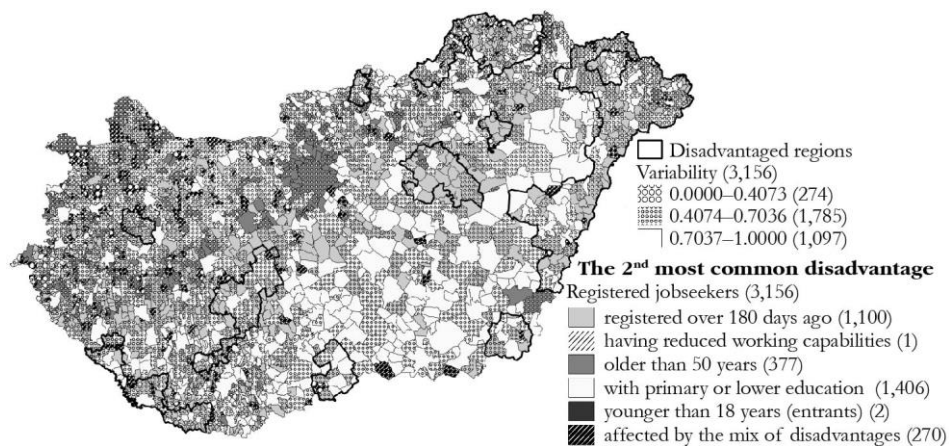
<sup>9</sup> ANOVA *F*-test: 163.253, significance level: 0.000; saturation homogeneity condition is not fulfilled; Levene-test: 15.162, significance level: 0.000.

<sup>10</sup> Pearson's chi squared test: 106.786, significance level: 0.000.

There is also a significant difference in the regional distribution of secondary disadvantages between the districts to be developed by a complex programme and the other settlements of the country (see Figure 6).

Figure 6

### The second most common disadvantage for registered jobseekers and its variability, 2007–2015



Note: See settlement numbers in parentheses.  
Source: Own elaboration based on HCSO data.

It is a tangible difference that the mixed character at this level is already decisive in all of the groups, although still primarily as a local feature. In the case of secondary disadvantage, the districts to be developed by a complex programme and the cities of the control group show differences. Although the lack of education was high in the second place in both types (60–70%) in the cities of the most disadvantaged areas, long-term job seeking also achieved a significant proportion.

On the regional level, a definite rupture extends from the central areas of Zala County through the Balaton–Székesfehérvár–Budapest line, from which to the northwest the mixed and the aged over 50 years disadvantages are in second place in a varied pattern. In contrast, the duo of long-term jobseekers and the lack of education are more typical southeast of the line.

## Conclusions

The present study, with the help of two indicators (relative disadvantage index and multiplication index) examined the group-specific and territorial impacts of the accumulation of individual labour market disadvantages, which are making the dissolution of the labour market situation more challenging. The focus of the study, in the case of group-specific impacts, was on jobseekers living in disadvantaged areas,



while the examination of the spatial image of multiplication covered the whole country.

The national level survey of the labour market situation and the multiplication index showed that the decline in unemployment typically occurs along with the increase in multiplication, which is logical considering that employment is typically achieved first by those people who are easier to employ and are less affected by disadvantages. Thus, the specific proportion of disadvantaged jobseekers is increasing. In this approach, the multiplication index also shows the territorial limitation of employability for the still available free labour force.

The study of disadvantaged jobseekers living in disadvantaged areas has confirmed that the cumulative effects are present among the people involved in the questionnaire survey, and the appearance of other disadvantages were generated by, in the first place, those aged over 50 years, followed by low educational attainment and long-term job seeking. The improvement of the economic situation and public work programmes together have led to a significant reduction in the number of long-term jobseekers and low-education graduates in comparison to the values experienced in the years of the crisis.

The analysis of the territorial image of the accumulation of disadvantages showed that the disadvantaged districts to be developed by a complex programme are more affected by the problem; however, levelling can be experienced in this regard. Multiplication also appears in the more favourable areas of employment, which is due to, among other reasons, the selective recruitment of labour force by employers. In contrast, in the weaker economic regions, a high degree of multiplication was mainly due to selective migration and higher proportion of disadvantaged jobseekers within the population.

The accumulation of disadvantages is mitigated by a favourable labour market environment if it involves suburbanisation, labour inflow, and/or the presence of a strong HEI. However, the centre of better employment by itself did not induce a low degree of involvement in the accumulation of disadvantages. The Hungarian multiplication spatial structure is divided into three different zones; these are mainly disadvantaged areas characterised by high index values, the intermediate zone with mixed multiplication settlements, and stronger position settlement groups characterised by more favourable cumulative values. The spatial structural image of the multiplication differs from the structure outlined by the relative indicator.

The extent of the areas with favourable multiplication indicators in the north-west shrinks to the territory of Győr-Moson-Sopron County. The strong position of the Balaton region remains, similar to the better employment areas of the Southern Great Plain. Simultaneously, the competitive advantage of Central Hungary can no longer be clearly distinguished and is typically narrowed to settlements around Budapest. The northern part of Bács-Kiskun County and the south-eastern part of Pest County appear as new – in the case of disadvantage accumulation – depressed

zones. The spatial structure mostly differed from the pattern concerning the whole period of the survey in the strengthening of the contrasts and the extension of the high multiplication zone in 2015.

A dominant disadvantage at the national level over the entire period was long-term job seeking followed by the lack of education. However, there are territorial differences in this respect. On the one hand, in the districts to be developed by a complex programme, the lack of education and long-term job seeking is the most typical pair, while in the control group, the image is more heterogeneous; on the other hand, long-term job seeking enters the first place. In this area, being over 50 years has also emerged as a dominant disadvantage. In the relation of villages/cities, the dominance of long-term jobseekers is stronger in cities, while in the villages, the lack of education and almost unique mixed features are more typical.

The main lesson of the analysis of accumulation is that different combinations of disadvantages are affecting the emergence of additional tensions differently. A cumulatively disadvantaged situation is more likely to ruin the labour market opportunities than a single disadvantage by itself. It is necessary for the long-term improvement of the labour market situation of the most disadvantaged regions and jobseekers that certain employment policy instruments respond specifically to the problems created by certain types of accumulation.

Besides the effects of multiplication, employment alternatives (a job that provides suitable salary and permanent placement, which is as close to the primary labour market as possible) can also be mitigated by the complex application of passive and active employment policy instruments. On the one hand, it provides livelihood and on the other hand, it orientates the unemployed into programmes whose structures have been developed based on their special labour market position. This can be more effectively achieved in combination with individual mentoring.

### Acknowledgement



EMBERI ERŐFORRÁSOK  
MINISZTERIUMA

Supported by the ÚNKP-17-4-I New National Excellence Program of the Ministry of Human Capacities.

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## Evidence-based designation of development regions in Romania

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Public debates on the regional dimension of societal organisation are marked by a series of stereotypes originating from the lack of knowledge of this phenomenon. For this reason, this study combines the concepts of homogeneity and heterogeneity with specific spatial structures (core-periphery structures) in the designation of development regions (NUTS 2 level) in Romania. Its aim is to provide scientifically sound alternatives for the designation of development regions. The main contribution of the paper is to introduce three alternative scenarios for the delimitation of development regions.

### **Keywords:**

homogeneity,  
heterogeneity,  
core-periphery structures,  
regionalisation Romania

## **Introduction**

The question of the regional shaping of society has received substantial academic attention during the last two decades in very different spatial, political and economic contexts (Săgeată 2004, Benedek–Jordan 2007, Lentz et al. 2007, Máté et al. 2011, Ertugal–Dobre 2011, Benedek–Bajtalan 2015, Keating 2015, Benedek 2016). Additionally, regional agenda became an influential subject for state and party politics in societies with high ethnocultural diversity, including Romania. On the one hand, we can observe that the most recent examples of the British or Italian devolution are related to the general concept of state modernisation and the recognition of ethnocultural and regional diversity. On the other hand, the very recent case of the Catalan independence movement exemplifies the strong limits of the so-called ‘Europe of regions’ model. Moreover, the question of regionalisation is not only

viewed as a scientific or political one, but is also related to increasing expectations of better-tailored public policies and improved economic governance (Rodríguez-Pose–Gill 2005, Benedek–Lembcke 2017).

The post-communist establishment of public administration in Romania has strengthened sub-national levels of governance. The discussions about the role of the development regions (created in 1998) and about regionalisation and the reshaping of the administrative-territorial units in Romania, came into a new light very recently. In 2011, when former state President Traian Basescu launched a political project on regionalisation, and in 2013, when the then ruling coalition government Social Liberal Union (USL) instituted a new project on regionalisation. Both projects have triggered a wide debate in Romania on the scope and content of regionalisation, with a significant number of alternatives developed by different scientists, politicians, and mass media representatives (for more details, see Benedek–Bajtalan 2015). The regionalisation discourses and projects referred to both new administrative-territorial divisions at the regional level, as well as the decentralisation of administrative competencies from the state to the regional level. This article contributes to these discussions and is based on comprehensive research made in 2013 and published in Romanian in the same year (Benedek et al. 2013). This paper addresses the following question: what is the adequate way to designate development regions in Romania? It would not be possible to propose an optimum solution for the designation of development regions due to the complexity. However, we provide an evidence-based alternative, which relies on the combination of different tools and methods of regional science and spatial analysis.

The question raised in this paper is of major interest for two reasons (Benedek 2015): the paper offers different scenarios for the adequate spatial scale and form of 1. the state's economic policy design and implementation in fields like infrastructure planning, the labour market, or innovation; 2. management for cultural and ethnic diversity. Therefore, our study addresses the question of area designation for development purposes combining the above-mentioned perspectives. This line of questioning and argumentation concurs with the major findings of the study of Lineira and Cetra (2015), where economy and national identity – alongside party politics – are considered the main factors behind regionalisation in Europe.

The article proceeds as follows: first, we present some theoretical and methodological considerations. Second, we focus on ethnocultural and economic homogeneity/heterogeneity criteria in determining the structural regions in Romania. Third, we present different proposals for the reorganisation of the development regions. Finally, we draw some conclusions from the discussion.

## Homogeneity/heterogeneity criteria for the designation of structural regions

This paper's methodology focuses on the delimitation of *homogeneous (structural) regions based on the similarity principle*, that is, a homogeneous region is determined by the individuality of its structure (for more details see Benedek 2004, 2006). One can speak of homogeneity only in the case when similar or almost similar elements characterise a certain territory continuously and permanently. Homogeneous regions are those that can be delimited based on internal similarities and can be described using one (some) uniformity index (indices) (Hoover–Giarratani 1999). When delimiting the homogeneous regions, we can use several structural indicators and their combinations. Depending on the manner in which these indicators and the connections between them are determined, we can specify several homogeneous regions. To delimit the homogeneous regions, certain structural characteristics are used, or their aggregate expression, in the form of some indices. One can take into account one or several structural characteristics. In the last case, structural characteristics are combined as complex indices. Concerning the delimitation of the homogeneous regions, we mention two essential methodological problems (Weichart 1996): 1. Regionalisation is strongly influenced by the spatial reference units used for the representation of the structural characteristics; 2. Regionalisation is also influenced by the construction of value ranges and their corresponding categories. To choose the value ranges, different statistical techniques are used, but they are not generally valid as they prescribe only certain range construction rules. It follows from the above that regionalisation based on the homogeneity principle is, to a certain extent, the result of deploying delimitation methodology, as the homogeneous regions are often methodological constructions (Benedek 2004). However, this is frequently used, as it represents the only technical way of representing the spatial dispersion of the values of some important parameters.

Following the arguments presented in the introduction, we will now examine the ethnocultural and economic diversity of Romania, which is considered as crucial for the designation of development regions.

### Ethnocultural homogeneity/heterogeneity

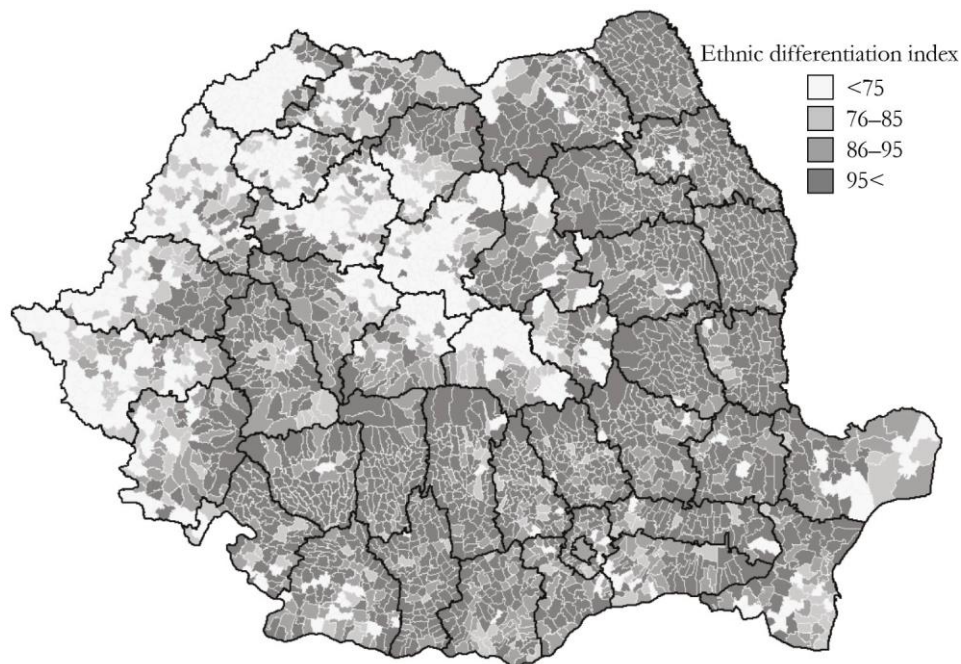
We will further analyse the manner of distribution of population belonging to various ethnic and religious groups. The most important characteristic in the territorial distribution of an ethnocultural community is alternating the high ethnic-cultural diversity areas with other ethnically or religiously homogeneous areas, resulting from historical evolution (Pénzes et al. 2018). The ethnic fragmentation of a country may be calculated and compared using the ethnic differentiation index (EDI) (Muir 1981). The lower the value of the index, the higher the ethnic differentiation. The index of a perfectly homogeneous territory equals 100. In this analysis, only those ethnic groups where the population represented 1,500 persons maximum



were considered. Based on this formula, the religious fragmentation index (RFI) was also calculated. The lower the value of RFI, the higher the religious fragmentation. The value of the EDI at the national level, according to the 2002 census is 81, which does not show major changes as compared to the 1992 census, when Romania's index was 80. At the commune level, there are several perfectly homogeneous localities but, also, territories where the ethnic differentiation index barely reaches 30. This is the case of the Suplacu de Barcău (Berettyószéplak) commune, where ethnic diversity is determined by the high percentage of the Roma and Slovak population besides the Romanian and Hungarian population (see Figure 1).

Figure 1

**The ethnic differentiation index  
in Romania at the local level, 2002**



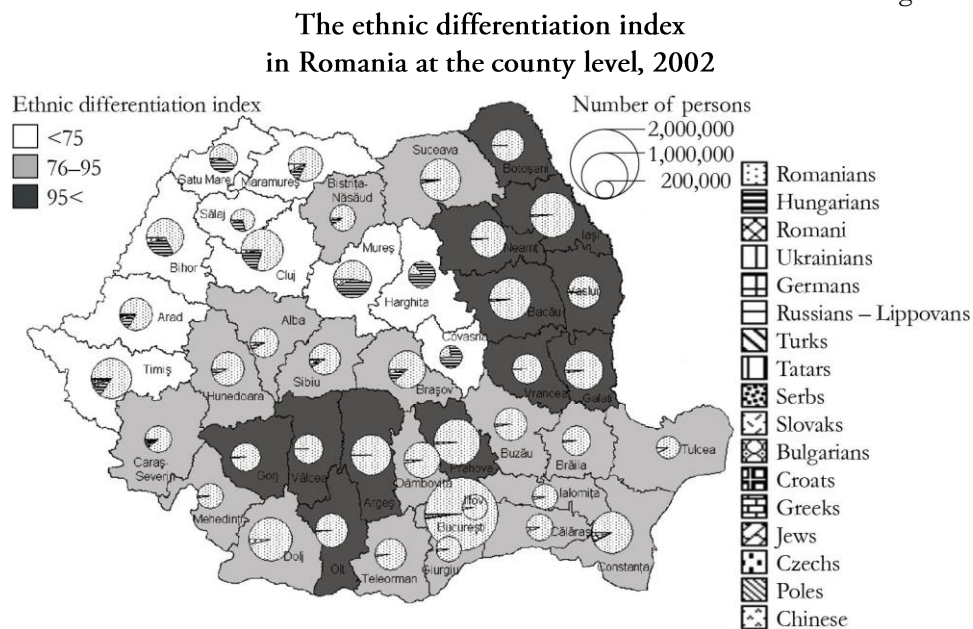
*Source:* Own elaboration based on INSSE's (Romanian National Institute of Statistics) 2002 Census data.

At the county level, the lowest values of the EDI are recorded in Mureş (44), Satu Mare (47) and Bihor (51), while the highest are in Vâlcea, Botoşani and Vaslui (98). From this perspective, the counties belonging to the historical region of Banat represent the territory with the highest level of ethnic diversity in Romania (see Figure 2).

EDI reflects, to a larger extent, both the size and number of the ethnic groups as compared to the percentage of the majority population. However, it reflects only

the major groups, as the small ones do not influence this indicator much (Bodocan 1997). For example, the Caraş-Severin County and Bucharest are composed of 8 ethnic groups of more than 1,500 persons. However, the value of the ethnic differentiation index is higher than that recorded in Mureş County (78 and 94, as compared to 44), composed of only 3 ethnic groups with more significant percentages than the first two cases. Furthermore, in the 2 Székely counties, the ethnic homogeneity index is 60 in Covasna and 73 in Harghita, as the percentage of Hungarian population is 74% and 85%, respectively. At the same time, it may be noted that EDI has lower values in those counties where national minorities are sporadically present.

Figure 2



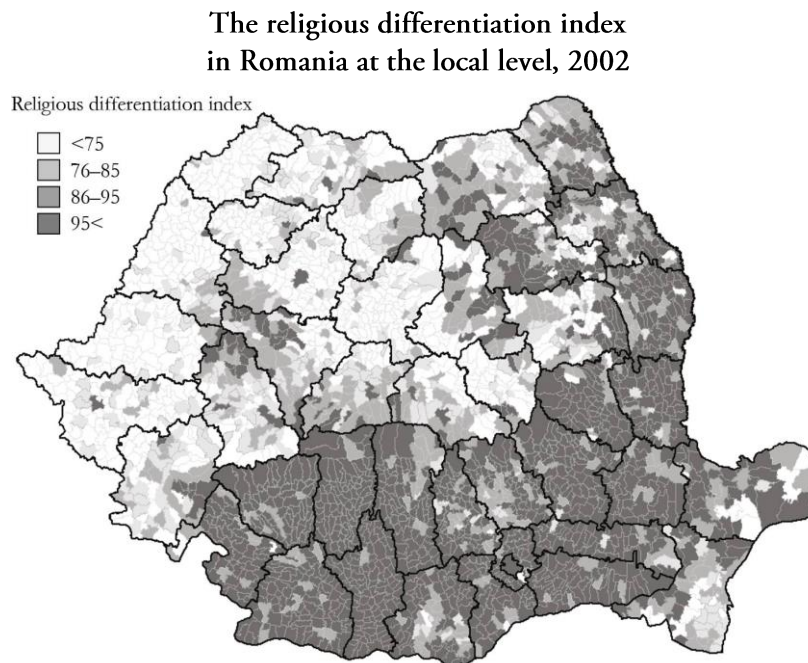
Source: Own elaboration based on INSSE's 2002 Census data.

The religious structure of the population marks another component of the cultural differences. In the 2002 census, 99.8% of the country's population declared having a certain religion (confession), 0.1% declared they were atheists or with no religion, while the remaining 0.1% refused to declare their religious membership. According to the 2002 census, the Orthodox population was predominant (representing 86.8%). The Romano-Catholics represented 4.7% of the total, the Reformed 3.2% and the Pentecostals 1.5%. The percentage of the other religious confessions was less than 1%. Their ethnic structure influences the confessional structure of the counties: the Romanians belong mainly to the Orthodox confession, and the Hungarian population belongs to Romano-Catholicism, Reformed religion, Unitarianism

and partially to Evangelicalism. As shown in Figures 3 and 4, the religious diversity of the country far exceeds its ethnic diversity, being much higher in the counties of Transylvania.

The counties of Covasna, Satu Mare and Mureş stand out, with the lowest values of the RFI (below 40), while the counties of Vâlcea and Olt have registered values over 98. This reflects the more or less significant percentage of the population groups belonging to a religious cult. The religious diversity of the localities reflects this situation without changing the county image drastically (see Figures 3 and 4).

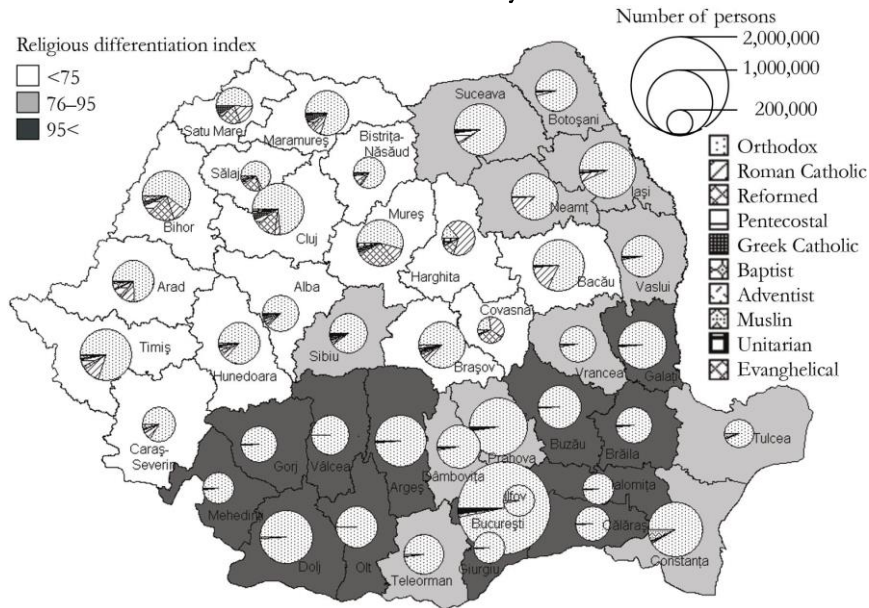
Figure 3



Source: Own elaboration based on INSSE's 2002 Census data.

Figure 4

The religious differentiation index and the religious structure  
in Romania at the county level, 2002



Source: Own elaboration based on INSSE's 2002 Census data.

### Economic homogeneity/heterogeneity

The economic homogeneity/heterogeneity is outlined by using gross domestic product (GDP) per capita data available in Romania at NUTS 2 and NUTS 3 levels. At the NUTS 3 level, the economic output is highly concentrated in the administrative centres of the counties (Benedek–Kurkó 2012). The homogeneity/heterogeneity is further analysed on economic development (GDP per capita), using the potential model. This method is based on the physical analogies from the spatial model category and, at the same time, enables the general description of the country's economic space structure, the territorial distribution of the areas with various degrees of development. The essence of the method is that it explains the 'intensity' of the social-economic phenomena as it takes into consideration the value of the analysed phenomenon belonging to the territorial units, that is, the distance between them. At the same time, the potential model highlights the disadvantaged areas from the economic development point of view. This model enables us to specify the more general aspects; the economic core of the country becomes visible, and we can delimit the transition area/areas, as well as the disadvantaged, peripheral areas (Nagy 2004).

According to the model, the best-positioned regions (with the highest potential) are those that concentrate the major economic force and/or are located near the

main economic power cores. Consequently, in determining the economic potential of one territorial unit, besides its economic performance, an important role is also played by the other analysed territorial units. It is possible that a region of relatively low economic power will have a high economic potential if economically powerful neighbours surround it. By contrast, there are also cases where a region of significant economic power has moderate potential, but regions of a weaker economic situation surround it and it is far from the key sectors of the national economy (Nagy 2004). Thus, the potential may be divided into three components: intrinsic potential, internal potential, and external potential.

The intrinsic potential is  $P_{\text{intrinsic}}(A_i) = \frac{M_i}{d_{ii}^b}$ , where  $P(A_i)$  is the potential of the point  $A_i$ ,  $M_i$  stands for the mass of territory points taken into consideration,  $d$  denotes the distance between two points, and is equal to  $(T_i/\Pi)^{0.5}/3$  ( $T_i$  is the area of the analysed territory), and  $b$  is a constant.

The internal potential is  $P_{\text{internal}}(A_i) = \sum_{j=1}^n \frac{M_j}{d_{ij}^b}$ , while the external potential is

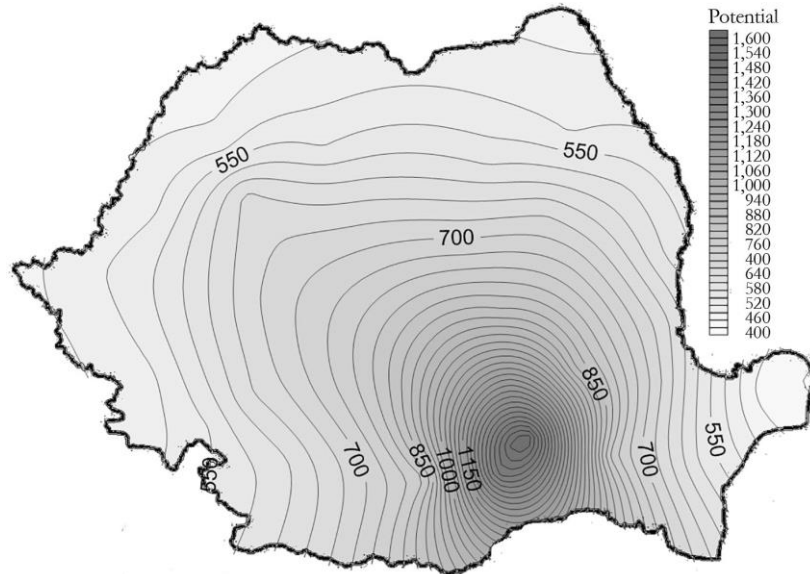
$$P_{\text{external}}(A_i) = \sum_{k=1}^n \frac{M_k}{d_{ik}^b}.$$

The allocation of some territorial units determines *the intrinsic potential* to each point (e.g. in the case of the localities, their size) but, after that, the distance to the unit will be calculated based on its size. When we determine *the internal potential*, we need to calculate the value of the effect of some analysed territorial units on the other territorial units. The effect depends on the size of the analysed points, respectively on the distance calculated to the given territorial unit; the larger the territorial unit and the closer in space, the higher the value. *The external potential* is practically identical to the internal potential but, in this case, we can also take into consideration the effect of the territorial units located outside the analysed area (Nemes Nagy 2005, Péntzes 2010).

The analysis of the core and peripheral relationship reveals that – despite the eccentric geographic location – Bucharest occupies a special place in the spatial-economic structure of the country (see Figure 5). Its economic contribution exceeds twice the average national value (23% in 2008, when the population concentration was only 9%). At the same time, in Bucharest, most of the small and medium-sized enterprises (SMEs) (21.5% of the total SMEs) exist, which stand out both by a large number of employees in the research and development sector (R&D) and by the high concentration of foreign direct investments (FDI).

Figure 5

## The distribution of counties by the potential model, 2002



*Note:* The potential values are based on GDP per capita.

*Source:* Own elaboration based on Eurostat data.

The western regions – due to their location – may be considered more dynamic than external peripheries; the latter instead characterises some counties in Moldavia and Muntenia, composing homogeneous regions because of the lower level of development. The situation of the counties in the Seklerland is not favourable, as these counties are considered, from many points of view and according to the analysis of many indicators, to be internal peripheries dependant on their surrounding areas. The core-periphery relationship from the perspective of geographical location not only refers to a privileged area or a peripheral locality, but also to the presence or lack of economic activities, that is, it is identical to accessibility (Nagy 2004).

Starting from the fact that there is a relatively close relationship between the unemployment rate and the GDP per capita ( $r = -0.60$ ), it is important to also examine the situation of counties depending on the unemployment rate and the positions they occupy in the spatial hierarchy of development. According to the two indicators, 20% of the counties have a relatively high level of development, correlated with a low unemployment rate. Almost 15% of the counties fall into the category with a low level of development and, implicitly, with a high unemployment rate. As shown in Table 1, Bucharest, the counties of Ilfov, Timiș, Cluj, Constanța, Sibiu, Arad, Bihor and Brașov compose the dynamic regions of Romania, while the counties of Vaslui, Teleorman, Buzău, Olt and Mehedinți constitute the most socially and economically peripheral regions (see Table 1).



Table 1

**The classification of counties by GDP per capita  
and the unemployment rate, 2011**

GDP per capita, PPP				
		high (>9,833)	moderate (8,700–9,833)	low (<8,700)
Unemployment rate, %	low (<5.2)	Bucharest, Ilfov, Timiș, Cluj, Constanța, Sibiu, Arad, Bihor, Brașov		Suceava, Maramureș, Satu Mare, Botoșani, Bistrița-Năsăud
	moderate (5.2–6.4)	Tulcea, Argeș, Prahova	Vâlcea, Iași, Caraș- Severin, Giurgiu, Brăila, Hunedoara, Mureș	Neamț, Vrancea, Bacău, Călărași
	high (>6.4)	Alba, Gorj	Dolj, Covasna, Har- ghita, Ialomița, Sălaj, Dâmbovița	Vaslui, Buzău, Tele- orman, Mehedinți, Galați, Olt

Note: PPP – purchasing power parity.

Source: Own elaboration based on INSSE (2013a) data.

A special case is represented by the counties of Alba and Gorj, which fall under the category of counties with a high GDP per capita and, at the same time, with high unemployment rates. The massif privatisation and economic restructuring of the mining regions following 1997 have led to the loss of jobs for a significant number of persons in these counties.

## Proposals for the reorganisation of the development regions

### The development regions in Romania

The regional level in Romania does not represent an administrative level *per se*, as it was formed in 1998 by the multi-criterial grouping of several counties into eight development regions. The legislative framework for the operation of these regions is provided by *Law No. 151* of 1998 on the regional development in Romania. The Romanian development regions are not political entities, have low decision-making power and limited financial resources. Consequently, the most important stakeholder of the regional development in Romania remains the state that controls and directs, to a significant extent, the resources allocated to development. New projects on reshaping this institutional and territorial arrangement are widely debated and discussed regarding Romanian, as presented in the introduction. Thus, the following sections attempt to develop further empirical evidence for the designation of development regions with a combination of homogeneity and functional criteria of area designation.

### Designation of development regions based on economic homogeneity/heterogeneity

The multidimensional analysis (ethnic-cultural and economic) of the homogeneity/heterogeneity degree (in section two) offered a diversified image of the counties and regions that cannot provide the necessary scientific arguments to designate regions when we include these in the same regional counties with a variable degree of homogeneity. The literature does not offer us ready-made solutions. Therefore, we propose designating regions with a core-periphery structure where one or two counties with a higher degree of economic development represent the core-area of the region to which a variable number (depending on ethnocultural characteristics) of counties with semi-periphery or periphery status are added. Based on Table 1, we have classified counties into core, semi-core, semi-periphery, and periphery structures (see Table 2). The positioning of the counties according to Table 2 is in line with our recent findings on core-periphery structures in Romania (for detail, see Benedek 2015). All counties in the ‘core’ category have a high demographic potential, a high education index and a high percentage of the population occupied in the secondary and tertiary sector (see for details Benedek et al. 2013).

Using the status of each county in Table 2, we applied a principle that may be called the *principle of combining areas of various degrees of homogeneity*. The outcome is a new scenario for redrawing the development regions in Romania, which includes ten regions (see Figure 6), instead of the existing eight. It presents a series of not inconsiderable advantages: a larger number of regions and, implicitly, reduced area and the number of inhabitants create better conditions for the management of regional problems; stronger identification of the population with the delimited region; higher accessibility of the regional core areas; building of the regions around core-periphery spatial structures, which are more competitive and much easier to designate than regions defined according to homogenous criteria.

Table 2

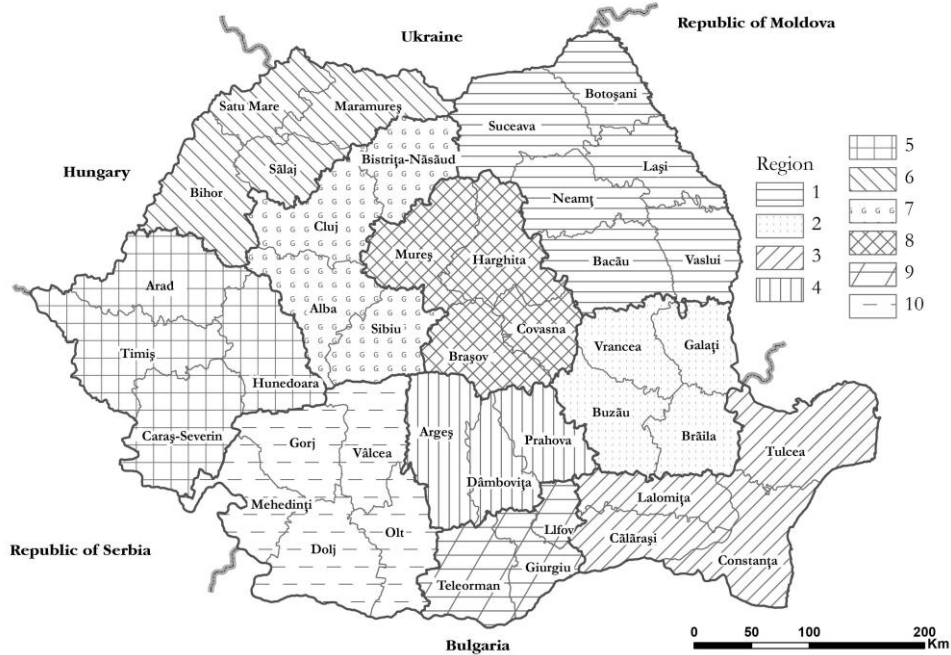
#### Core, semi-core, semi-periphery and periphery counties

Core	Semi-core	Semi-periphery	Periphery
counties			
Bihar, Cluj, Sibiu, Constanța, Prahova, Ilfov, Bucharest, Arad, Timiș	Brașov, Argeș, Alba, Gorj, Hunedoara	Bistrița-Năsăud, Sălaj, Mureș, Brăila, Tulcea, Vâlcea, Iași, Covasna, Harghita, Bacău, Galați, Dâmbovița, Dolj, Caraș-Severin	Neamț, Maramureș, Satu Mare, Botoșani, Suceava, Vrancea, Călărași, Giurgiu, Ialomița, Olt, Vaslui, Buzău, Teleorman, Mehedinți



Figure 6

### The grouping of counties into development regions by economic homogeneity/heterogeneity

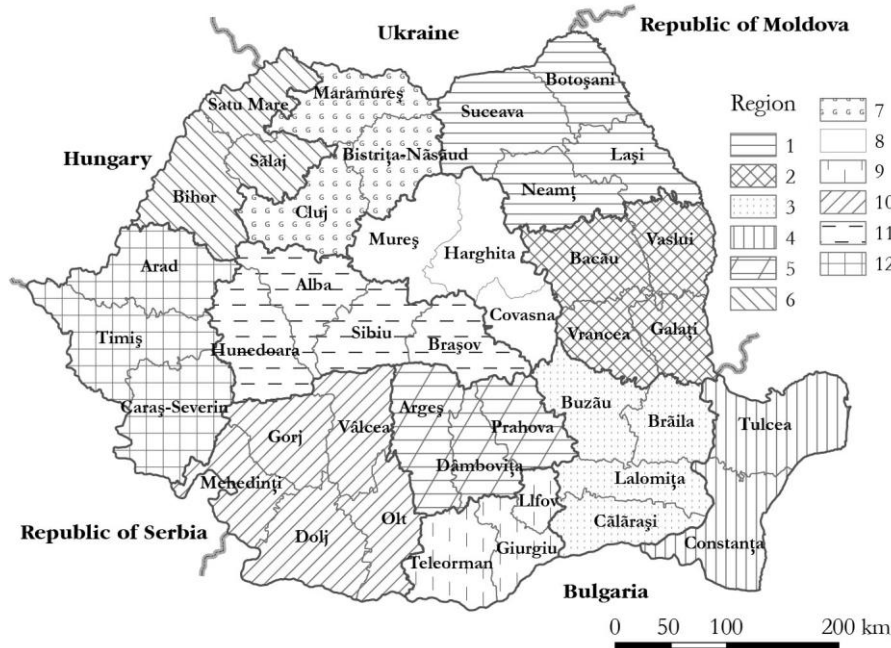


### Designation of development regions based on ethnocultural homogeneity/heterogeneity

Ethnocultural diversity offers another variant for the organisation of the development regions. Figures 1–4 provide us with an image of cultural homogeneity/heterogeneity, expressed by two dimensions: ethnic and religious. In this situation, the optimum variant from the ethnocultural perspective is in the grouping of counties of high cultural heterogeneity – with possibilities for the efficient use of the cultural diversity as a development resource – within the same development regions. This logic would imply three such territorial groups: the counties of Mureș, Harghita and Covasna, then the counties of Bihor, Satu Mare and Sălaj and, finally, the counties of Constanța and Tulcea. Furthermore, this logic would not particularly affect the structure of the other development regions, which would remain mostly the same, with the above exceptions (see Figure 7).

Figure 7

The grouping of counties into development regions  
by ethnocultural homogeneity/heterogeneity



The adjustments performed pursue the application of the cultural criterion, more specifically, the belonging of counties to various historical-geographical regions.

#### Designation of development regions based on complex homogeneity criteria

In most cases, the classification of the regions and definition of the types of regions can be based on some complex, multidimensional criteria and indicators. Thus, the most important mathematical-statistical method for the multidimensional classification is the *cluster analysis*, which can be used in cases when we attempt to group and classify similar elements from a certain perspective. The main objective is to classify the individual territories – based on the variables used – into homogeneous groups, thus leading to downsizing. Thus, analysis can be carried out without preliminary information on the characteristics of the group but, following the analysis, the types of units will be formed based on the classification. This analysis is the best method to understand the formation of various typologies. The cluster analysis is most successful when the counties in a certain group have a high degree of similari-

ty. After the completion of the cluster analysis, one unit will fit into one single group and will be different from the units that are classified in the other clusters (Han–Kamber 2004, Füstös et al. 2004, Székelyi–Barna 2005). For the grouping of similar counties based on the cluster analysis, the following indices were taken into consideration: Rural population (%), 2013; GDP per capita (PPP), 2011; Unemployment rate (%), 2013; Population occupied in R&D per 1,000 inhabitants, 2013; FDI/inhabitant (EUR), 1990–2012; Number of vehicles per 1,000 persons, 2013; Population occupied in the primary sector (%), 2013; Number of physicians per 1,000 persons, 2013; Number of higher education graduates (%), 2013; SME/1,000 inhabitants, 2013.

In the first phase, Dolj stands out from the rest of the counties. While the amount of the foreign direct investments is among the lowest at the country level, concerning the percentage of higher education graduates, the percentage of the population occupied in R&D, the number of physicians per 1,000 persons, as well as the number of vehicles per 1,000 persons, extremely favourable values are recorded. Dolj also stands out by the high value of its unemployment rate.

In the following phases, Ilfov and Iași stand out from the rest of the counties, together with the country's capital city. If the separation of Bucharest may be explained by the fact that all the analysed indicators recorded more favourable values, Ilfov county is especially different because of its favourable position regarding GDP per capita and foreign direct investments. Conversely, Iași county stands out because of the high percentage of higher education graduates, as well as the number of physicians per 1,000 persons.

In the fifth phase, another group of counties stand out: to the counties in Moldova (Botoșani, Suceava, Neamț, Vaslui, and Vrancea) the following are added: Ialomița, Călărași, Giurgiu, Teleorman, Buzău and Dâmbovița from Muntenia and the counties of Olt and Mehedinți from Oltenia. As may be seen, these are less developed counties, with high unemployment rates, which are also ranked lower regarding foreign direct investments, GDP, number of SMEs and vehicles per 1,000 persons. In conclusion, these counties compose a distinctive group with multiple disadvantages.

In the sixth phase of the cluster analysis, those counties stand out that, paradoxically, though they have a higher level of economic development, record high rates of unemployment. These are Hunedoara, Arad, Constanța, Sibiu and Brașov, where, following the deindustrialisation process, even at the beginning of the twenty-first century, the negative effects of industrial restructuring are still felt.

In the following phase, two clusters have occurred, represented by the counties of Timiș and Cluj, with a high percentage of higher education graduates and a high rate of the population occupied in R&D. At the same time, a series of indicators, such as the number of SMEs per 1,000 inhabitants, GDP per capita and FDI per capita or the population occupied in the tertiary sector also record high values in the above-mentioned counties.

In the following phase, the counties of Iași, Dolj, Galați and Argeș stand out. These counties record favourable values for only a few of the selected indicators: Iași and Dolj for the number of vehicles per 1,000 persons, the percentage of higher education graduates and the percentage of the population occupied in R&D. Argeș and Galați fall under this class due to the high volume of foreign direct investments.

In the last phase, eight clusters are highlighted: including the counties of Ialomița and Mehedinți, another group composed of the counties of Botoșani, Vaslui, Călărași, Giurgiu and Teleorman are highlighted. The low level of development, the low quality of sanitary services and lack of diversification of the economic structures (high percentage of the persons occupied in the primary sector) have contributed to the emigration of a large part of the population, leaving behind highly rural communities. As a whole, these counties compose the group of counties with multiple disadvantages (see Figure 8).

Figure 8

### The grouping of counties based on cluster analysis



The rest of the counties do not necessarily compose one completely homogeneous cluster, as the distribution of the variables is very random. Thus, going into more detail in the following phase, the separation of Tulcea County can be noted, with a very low level of motorisation and very poor sanitary infrastructure, followed by Caras-Severin County, based on the low percentage of higher education gradu-

ates. The low level of the foreign direct investments contributes to the individualisation of Olt County, followed by the separation of the Harghita and Covasna counties because of the reduced proportion of the population occupied in the R&D sector. As the counties outside the above-mentioned seven clusters compose a group with a much higher heterogeneity, we will not explain each of them, but this does not mean that they compose a perfectly homogeneous grouping.

Of course, when applying the cluster method, the basic question remains: How do we most efficiently group the counties into development regions? A major shortcoming of the existing development regions may be attributed to their economic diversity, counties with a higher level of economic development being included in the same administrative region as less developed counties (Benedek 2004, 2006, Cörvers et al. 2009). A typical example is the North-West region, where the level of development is negatively affected by the lower economic GDP per capita of counties such as Sălaj and Bistrița-Năsăud. The inverse interpretation is that the high values of GDP per capita of some counties (Argeș or Prahova in South-Muntenia) are fetishising the difficult situation of less developed counties (Teleorman and Giurgiu in South-Muntenia). Additionally, the peripheral location of some first-rank municipalities (Iași, Constanța, Brașov), within the region they belong to, leads to the reduction of their spatial polarisation ability.

Figure 9

### The grouping of counties into development regions by complex homogeneity



The third and final scenario for the reorganisation of the development regions results from combining the cluster analysis with the determination of the areas of theoretical influence (catchment areas) of the major urban centres. The latter has been determined according to the size and rank of the urban centres (cities over 250,000 inhabitants). All eleven urban centres of rank one have been taken into consideration (for full details, see Benedek et al. 2013). The results are represented by eleven development regions presented in Figure 9. The main argument for this combination is shared with other studies (Andersen 2002, Cörvers et al. 2009, Pálóczi et al. 2016), namely that administrative regions should be based on functional economic regions for policymaking purposes.

Table 3 presents the territorial composition of all three scenarios discussed in this paper. Comparing these scenarios, we can observe some differences in the number of designated regions, from ten for the first scenario (economic homogeneity), to twelve regions for the second scenario (cultural homogeneity). According to the complex homogeneity criteria (third scenario), the resulting eleven regions represent an intermediate situation. We think that the latter has the highest empirical evidence because it is the only one that can be considered as a functional region.

Figure 10

### The theoretical catchment areas of first-rank cities

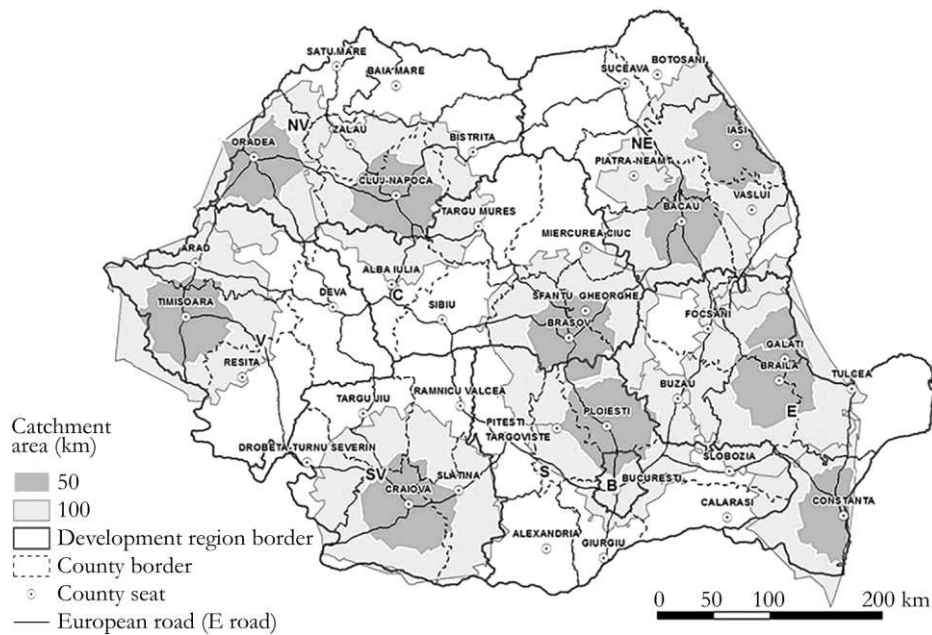


Table 3

**The grouping of counties into development regions based on economic, cultural and complex homogeneity/heterogeneity criteria**

Number of regions	Scenario I	Scenario II	Scenario III
	Regions with a low degree of economic homogeneity (organised as core-periphery regions)	Regions with a high degree of cultural homogeneity	Regions with a high degree of complex homogeneity
1	Iași, Bacău, Suceava, Botoșani, Neamț, Vaslui	Iași, Suceava, Botoșani, Neamț	Iași, Botoșani, Suceava, Neamț, Vaslui, Bacău
2	Galați, Brăila, Vrancea, Buzău	Bacău, Galați, Vaslui, Vrancea	Galați, Brăila, Buzău, Vrancea
3	Constanța, Tulcea, Ialomița, Călărași	Brăila, Ialomița, Călărași, Buzău	Constanța, Tulcea
4	Prahova, Argeș, Dâmbovița	Constanța, Tulcea	Prahova, Dâmbovița, Argeș
5	Timiș, Arad, Caraș-Severin, Hunedoara	Prahova, Argeș, Dâmbovița	Bihor, Satu Mare, Maramureș
6	Bihor, Sălaj, Satu Mare, Maramureș	Bihor, Sălaj, Satu Mare	Cluj, Bistrița-Năsăud, Sălaj
7	Cluj, Sibiu, Alba and Bistrița-Năsăud	Cluj, Maramureș, Bistrița-Năsăud	Mureș, Harghita, Covasna
8	Brașov, Mureș, Harghita and Covasna	Mureș, Harghita and Covasna	Bucharest-Ilfov, Călărași, Ialomița, Giurgiu, Teleorman
9	Bucharest-Ilfov, Teleorman, Giurgiu	Bucharest-Ilfov, Teleorman, Giurgiu	Dolj, Olt, Vâlcea, Gorj, Mehedinți
10	Gorj, Dolj, Vâlcea, Mehedinți, Olt	Gorj, Dolj, Vâlcea, Mehedinți, Olt	Brașov, Sibiu, Alba, Hunedoara
11	–	Brașov, Sibiu, Alba, Hunedoara	Timiș, Arad, Caraș-Severin
12	–	Timis, Arad, Caraș-Severin	

## Conclusions

During the Romanian transition period – particularly in 2013 – many competing scenarios for regionalisation have been launched. The benefit of this paper is that it offers evidence-based solutions to the reorganisation of the development regions. All scenarios presented in this paper are the result of applying tools of spatial analysis. The authors are aware that the solutions proposed cannot be viewed as ‘optimal ones’ and do not exclude other alternatives. The methods, data, and spatial scale all impose some limits on the scope of the article. Therefore, the quantitative and positivist approach has somehow eluded the options and expectations of the population, of local or regional communities, which may be considered as being crucial in delimiting development regions. We do not underestimate these options, but the frame-

work and scope of the study made it impossible to include this bottom-up perspective. The data used in the study is static and not flow data. This limitation is imposed by the low availability of accurate and actual flow data like commuting. Commuting is considered as an important process contributing to the formation of so-called functional economic regions where the majority of inhabitants work, shop, and live. Therefore, there are arguments to consider commuting areas or labour market areas relevant for the designation of administrative regions (Andersen 2002). In the absence of flow data, we had to estimate the potential of spatial interactions using the potential model for GDP per capita and the distance and population for the theoretical influence zones of the cities. Finally, most data were available only at the NUTS 3 level, so the study had to focus on the county level. The outcome of this is the grouping of counties into development regions. We admit that a more accurate analysis should take into account lower spatial levels. Despite all these limitations, our article contributes twofold to the actual debate on the role of development regions in Romania. First, we have outlined that the best way for designating development regions in Romania is a combination of two perspectives: one rooted in the functional economic differentiation and the other related to the ethnocultural diversity of the country. Second, we have argued in the paper for evidence-based area designation, which relies on the combination of different tools and methods of regional science and spatial analysis.

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## The impact of the 2008 financial crisis on household income and wealth in Visegrad countries

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### **Keywords:**

financial crisis,  
household income and wealth,  
asset loss,  
Visegrad countries,  
NUTS 2,  
recovery of income

Economic history conducting investigations into financial crises of the long 20th century primarily analyses the permanent character of crises and their macroeconomic consequences. Statistics focuses, primarily, on the number of bank failures, corporate bankruptcies, low macroeconomic output (gross domestic product [GDP]), decreased employment rates, increased inflation, and government debts. Both economic history and statistics only deal with the decrease in household income and with losses in their net wealth positions afterwards.

The authors of this study investigate the impact of the 2008 crisis on household income and their net wealth positions. They also examine options of restoring household income in Visegrad countries based on the data of NUTS 2 level (Nomenclature des unités territoriales statistiques) territorial units. The authors have used empirical analysis and statistical comparison for the change of the income and wealth situation of the Visegrad countries' households. The results show that in the 2000s, the growth in the income gap between households slowed down, but after the crisis of 2008, the differentiation of the wealth of households in the region continued. As a result of this crisis, the income differences also started to rise again, which led to even wider gaps in income inequalities. Recovery of income and wealth has begun, but it will take at least 3-4 years to reach the pace of the pre-crisis growth. In addition, its level could be permanently lower since households and credit institutions behave more cautiously than before the crisis.

## Introduction

The 20th century was not only the age of ‘huge’ geopolitical changes but also the age of global and local financial turbulence and crises. As a result of the financial situation, households in Central Europe experienced considerable increase in income and wealth positions until 2008, which was followed by huge losses and subsequent inter-regional disparities (KSH 1981, Segert 2013). Although it is impossible to be exhaustive, it is worth mentioning the reasons lying behind these changes, which are described below.

In the aftermath of World War I, the states of the Central Power suffered from such a high inflation rate that retail deposits and the capital invested in war loans had no value at all. The depression recovery that started in the 1920s ground to a halt because of The Great Depression (1929–1933) (Matolcsy 1938, Blaich 1990, Andorka 2006).

Following World War II, the recovery of household income and their wealth positions was not only extremely slow but also considerably hindered by ideological reasons in the countries occupied by the Soviet Union.

During the second half of the 1970s, the differentiation of net wealth positions took place at a much higher pace than ever before in the countries under investigation (KSH 1981, Andorka–Harcsa 1990, Valuch 2017). The invasion of Czechoslovakia (1968), the interruption of market-oriented reforms in the Hungarian economic policy (1972–1973), and the introduction of a state of emergency in Poland (1981) seriously damaged economic growth, hindered households’ capacity to generate income, and hampered consumption in the countries concerned (Poznanski 1996, Kowalik 2011, Teichowa 1988, Kosta 2005).

Major geopolitical changes sweeping across the countries in Central Europe (1989/90) triggered structural reforms in public economies and enhanced new types of ownership structures, which resulted in the increasing rate of income of those ranked in low deciles.

The US mortgage crisis of 2007–2008 also seriously affected the European Union, especially financial intermediary systems, economies, and households of the countries lying in its periphery.<sup>1</sup>

Presumably, the history of financial crises has not ended. The future is as likely to be prone to crises as the past since there may be temporary relief from the root causes, but they will not disappear.

Economists have been investigating crises, and within them financial crises, for over a hundred years. As a result, they have identified several causes of financial crises, which are as follows: rapid and unfounded credit expansion (lacking real

<sup>1</sup> The income of 10% of the lowest-income households decreased by 16%, whereas the income of the 10% of the highest-income households decreased only by 4% in the developed countries during the crisis of 2007–2010 (OECD 2008 2016a).

economic background) and raising money out of bubbles (Eichengreen 2015); introduction of financial instruments involving excessive risk-taking; imprudent and irresponsible speculative activities of investors and banks, overvaluation of mortgages and securities, etc. (Kosłowski 2009, Umantsiv–Ishchenko 2017); investors' hope to make decent profits in a rapid and easy way, lack of values and ethical behaviour (Bauer 2008); imprudent regulation of financial markets (Lähn 2004).

Financial crises have significant adverse macro- and microeconomic as well as social consequences because increasing economic inequalities generate increasing social tensions (Piketty 2014). As a result of this: the real economic growth will fall, inflation will rise and solvent demand will decrease; the unemployment rate will increase (Okun's law), which will have an adverse effect on the net financial wealth of households.

The development (convergence vs divergence) and the concentration of household income, net monetary savings, and financial positions (inequalities between certain social groups) are of paramount importance both from economic (consumption, GDP, budget deficit) and political (national mood) aspects.

This study investigates economic and social processes, causes, and consequences of asset losses as well as asset restoring options in the Visegrad countries in the period after the financial crisis of 2008.

## Theoretical background, data sources, and methodology

### General considerations

An important micro level contribution to the socio-spatial inequalities and polarisation is represented by the incomes and wealth of households (Benedek–Moldovan 2015). The latter are influenced by a range of demographic factors like age, education level (Jackson et. al 2016), and number of active persons living in one household (Jackson et. al 2016).

Net wealth is understood as the total amount (marketable value) of financial assets plus non-financial assets (housing and land) less debts (Cowell–Van Kerm 2015, Kersley–Koutsoukis 2016). There is the huge challenge represented by the valuation (pricing) of the assets (housing for example). A distinction is made between real assets (real estate property including the household's main residence, self-employment businesses, vehicles, etc.) and financial assets (bank deposits, private pensions and life insurance, bonds, shares, etc.). Debt refers to home-secured debts (residence mortgage debts), vehicle loans, educational loans, credits, and informal debts (Cowell–Van Kerm 2015). In the Eurozone, real assets have a share of 85% of total gross assets, while households' main residences represent 61% of the total real assets (European Central Bank 2013).

Globalization has reduced international income inequality but has widened intra-national inequality (Khondker 2017). Income inequality has increased in many de-

veloped countries due to the income increase in the top of the distribution (Roine–Waldenström 2011). An important component of the top income groups is represented by the capital gains. Roine and Waldenström (2011) have proved for Sweden that there is a capital gains-driven inequality increase since the 1980s fuelled by the strong asset price increases of the deregulated financial markets.

Income distribution determines the accumulation process and, therefore, it can be considered the engine of economic growth (Molero-Simarro 2017). Piketty (2014) considers that income inequalities have an increasing tendency due to the faster growth of wealth in comparison to economic output.

Household income and net financial savings are determined by total amount of liquid assets, financial savings, and investments available at a particular time. The calculation of households' net wealth positions and net financial savings is based on the adjusted real estate and other assets. Based on the explanation of the European Central Bank, 'Net wealth is defined as real assets plus financial assets minus debt of a household. Real assets consist of the main residence, other real estate property, investments in self-employed businesses, vehicles, and other valuables. Financial assets are current accounts, savings deposits, mutual funds, bonds, stocks, money owed to the household, and other financial assets... Gross household income is the sum of employee income, self-employment income, income from pensions, regular social transfers, regular private transfers, income from real estate property, income from financial investments, income from private business and partnerships, and other non-specified sources of income.' (ECB 2015, pp. 11–12.)

Financial assets may consist of households' own and external financial resources. Households' own financial resources include net salary (basic salary, wage supplements, and other monetary benefits), social income (pensions, unemployment benefits, children-related allowances and other social allowances), and income generated from assets and properties (interests, dividends, leasing fees, etc.).

The examination of factors affecting individuals' and households' income and wealth positions has a long history since all schools of economic theory have addressed these issues<sup>2</sup>.

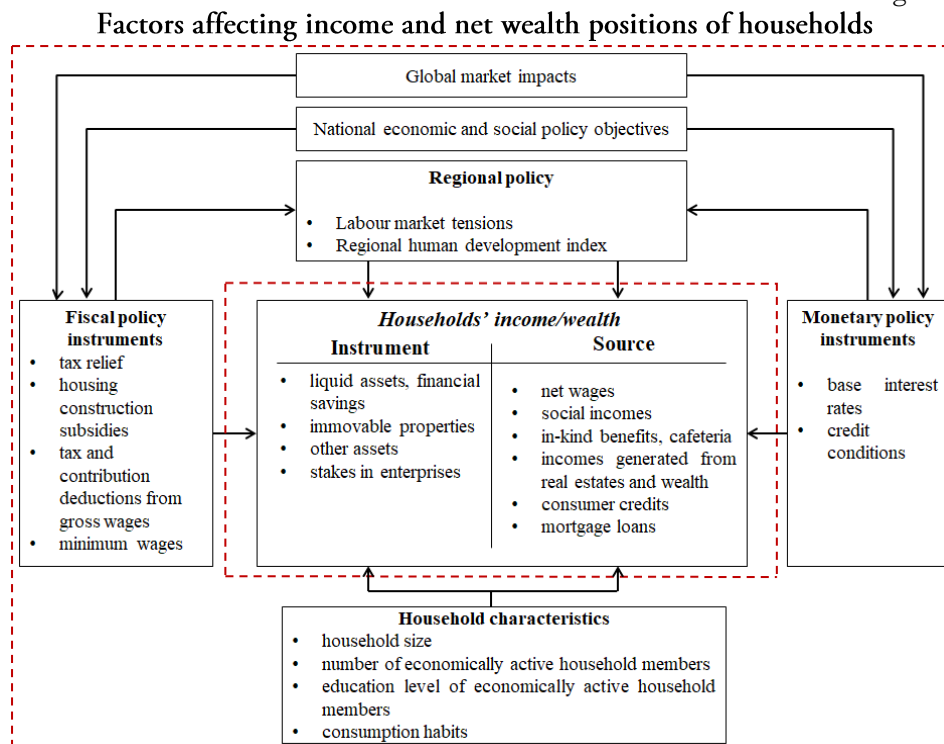
Macro (global, national and local) and micro (household) factors considerably influence households' income and wealth positions (see Figure 1).

The extent of transfer effects of particular indicators change depending on the level of development of the country under investigation and its data series (OECD 2007).

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<sup>2</sup> Wealth accumulation of households is discussed in Adam Smith's, Werner Sombart's, and Max Weber's works on revenue accumulation and in Maynard Keynes' writings on savings and investments.

Figure 1



**Effects of monetary policy on household incomes and net savings rates**

All major theories of economics (classical, neoclassical and Keynesian) and the so-called life-cycle theories (Browning–Lusardi 1996) investigate the relationship between interest rates and saving willingness. They conduct detailed analyses of factors affecting balance interest rates (and the inflection point between investment and financial reserves) and attempt to find out how real interest rates influence net household savings. Inflation-targeting central banks change basic interest rates and the reserve requirement ratio of commercial banks, which significantly affect deposit and credit terms and conditions as well as willingness of households to apply for credits and to accumulate savings. There is empirical evidence that there is a relationship between household income and economic and social processes because, through consumption, incomes affect economic output, which influences investment and employment (Marschak 1951, Diacona–Mahab 2015, World Economic Forum 2017).

### Effects of fiscal policy on household incomes and net savings rates

Fiscal policy regulates household incomes through cuts (taxes<sup>3</sup>, charges, inflations) and redistribution tools (maternity pay, minimum pension regulation, etc.) (Feldstein 1995). The scope of practice of the fiscal policy depends highly on the budgetary position of the country and the government debt. There is a dual relationship between fiscal policy and household savings. On the one hand, fiscal policy affects macroeconomic equilibrium. Permanent budget deficit results in increasing government debt and the adopted budgetary austerity measures may lead to cuts in family allowances (social policy).<sup>4</sup> On the other hand, household savings (by investing into government bonds) may contribute to budgetary consolidation and decrease the international exposure of public finances.

### Effects of regional (local) policies on household incomes and net savings rates

Governments may affect the asset and the liability side of a family balance sheet by adopting various reallocation mechanisms. In disadvantaged regions, these mechanisms may be as follows: create workplaces, introduce public works schemes, enhance the foundation of social cooperatives,<sup>5</sup> and provide educational and training programmes to promote labour-market integration of disadvantaged job seekers (ILO 2008, OECD 2016b).

### Data sources and methodology

This study investigates 35 NUTS 2 regions of the Visegrad countries in the period of 2008–2015.<sup>6</sup> While conducting the investigation into household wealth and income positions, information from financial accounts and the databases of the European Central Bank (ECB 2016), national central banks<sup>7</sup>, statistical offices of the

<sup>3</sup> Personal income tax in the Czech Republic (2017) is 22%, in Hungary 16%, in Poland 32%, and in the Slovak Republic 25%.

<sup>4</sup> This happened in Hungary on 1 July 2009 when the socialist government abolished the 13th month pension, altered pension indexation rules (inflation-related indexation was adopted) and increased the pension age from 62 to 65 in order to mitigate the increasing budgetary deficit.

<sup>5</sup> It is well-known that the F. D. Roosevelt administration adopted a series of fiscal measures and established several government agencies (Agricultural Adjustment Act, National Industrial Recovery Act, Security and Exchange Commission, Glass-Steagall Act, margin requirements of the US Federal Reserve System (Fed), Federal Deposit Insurance Corporation, Social Security Act) in response to the Great Depression between 1929 and 1933 in order to recover from the consequences of the financial crisis, enhance employment and eliminate unemployment. However, the economic literature interprets the consequences of the measures in different ways.

<sup>6</sup> This analysis was hampered by the fact that the investigation of household incomes and wealth has a short history compared to practices adopted in industrialized countries. A comprehensive statistical data collection on financial and non-monetary instruments and obligations of households in Hungary started only in 2014.

<sup>7</sup> Financial accounts of central banks provide detailed and relatively actual data on household net wealth. There is no reliable information available about household gross wealth in Visegrad countries since there is no wealth tax in Visegrad countries.



countries concerned, and Eurostat<sup>8</sup> was collected. External factors influencing household income and wealth were examined by using the following indicators:

- fiscal (debt, budget deficit) and monetary (base interest rate, inflation) policy indicators (which affect credit conditions, GDP and the employment rate);
- regional (NUTS 2) characteristics (human development index, employment rate).

Internal factors of household income and wealth differentiation includes household sizes and the number, education level and consumption habits of the wage earners who live in the households.

### Household income inequalities

The changes in geo- and economic policies and in economic indicators in Visegrad countries after 1990 triggered reforms and market-oriented transformation of the economy, which significantly affected income and wealth accumulation opportunities (Benedek–Kocziszky 2012, 2015, 2017). The changes passed through three stages.

In the initial transition stage (1989–1999), considerable inequalities in income and net financial assets were experienced. Factors affecting this stage were as follows (European Commission 1997, Bhalla–Lapeyre 2016): restructuring of economies, reduction of capacities in particular sectors (mining, metallurgy), and increase in unemployment rates in heavy industry areas; the initial (less regulated) stage of privatisation provided opportunities for a small privileged group to accumulate substantial assets; rate of return on capital well exceeded the rate of growth of output and income for years (Piketty effect).

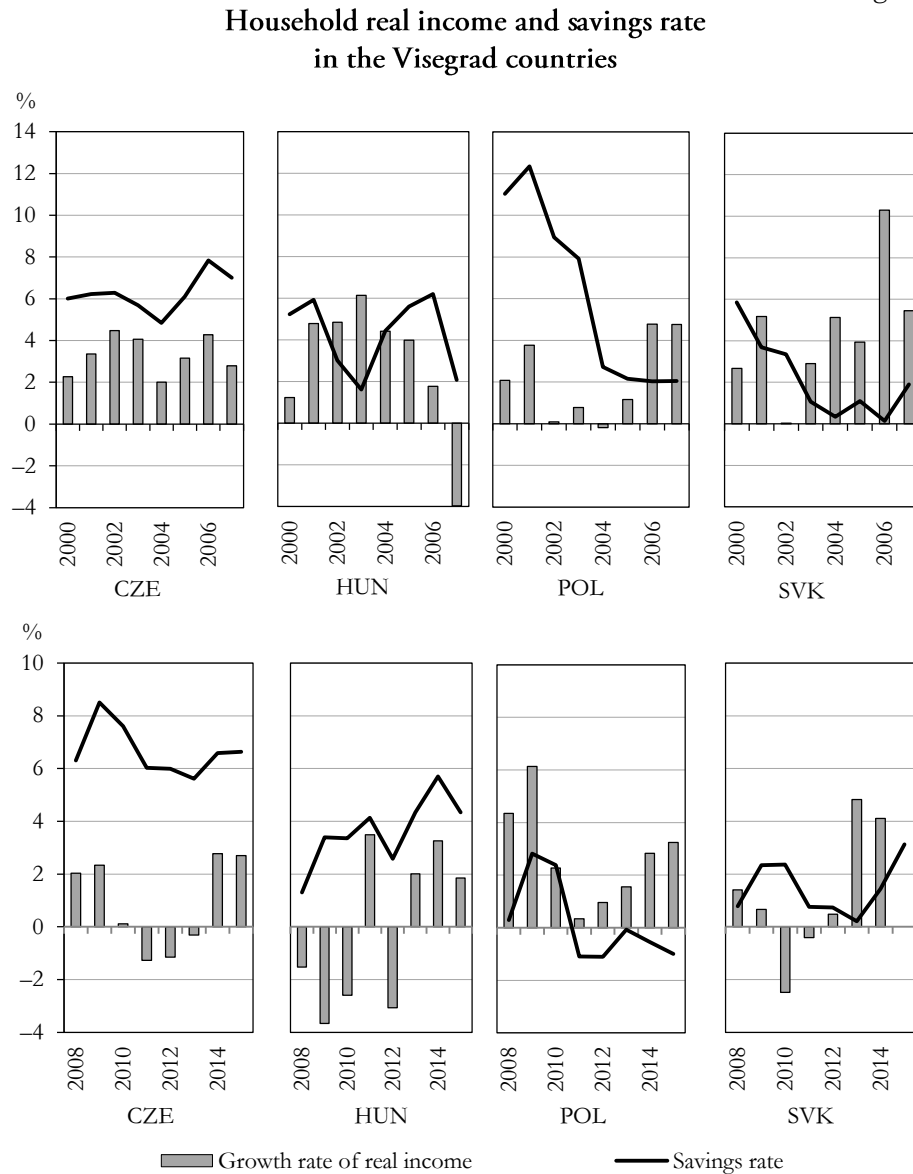
In the second stage (2000–2007), the real income of households decreased in all four member states<sup>9</sup> compared with the previous period, as the growth of real incomes was slowing down, which was followed by another decrease in 2008 (in the third stage) in most of the Visegrad countries (except Poland) (see Figure 2).

Before the crisis (from 2000 to 2007), there was a negative relationship between the growth rate of real incomes and the households' savings in the EU28 countries ( $y = -1.518x + 4.206$ ), which was also true for the countries under investigation. However, after the crisis there was a clear change from this aspect, as the relationship of the two indicators became positive ( $y = 0.5895x + 1.717$ ) in the European Union and the Visegrad countries (Palócz–Mateika 2014). This process was clearly observable in the case of Hungary and the Czech Republic, where the gap between the indicators increased significantly.

<sup>8</sup> [https://ec.europa.eu/eurostat/statistics-explained/index.php/Households\\_-\\_statistics\\_on\\_financial\\_assets\\_and\\_liabilities](https://ec.europa.eu/eurostat/statistics-explained/index.php/Households_-_statistics_on_financial_assets_and_liabilities)

<sup>9</sup> In Hungary, the labour income reached the average level of 1990 in 2002, and the pension only reached this level in 2004.

Figure 2



*Note:* Here and in the following figures and tables, the abbreviations of the four Visegrad countries are as follows: CZE – Czech Republic, HUN – Hungary, POL – Poland, SVK – Slovakia.

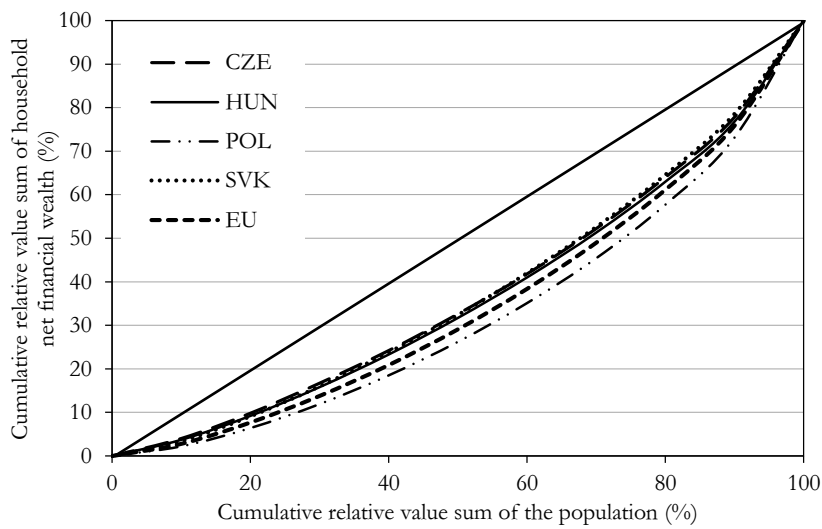
*Source:* Own calculation based on OECD database.

The Lorenz curve in Figure 3 shows that the distribution of household income in the countries under investigation for the years 2005 and 2015 is almost the same.

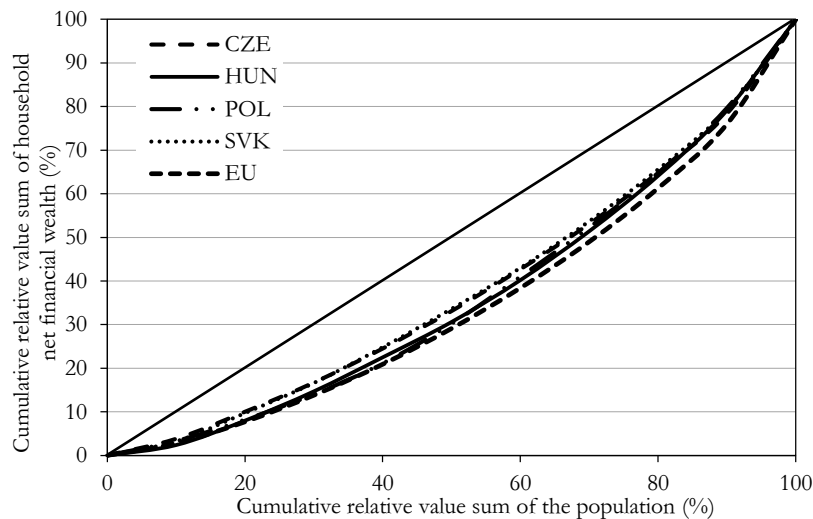
Per capita income of about 40% of the population amounts to 20% of the cumulative relative value, whereas slightly more than 6% of the total population belong to the highest income category (the last decile) (see Figure 3). The notable exemption is Poland with a more equilibrated distribution in 2015 than in 2005. The distribution of income in all Visegrad countries is more equilibrated than the EU average.

Figure 3

Distribution of household income in the Visegrad countries  
2005



2015



Source: Own calculation based on Eurostat database.

Household income inequalities decreased slightly in the Czech Republic and the Slovak Republic, increased in Hungary, and decreased considerably in Poland for the period 2005–2015 (see Table 1). If we compare the years 2000 and 2015, the only improvement has been registered in Slovakia.

Table 1

**GINI index<sup>10</sup> of household income (after taxation and social transfers)  
in the Visegrad countries**

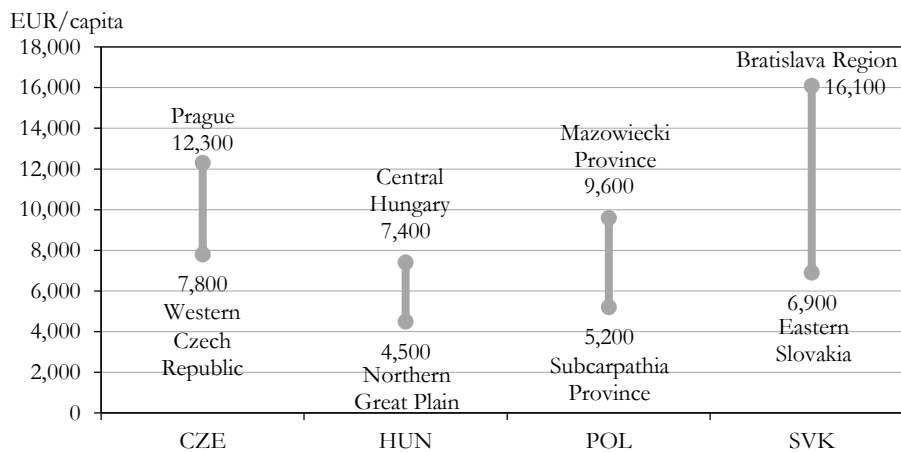
	2000	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
CZE	25.0	26.0	25.3	25.3	24.7	25.1	24.9	25.2	24.9	24.6	25.1	25.0
HUN	26.0	27.6	33.3	25.6	25.2	24.7	24.1	26.9	27.2	28.3	28.6	28.2
POL	30.0	35.6	33.3	32.2	32.0	31.4	31.1	31.1	30.9	30.7	30.8	30.6
SVK	26.2	26.2	28.1	24.5	23.7	24.8	25.9	25.7	25.3	24.2	26.1	23.7
Mean	26.8	28.9	30.0	26.9	26.4	26.5	26.5	27.2	27.1	27.0	27.7	26.9

Source: Own calculation based on Eurostat database.

The distribution of household income between regions (NUTS 2 units) was the highest in Poland and the lowest in Hungary. The latter also registered the lowest average per capita income among the NUTS 2 regions of the Visegrad countries (see Figure 4).<sup>11</sup>

Figure 4

**Income distribution in the Visegrad countries, 2013**



Source: Own calculation based on Eurostat and Czech, Hungarian, Polish, and Slovak statistical offices databases.

<sup>10</sup> The Gini index is a measure of inequality of a distribution. It was developed by the Italian statistician Corrado Gini.

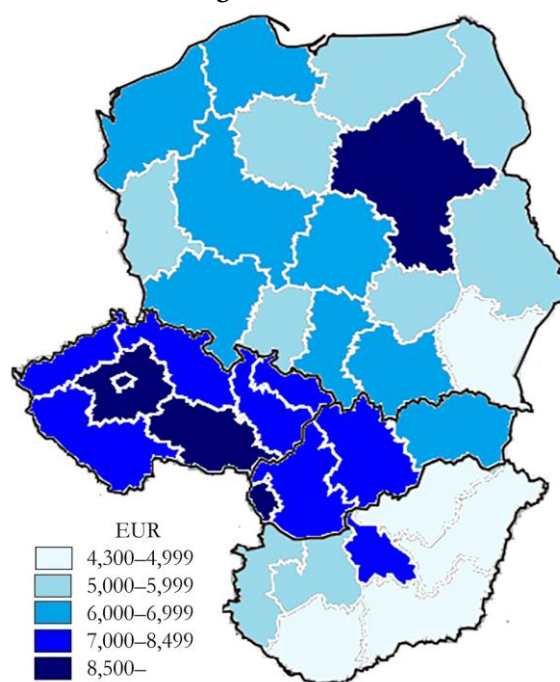
<sup>11</sup> The analysis of income distributions across EU member states illustrates that income inequalities were higher in low-income countries and lower in high-income countries (Eurostat 2017).

Since the crisis from 2007, and between 2008 and 2013, we have observed considerable income inequality increases: Hungary showed a difference of 65.1% between the lowest and highest values, and an inequality increase of 9.11%, followed by Poland (difference of 85.7%, an increase of 5.67%), while Slovakia registered the highest level of inequalities (135.4%), with a stationary tendency (0.21%). The only exemption is the Czech Republic with a difference of 60.8%, and a slight decrease of regional income inequalities of  $-1.69\%$ .

The income position in the capital cities was far more favourable in all Visegrad countries (see Figure 5).

Figure 5

Map of household income distribution in the NUTS 2 regions of the Visegrad countries, 2013



Source: Own elaboration based on Eurostat database.

Based on the GINI coefficient of disposable income, the situation of the Visegrad countries, compared with the other member states of the EU, is quite good; their values are almost in every case below the EU average (see Table 2). The highest income inequality among the member states is shown by Bulgaria with a value of 38.3 in 2016. Besides this country, Latvia, Lithuania, Romania and Spain also have high values. In contrast, Slovakia had the lowest rates in 2016 among all of the member states.

Table 2

## GINI index of the household income in the EU member states

	2008	2009	2010	2011	2012	2013	2014	2015	2016	Yearly average change, % 2008–2016
European Union	31.0	30.6	30.5	30.8	30.5	30.5	31.0	31.0	30.8	-0.08
Eurozone	30.5	30.2	30.2	30.6	30.4	30.6	30.9	30.8	30.7	0.08
Belgium	27.5	26.4	26.6	26.3	26.5	25.9	25.9	26.2	26.3	-0.56
Bulgaria	35.9	33.4	33.2	35.0	33.6	35.4	35.4	37.0	38.3	0.81
Czech Republic	24.7	25.1	24.9	25.2	24.9	24.6	25.1	25.0	25.1	0.20
Denmark	25.1	26.9	26.9	26.6	26.5	26.8	27.7	27.4	27.7	1.24
Germany	30.2	29.1	29.3	29.0	28.3	29.7	30.7	30.1	29.5	-0.29
Estonia	30.9	31.4	31.3	31.9	32.5	32.9	35.6	34.8	32.7	0.71
Ireland	29.9	28.8	30.7	29.8	30.5	30.7	31.1	29.8	29.5	-0.17
Greece	33.4	33.1	32.9	33.5	34.3	34.4	34.5	34.2	34.3	0.33
Spain	32.4	32.9	33.5	34.0	34.2	33.7	34.7	34.6	34.5	0.79
France	29.8	29.9	29.8	30.8	30.5	30.1	29.2	29.2	29.3	-0.21
Croatia	–	–	31.6	31.2	30.9	30.9	30.2	30.4	29.8	-0.97
Italy	31.2	31.8	31.7	32.5	32.4	32.8	32.4	32.4	33.1	0.74
Cyprus	29.0	29.5	30.1	29.2	31.0	32.4	34.8	33.6	32.1	1.28
Latvia	37.5	37.5	35.9	35.1	35.7	35.2	35.5	35.4	34.5	-1.04
Lithuania	34.5	35.9	37.0	33.0	32.0	34.6	35.0	37.9	37.0	0.88
Luxembourg	27.7	29.2	27.9	27.2	28.0	30.4	28.7	28.5	31.0	1.42
Hungary	25.2	24.7	24.1	26.9	27.2	28.3	28.6	28.2	28.2	1.42
Malta	28.1	27.4	28.6	27.2	27.1	27.9	27.7	28.1	28.5	0.18
Netherlands	27.6	27.2	25.5	25.8	25.4	25.1	26.2	26.7	26.9	-0.32
Austria	27.7	27.5	28.3	27.4	27.6	27.0	27.6	27.2	27.2	-0.23
Poland	32.0	31.4	31.1	31.1	30.9	30.7	30.8	30.6	29.8	-0.89
Portugal	35.8	35.4	33.7	34.2	34.5	34.2	34.5	34.0	33.9	-0.68
Romania	35.9	34.5	33.5	33.5	34.0	34.6	35.0	37.4	34.7	-0.42
Slovenia	23.4	22.7	23.8	23.8	23.7	24.4	25.0	24.5	24.4	0.52
Slovakia	23.7	24.8	25.9	25.7	25.3	24.2	26.1	23.7	24.3	0.31
Finland	26.3	25.9	25.4	25.8	25.9	25.4	25.6	25.2	25.4	-0.43
Sweden	25.1	26.3	25.5	26.0	26.0	26.0	26.9	26.7	27.6	1.19
United Kingdom	33.9	32.4	32.9	33.0	31.3	30.2	31.6	32.4	31.5	-0.91

Source: Own compilation based on Eurostat database.

If we take a look at the last column of Table 2 that shows the changes happened from 2008 to 2016 in the GINI coefficient of the member states, we can state that in half of the member states there was a positive shift in income disparities, while in the other half a negative shift. The biggest increase of the income inequalities can be

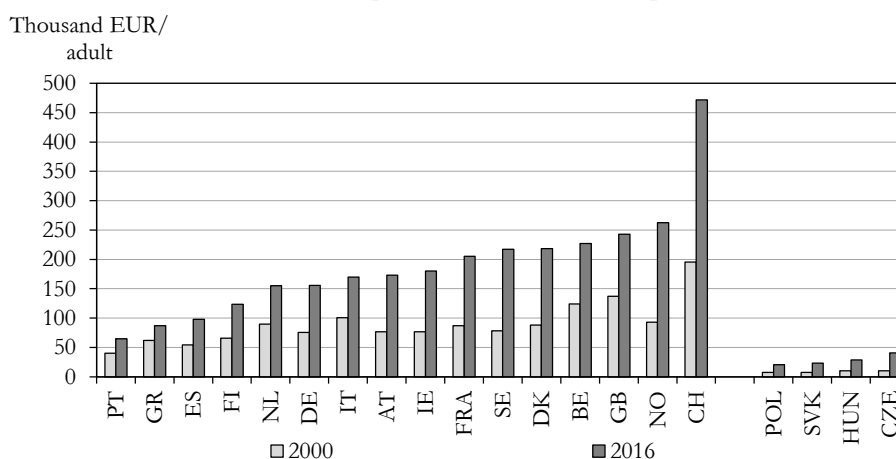
seen in the case of Cyprus and Denmark, with yearly average growth of 1.28 and 1.24 percentage points, respectively. The biggest declines were shown by Latvia (−1.04) and Croatia (−0.97) in the analysed period. In the case of the Visegrad countries, there was an increase in income disparities (except for Poland where it decreased by 0.89%), it was the biggest in Hungary with 1.42%.

### Household wealth inequalities

There are considerable inequalities in terms of accumulated financial assets between the developed EU member states and Visegrad countries. Residents of Visegrad countries own the fewest gross financial assets, which amount to almost half of the assets owned by the Portuguese (see Figure 6).

Figure 6

#### Gross financial assets per adult in some European countries



Note: For country abbreviations, see <https://www.iso.org/obp/ui/#search/code/>.

Source: Own calculation based on Global Wealth Databook 2016 (Kersley–Koutsoukis 2016).

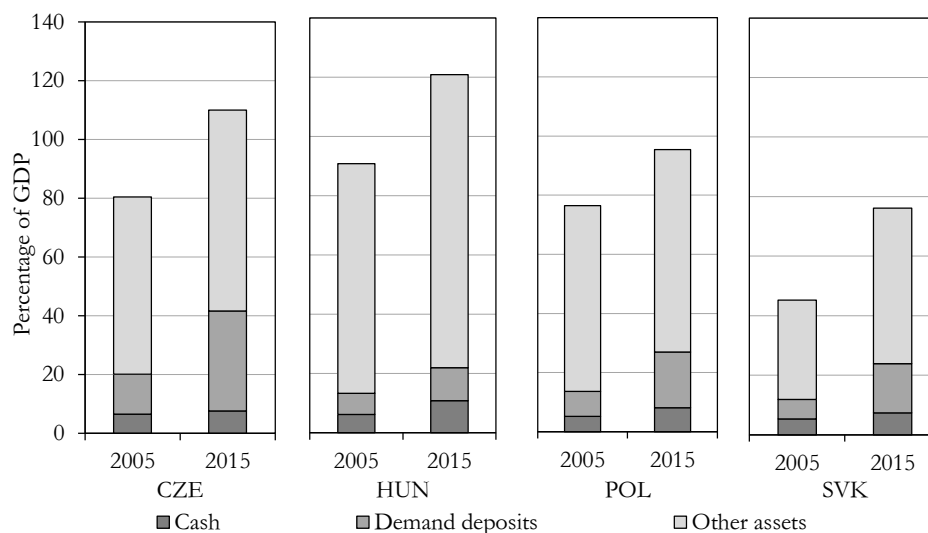
The household financial assets started to increase after 2010 (in Hungary in 2013) with the increase of liquid savings. Household financial assets were the highest in Hungary compared to the other three Visegrad countries (assets exceeded 120% of GDP by the end of 2015) despite the fact that the wealth was held in liquid assets in all Visegrad countries, which is the result of the increase in the cash-to-GDP ratio (see Figure 7). Cash balances in Hungary increased at a higher pace than in other countries in the region, whereas a considerable increase in demand deposits was observed in the Czech Republic, Poland and the Slovak Republic. The greatest increase in demand deposits was reported in the Czech Republic where the rate of total liquid assets accounted for almost 40% of gross financial assets by 2015. The shift of the household demand towards liquid financial assets was generated by

a lack of confidence and a record-low return climate, which resulted in a decrease in the costs of liquid asset alternatives.

The cause for the high level of demand deposits in the Czech Republic can be that this type of deposit (especially current accounts) counts as the major source of funding and reinvestment possibility for a bank. Current accounts have a stable core and due to this stable core balance, current accounts represent a stable source of funding for banks (Dzmunánová–Teply 2015, p. 280.). Regarding this, from 2003 to 2015, cash compared with demand deposits (liquid assets of households and enterprises) clearly confirms a declining importance (Reveda 2017, p. 22.). In Hungary, the level of households' net financial assets was relatively low before the crisis, as there was a significant indebtedness of households. After the crisis, the households have saved an increasing amount of their income, which went either for credit repayment or into deposits. From the end of 2012, households were looking for investments with higher yields, and the demand for liquid financial assets (cash, demand deposits) was increased (MNB–Portfolio 2016). In the international comparison, the level of Hungarian demand deposits is relatively low, but the share of securities is the highest in the region, which means that the level of households' financial assets is the highest in Hungary among the Visegrad countries. The high share of securities is the consequence of significant government securities investments (MNB 2016).

Figure 7

### Household gross financial assets in the Visegrad countries by asset type



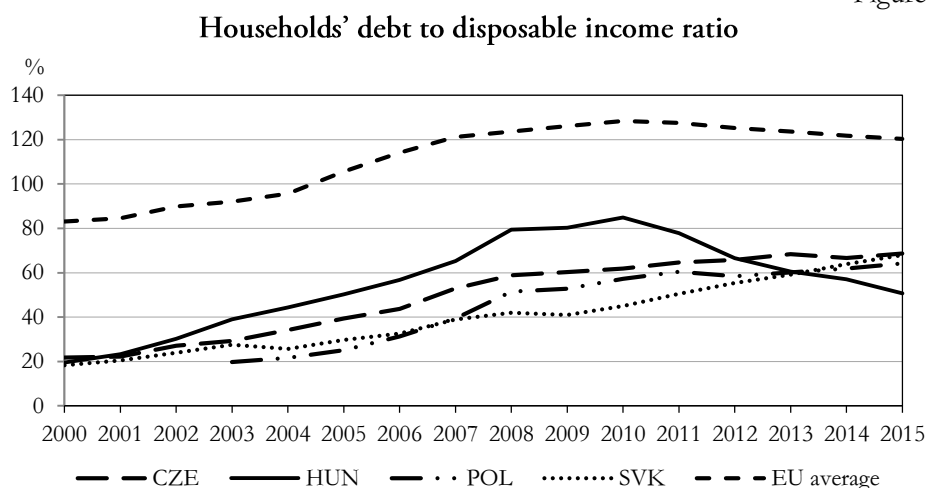
*Note:* Types of financial assets: monetary gold and special drawing rights; currency and deposits; debt securities; loans; equity and investment fund shares or units; insurance; pension and standardised guarantee schemes; financial derivatives and employee stock options; other accounts receivable/payable.

*Source:* Own calculation based on Eurostat database.



Credit to household trends increased considerably. However, the pace of increase varied across the region. The only exception to this trend was Hungary where households became more risk aware, due to the unfavourable impact of the 2008 crisis, and made attempts to get rid of their foreign-currency denominated debts (see Figure 8). It is observable that the households' debt to disposable income ratio is lower in the Visegrad countries than the EU average, which also shows a slow consolidation after 2011. In Slovakia, there was a great increase in this indicator from the beginning of the 2000s, which corresponds to structural changes and to positive macroeconomic development reflected in strong demand (National Bank of Slovakia 2006). In the last five or six years the increase of households' debt to disposable income ratio was more rapid, which can be explained as a result of improved financial conditions that are triggering higher credit growth and rising household debt in excess of increases in gross disposable income (IMF 2016).

Figure 8



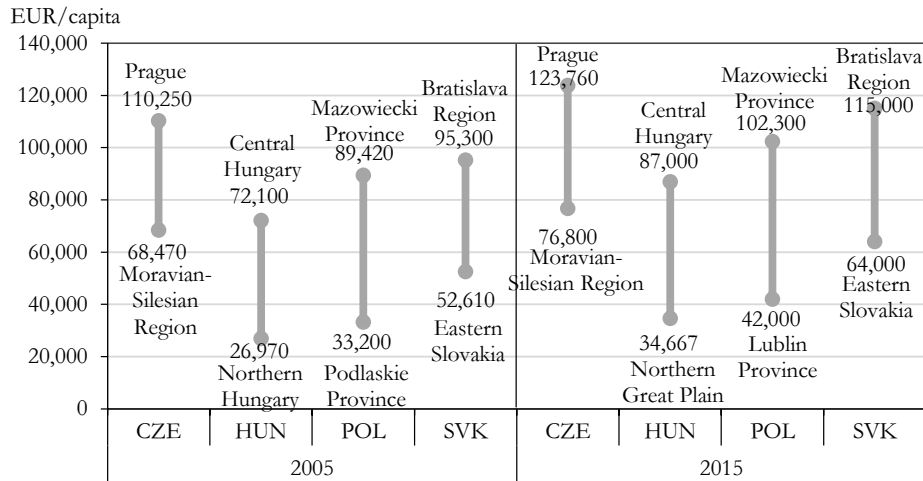
Source: Own calculation based on Eurostat database.

Household net financial assets are largely dispersed at NUTS 2 level, especially in the case of Hungary and Poland (see Figure 9).

In the examined period, we have analysed the distribution of net financial assets, and we have observed that the greatest in-country differences between the maximum and minimum values (150.95%) are present in Hungary. It is a positive fact, that the differences decreased by approximately 2.44% from 2005 to 2015. The lowest difference between the maximum and minimum values of financial assets is characterised by the Czech Republic in 2015 (61.14%), which increased by 0.48% from 2005. Poland has shown similar tendencies to Hungary in the examined years, as the difference of regional values was 143.57%, with a decrease of 3.92% from 2005. In Slovakia, there was a 79.68% gap among the values (which is 0.44% lower than in 2005).

Figure 9

**Distribution of household net financial assets at NUTS 2 level in the Visegrad countries**

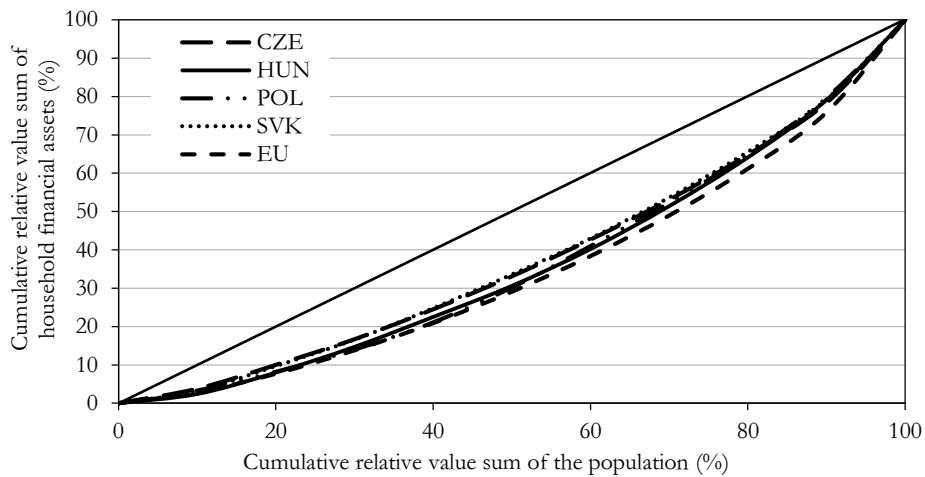


Source: Own calculation based on Eurostat database.

The distribution of household net financial assets in the Visegrad countries is similar and closely follows the distribution of the net income (see Figures 10).

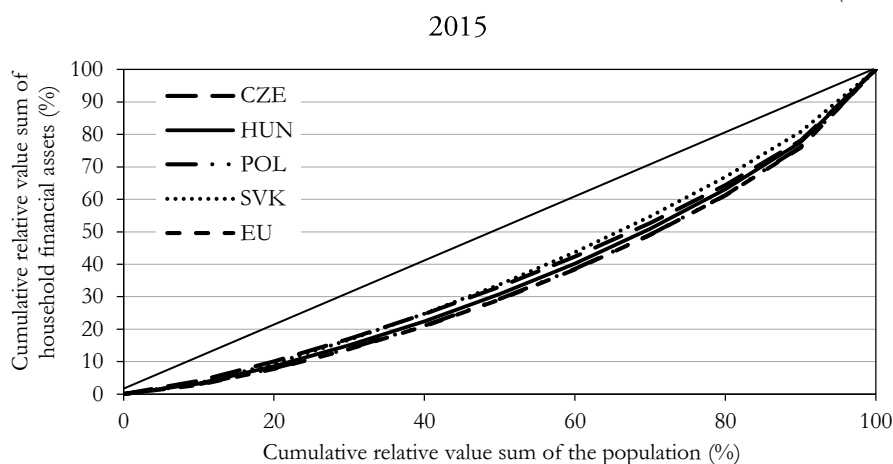
Figure 10

**Distribution of household financial assets in the Visegrad countries 2005**



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Source: Own calculation based on ECB database.

The period after the crisis of 2008 saw a considerable increase in the net financial assets of households (see Figure 9 and Table 3).

Table 3

**GINI index of household net financial assets**

	Eurozone	CZE	HUN	POL	SVK
2005	0.678	0.641	0.652	0.624	0.598
2008	0.672	0.634	0.651	0.662	0.620
2010	0.648	0.588	0.650	0.619	0.576
2012	0.633	–	–	–	0.450
2015	0.685	0.521	0.643	0.587	0.492

Note: There are no 2012 data for the Czech Republic, Hungary, and Poland.

Source: ECB database and household finance and consumption survey data.

### Effects of monetary policy on household wealth

In housing loan practices related to housing construction/purchases, mortgage borrowings denominated in foreign currencies (in EUR and Swiss franc [CHF]) soared at the beginning of the 2000s (especially in Hungary and Poland) due to high inflation, high bank interest rates and more favourable credit conditions.<sup>12</sup>

As a result of the 2008 financial crisis and the weakening rate of the Hungarian forint (HUF) and the Polish zloty (PLN), the interest rates and capital repayments in

<sup>12</sup> In Hungary, in the summer of 2011, 576 thousand households had mortgages, i.e. almost 1.9 million people (every fifth Hungarian) were involved, 287 thousand families out of these (almost 945 thousand people) had a loan in foreign currency (kormanyzat.hu; date of access: 25/06/2012).

respect of loans gradually grew. An increasing number of mortgage holders were unable to meet their obligations; thus, they expected their government to introduce some measures to ease their burden.<sup>13</sup>

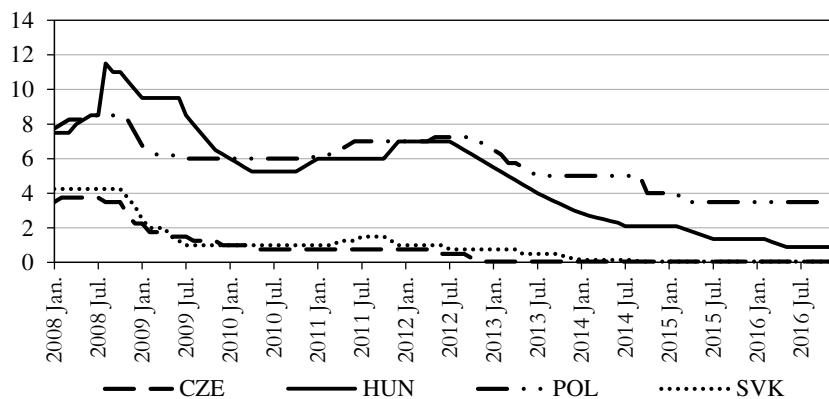
Mortgage lending considerably reduced the consumption of households, exposing both the population and the government, wishing to handle mortgage-lending problems, to long and protracted difficulties.<sup>14</sup>

As a consequence of the financial crisis of 2008, the real economy experienced a serious downturn, and the unemployment rate rose in the countries of the region. In order to compensate for this, the central banks of Europe (e.g. ECB as well as the Czech, Polish and Hungarian central banks) took a more active role in resolving the problems than before (albeit more belatedly than the Fed). In order to prevent further GDP decline they decreased interest rates and launched non-traditional monetary programs (e.g. quantitative easing).

In this respect, the Czech National Bank was the most active since it practically kept its base rate at almost zero from the end of 2012. The Slovak National Bank followed the ECB policy (see Figure 11).

Figure 11

#### Change of the central bank base rate in the Visegrad countries



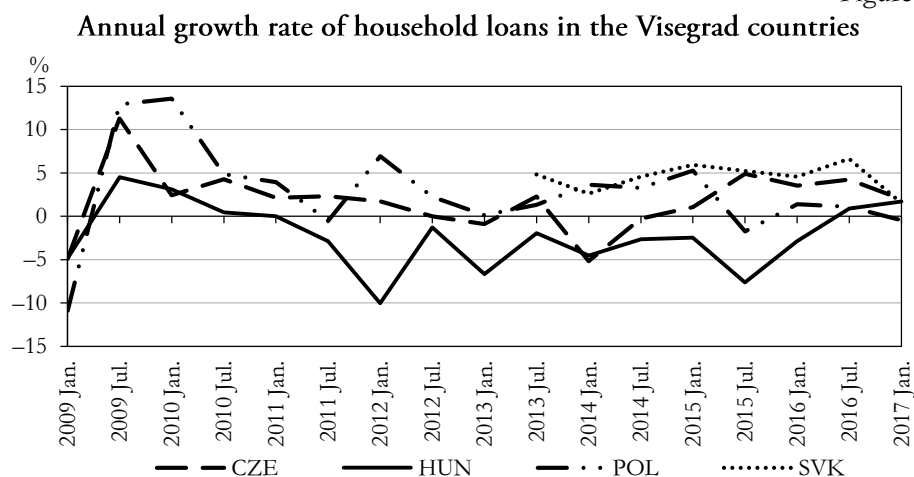
Source: Own calculation based on Czech, Hungarian, Polish, and Slovak central bank data.

<sup>13</sup> The situation got even worse when in January 2015 the Swiss Central Bank unexpectedly abandoned the CHF 1.2 exchange rate threshold in EUR/CHF exchange rate, in effect from January 2011 (thus preventing CHF from strengthening), and let CHF get stronger, which also cut the EUR/USD exchange rate. As a result, the HUF and the PLN started to devalue. The majority of the Hungarian foreign currency borrowers, who had taken the opportunity of the National Bank of Hungary with a measure of HUF-denominated foreign currency lending, averted the disaster, however, nearly 377,000 car loan and personal loan contracts went through gross revaluation.

<sup>14</sup> According to the Polish Financial Fiduciary Authority (KNF), Polish mortgage holders can be supported by about 9.1 billion PLN (670 billion HUF) if they accept the related law. According to the draft endorsed by the president, Andrzej Duda, the mortgage lending banks had to repay their customers the difference between the allowed price gap (the difference between the disbursement and repayment rates compared to the official central bank rate) and the interest rates of the loans granted in CHF – between 1 July, 2000 and 26 August, 2011. The latter date coincides with the date when the measures to eliminate the price gap came into force (Mártonffy 2017).

The number of credit transactions and their value decreased in the examined period, especially in Hungary (see Figure 12). The decrease in the base rate had a favourable impact on GDP (see Table 4) and public debts (see Figure 16) in all four countries, however, this was not experienced immediately.

Figure 12



Source: Own calculation based on Eurostat data.

After the financial turmoil of 2008, the impact of interest rate cuts affected inflation to a lesser extent than in the 1995–2007 period due to the moderate consumption of the population (see Table 4).

Table 4

**Impacts of monetary policy on issuance (GDP)**

Denomination	CZE	HUN	POL	SVK
1995–2007				
Base rate	-0.791**	-0.916**	-0.918**	-0.920**
Inflation	-0.676*	-0.858**	-0.846**	-0.609*
CDS surcharge	N/D	N/D	N/D	N/D
Employment	-0.247	0.830**	-0.174	0.395
Base rate (by filtering the employment rate)	-0.921	-0.598	-0.896	-0.880
2008–2015				
Base rate	-0.534	-0.789*	-0.683	-0.856**
Inflation	-0.093	-0.674	-0.757*	-0.398
CDS surcharge	-0.562	-0.457	-0.572	-0.363
Employment	0.813*	0.727*	0.714*	0.286
Base rate (by filtering the employment rate)	-0.300	-0.487	-0.229	-0.868

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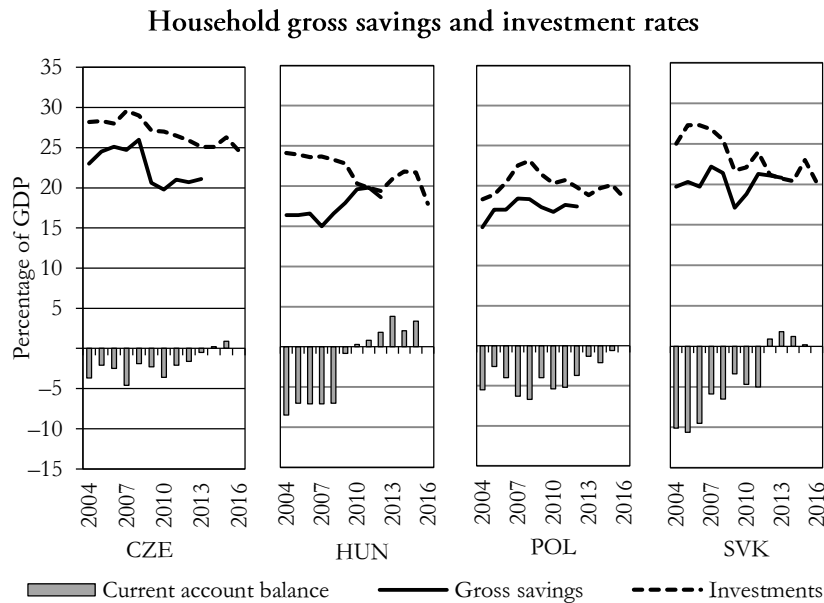
Denomination	CZE	HUN	POL	SVK
	NUTS 2			
	2007			
Employment	0.081	0.902**	0.810**	-0.719
	2015			
Employment	0.180	0.860*	0.863**	-0.796

Note: \*  $p < 0.05$ , \*\*  $p < 0.01$ . CDS stands for credit default swap. As for CDS spreads, the data were available for the 2010–2015 period. The employment rate data covers the years 1998 to 2015.

Source: Own compilation based on Eurostat, World Bank, Bloomberg data, and Czech, Hungarian, Polish, and Slovak central bank data.

The 2008 crisis also curbed the investment and savings rates of households (see Figure 13).

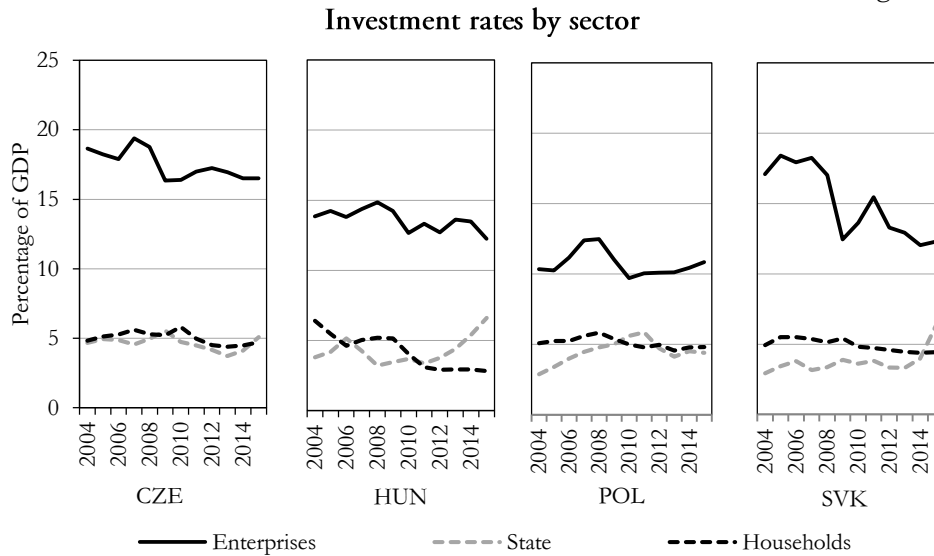
Figure 13



Source: Own calculation based on Eurostat data.

The willingness of households to invest fell especially in Hungary (see Figure 14).

Figure 14

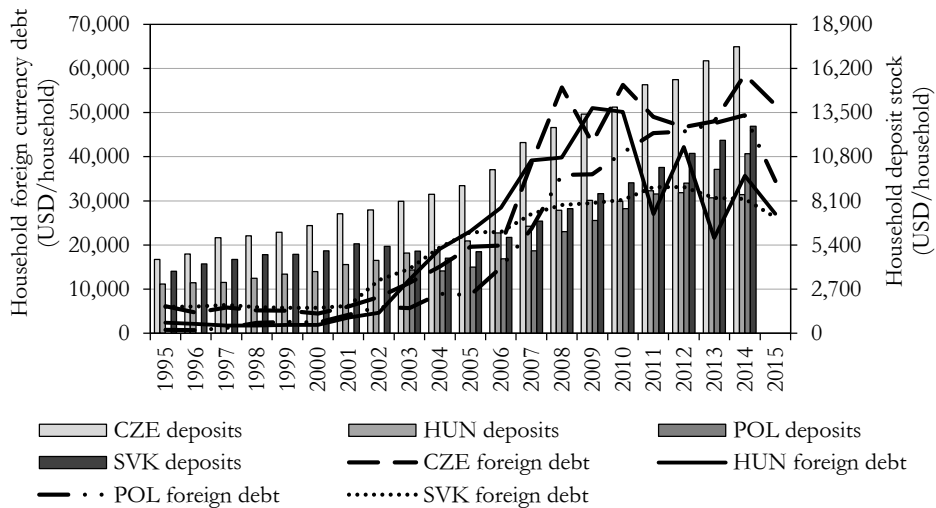


Source: Own calculation based on OECD data.

From the beginning of the 2000s, in the Visegrad countries the demand for consumer durables and new homes increased, and people intended to cover this demand mainly from long-term loans (see Figure 15).

Figure 15

### Change in foreign currency debt and household deposits in the Visegrad countries



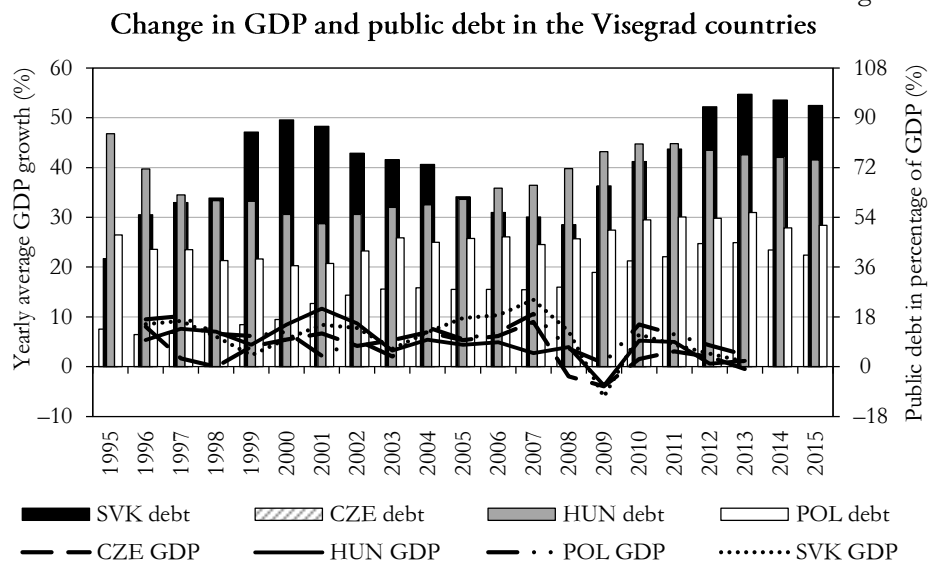
Source: Own calculation based on OECD data.

Compared to debt practices followed decades ago, a new element emerged in the credit growth (mainly in Hungary and Poland), namely the indebtedness in foreign currencies.

The turbulence of the financial crisis in 2008 affected families extremely unfavourably. Lending banks further weakened national currencies. As a result, mortgage borrowers were trapped: most of them had almost no chance to repay the continuously increasing monthly instalments. Consequently, banks began to enforce their rights in line with the mortgage contract. Low-income young families got into a particularly disadvantageous situation. As a result of the crisis, however, unemployment grew in the majority of the region, which also affected the income disparities.

After the change of regime, Czechoslovakia's public debt was extremely low compared to Poland's and Hungary's. The Czech Republic and Slovakia have retained this advantage while Hungary has again increased its public debt since 2002 (see Figure 16).

Figure 16



Source: Own calculation based on Eurostat data.

### Chances of restoring financial positions

There is no consensus in the economic literature in connection with the income recovery from crisis (Lehmann et. al. 2017). There is a debate as to whether GDP



growth will return to the pre-crisis level, if there will be a prolonged decline in the level, or whether a long-lasting loss of growth will be experienced.<sup>15</sup>

In fact, three scenarios can be outlined for the future of GDP: 1. it will return to the original growth rate (trend); 2. the deviation from the original trend will be permanent, and a new lower but parallel trend will emerge; 3. a new, flatter trend will be observed.

Following 1990, there is already some empirical experience in the case of Hungary, where in 2002 the labour income reached the average level of 1990, while pensions did so in 2004.

According to the current data, the financial crisis of 2008 slowed down growth rate of household income and financial assets in the Visegrad countries. Since 2010, it has been on a new trend path. In the period of 2010–2015, household loan stocks were written-off and restructured, which had a significant impact on the wealth of households, for each asset item.<sup>16</sup>

According to our estimates, the restoration of financial assets has slowed down due to the rising household lending, the recovery of housing markets and rising consumption (providing the Fed and ECB's tightening monetary policy will not cause more turbulence in the global financial markets).

In the coming years, net financial savings of households may decrease as a result of increasing consumption which was hindered by the crisis, measures introduced by governments, decreasing interest rates, and increasing household investments. In the future, the financing potential of households may further exceed the pre-crisis level and may amount to around 4% of GDP in the region by 2019.

## Conclusions

The neoliberal economic policy revolution of the 1970s resulted in the increase in households' income and wealth differences in developed countries. This trend in the Visegrad countries became stronger, with a delay, after the 1989/1990 geopolitical model change. This was partly due to the change in the economic structure in the countries of the region and, on the other hand, to privatization, where a small social group acquired a significant part of former state property.

In the 2000s, the growth in the income gap between households slowed down, and after the crisis of 2008, the differentiation of the wealth of households in the region continued.

Despite the restarted growth, the financial property of households in the Visegrad countries is significantly smaller than in the developed EU member states.

<sup>15</sup> According to a 2000–2016 study on real GDP in the US and the Eurozone (Lehmann et. al. 2017), the recovery in GDP was slower in the period following the outbreak of the crisis than before the crisis.

<sup>16</sup> Our findings are in line with the fact that the rate of recovery of income depends on the real GDP growth rate.

Serious social tension emerged – due to foreign currency mortgages – whose treatment required serious state interference in Hungary. These tensions are still experienced even nowadays.

According to our empirical studies, there would have been a credit crunch (lack of money and lending willingness) without monetary and fiscal easing after 2008. The relaxed monetary policy of the relevant central banks (Czech, Polish and Hungarian) was therefore justified. At the same time, this policy could only partially compensate for the economic downturn due to the banks' pro-cyclical lending practices. As a result of the crisis, income differences started to rise again, which led to even wider gaps in incomes.

The loss of family assets was mainly due to families affected by foreign currency mortgage lending (for Hungary and Poland).

Recovery of income and wealth has begun, but it will take at least 3-4 years to reach the pace of pre-crisis growth. In addition, its level could be permanently lower since more families and credit institutions are behaving more cautiously than before the crisis.

On the other hand, it has been demonstrated that the more open an economy is (e.g. the Visegrad countries), the more vulnerable the affected households are to the global crisis. Therefore, in order that the impacts of the expected financial crises could be addressed, increased attention should be paid to macro-prudential regulation, ethical interest rates, as well as to strengthening the financial culture of the population.

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## Dwelling services, with an emphasis on imputed rent in the European Union \*

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Imputed rent and actual rent paid by the tenant are inherent in dwelling services. The study presents the estimation method of imputed rent in national accounts. Without imputing this item, gross domestic product (GDP) figures would be skewed. The author examines the distribution of imputed rent within the European Union (EU) member states, and describes the housing conditions therein; she also identifies the theory behind the differential distribution of owner-occupied dwellings among member states and analyses EU housing conditions. Using the Esping-Andersen (1990) welfare state typology and national accounts figures, EU member states are clustered based on their imputed rents. Some of the findings align with the Esping-Andersen typology, while others do not. Convergence of liberal, universalistic and conservative welfare regimes is found with respect to housing tenure. In the paper the Mediterranean welfare regime constitutes a separate cluster, just as EU 'new-comers' (formerly socialist member states) that showed a completely different character with respect to housing tenure. The study presents two methods (the stratification and the user-cost methods) by which imputed rent was determined for the EU member states. Macro- and micro-level aspects are considered when analysing dwelling services of EU member states, depending on the scope and depth of the examination. The two data sources are based on different methodologies thus satisfy different research purposes. Nonetheless, by leveraging these two data sources, one can achieve deeper insights into EU housing conditions.

### **Keywords:**

imputed rent,  
dwelling services,  
housing condition

\* The views expressed herein are solely those of the author.

## Introduction

Imputed rent is the main component of dwelling services; it is the amount that a homeowner would pay to himself or herself if he/she were to rent that home. The estimation of imputed rent of an owner-occupied dwelling is one of the specialities of national accounts: according to the System of National Accounts (SNA) and the European System of Accounts (ESA), imputed rent is indispensable, as it constitutes a part of GDP. In fact, in the absence of imputed rent, it is impossible to compile the sequence of national accounts. It is essential that this item be included in the main aggregates of the economy, because a general shift from rented dwellings to private ownership may provide a misleading or inaccurate picture of the economy's performance.

Countries can vary significantly in terms of the ratio of owner-occupied to rented dwellings, and in the absence of this information, international comparisons will be distorted. Additionally, having a net imputed rent tends to reduce inequality within a country, or among countries. In any case, imputation data are needed, because housing tenure changes over time in any country and in the absence of said data, intertemporal comparisons of production and consumption vis-à-vis housing services would be biased. The European Commission's task is to ensure that member states use comparable methodologies when estimating the components of their national accounts. GDP and gross national income (GNI) are the basic measures that play important roles in determining transfers payable through the EU budget, and so the importance and implications of having sound imputed rent information are clear.

With the production approach, the value of the imputed services of owner-occupied dwellings appears as an output of production; however, with the expenditure approach it appears as the final consumption of households. In the income approach of national accounts, finally, it appears as one of the most significant components of household-level disposable income. In emphasizing the need to impute non-market items, inspiration can be drawn from the Report by the Commission on the Measurement of Economic Performance and Social Progress, also known as the Stiglitz Report (Stiglitz et al. 2009). The report suggests that, when examining welfare, the household-level perspective should predominate, and a broader measure of household income should be taken into account. It has been proven on the basis of Gini index values that when one takes into consideration imputed rent items, inequalities among countries decrease, as do those within a single country (Juntto-Reijo 2010, Törmälehto-Sauli 2013, 2017).

Several hypotheses exist concerning the magnitude of tenure status or of dwelling ownership within a country. Some suggest that the magnitude relates to the country's level of economic development – which is to say, the more developed a country's economy is, the higher its percentage of dwelling ownership will be. Others assume that the share of owner-occupied dwellings is influenced by other factors, like cultural or socioeconomic factors, institutional or historical backgrounds, and the legal system of the country.

This study aims to determine the degree to which housing conditions and housing tenure differ among countries, and to cluster EU member states in terms of their imputed rent (as drawn from national accounts figures). I use both macro- and micro-level data to compare the member states in terms of imputed rent and housing tenure; macro-level data comprise national account data, while micro-level data are obtained from the statistics on income and living conditions (EU-SILC) database (Eurostat 2014), available from the Eurostat homepage (<https://ec.europa.eu/eurostat/data/database>).

In the paper, first the theory that explains the rationale behind the distribution of home ownership in the EU is discussed. Then the two main valuation methods on imputed rent (namely, the stratification method and the user-cost method) are introduced, and the macro- and micro-level data sources used for the examination are presented. After that, EU housing conditions are analysed based on the aforementioned macro- and micro-level data, emphasizing the ways in which the two main data sources are used. Finally, conclusions are drawn regarding the distribution of imputed rent versus housing tenure status.

### **Rationales and theories behind the institutional dwelling services framework**

There are different rationales or theories behind the state of (and changes in) the share of home ownership across different countries. One would suppose that the possession of certain properties (dwellings) relate to the prosperity of a state: the higher the state's per-capita GDP is, for example, the higher the ratio of owner-occupied dwellings will be. However, research findings do not support this hypothesis. In fact, the opposite trend can be seen in the cases of Germany and Romania, where in spite of high-level economic performance, there are low proportions of owner-occupied dwellings, and vice versa. In exploring other explanations for this phenomenon, the following ideas can be found in the literature.

Juntto and Reijo (2010) undertook a methodological study related to imputed rent, based on Network for the Analysis of EU-SILC (Net-SILC) data.<sup>1</sup> They suggest that every country has its own institutional framework for housing. Welfare regime typologies can provide some explanation vis-à-vis national housing conditions, cultures, and structures. Based on the work of Esping-Andersen (1990) and his colleague (Esping-Andersen–Myles 2009), welfare regime typologies can be used to categorize countries into groups, in terms of the relationships therein among the state, market, and family in housing provisions. These types of welfare regimes are the liberal, universalistic, conservative, and Mediterranean state regimes. These researchers have found in each country a strong correlation between its type of welfare regime and its housing framework. (One should bear in mind, however, that

<sup>1</sup> See Eurostat (2010).



these categories were not primarily created to describe differences in institutional housing conditions.)

A *liberal welfare regime* is influenced predominantly by the market, and its housing policy is marginal. This regime supports the possession of private property, and there is a deep demarcation between the social and private rental sectors. The taxation system favours the private rental sector, and subsidies are predominantly means-tested benefits. In a liberal welfare regime, developed financing and housing market prevails, and household indebtedness is treated as something quite typical.

The main features of a *universalistic welfare regime* – often referred to as a *Nordic* or *Scandinavian welfare regime* – include the large share of the non-profit housing sector and the presence of high-level public subsidies. Housing provision allocations have no means testing. This is the most egalitarian regime of all.

In a *conservative* (or *corporatist welfare*) *regime*, the market's role is moderately determined by housing provision and financing. The proportion of owner-occupied dwellings is large. Family relationships tend to carry more weight with regard to housing services and house building than is typically seen in liberal or universalistic regimes. As the countries that belong to this regime group generally have high levels of industrialization, urbanization, and wealth, the share of dwellings inherited through intergenerational transfers is relatively high.

The *Mediterranean welfare regime* was not considered by Esping-Andersen as constituting a separate welfare regime, but later the typology was extended to feature this group. Compared to a conservative regime, family and kin are considered even more important in this regime, and intergenerational housing transactions are significant. The state does not play an important role in regulating the housing market or housing services through taxation or subsidization.

Among Esping-Andersen's original regime types, Central-Eastern European countries did not comprise a separate regime type, because at that time they were still economies in transition. The new member states (i.e. those that became EU members after 2004) can be characterized as having very high shares of owner-occupancy; a small social housing sector, mostly because of the intensive privatization process; and a small private rental sector. Within this regime, private homes are rarely sold, and so defining competitive pricing is nearly impossible. Additionally, new homes and mortgage loans are more difficult to obtain within these countries. By now, one can see that in many respects, Central-Eastern European countries constitute a separate type of welfare regime in terms of dwelling services.

### **Estimation methods used to compile imputed rent**

The compilation of imputed rent is not a new phenomenon in the history of national accounts. The earliest version of SNA, published in 1953, states that the 'rental imputation accords with the rules given for other producers if account is taken of the fact that home

ownership is regarded as a trade' (SNA 1953, p. 5). Since then, all versions of the SNA (1993) treat owner-occupied dwelling services as falling under the auspices of production. The actual SNA 2008 describes in paragraph 6.34 that, although it constitutes an exception to the general exclusion of own-account service production, owner-occupiers' production of housing services for their own final consumption has always constituted a part of domestic output. In the ESA 2010 regulation, imputed rent is defined as a main component of real estate services: it describes in paragraph 3.75 that the output of services of owner-occupied dwellings is valued as the equivalent of tenant-occupied unfurnished dwellings. At the time of imputation, several factors should be taken into account, like location, neighbourhood amenities, as well as dwelling size and quality. A similar imputation is required for garages located separately but used by the owner of the dwellings, and holiday homes used for permanent living. Apart from SNA and ESA (1995, 2010), there are other European Commission regulations that describe the principles used to estimate dwelling services. One of them is a regulation that specifies the said principles and which took effect in 1995.<sup>2</sup> Until 2000, the EU member states comprised Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, the Netherlands, Portugal, Spain, Sweden, and the United Kingdom. These member states' housing markets and housing conditions varied widely, but differed even more from those of the newcomers that acceded to the EU in 2004. The suggested and preferred method for imputing owner-occupied dwelling services was (and still is) the stratification method, which is based on actual rents. However, while self-assessment and the user-cost method were mentioned among the options, they received no special emphasis at that time. The other important specific law was Commission Regulation No. 1722/2005, which focused on the changed situation of the enlarged EU. In 2004, following the accession of Central-Eastern European member states, the composition of housing tenure status shifted towards a higher rate of owner occupancy, relative to a 'comparatively' tiny private rental sector. The main difference between the two aforementioned documents is that while the former did not specify the circumstances under which the second best method – namely, the user-cost method – should be applied, the latter gave more detailed rules for its application. Two other methods have been mentioned, but there has been no suggestion that they be applied. Under the first, the self-assessment method, an owner-occupier estimates the potential rent for his or her dwelling, but the estimation is treated as subjective. Under the second, the administrative assessment method, the potential rent is determined by third parties like the government, generally for fiscal purposes. In the following, I discuss the stratification and user-cost methods in detail.

### **Stratification and regression method**

To compile the output of dwelling services, it is recommended that EU member states apply the stratification method while using actual rents, where 'rent' means the

<sup>2</sup> See Commission Decision No. 95/309 (European Commission 1995).

fee that must be paid for an unfurnished dwelling. Public-owned and furnished dwellings might be included in the imputation, on the condition that amounts that deviate from those of privately owned unfurnished flat can be eliminated. To define the rental value, there are three sets of variables that should be examined. The first set concerns the characteristics of the dwellings and buildings, like the size of the dwelling, the number of rooms, and dwelling amenities. The existence of a bathroom, balcony, central heating, air conditioning, garage, lift, or swimming pool, the position of the dwelling, and the number of dwellings within the building are all relevant factors. The environmental characteristics constitute the second set of variables. Proximity to the economic centre, the beauty of the landscape and the surrounding green area, access to transport facilities, access to shops/schools/pharmacies, and the reputation and security of the district all are factors that contribute to the rental value amount. The third set of variables can be summarized as socioeconomic factors, which include the rental regulations of central and local governments, the age of the tenancy agreement, the housing tenure status, and the rental policy of the landlord. These are all factors that play an important role in shaping the rent amount.

Use of the capital value of dwellings for stratification purposes is considered adequate, because the capital value reflects all the important dwelling characteristics. The ratio of capital value to actual rent can be applied if the ratio is proven stable and if the value of capital is based on an objective assessment. The method can be used with physical stratification criteria. The weakness of this method is that the number and descriptions of strata can differ among EU member states. However, certain basic criteria (e.g. dwelling size and location) should be applied everywhere.

By using multiple regression analysis, one can assess the influence of individual variables. The explanatory power of a variable can be quantified by a correlation coefficient, thus allowing one to rank characteristics in terms of importance. In this way, the selection of important variables can help stratify the housing stock. Commission Regulation No. 1722/2005 claims that tabular analyses or special statistical techniques should be used to derive significant stratification criteria. For estimation purposes, at least 30 cells should be produced, and three size classes and two location types should be distinguished. The number of variables is acceptable if the multiple correlation coefficient reaches 70 per cent.

### User-cost method

The second preferred method is the user-cost method. According to the formerly cited regulation, the user-cost method can be applied if both of the following conditions are met: 1. Privately rented dwellings must represent less than 10 per cent of the dwelling stock; 2. Disparity between private and other paid rents exceeds a factor of 3. In the late 1990s, these two conditions were seen in many Eastern European states.

In 1998, 13 formerly socialist countries signed their intention to accede to the EU. Realizing that the stratification method was not feasible for these candidate countries,

Eurostat organized two projects to provide technical assistance to national statistical offices in implementing the user-cost method. The evolution of the user-cost method in satisfying the needs of candidate countries is described in detail by Katz (2009), who explains how it became clear that the stratification method was not applicable in these cases, given the small and unrepresentative private rental sectors of the formerly socialist countries. The user-cost method reverses the normal accounting procedure and compiles the output from its components; in essence, it is the reverse of the usual imputation for dwelling services based on the stratification method.

The components of the user-cost method are intermediate consumption, the consumption of fixed capital, other (net) taxes on production, and the net operating surplus. *Intermediate consumption* contains the expenditure on ordinary maintenance and repair that an owner-occupier incurs in decorating and repairing the dwelling, in areas not typically carried out by tenants. Net insurance paid by the dwelling owners and the financial intermediation services indirectly measured (FISIM) also comprise parts of intermediate consumption. According to ESA 2010 (paragraph 14.01), the amount of FISIM is the difference between the reference rate and the rate actually paid to depositors and charged to borrowers, where the reference rate of interest is the rate at which both the lender and the borrower are happy to conclude a deal. According to Katz (2009), in Eastern European countries, intermediate consumption is between 15 and 25 per cent of the output of owner-occupied dwellings.

The *consumption of fixed capital* (CFC) is estimated based on the stock of fixed assets and the expected average economic life of the different categories of those goods (ESA 2010, paragraph 3.141). The preferred means of estimating the CFC is the perpetual inventory method, which has a long tradition in Western European countries. At the time of their accession, it was recommended to the Eastern European countries that they implement the method as early as possible. The CFC represents on average 30-40 per cent of the output of dwelling services.

*Other (net) taxes on production* concerning dwelling services refer to those taxes payable that relate to the possession of the dwelling (e.g. taxes on the ownership of a building or land) and which are independent of the quantity or value of its production. Across Eastern European countries, the share of this item compared to that of the other components is relatively low.

The most important component of the imputed rent is the *net operating surplus*, which represents nearly 50 per cent of output. By convention, it is calculated by applying a constant real annual rate of return to the net value of the stock of owner-occupied dwellings at current prices. To ensure comparability among countries and to avoid net operating surplus volatility due to different rates of return, it was set by a Commission regulation that the real rates of return on both dwellings and lands were 2.5 per cent.

Table 1 is a sample worksheet compiled by the World Bank, by which one can estimate expenditures on owner-occupied dwelling services by using the user-cost method. This worksheet is helpful in aggregating the main components by which one can derive the amount of imputed rent.

Table 1

**Worksheet for estimating expenditures on owner-occupied dwelling services,  
using the user-cost method<sup>3</sup>**

Item description	
Intermediate consumption	
UC 01	Expenditure on maintenance and repair of owner-occupied dwellings
UC 02	Gross insurance premiums paid on owner-occupied dwellings
UC 03	Insurance premium paid to owners
UC 04	Net insurance premium paid by owners (UC 02 – UC 03)
UC 05	Total intermediate consumption (UC 01 + UC 04)
Other taxes on production	
UC 06	Taxes paid by owners on dwelling services
UC 07	Taxes paid by owners on the value of owner-occupied dwellings and their associated land
UC 08	Total taxes paid by owners (UC 06 + UC 07)
Consumption of fixed capital	
UC 09	Consumption of fixed capital on owner-occupied dwellings at current prices (excluding land)
Net operating surplus	
UC 10	Current market value of the stock of owner-occupied dwellings at the beginning of the year (including land)
UC 11	Current market value of the stock of owner-occupied dwellings at the end of the year (including land)
UC 12	Current market value of the stock of owner-occupied dwellings at mid-year (including land) $((UC\ 10 + UC\ 11) / 2)$
UC 13	Real rate of return on owner-occupied dwellings (including land), in per cent per annum
UC 14	Real net operating surplus $((UC\ 13 * UC\ 12) / 100)$
Expenditure on owner-occupied dwelling services	
UC 15	Expenditure on owner-occupied dwelling services (UC 05 + UC 08 + UC 09 + UC 14)

Source: World Bank (2010).

## Data sources relating to imputed rent and housing conditions

### Macro-level data sources

By macro-level data, I primarily mean data that are based on national accounts or data acquired through aggregation. The most well-known macro-level data aggregated in the national accounts pertain to GDP, GNI, disposable income, and house-

<sup>3</sup> For more information on this worksheet, see <http://documents.worldbank.org/curated/en/116491468180868626/pdf/905170WP003-030N0Box0385317B0PUBLIC.pdf>, p. 9.

hold consumption, *inter alia*. Macro-level data are compiled, among other things, by using different kinds of survey and administrative data, imputations, and leveraging expert estimations. In the case of imputed rent, the following data sources are typically used: housing census data, price index statistics, household budget survey data, and the annual reports of financial corporations. In national accounts, the scope of the reference population includes both private and institutional households, and so all resident households are taken into account. For the sake of comparability among countries, imputed rent compiled in the national accounts is frequently presented as a percentage of GDP or household final consumption expenditure (HFCE).

### Micro-level data sources

Micro-level data refers to survey data collected from individuals, such as those gathered through household budget surveys. Concerning housing conditions, my main data source was the EU-SILC database, which was established in 2003 and is organized under Framework Regulation 1177/2003 accepted by the European Parliament and Council. EU-SILC is a multi-purpose instrument that serves as the reference source for statistics on income and living conditions. By using micro-level statistics like those in the EU-SILC, I was able to achieve deeper insights into not only the distribution of household categories, but also the housing conditions of the member states. As the data are gathered through household surveys, the EU-SILC offers diversified data related to housing conditions. The survey of the EU-SILC serves as a tool for collecting and compiling data and for monitoring the progress made towards fulfilling the goals of the Europe 2020 Strategy. EU-SILC is based on a common framework rather than a common survey, and is organized under a framework regulation that is used by all member states.

The EU-SILC framework comprises a list of target variables. Two kinds of variables exist in the database (primary and secondary variables), and both are gathered at the household and individual levels. Data pertaining to the primary variables are collected every year, while secondary-variable data are collected every five years (or even less frequently) in the so-called *ad hoc* modules related to specific topics. Concerning households and housing conditions, the database contains annual indicators, like ‘imputed rent’ (HY030G/HY030N) on net and gross bases, ‘income from renting a property or land’ (HY040G/HY040N), ‘person responding to the household questionnaire’ (HB070), ‘person 1 responsible for the accommodation’ (HB080), ‘dwelling type’ (HH010), ‘tenure status’ (HH020), and so on. The *ad hoc* module that collects information on dwelling circumstances is called the Housing Conditions Survey, and it was executed in 2007 and 2012.

The variables used in the housing conditions module prioritize the quality measures of housing; these include ‘adequate electrical installations’ (HC030), ‘dwelling comfortably warm during winter time’ (HC060), ‘dwelling comfortably cool during summer time’ (HC070), and ‘accessibility of grocery services, banking

services, postal services, public transport, and primary health care services’ (HC090-HC130), among others.

The value of imputed rent calculated on the basis of micro-level data is examined in the proportion of adjusted disposable income, as part of the EU social indicators. The method by which it is calculated is not as strict as in national accounts, and the compilation method is more diverse across countries.

### Comparing macro- and micro-level data sources

Using the two aforementioned types of data sources, we need to bear in mind that they illustrate different aspects of reality and are not interchangeable; furthermore, their comparability is limited (Eurostat 2013). Table 2 provides an at-a-glance comparison of the macro- and micro-level data sources used in the current study.

Table 2

**Comparison of macro- and micro-level data sources**

Feature of the data source	Macro-level data source	Micro-level data source
Population coverage	Total resident population of a country	Private households
Purpose	Presenting main aggregates like GDP, final expenditure, etc.	Providing EU social indicators
Regulation	Its regulation is compulsory for EU member states	Its regulation is only a recommendation and serves as a framework
Forms of data collection	Multiple sources like surveys, administrative sources, expert estimations, etc.	EU-SILC survey based on household budget survey

In summary, in comparing the macro- and micro-level data aggregates, one can say that, owing to the fact that the compilation method for imputed rent in the national accounts is more strict and regulated by community law – not to mention that it goes through a more thorough checking process –, imputed rent as a macro-level aggregate is more reliable. However, it does have some deficiencies. For example, it cannot provide one with deeper insights into quality measures of a given country’s distribution of housing services. One cannot gain sufficient background information relating to the quality and condition of buildings, the age and income groups of proprietors, and so on. At the same time, however, plenty of detailed information can be acquired from micro-level sources like the EU-SILC and other household surveys. In any case, national accounts figures as macro-level sources describe the total economy, whereas describing how distribution is shaped, micro-level sources are used.

## Comparison of imputed rents and housing conditions across the EU

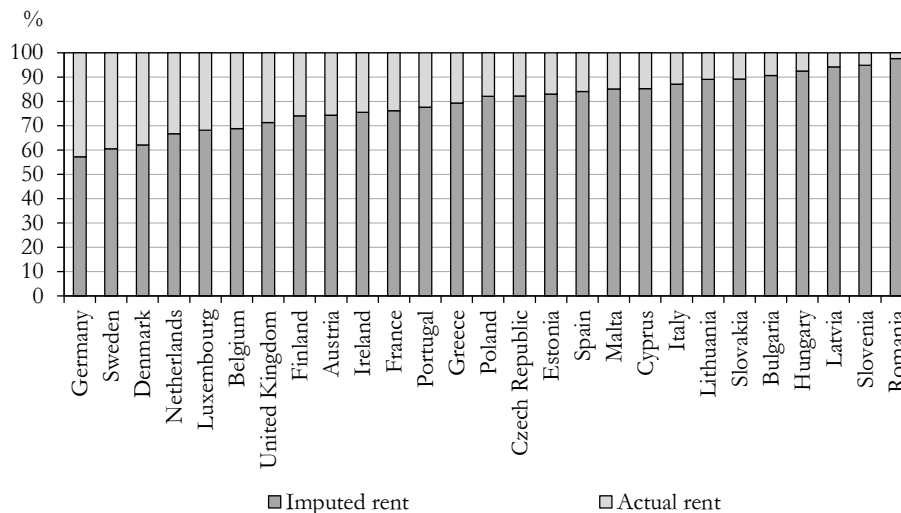
A household's dwelling is an important element of its wealth, and for the majority of households it is one of the biggest expenditures. To compare dwelling services among European member states, I used both micro-level data and macro-level aggregates. In the research, national accounts figures have been used to examine the value of dwelling services as a whole. As a part of the sequence of national accounts, the values have been compared to important aggregates like GDP and the household final consumption expenditure (HFCE). Nevertheless, information can be obtained by using micro-level sources, and in this way, one can achieve deeper insights, for example, into the quality distribution of housing and indebtedness. This study, however, aims to highlight the main difference between the two data sources in terms of applicability.

### Comparison of imputed rent in the EU, using macro-level sources

Using national accounts data, I created a ranking of EU member states with respect to the share of imputed rent for the year 2016 (see Figure 1). The value of owner-occupied dwelling services ranged from 57.3 per cent (in Germany) to 97.6 per cent (in Romania). Among the Western European member states, the shares are lower, while moving towards the Mediterranean and Eastern European member states, one can observe a gradual increase in the share values.

Figure 1

Ratio of actual and imputed rents in dwelling services, 2016



Note: The list of countries does not include Croatia.

Source: Eurostat database.



In many of the EU member states, the share of imputed rent in total rent has been stable over time. However, in the cases of Ireland, Luxembourg, and the United Kingdom, there was an approximately 10-percentage-point decrease in the share of imputed rent between 2000 and 2016. Poland, Estonia, and Belgium each saw a slight decrease in the ratio, while the Czech Republic, the Netherlands, and Portugal sustained a bit of an increase. Despite its lowest share among the EU member states, Germany's number grew by 4.4 percentage points during this period. Table 3 presents the changes in the share of imputed rent across member states.

Table 3

## Changes in the share of imputed rent in total rent

EU member state	2000	2005	2010	2015	2016
Germany	52.9	54.2	55.3	57.0	57.3
Sweden	59.9	61.0	61.3	60.5	60.5
Denmark	61.5	60.8	61.2	62.2	62.2
Netherlands	60.1	62.2	64.5	66.4	66.8
Luxembourg	80.5	81.4	80.3	68.1	68.1
Belgium	74.0	73.0	71.1	69.2	68.9
United Kingdom	80.7	80.2	75.3	71.7	71.4
Finland	71.8	71.8	74.0	74.1	74.1
Austria	76.3	77.1	75.3	74.9	74.4
Ireland	86.2	83.7	77.5	76.5	75.6
France	76.1	76.8	76.7	76.2	76.2
Portugal	73.2	75.1	77.2	77.7	77.7
Greece	78.1	78.5	79.3	79.4	79.4
Poland	90.6	76.6	80.5	81.6	82.2
Czech Republic	74.9	77.7	80.0	82.1	82.3
Estonia	91.5	88.4	88.9	83.3	83.0
Spain	88.6	88.0	85.5	84.0	84.1
Malta	90.4	91.7	86.4	85.2	85.2
Cyprus	87.2	87.5	85.6	85.3	85.3
Italy	85.2	86.6	86.7	86.9	87.1
Lithuania	94.3	95.0	94.3	91.0	89.2
Slovakia	92.8	88.9	89.0	88.9	89.2
Bulgaria	88.9	93.3	92.2	90.3	90.6
Hungary	94.5	93.8	93.7	92.7	92.5
Latvia	85.6	93.6	93.2	94.2	94.3
Slovenia	96.0	94.8	93.6	94.8	94.9
Romania	99.7	96.1	95.5	97.6	97.6

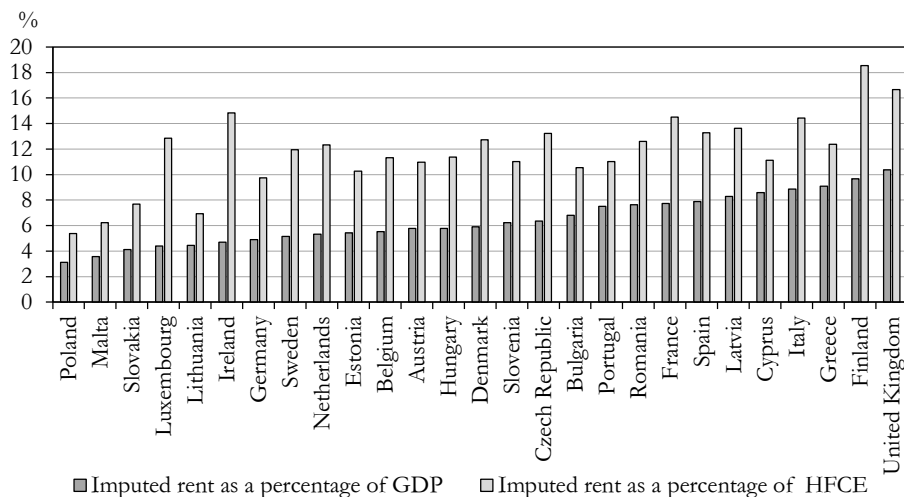
Note: The list of countries does not include Croatia.

Source: Eurostat database.

Imputed rent is one of the most significant components of the HFCE, disposable income and GDP. Figure 2 shows the imputed rent (owner occupancy) in the share of GDP, as well as HFCE, across the EU member states in 2016.

Figure 2

### Imputed rent as a percentage of GDP and HFCE, 2016



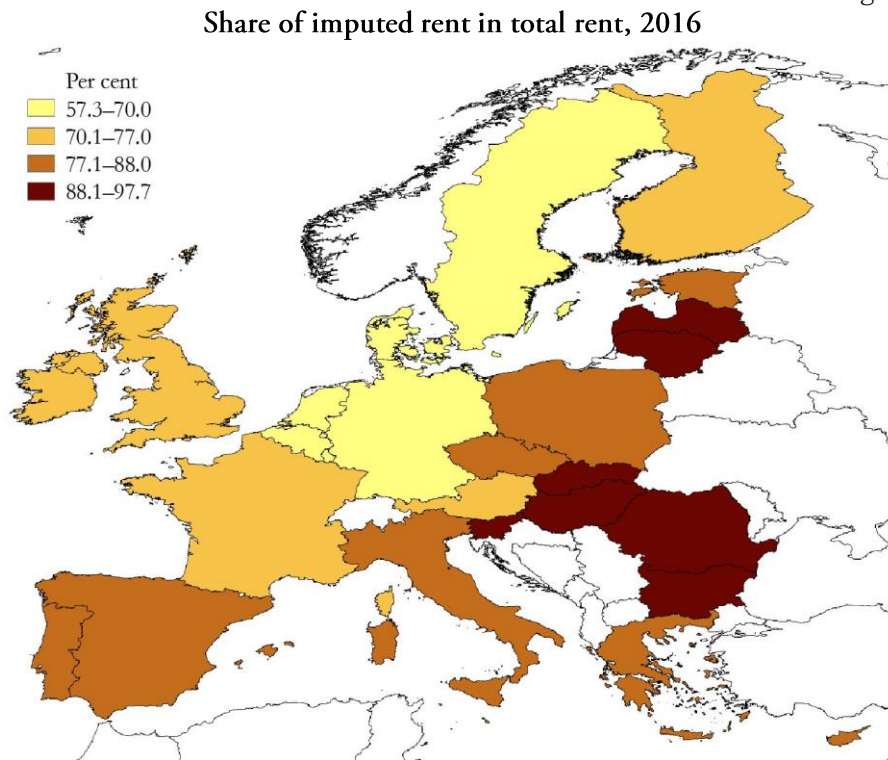
*Note:* GDP – gross domestic product; HFCE – household final consumption expenditure. The list of countries does not include Croatia.

*Source:* Eurostat database.

In 2016, imputed rent ranged from 3.1 per cent (in Poland) to 10.4 per cent (in the United Kingdom) of GDP. However, the measure of imputed rent shows a more diverse picture in the share of HFCE: whereas in Finland it reached 18.5 per cent, in Poland it hardly amounted to 5.4 per cent.

Figure 3 is a map showing the share of imputed rent in total rent across EU member states. Clearly, there are large variations across the EU in terms of owner occupancy, with the share of imputed rent ranging from about 57.3 per cent (in Germany) to above 97.6 per cent (in Romania).

Figure 3



*Note:* The map is based on national accounts figures and shows EU member states except for Croatia.  
*Source:* Eurostat database.

With the help of macro-level data on imputed rent, I was able to identify the following four main groups:

- Scandinavian and Benelux member states with Germany;
- ‘remaining’ Western European member states;
- Mediterranean countries, together with three Central-Eastern European member states;
- rest of the formerly socialist member states.

In any case, I must concede that the value limits among the category groups were set up arbitrarily.

The four groups are somewhat similar to the welfare state typologies described by Esping-Andersen (1990) and Juntto-Reijo (2010). However, the liberal, universalistic, and conservative welfare regimes are gradually converging, largely because of the growing role of the market versus those of states and families. The share of owner occupancy ranged from 57.3 to 70.0 per cent across Northern European and Benelux member states, and in Germany (see Figure 3). In my ranking, Austria, Finland, France, Ireland, and the United Kingdom belong to the second group,

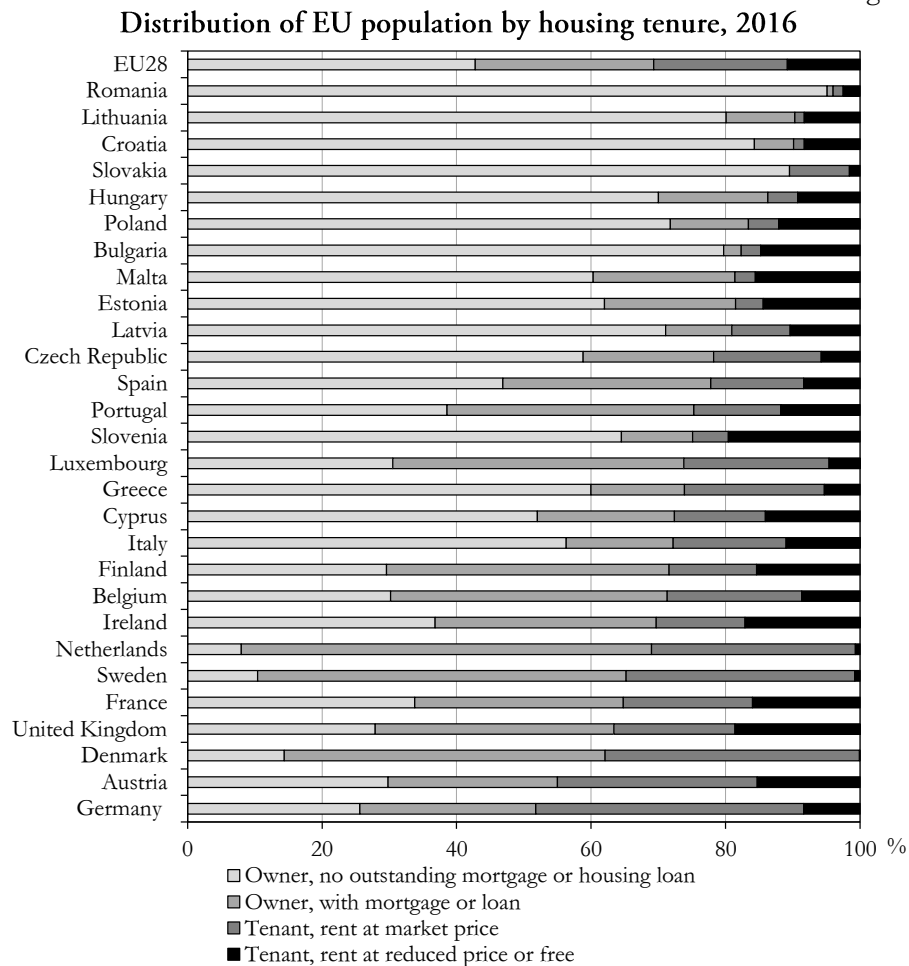
where the owner-occupancy rate ranged from 70.1 to 77.0 per cent. However, the demarcation between the first and second groups is not clear, as the defining limits are not overly strict, and so a member state can easily move from the first group to the second one. In the third group, the dominance of the Mediterranean member states is obvious, but three formerly socialist member states – namely, Poland, the Czech Republic, and Estonia – are included. The state and family play more important roles in these member states, as it was discussed earlier. In considering the formerly socialist member states, a homogeneous group emerges and can be separated from the others. This type of regime did not exist in the typology of Esping-Andersen (1990), as he had set up his typology only for capitalist member states. The main characteristics of Eastern European states is that owner occupancy predominates, and tenancy is considered a temporary situation. In these countries, privatization of state- or local government-owned dwellings promote private ownership; private dwellings constituted – and continue to constitute – the most valuable component of a household's fixed assets, and ownership imbues a household with a sense of security.

#### **Comparison of housing conditions in the EU, using micro-level sources**

The use of a micro-level source (the EU-SILC database) allows me to undertake detailed examinations. By using this data source, I was able to achieve more in-depth insights into certain topics on dwelling services, like the distribution of houses with a mortgage or loan, or with no such outstanding debt. Moreover, that database provides information on the distribution of rented dwellings where the tenant pays the market price versus a reduced price or lives rent-free.

Figure 4 illustrates the distribution of owner-occupied dwellings with or without an outstanding mortgage, and rents at market prices and at reduced prices (or free). In 2016, almost 70 per cent of households in the EU28 population owned their own homes, and more than 38 per cent of the owners had a mortgage or a housing loan. In line with data from the macro-level source, home ownership rates ranged from less than 52 per cent (in Germany) to more than 96 per cent (in Romania). Lower percentages of dwellings in Slovakia, Romania, and Bulgaria had outstanding mortgages; meanwhile, around 84 and 88 per cent of owners in Sweden and the Netherlands, respectively, held mortgages. More than 30 per cent of the EU population lived in rented dwellings, of which 65 per cent were paying market-price rent, and 35 per cent were either paying reduced-rate rent or were living rent-free. Finally, in Lithuania, Malta, Bulgaria, and Croatia, over 80 per cent of tenants were paying reduced-rate rent or lived rent-free, while in Sweden and Denmark more than 98 per cent of tenants were paying market-price rent.

Figure 4



Source: Eurostat database (EU-SILC survey data on the distribution of population by tenure status, type of household, and income group).

By using micro-level data, it is possible to derive more detailed information on housing conditions. If I go beyond the tenure structure, considerable data exist vis-à-vis quality of living conditions, such as overcrowding or whether the interiors are well lit. Households with a leaking roof, without a bath/shower/indoor flushing toilet, or with a housing cost overburden rate can also be examined. In my study, I primarily focused on the distribution of dwelling services and the main applicability of the data sources, but further analysis can certainly be conducted with respect to quality measures.

## Conclusions

This study examined the distribution of imputed rent and housing conditions in the EU, as derived using macro- and micro-level data. It also sought to identify those theories that explain differences in the distribution of owner-occupied dwellings in the member states, and as a result, four groups were established. Esping-Andersen, in his text *The Three Worlds of Welfare Capitalism* (1990), distinguishes three different welfare state types; however, since he had originally categorized only capitalist states, the formerly socialist states are not represented in his typology. His original welfare regime typology consisted of liberal, universalistic, and conservative regime types, and these were later accompanied by the Mediterranean welfare regime. By focusing on dwelling ownership and using the share of imputed rent based on national accounts data, I identified four main clusters: the Benelux and some Nordic member states, with Germany; the remaining Western European member states; the Mediterranean member states with three Central-Eastern European member states; and the rest of the formerly socialist member states. Nonetheless, the categories were set up somewhat arbitrarily. In spite of the similarities between my typology and that of Esping-Andersen, I found that the role of the market has been growing among EU member states, and that the formerly socialist member states constitute a separate category with respect to owner occupancy.

As imputed rent is a critical component of dwelling services, I presented two main estimation methods regarding the compilation of imputed rent: 1. the stratification method is preferred for imputing owner-occupied dwelling services and is based on actual rents; and 2. the user-cost method that reverses the normal accounting procedure and compiles the output from its components (i.e. intermediate consumption, CFC, other (net) taxes on production, and net operating surplus).

My special aim was to highlight the appropriate use of macro- and micro-level data sources, by undertaking a brief analysis of the main applications of data sources. In this study, national accounts figures held utmost importance in determining the overall value of dwelling services. Housing conditions were analysed using both macro- and micro-level data sources, and it was found that while one could derive a general picture by aggregated national accounts, the use of EU-SILC micro-level data allows for deeper insights into EU housing conditions.

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## **Ranking of provinces by entrepreneurship, innovativeness, and human capital indicators, using PROMETHEE – The case study of Turkey**

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### **Keywords:**

entrepreneurship,  
innovation,  
human capital,  
PROMETHEE,  
ranking

In the study, the authors aim to rank Turkey's provinces through the lens of innovativeness, entrepreneurship, and human capital. They use company establishment and liquidation statistics, industrial capacity report statistics, intellectual property statistics, national education statistics, and higher education statistics for this purpose. The presented 16 variables are grouped into 3 categories: entrepreneurship, innovativeness, and human capital. As a ranking technique, the preference ranking organization method for enrichment evaluation (PROMETHEE) is used. The 81 provinces of Turkey are ranked in terms of innovativeness, entrepreneurship and human capital performance, and their advantages are shown relative to one another. According to the results, Istanbul takes the first place followed by Ankara, İzmir, Konya, and Kocaeli provinces, while Sinop, Iğdır, Tunceli, Ardahan, and Bayburt provinces perform the worst.

## **Introduction**

Many extant studies focus on ranking cities, provinces, or regions using various indicators in both developed and developing countries (Azar–Gholamrezaei 2006, Amini et al. 2006, Murias et al. 2006, Mehrjardi et al. 2012, Rostampour 2012, Csomos 2015). Regional (or provincial) statistics include economic accounts, demography, labour market, education, health, agriculture, business, tourism, science and technology, transport, digital economy and society, poverty, crime, social connections, social exclusion, governance, environment, among others (Brandmueller et al. 2017, p. 8., Bartha–Tóthné 2015, p. 127.). In Turkey, various institutions (especially the Ministry of Development [MoD]) have conducted studies to determine the socio-economic level of development of provinces and regions in certain periods. These studies use a large number of economic and social variables. Some examples of these studies are ‘Socio-economic development ranking of prov-

inces and regions' (SEGE) prepared by the MoD, 'Well-being index of provinces' prepared by TurkStat (TUIK), and 'Provincial competitiveness index for Turkey' conducted by the Centre for Economic and Foreign Policy Studies (EDAM). They are important references to determine policies and strategies in many other areas as well as to allocate public resources and orientate private sector investments.

In addition to ministerial/institutional studies, there are academic papers that rank the provinces based on selected variables. Each paper has different indicators, time interval, and methods to determine provinces' socio-economic development level. To rank and classify the provinces, several techniques can be used such as clustering analysis, discriminant analysis, principal component analysis (PCA), multidimensional scaling analysis, etc. (Filiz 2005). For example, Erilli et al. (2009), Erilli–Gundogdu (2013), and Yılcı (2010) used fuzzy clustering analysis; Kaygısız et al. (2005) used path analysis and clustering analysis; Özdemir and Altıparmak (2005) used factor analysis; Gul and Cevik (2014, 2015), Albayrak (2005), and Baday Yıldız et al. (2010, 2012) used PCA; Koç (2001) and Karabulut et al. (2004) used clustering analysis; Kılıç et al. (2011) used multidimensional scaling analysis; and Filiz (2005) used multivariate statistical techniques.

Albayrak (2005) examined the determinants of Turkish provinces' socio-economic development levels. The author used 48 variables from a large number of distinct fields, such as geography, demography, education and culture, health, employment, social security, finance, manufacturing industry, agriculture, export, energy, housing, and infrastructure. Based on the results, Istanbul, Izmir, Ankara, Kocaeli and Bursa rank as the most developed provinces. Baday Yıldız et al. (2010) determined the provinces' socio-economic development ranking by using up-to-date data from the year of the publication. They selected 41 variables from social (demographic, employment, education, health, infrastructure, and other welfare) and economic (manufacturing, construction, agriculture, financial) indicators for the 81 provinces, and used PCA. In their study, Sakarya and Ibisoglu (2015) prepared a socio-economic development index with a geographically weighted regression model for 2011. The authors used eight out of the 61 indicators from the socio-economic development index prepared by the MoD and investigated how these indicators explained the development rates geographically. Dikmen and Dursun (2016) examined the well-being and quality of life in Turkish provinces and ranked the provinces by 40 indicators. They used multi-objective optimization on the basis of ratio analysis (MOORA) and MOORA plus full multiplicative form (MULTIMOORA) methods. The results revealed that Istanbul, Ankara, Izmir, Trabzon and Yalova ranked as the top five provinces. Gulel et al. (2017) calculated a human development index for Turkey's provinces for 2013. Their study concludes that Ankara ranks first and Mus ranks last.<sup>1</sup>

<sup>1</sup> For more studies on ranking provinces, see DPT (2003), EDAM (2009), Gul–Cevik (2014, 2015), Kalkınma Bakanlığı (2013), Karadeniz Yılmaz et al. (2016), Ozaslan et al. (2006), TEPAV (2013), and TUIK (2015).

This study aims to create a similar ranking through the lenses of characteristics such as innovativeness, entrepreneurship, and human capital. In this context, the number of patents, utility models, trademark registrations, established/closed companies and higher education students as well as other relevant human capital indicators are employed. We use the multi-criteria decision making (MCDM) method and the PROMETHEE II full ranking method as ranking techniques. As far as we know, this is the first study that uses PROMETHEE to rank provinces in Turkey as an alternative ranking technique. In the study, 81 provinces are ranked in terms of innovativeness, entrepreneurship and human capital performance, and the advantages of these provinces are compared with one another.

The study consists of four sections. After an introduction and a brief literature review, we describe PROMETHEE in the first section. In the second section, we present the dataset used in the study. The analysis results are presented in tables and figures in the third section. The last section concludes the study.

### Methodology

In this study, PROMETHEE is used to rank provinces in terms of the entrepreneurship, innovativeness, and human capital criteria. This method was developed by Brans et al. (1984, 1986) and Brans and Vincke (1985). The main purpose of PROMETHEE is to ensure the most suitable choice among alternatives depending on multiple criteria.

According to PROMETHEE, an evaluation table, which includes both criteria and alternatives, must first be composed. The evaluation table is a  $m \times n$  matrix, where  $m=1,2,3...$  indicates the number of alternatives, and  $n=1,2,3...$  denotes the number of criteria (Bagci–Rencber 2014, p. 42.). Table 1 presents an example of such an evaluation table.

Table 1

**Evaluation table (example)**

Alternative/Weight	Criterion 1	Criterion 2	Criterion $n$
Alternative $a$	$f_1(a)$	$f_2(a)$	$f_n(a)$
Alternative $b$	$f_1(b)$	$f_2(b)$	$f_n(b)$
Alternative $c$	$f_1(c)$	$f_2(c)$	$f_n(c)$
....	...	...	...
Alternative $m$	$f_1(m)$	$f_2(m)$	$f_n(m)$
Weight	$w_1$	$w_2$	$w_n$

Source: Fernandez (2014, p. 11).

As the first step, the preference function is defined for the relevant criteria. A preference function for  $a$  and  $b$  alternatives for criterion  $C_j$  is described as follows:

$$\Omega_j(a,b) = H_j(d_j); C_j(a) > C_j(b), \quad (1)$$

where  $d_j$  stands for the difference of evaluations (alternatives  $a$  and  $b$ ), and  $H_j$  denotes the criterion function. In the second step, we calculate the preference indices reflecting the weights for criteria  $k$  depending on the preference function:

$$c(a,b) = \sum_j w_j \Omega_j(a,b); w_j (j = 1, 2, \dots, k). \quad (2)$$

In the next step, positive ( $\Phi^+(a)$ ) and negative ( $\Phi^-(a)$ ) priorities (flows) are determined for the alternatives. A positive flow for alternatives  $a$  and  $b$  measures how good alternative  $a$  is compared with alternative  $b$ . On the contrary, a negative flow expresses how weak alternative  $a$  is compared with alternative  $b$ .

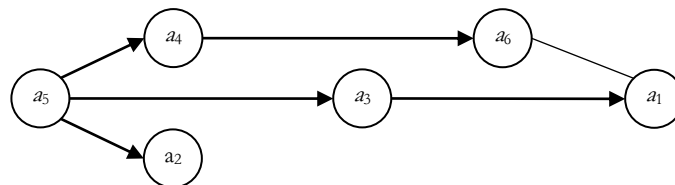
$$\Phi^+(a) = \sum c(a,b) \quad (3)$$

$$\Phi^-(a) = \sum c(a,b) \quad (4)$$

Finally, the partial priorities of alternatives are set using the PROMETHEE I, then full priorities are calculated by the PROMETHEE II (see Figures 1 and 2).

Figure 1

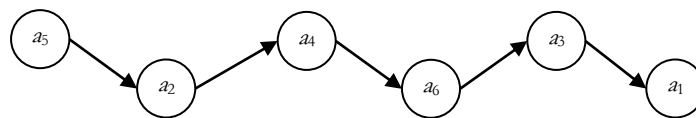
#### Partial priorities of six alternatives by PROMETHEE I (example)



Source: Brans-Vincke (1985, p. 655).

Figure 2

#### Full priorities of six alternatives by PROMETHEE II (example)



Source: Brans-Vincke (1985, p. 656).

The main difference between PROMETHEE I and PROMETHEE II is that while the former provides a partial ranking (priorities) of alternatives, the latter gives a final ranking (full priorities) of alternatives from best to worst, using net flow values (Macharis et al. 2004, pp. 308–309.).

### Dataset

We used company establishment and liquidation statistics, industrial capacity report statistics, intellectual property statistics, national education statistics, and higher education statistics in this study. The 16 variables presented are grouped into three categories (entrepreneurship, innovativeness, and human capital). The variables are shown in Table 2.

Table 2

Research variables for the reference year of 2016	
Category	Variable
Entrepreneurship	Number of companies established
	Number of companies closed
Innovativeness	Number of patents
	Number of utility models
	Number of trademarks
Human capital	Literacy rate (of people aged 15 and over)
	Number of students (associate's and bachelor's degrees)
	Number of students (master's and doctoral degrees)
	Number of graduate students (primary education)
	Number of graduate students (secondary education)
	Number of graduate students (associate's and bachelor's degrees)
	Number of graduate students (master's degree)
	Number of graduate students (doctoral degree)
	Number of academicians
	Number of engineers
Number of technicians	

Our data is obtained from various sources such as the Union of Chambers and Commodity Exchanges of Turkey (TOBB), the Council of Higher Education (YOK), TUIK, the Turkish Patent and Trademark Office (TPE), and the Ministry of National Education (MEB). The number of established and closed companies, and the engineers' and technicians' statistics are from the TOBB; patent, utility model and trademark statistics are from the TPE; statistics on primary, secondary and higher education as well as on human capital are from MEB and YOK databases. The 'Visual PROMETHEE' software was used to analyse data and rank the provinces. During the analysis, all the preference functions of variables were selected as V-shaped since all the variables are quantitative. In addition, for all the variables, the maximum preference was selected, except for the 'Number of companies closed' variable; and no thresholds were selected.

## Results

Table 3 shows the descriptive statistics for each variable. Since there are 81 provinces, each variable has 81 observations. As can be seen in Table 3, about 1,305 companies were established and 378 companies were closed in 2016, on average, across the provinces of Turkey. In terms of innovativeness, 22 patents, 29 utility models, and 1,033 trademarks were registered on average. The human capital indicators given in Table 3 are the literacy rate of the population aged 15 and over (the total number of the population aged 15 and over who can write and read), the number of higher education students, the number of graduates from primary, secondary and tertiary education, the number of academicians, the number of engineers, and the number of technicians.

Table 3

### Descriptive statistics

Variable	Minimum	Maximum	Mean	Standard deviation
Number of companies established	31.0	40,924.0	1,304.7	4,659.2
Number of companies closed	9.0	11,639.0	378.4	1,342.9
Number of patents	0.0	956.0	22.1	108.9
Number of utility models	0.0	985.0	29.0	116.7
Number of trademarks	5.0	40,212.0	1,032.9	4,546.3
Literacy rate (of people aged 15 and over)	64,014.0	10,865,370.0	706,752.0	1,316,345.9
Number of students (associate's and bachelor's degrees)	2,370.0	2,914,115.0	76,370.5	327,994.2
Number of students (master's and doctoral degrees)	0.0	150,721.0	6,212.1	18,631.1
Number of graduate students (primary education)	744.0	202,282.0	14,344.5	24,501.1
Number of graduate students (secondary education)	816.0	174,411.0	12,255.2	21,365.0
Number of graduate students (associate's and bachelor's degrees)	685.0	204,029.0	9,300.0	24,918.3
Number of graduate students (master's degree)	8.0	17,226.0	541.1	2,007.6
Number of graduate students (doctoral degree)	1.0	1,547.0	93.1	259.1
Number of academicians	246.0	27,634.0	1,802.9	3,661.8
Number of engineers	10.0	21,926.0	1,458.5	3,600.4
Number of technicians	4.0	24,868.0	1,560.6	3,743.1

Table 4 shows the provinces' net flows of priorities and ranking based on PROMETHEE analysis results. As the table shows, Istanbul took the first place

based on the mentioned 16 variables. Istanbul has a positive flow of 0.921, a negative flow of 0.065 (only for the ‘Number of companies closed’ variable), and thus, a net flow of 0.856. Istanbul is the most populous province having about 15 million people. Nearly one-third of Turkey’s universities are located in Istanbul, and 27 thousand academics work at these universities. In addition, 10% of associate and undergraduate students and 30% of graduate and doctoral students are educated in the province. Moreover, there are 127 R&D centres in Istanbul, and 30% of Turkey’s enterprises are also located there. Hence, 956 patents, 985 utility models, and more than 40 thousand trademarks were registered in Istanbul in 2016.

Table 4

**Ranking of Turkish provinces by net flow of priorities**

Rank	Province	$\Phi$	Rank	Province	$\Phi$
1	İSTANBUL	0.856	28	KÜTAHYA	0.251
2	ANKARA	0.838	29	ELAZIĞ	0.234
3	İZMİR	0.806	30	AFYON	0.222
4	KONYA	0.745	31	ÇANAKKALE	0.207
5	KOCAELİ	0.721	32	SİVAS	0.205
6	BURSA	0.709	33	VAN	0.111
7	GAZİANTEP	0.651	34	ŞANLIURFA	0.067
8	ADANA	0.644	35	DÜZCE	0.035
9	SAKARYA	0.616	36	ZONGULDAK	0.013
10	KAYSERİ	0.611	37	EDİRNE	-0.003
11	ESKİŞEHİR	0.609	38	TOKAT	-0.018
12	ANTALYA	0.557	39	BOLU	-0.035
13	MANİSA	0.541	40	AKSARAY	-0.052
14	SAMSUN	0.521	41	RİZE	-0.082
15	MERSİN	0.505	42	GİRESUN	-0.096
16	DENİZLİ	0.466	43	UŞAK	-0.112
17	AYDIN	0.402	44	KIRIKKALE	-0.116
18	TRABZON	0.392	45	ADIYAMAN	-0.134
19	HATAY	0.354	46	KIRKLARELİ	-0.138
20	KAHRAMANMARAŞ	0.349	47	KARABÜK	-0.173
21	BALIKESİR	0.347	48	NİĞDE	-0.176
22	ERZURUM	0.340	49	ORDU	-0.176
23	ISPARTA	0.331	50	BURDUR	-0.183
24	TEKİRDAĞ	0.326	51	KASTAMONU	-0.193
25	MALATYA	0.291	52	ÇORUM	-0.208
26	MUĞLA	0.281	53	AMASYA	-0.244
27	DİYARBAKIR	0.267	54	NEVŞEHİR	-0.250

(Continued on the next page)

(Continued)

Rank	Province	$\Phi$	Rank	Province	$\Phi$
55	YALOVA	-0.254	69	BARTIN	-0.481
56	MARDİN	-0.255	70	SİİRT	-0.482
57	BATMAN	-0.262	71	ŞIRNAK	-0.503
58	KARAMAN	-0.281	72	GÜMÜŞHANE	-0.545
59	OSMANIYE	-0.284	73	HAKKARİ	-0.581
60	BİLECİK	-0.327	74	BİTLİS	-0.581
61	YOZGAT	-0.375	75	KİLİS	-0.640
62	KARS	-0.383	76	ARTVİN	-0.647
63	KİRŞEHİR	-0.384	77	SİNOP	-0.666
64	ERZİNCAN	-0.414	78	İĞDIR	-0.676
65	AĞRI	-0.414	79	TUNCELİ	-0.689
66	ÇANKIRI	-0.469	80	ARDAHAN	-0.735
67	BİNGÖL	-0.470	81	BAYBURT	-0.760
68	MUŞ	-0.473			

Istanbul is followed by Ankara (with a net flow of 0.838), İzmir (0.806), Konya (0.745), and Kocaeli (0.721). Ankara is Turkey's capital and the second most populous city in the country. There are 17 universities in Ankara, where more than 18 thousand academicians work. Ankara has 46 R&D centres specialised in fields such as computer, software, and defence industries. Izmir is a port city located in the west and Turkey's third most populous city. It is highly developed in terms of R&D, innovation, and human capital. In the province, there are eight universities as well as an Innovation Centre, and various regional innovation systems are carried out in many areas. Konya, which is Turkey's largest city by land area, is located in central Anatolia, close to Ankara. It stands out with its industrial sector, especially with its machinery and equipment, and automotive industries. There are four universities and five R&D centres in Konya. Kocaeli, located east of Istanbul, is considered Turkey's 'industrial capital'. Chemistry, steel, automotive and iron industries are its biggest industrial sectors. The city has a major role in the country's automotive industry.

The worst performing provinces are Sinop, Iğdır, Tunceli, Ardahan, and Bayburt. All these provinces are located in Eastern Anatoli Region. This result is not surprising as Turkey's eastern part is much less developed than the western part, and the disparities between them are high (Onder et al. 2007). In terms of many socio-economic indicators such as population, income, GDP per capita, industry, employment, and financial indicators, Turkey's eastern part has remained quite backward compared with the west. This is not much different when it comes to innovativeness, entrepreneurship, and human capital indicators as well.



Figures 3, 4, and 5 are maps that show the provinces and their net flow of priorities from various aspects. According to Figure 3, Turkey’s western and southern provinces generally have positive net flow values, while the central and eastern provinces have negative ones. In Figure 4, the provinces are coloured in different tones according to their net flow values of priorities. It is clear from the figure that  $\Phi$  values increase from east to west. Finally, Figure 5 shows a map of the provinces’ grouping into five scales based on their net flow values. The first group has the highest net flow values, while the fifth group consists of provinces with the lowest  $\Phi$  values.

Figure 3

Turkish provinces with positive/negative net flow of priorities, 2016

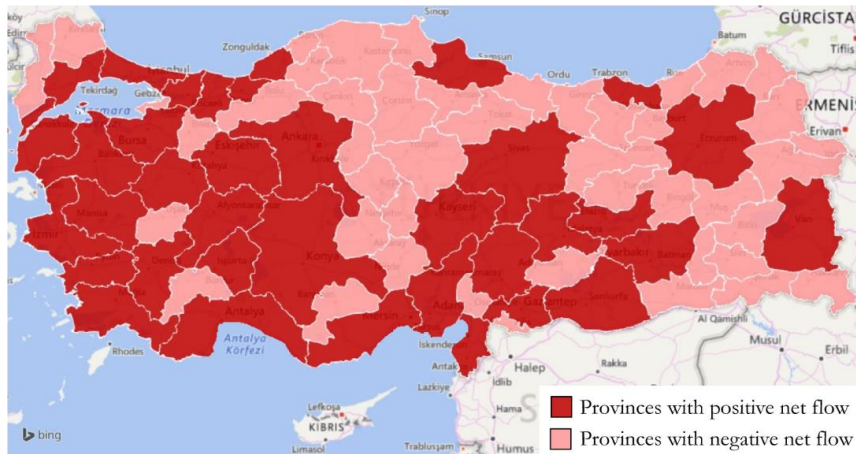


Figure 4

Turkish provinces by net flow value of priorities, 2016

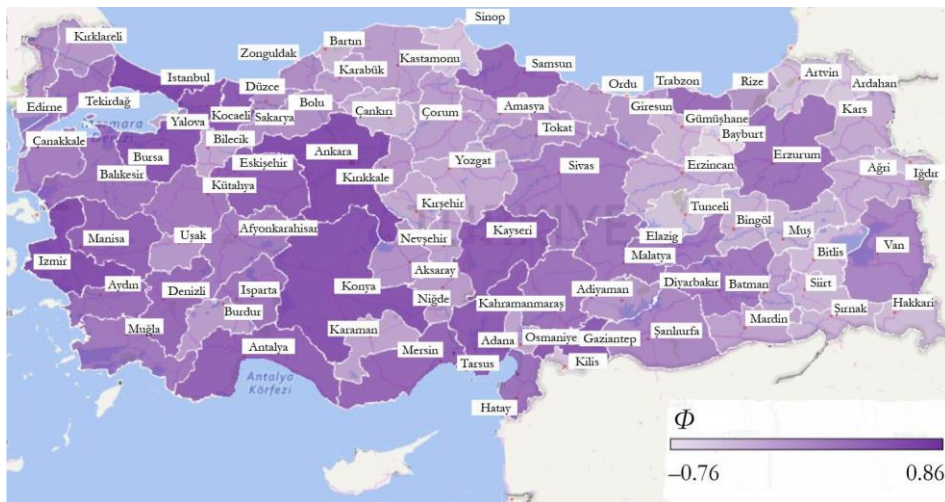
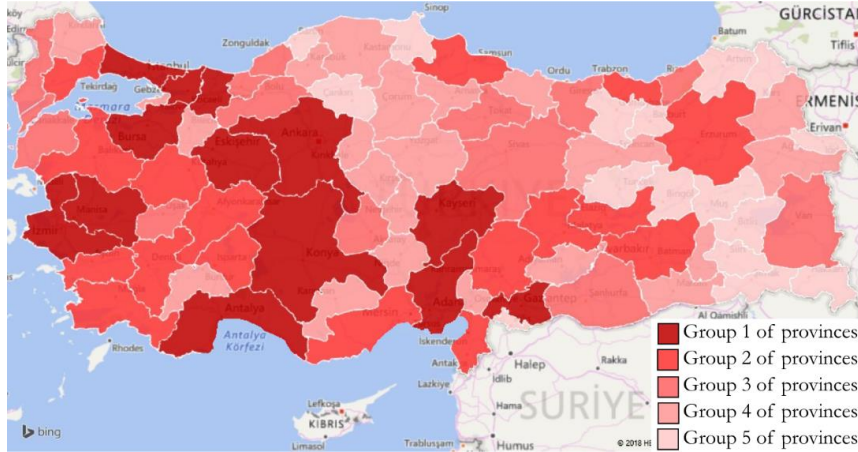


Figure 5

## Five groups of Turkish provinces by net flow of priorities, 2016



Note: For the  $\Phi$  intervals and the province list of the five groups, see Table 5.

Table 5 shows the provinces grouped into five categories based on their net flows of priorities. Istanbul, Ankara, Izmir, Konya, Kocaeli, Bursa, Gaziantep, Adana, Sakarya, Kayseri, Eskişehir, Antalya and Manisa have the highest values. They can be considered developed provinces based on their industrial and other socio-economic development indicators and are mainly located in Turkey's western part, as can be seen in Figure 5. Besides these 13 provinces of Group 1, there are 17 provinces in Group 2, 13 in Group 3, 22 in Group 4, and 16 provinces in Group 5 (that has the lowest net flows).

Figure 6 presents PROMETHEE II's final ranking based on the provinces' net flows. According to the results, while the provinces' ranking is evident to a certain point (Denizli province), after that it becomes unclear, especially after Van province. In other words, the provinces' superiority over one another is increasingly ambiguous following Denizli province.

Finally, the GAIA plane results are presented in Figure 7. The GAIA plane displays each alternative's relative position in terms of its contributions to the various criteria (Macharis et al. 2004, p. 309.). Even though the provinces' ranking remains unchanged, some useful conclusions can be drawn from the figure. The provinces on the left side of the optimal line (the left side of the vertical axis in the graph) are the ones that have no superiority in terms of any criteria. These include the worst performing provinces such as Kırkkale, Bolu, Tunceli, Siirt, Yozgat, Ağrı, Ordu, Batman, Mardin, etc.

Table 5  
Five groups of Turkish provinces by net flow interval of priorities, 2016

Number of provinces	Group 1	Group 2	Group 3	Group 4	Group 5
	$\Phi$ interval				
	0.86 to 0.54	0.54 to 0.22	0.22 to -0.12	-0.12 to -0.44	-0.44 to -0.76
1	İSTANBUL	SAMSUN	ÇANAKKALE	KIRIKKALE	ÇANKIRI
2	ANKARA	MERSİN	SİVAS	ADİYAMAN	BİNGÖL
3	İZMİR	DENİZLİ	VAN	KIRKLARELİ	MUŞ
4	KONYA	AYDIN	ŞANLIURFA	KARABÜK	BARTIN
5	KOCAELİ	TRABZON	DÜZCE	NİĞDE	SIİRT
6	BURSA	HATAY	ZONGULDAK	ORDU	ŞIRNAK
7	GAZİANTEP	KAHRAMANMARAŞ	EDİRNE	BURDUR	GÜMÜŞHANE
8	ADANA	BALIKESİR	TOKAT	KASTAMONU	HAKKARİ
9	SAKARYA	ERZURUM	BOLU	ÇORUM	BİTLİS
10	KAYSERİ	ISPARTA	AKSARAY	AMASYA	KİLİS
11	ESKİŞEHİR	TEKİRDAĞ	RİZE	NEVŞEHİR	ARTVİN
12	ANTALYA	MALATYA	GİRESUN	YALOVA	SİNOP
13	MANİSA	MUĞLA	UŞAK	MARDİN	İĞDIR
14		DİYARBAKIR		BATMAN	TUNCELİ
15		KÜTAHYA		KARAMAN	ARDAHAN
16		ELAZIĞ		OSMANİYE	BAYBURT
17		AFYON		BİLECİK	
18				YOZGAT	
19				KARS	
20				KIRŞEHİR	
21				ERZİNCAN	
22				AĞRI	

Figure 6

Ranking results by PROMETHEE II

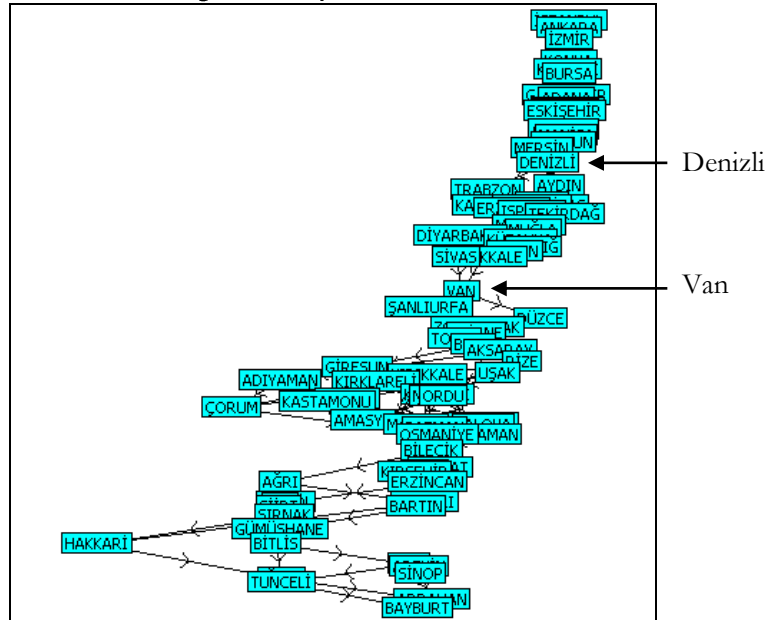
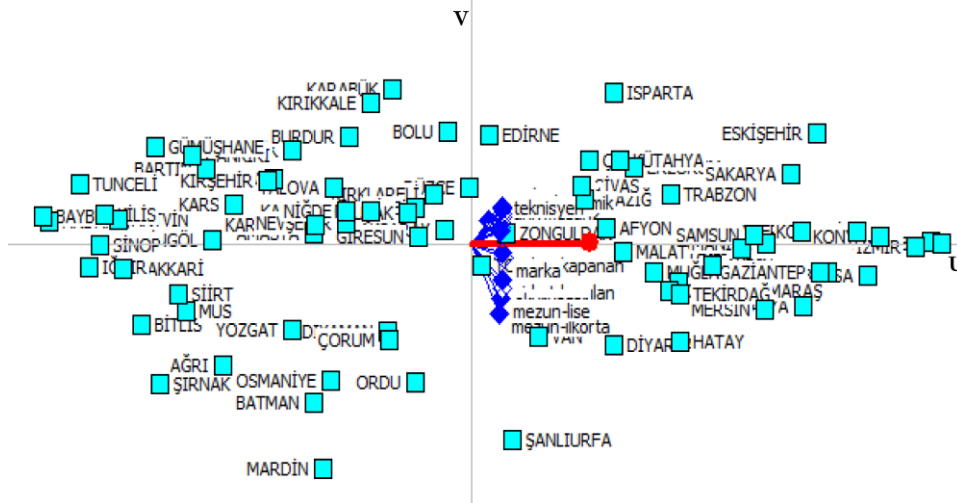


Figure 7

GAIA plane results



Note: Axis U denotes the first principal component and accounts for the maximum possible variance in information. Axis V is orthogonal to Axis U and shows the second principal component. It captures the maximum variance in additional information.

## Conclusions

This study aimed to rank Turkey's provinces in terms of innovativeness, entrepreneurship, and human capital indicators. Although considerable research has been devoted in the literature to this subject, so far no study has used our analysis method. Besides emphasising the importance of using multiple variables in the provinces' ranking based on innovativeness, entrepreneurship, and human capital indicators, we demonstrated that PROMETHEE could be used as an alternative method.

Our findings are consistent with other research mentioned in the literature section. According to many studies, Istanbul, Ankara, İzmir, Kocaeli, Bursa, and Konya rank on the top places. This research also proves that these provinces are the best performers in terms of innovation, entrepreneurship, and human capital. However, several eastern provinces, especially Kilis, Artvin, Iğdır, Tunceli, Bayburt, and Ardahan, have been performing poorly as measured by the subject variables.

## Acknowledgement

This study was financed by the Scientific and Technological Research Council of Turkey (TÜBİTAK). Project No. 1919B011600799.

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## Jarred baby food purchasing habits among mothers of infants in Hungary, and the features of baby food labels

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Consumers are becoming more conscious of product selection owing to the vast amount of information available on the Internet. This attitude is particularly apparent towards food products sold in the market. The healthy lifestyle trend has led to the appreciation of nutrition facts labels on packaged foods. Information, such as guideline daily amounts (GDA), product components, manufacturer details, expiration date, etc. influences our purchase decisions. By listing the ingredients and providing the recommended intake levels, these labels especially play a key role in influencing the purchasing decisions of consumers regarding first food options. This is particularly true for a growing number of mothers whose infants have intolerance to various foods (containing dairy products, eggs, etc.).

The purpose of this study is to examine the information content on the labels of jarred baby foods available from different manufacturers in Hungary with the help of a questionnaire survey and to determine whether there is a difference between the purchase behaviour of mothers and the purchasing tendencies. In the view of the demographic problem of aging in Europe, it has become important to focus on the kind of foods consumed by the population. In this context, it is crucial to examine the first foods of babies which set up the foundation of their health for the rest of their life. The authors examine the nutrition labelling of jarred baby foods. The fields of economics, marketing, and consumer protection law are combined in this paper because they are key to examining consumer behaviour consumer rights in the studied context.

**Keywords:**  
food labelling,  
jarred baby foods,  
consumer behaviour



## Introduction

Nielsen estimated the global baby food and formula sales to reach \$35 billion in 2015. The overall picture shows major differences between countries and regions regarding consumer preferences (Nielsen 2015). The mediatisation of food scandals in the past decades has affected consumer confidence. In the case of baby foods, the focus of consumers and authorities on product safety leads companies to treat the safe production and marketing of these products with high sensitivity.

Consumer protection and food laws give consumers the rights to safe food and accurate information. The Hungarian consumer protection law (Act CLV of 1997) declares five consumer protection principles, of which the two most important ones are the protection of consumers' health and safety, and the right to consumer information. According to the Hungarian consumer protection law (2. §), 'a consumer is a natural person acting for his/her independent occupation and economic activity, who purchases, orders, receives, claims, and uses a product offer, and who is the addressee of the commercial communication'.

The manufacturer informs the consumers about the composition of a product through the product label, user and instruction manuals and distinctive signs. The purpose of such pieces of information is to give appropriate knowledge about the use or the composition of goods (Kovács 2013). According to Szűcs (2010), one of the simplest ways of providing information is to use food labels that provide not only quantitative, but also qualitative information to consumers in an easily comprehensible manner. The Regulation No. 1169/2011 on the provision of food information to consumers was passed in December 2011 by the European Union (EU). It was applicable in all EU member states, however, the provision of allergen information for pre- and non-packaged foods became mandatory only in December 2014. (The manufacturers were entitled to a grace period of 3 years to revise the contents of their food labels, to make sure that they conform to the regulation.) By the formerly mentioned legislation, it is necessary to provide adequate information on food products to ensure the high level of consumer health protection and to guarantee the consumers' right to information. The regulation reinforced the previous food labelling rules and laid down the mandatory indication of the products' nutritional value from December 2016. The mandatory particulars of food labels include the name of the food, the list of ingredients, the quantity of certain ingredients (e.g. that of additives and allergenic substances, any ingredient or processing aid derived from a substance or product causing allergies or intolerances, the country of origin, the net quantity of the food), a nutrition declaration, the expiration date, any special storage conditions, and the (business) name and postal address of the food producer (Friedrichné 2010). In this study, as mentioned earlier, we examine only the food labels of jarred baby foods.

Conscious consumers check food labels for ingredients at the time of purchase. Gintner's study (1999) reveals that consumers primarily focus on the amount of

flavour enhancers, raising agents, food colourings, and stabilisers. The ingredients of baby foods are subject to stricter controls than those of any other foods, as the children's health condition, among others, depends on their nutrition that is their parents' responsibility.

While food labelling regulations are continuously evolving, only a few studies on baby food label preferences and usage have been published worldwide. Although the baby food production system is very safe in terms of ingredients and the production process, an inadequate food labelling system, low consumer involvement, or poor knowledge regarding the label information can jeopardise consumers' health. The absence of consumer behaviour studies related to baby food labels is also characteristic of the literature in Central and Eastern European countries.

### **Role of food labels in the food consumer behaviour models**

Lehota (2001) categorised the factors that affect food consumer behaviour in the following groups: economic factors (price and income proportions), biological factors (perception, cognition, and illnesses), demographic factors, social factors (social stratification and family), psychological factors (personality, motivation, and attitudes), and cultural factors (traditions). Among the economic factors, we primarily focus on consumers' income, purchasing power, and the price of the products. The prices of baby foods considered in this study are relatively high, which implies that families with small children incur a high cost on their purchase. Concerning the biological factors, the flavour and composition of baby foods are critical; they determine not only the children's preferences, but also the edibility of foods. Nowadays food allergies and intolerances affect a lot of babies, and hence mothers consciously browse to collect information on ingredients used in these products. Demographic structural changes also affect a nation's nutritional status. Concerning the social factors, it must be noted that in our society there is an emphasis on adopting a healthy and conscious lifestyle, and consumers demand products that support such a lifestyle. We follow reference groups and family traditions in our lives, which also influence our food purchasing habits. Concerning the psychological factors, the values reflecting a healthy lifestyle are manifested in an attitude that motivates the development of our regular meals. Additionally, cultural factors, such as eating habits and traditions, fundamentally determine the consumers' behaviour.

The Pilgrim (1957) model was the first model in the literature that examined food consumption behaviour. It is based on three pillars (food properties, personal and socioeconomic factors) which influence consumers' food purchasing decisions. Concerning the food properties, nutrient characteristics and psychological effects of food predominate all other factors. The food properties in the Pilgrim model also

include the sensory properties that have various physiological effects. An individual senses the visual stimulus induced by foods and reacts to them. When considering the psychological factors, it is essential to understand an individual's previous experience with a food product, his/her specific preferences, and the method employed to analyse the affective responses to food. Among the socioeconomic factors, price, brand, and availability are influential. Lehota (2001) and Szakály (2011) have revealed that the Pilgrim model is limited as the interactions between the factors are not fully covered. The Pilgrim model was improved by Shepherd (1990); Brávác (2015) notes that the improved model emphasizes food characteristics, details person-related factors, and groups the socio-cultural and economic factors under the environmental factors. According to Miller and Cassidy (2015), nutrition knowledge can support the use of information on food labels at least in the following three ways: it 1. motivates consumers to pay attention to the important information on the label and ignore marketing features, 2. helps consumers to understand the data on the label, and 3. encourages the use of information while making food choices.

Kempen et al. (2011) have revealed during their qualitative research that consumers use labels to assess the nutritional values, personal benefits, health features and quality of food products. Making a food choice is no longer considered a part of a routine shopping activity involving low risk, but as an activity requiring a high degree of involvement and hence resulting in a rational choice (Schiffman–Kanuk 2010). Health conscious consumers buy products that meet their specific nutritional needs as opposed to mass products (Panyor 2007). This factor raises the foundational question of our study: Is this the reason why there is a wide variety of baby foods on store shelves? We have to mention the concept of strategic foods, which is described by Szente et al. (2006) with the following three characteristics: their marketing involves a focus on the nutrient profile, they have distinct marketing features, and an increase in their annual consumption significantly exceeds the consumption of traditional foods. Based on this concept, the authors define three categories of foods: 1. functional foods, 2. organic foods, and 3. traditional and local foods. In the case of baby foods, only the first two categories are relevant and examined in our study.

Piskóti et al. (2006) state that functional foods have a beneficial effect on health and well-being. Functional foods can be defined as follows: They provide energy, contain vitamins, cure naturally, and strengthen the immune system. They have a positive effect on digestion – bringing it in balance – heart health, stress, and sleep (relaxation), strengthen bones and cartilages, and retard the aging process. Nagy (2010) draws attention to the role of mothers in promoting the adoption of functional foods and teaching their children how they may live and have a healthy diet. We prefer these foods of vegetable or animal origin to organic foods, which are produced, processed or imported under the statutory requirements of organic

production and under the control of recognized inspection bodies (Maczák et al. 2011).

### **Food labelling and searching for label information**

In 2011, the EU formulated a new law on food labelling (Regulation No. 1169/2011), with the aim of enhancing the overall information available for consumers. The excessive consumption of sugar, salt and (saturated) fats has led to an increase in the number of obese or diabetic people. According to Gyrd-Hansen and Kjaer (2015), health costs and reduced productivity of obese people can lead to a negative externality and to the bankruptcy of the healthcare system (Cawley–Meyerhoefer 2012, Cavaliere et al. 2017).

The individuals with multiple illnesses ‘burden’ the healthcare system since they are out of work for a longer or shorter time or have permanently exited the labour market due to their illnesses or reduced ability to work. Currently, the Hungarian employment policy is facing new challenges which suggest an increase in the shortage of labour. The main reason behind labour shortage is that the domestic wages are in Hungary lower in some professions (in healthcare, food service industry, services, etc.) than in Western Europe, and hence many employees work abroad. This is accompanied by the fact that, as per the employment status, the health condition of the Hungarian workforce is not adequate (Orosz–Kollányi 2016) and shows continued deterioration. Although we do not examine the reasons behind these phenomena in the present study, they may be interesting research questions in the future.

Miller and Cassady (2015) reviewed the labelling of foods and divided food label contents into the following three groups: nutrition facts, ingredients list, and claims. Concerning food label descriptions, the important information (such as nutritional data (WHO 2013) and the calorie content (Kiszko et al. 2014)) is indicated in various forms. However, this complex information many times poses a challenge to consumers in the selection of healthy foods (Nelson et al. 2014). In recent years, there has been a growing demand for foods that are rich in natural ingredients and free of additives as consumers believe that these products are healthier (Dickson-Spillman et al. 2011). In the EU, the European Food Safety Authority (EFSA) identifies some ingredients with ‘E’ numbers, consumers, however, often mistakenly consider them harmful and unhealthy.

Is labelling of foods enough to reform our lifestyle and consuming behaviour? The answer is not clear. According to Ollberding et al. (2010), labelling of foods itself is not enough to change consumer behaviour effectively. Nevertheless, dieticians can use food labelling as a motivating tool for preventing and treating obesity and chronic dietary illnesses. Pettigrew et al. (2017) draw attention to the nutritional values at the front of the food packs and to the novelty of the front-of-

pack labels (FoPLs). According to Loureiro et al. (2012), there is a correlation between nutritional labels and the measure of decreasing obesity, particularly in the case of women. Does a focus on health play a significant role in influencing the baby food choice of mothers of infants? We also cover this aspect in the following.

Bandara et al. (2016), in their research, have proven that most consumers tend to look at labels during their purchases; the labels contain the name, food safety and sustainability certifications as well as the origin of the product, and the reputation of the brand. In the case of a product designed to meet special dietary needs, such as food allergy, meatless diet, diets of various religious groups, and sustainable diet (organic foods), product information can be found in the description on the back of the product or can be accessed by applications that are able to read quick response (QR) codes. Nevertheless, there are also consumers who are loyal to a particular brand or may not study product labels when performing routine shopping activities.

As mentioned above, labels have a significant influence on our food selection, which raises the following questions: What constitutes a good label? What does a good label contain? What should be its colours and fonts like? How can it highlight information? The primary aspects of label design are regulated by the legislation of a country; the relevant rules are uniform in the member states of the EU.

## Methodology

To support the findings of the literature, we performed a questionnaire survey based on novel research conducted in Hungary. The data collection phase of the research took place in August and September 2017, by using the snowball method and searching targeted Facebook groups. The Google Forms questionnaire was filled in by the respondents online. The analysis was conducted using IBM SPSS Statistics Version 24. All data were processed anonymously. The questionnaire examined the purchasing habits of mothers with small children regarding ready-to-use baby foods and the characteristics of the labels of such foods. (The questionnaire survey was mirror translated into Romanian and filled in by 403 Romanian mothers in the same period. Their answers were then compared to those that were collected in the study conducted in Hungary (Hajdú et al. 2018).) Besides demographic data, the questionnaire contained 22 questions about the contents of baby food labels. We intended to measure the general consumer habits regarding jarred baby foods and to explore the causes of non-consumption. The following research questions were formulated:

RQ1: What are the motivations driving consumers' baby food choice?

RQ2: What are the main problems of baby food labelling?

RQ3: What is the most frequently searched information on a baby food label?

RQ4: Can we identify the information clusters based on the consumers' label reading behaviour?

## Evaluation of results

After cleaning and checking the collected data, we had information on 590 Hungarian mothers who had permanent residence in Hungary. The representativeness of the sample was verified based on the distribution of their residence, age and qualifications. In the phase of questionnaire completion, we omitted five responses from the sample because the mothers' permanent residence was not in Hungary.

Table 1

**Demographic distribution of the sample, 2017**  
(*N* = 590)

	Denomination	Number of respondents	Percentage of respondents in the total
Region	Southern Great Plain	22	3.7
	Southern Transdanubia	48	8.1
	Northern Great Plain	56	9.5
	North Hungary	249	42.2
	Central Transdanubia	38	6.4
	Western Transdanubia	51	8.6
	Central Hungary	126	21.4
Age	20–24	81	13.7
	25–29	167	28.3
	30–34	220	37.3
	35–39	96	16.3
	40–44	25	4.2
	45–	1	0.2
Marital status	Married	362	61.4
	Living in cohabitation	217	36.8
	Divorced	11	1.9
Educational attainment	Primary school	21	3.6
	Secondary school	135	22.7
	High school diploma	155	26.3
	University degree or higher	280	47.5
Permanent residence	Capital	82	13.9
	County seat	180	30.5
	Other city/town	194	32.9
	Small village	134	22.7

*Note:* Here and in the following tables, deviations from 100.0 result from rounding.

*Source:* Own calculation based on the 2017 survey results.

In the sample, 1 person had 6 children, 2, 35, and 124 respondents had 4, 3, and 2 children, respectively, and 426 people had only 1 child. A total of 337 (57.1%), 211 (42.6%), and 2 (0.3%) respondents started to feed their infants with jarred baby foods when the babies were 3-5 months, 6-8 months, and 9-11 months, respectively. The mothers purchased the following brands (several brands could be marked): Kecskeméti (380 persons), Unilever (351 persons), Hipp (328 persons), Hamanek (190 persons), DM (180 persons), Babydream (179 persons), and Rossmann (151 persons).

Fifty mothers having 1 child, 14 mothers having 2 children, and 3 mothers having 3 children did not try to give ready-to-use baby foods to their infants. Altogether, 523 mothers fed, but 67 mothers did not feed their babies with jarred baby foods. We asked the latter group of mothers about the reasons behind their abstaining from buying such products. By grouping their answers, the following aspects can be identified: 1. They do not trust in the ingredients of the ready-to-use products available in stores; 2. They have already given ready-to-use food to their children but the babies did not like it; 3. They think the ready-to-use baby foods available in stores are very expensive; 4. They do not buy ready-to-use products because of additives. Forty-eight mothers gave daily more than 1 jar of ready-to-use baby food to their children. Ninety-eight mothers fed their babies with 1 jar of ready-made baby food in a day, and a total of 165, 110, 50, and 52 mothers gave such foods to their children several times a week, once a week, once a month, and rarely, respectively.

### Demographic determinants of the baby food selection

We examined the relationship between the permanent residence (region) and the purchases of ready-to-use baby foods. According to our null hypothesis, there is no correlation between them. We examined the null hypothesis with a cross table analysis and Chi-square statistics. The mothers that fed their children with jarred baby foods accounted for 88.6% of the Hungarian mothers taken part in the survey (while the remaining 11.4% did not give such foods to their children).

The correlation between the two variables is given by the value of Pearson's Chi-square. The observed value of the indicator is 5.417 which is above the threshold of 0.05 at 0.000 significance level. Hence, we rejected the null-hypothesis. The results indicate that there is a significant relationship between the mothers' residence and their purchases of ready-to-use baby foods. We also examined the values of  $\lambda$ , Goodman and Kruskal's  $\tau$  and the uncertainty coefficient; they indicate a decline in the error probability of the estimation.  $\lambda$  contributes to our understanding of the country's baby food purchase with 0.0%, Goodman and Kruskal's  $\tau$  with 0.9%, and the uncertainty coefficient with 0.5%. This means that the mothers' residence in the indicated regions is not a good prediction variable of

baby food purchases. There is a weak significant relationship between the two variables (the value of  $\varphi$  is 0.096, and Cramer's  $V$  is 0.096).

Table 2

**Cross tabulation of baby food consumption and the regions of Hungary, 2017**

Region	Denomination	Number and distribution of the answers to the survey question: 'Have you already given ready-to-use baby food to your baby?'		Total
		Yes	No	
Northern Hungary	Number of the answers	20	2	22
	% distribution of the 'Yes' and 'No' answers in the region	90.9	9.1	100.0
	% in the total number of the 'Yes' or 'No' answers	3.8	3.0	3.7
	% in the total number of the answers	3.4	0.3	3.7
Northern Great Plain	Number of the answers	45	3	48
	% distribution of the 'Yes' and 'No' answers in the region	93.8	6.3	100.0
	% in the total number of the 'Yes' or 'No' answers	8.6	4.5	8.1
	% in the total number of the answers	7.6	0.5	8.1
Southern Great Plain	Number of the answers	50	6	56
	% distribution of the 'Yes' and 'No' answers in the region	89.3	10.7	100.0
	% in the total number of the 'Yes' or 'No' answers	9.6	9.0	9.5
	% in the total number of the answers	8.5	1.0	9.5
Southern Transdanubia	Number of the answers	213	36	249
	% distribution of the 'Yes' and 'No' answers in the region	85.5	14.5	100.0
	% in the total number of the 'Yes' or 'No' answers	40.7	53.7	42.2
	% in the total number of the answers	36.1	6.1	42.2
Western Transdanubia	Number of the answers	36	2	38
	% distribution of the 'Yes' and 'No' answers in the region	94.7	5.3	100.0
	% in the total number of the 'Yes' or 'No' answers	6.9	3.0	6.4
	% in the total number of the answers	6.1	0.3	6.4

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Region	Denomination	Number and distribution of the answers to the survey question: 'Have you already given ready-to-use baby food to your baby?'		Total
		Yes	No	
Central Transdanubia	Number of the answers	46	5	51
	% distribution of the 'Yes' and 'No' answers in the region	90.2	9.8	100.0
	% in the total number of the 'Yes' or 'No' answers	8.8	7.5	8.6
	% in the total number of the answers	7.8	0.8	8.6
Central Hungary	Number of the answers	113	13	126
	% distribution of the 'Yes' and 'No' answers in the region	89.7	10.3	100.0
	% in the total number of the 'Yes' or 'No' answers	21.6	19.4	21.4
	% in the total number of the answers	19.2	2.2	21.4
Total	Number of the answers	523	67	590
	% distribution of the 'Yes' and 'No' answers in the 7 regions/in the total number of the answers	88.6	11.4	100.0

Source: Own calculation based on the 2017 survey results.

We also aimed to explore the relationship between the settlement types the mothers live in and their purchases of jarred baby foods. We examined the null-hypothesis (there is no correlation between settlement types and the purchases of ready-to-use baby foods) with a cross table analysis and Chi-square statistics. We assumed that people living in villages did not give ready-to-use baby foods, which can be bought in shops, to their children because they produced vegetables and fruits themselves in their backyard garden and prepared food from these for their infants. Conversely, 79.1% of the mothers in the sample, living in villages buy jarred baby foods for their children. Additionally, 92.7% of the mothers living in the capital, 88.9% of the mothers living in county seats, and 93.3% of the mothers living in other cities/towns give such foods to their children.

The correlation between the two variables is given by Pearson's Chi-square. The value of the observed indicator is 17.6 ( $df=3$ ) which exceeds the threshold value of 0.05 at the 0.000 significance level. Hence, we rejected the null-hypothesis: the results show that there is a significant relationship between the type of settlement and purchases of ready-to-use baby foods. The knowledge of the

settlement type improves our estimate for baby food purchases by 3.2%, according to the uncertainty coefficient. The significance level is 0.000 in all cases. We also examined the values of  $\lambda$ , Goodman and Kruskal's  $\tau$  and the uncertainty coefficient. The  $\lambda$  is not significant (0.019). There is a weak significant relationship between the two variables (value of  $\varphi$  is 0.0173, and Cramer's  $V$  is 0.173). Additionally, the predictive ability of the independent variable (settlement type) is very low, and hence it is probable that other variables also play a role in promoting the purchase of ready-to-use baby foods.

Table 3  
Cross tabulation of the type of settlement and baby food consumption, 2017

Type of settlement	Denomination	Number and distribution of the answers to the survey question: 'Have you already given ready-to-use baby food to your baby?'		Total
		Yes	No	
Capital	Number of the answers	76	6	82
	% distribution of the 'Yes' and 'No' answers in the type of settlement	92.7	7.3	100.0
	% in the total number of the 'Yes' or 'No' answers	14.5	9.0	13.9
	% in the total number of the answers	12.9	1.0	13.9
Country seat	Number of the answers	160	20	180
	% distribution of the 'Yes' and 'No' answers in the type of settlement	88.9	11.1	100.0
	% in the total number of the 'Yes' or 'No' answers	30.6	29.9	30.5
	% in the total number of the answers	27.1	3.4	30.5
Other city/town	Number of the answers	181	13	194
	% distribution of the 'Yes' and 'No' answers in the type of settlement	93.3	6.7	100.0
	% in the total number of the 'Yes' or 'No' answers	34.6	19.4	32.9
	% in the total number of the answers	30.7	2.2	32.9

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Type of settlement	Denomination	Number and distribution of the answers to the survey question: 'Have you already given ready-to-use baby food to your baby?'		Total
		Yes	No	
Village	Number of the answers	106	28	134
	% distribution of the 'Yes' and 'No' answers in the type of settlement	79.1	20.9	100.0
	% in the total number of the 'Yes' or 'No' answers	20.3	41.8	22.7
	% in the total number of the answers	18.0	4.7	22.7
Total	Number of the answers	523	67	590
	% distribution of the 'Yes' and 'No' answers in the type of settlement/in the total number of the answers	88.6	11.4	100.0

Source: Own calculation based on the 2017 survey results.

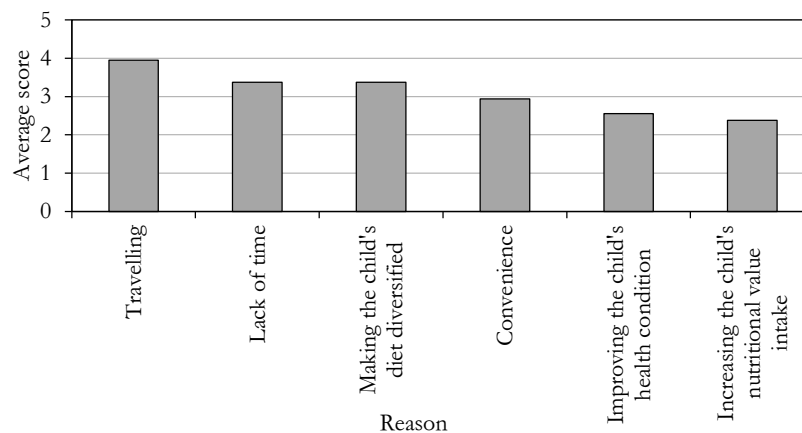
We also used the above method for examining the connection between the ages of mothers and their purchasing habits regarding jarred baby foods. The value of Pearson's Chi-square was 16.404 ( $df=5$ ) which exceeded the threshold value of 0.05 at the 0.000 significance level, showing a significant correlation between the two variables. However, their relationship is weak (the value of  $\varphi$  is 0.167, and Cramer's  $V$  is 0.167). The examination of various age groups of the sample shows interesting results: 97.5% of the mothers aged 20 to 24 years, 89.2% of the mothers aged 25 to 29 years, 82.7% of the mothers aged 30 to 34 years, 91.7 % of the mothers aged 35 to 39 years, 96% of the mothers aged 40 to 44 years and the remaining 1 mother in the age group of 45 years and over give/have already given ready-to-use baby foods to their children. Consequently, it can be stated that especially the very young and the elder mothers turn their attention towards ready-to-use products which are available in shops. (Elder mothers probably have more children, and younger mothers may not have enough experience in preparing baby food, therefore, to save time they choose the more comfortable, time-saving solution.)

### Baby food selection and label preferences

We aimed to explore the relationship between the type of settlement mothers live in and the decision-making aspects of purchasing baby foods. To this end, the mothers had to evaluate the following aspects on a scale from 1 to 5 (Questionnaire question: 'What is your reason for buying ready-to-use baby food?'): 1. to increase my child's nutritional value intake; 2. to improve my child's health condition; 3. due to lack of time; 4. for convenience purposes; 5. to feed my child when travelling, and 6. to make my child's diet diversified. We considered the settlement types to be independent variables and set the decision-making aspects of purchasing baby foods as the dependent variable. From the statistical methods, we chose the analysis of variance (ANOVA) to be applied, which examines the effect of one or more independent variables on one or more dependent variables. The condition for the applicability of variance analysis is that the dependent variable have normal distribution and the variance homogeneity (deviation homogeneity) is fulfilled. In the sample, the deviation homogeneity could not be achieved, and thus we did not continue the analysis.

Figure 1

#### Average scores given by the respondents to six decision-making aspects, 2017



Source: Own calculation based on the 2017 survey results.

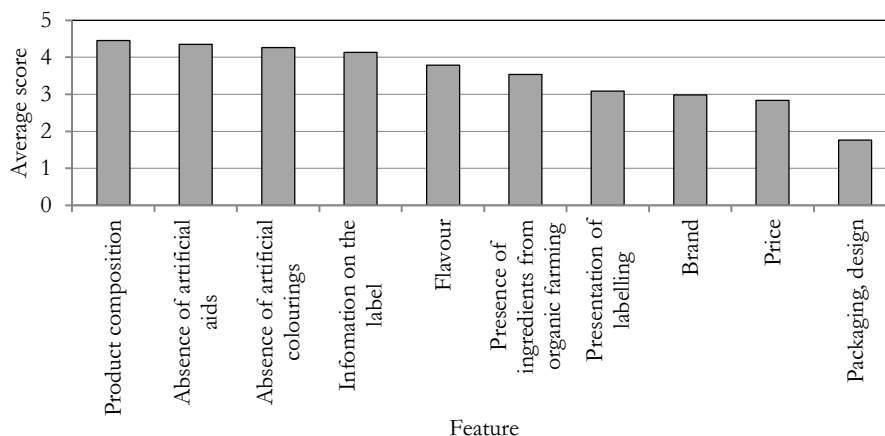
Travelling was the most valued reason for purchasing jarred baby foods; the lack of time received, on an average, 3.377 scores, and convenience, which is a similar aspect, 2.941 scores. To the reason of making the child's diet diversified, on an average, 3.372 average scores were given by the Hungarian mothers.

The packaging, design, and price, the absence of artificial colourings, the brand, and the presentation of labelling have less influence on the purchase decisions of mothers. However, the product composition, the information on the label, the

flavour, and the presence of ingredients from organic farming have more influence on their purchase decisions (the significance level of these were less than 0.05).

Figure 2

**Average scores given by the respondents to ten baby food features, 2017**



Source: Own calculation based on the 2017 survey results.

The mothers gave the highest scores to the labels that gave useful information (4.1) and to those that guaranteed the quality and safety of foods (3.3). The labels that prevented fraud of information (2.7), and the ones that were not easy to understand (2.1) or containing a lot of information (1.9) did not receive high scores.

We aimed to explore whether there was a relationship and what kind of relationship existed between the choice of mothers living in various settlement types as their permanent residence and the information on the labels of baby foods. For the mothers, the type of settlement is not relevant. It was found that the mothers pay more attention to the careful reading of ingredients, shelf life, recommended age, and nutrient composition on the labels. Unfamiliar expressions, tiny fonts, unorganised information, incorrect translations were rated with extremely low points of around 2, on an average. The significance level was acceptable for the following factors: list of ingredients (0.03), illustrations (0.04), and shelf life (0.04). The other information on the labels has extremely high significance level. Illustrations and colourings influence shopping, especially if the child is older and has the right to choose. There are significant differences between the packaging and colourings of the various products. For example, the Unilever baby foods brand has the illustration of Winnie the Pooh and his friends, which attracts young children rather than their mothers. The respondents also evaluated the list of ingredients, and gave, on an average, 4.6 scores to this factor. The highlighted appearance of allergens received, on an average, 4.3 scores.

### Factor analysis of the food label preferences

We performed a factor analysis on the following question: ‘To what extent do you pay attention to the information on baby food labels?’ A total of 106 mothers do not read the labels carefully, while 484 mothers read them with attention. Before performing the calculations, we checked whether the data were correct; the variables followed normal distribution. We worked with metric and non-dummy variables and found that multicollinearity prevailed between them. The sample is homogeneous, and the sample size is over 100; hence, after the fulfilment of the necessary conditions, we regarded the accomplishment of the head component analysis as acceptable. The test coefficients had to be decorrelated in pairs. This was performed through the Kaiser-Meyer-Olkin indicator. The closer the indicator is to the value of 1, the more applicable the analysis is to the variable. The Bartlett’s test showed the same results. The value of the Kaiser-Meyer-Olkin indicator is 0.825 that is quite good and reliable. Hence, the main component analysis was accepted for the variable set (Sajtos–Mitev 2007).

Table 4

#### The Kaiser-Meyer-Olkin indicator and the results of the Bartlett’s test

Kaiser-Meyer-Olkin measure of sampling adequacy		0.825
Bartlett’s test of sphericity	Chi-square	2731.635
	<i>df</i>	78
	Significance	0.000

*Note:* The results are based on the answers given to the question: ‘To what extent do you pay attention to the following information on baby food labels?’

*Source:* Own calculation based on the 2017 survey results.

The scree plot figure helped to decide on the number of factor groups. The breakpoint could be observed after the third variable number, and thus we tried to create three factors. The component matrix did not fit well because the variables did not fit into the factors, and hence the data had to be rotated. As a result, we received a rotated component matrix. We performed the rotation using the variance maximization (varimax) method by Kaiser’s normalization. The value of the explained variance must be at least 60%; in this case, it is 60.1%. A variable is a member of a factor if the weight of the factor is at least 0.5.

Based on the obtained factors, the following three groups were specified: 1. those who only deal with general product information; 2. those whose purchases are affected primarily by the content of the products; and 3. those who mainly pay attention to the appearance of the labels.

For selecting the important aspects of baby food labels, we performed another factor analysis. Here the value of the Kaiser-Meyer-Olkin indicator is 0.771.

We performed the rotation using varimax (variance-maximization) by Kaiser’s normalization. In this case, the explained variance value is 62.7%. Here again, a variable is a factor member if the weight of the factor is at least 0.5.

Table 5

**The rotated component matrix of baby food label information preferences**

Variable (baby food label information)	Factor		
	1	2	3
Daily recommended quantity	0.662	0.193	0.282
Shelf life	0.821	0.188	0.053
Storage conditions	0.866	0.188	0.094
Consumption suggestions	0.829	0.214	0.151
Recommended age	0.485	0.185	0.108
List of ingredients	0.194	0.698	-0.253
Indication of allergens	0.237	0.663	-0.011
Nutritional composition	0.293	0.661	0.088
Indications of special quality (bio, fair trade)	0.064	0.764	0.276
Place of origin	0.200	0.611	0.237
Illustrations	0.195	0.031	0.891
Colourings	0.153	0.024	0.881
Weight	0.149	0.350	0.430

Note: In the table, the three colours represent different factors.

Source: Own calculation based on the 2017 survey results.

Table 6

**The rotated component matrix of baby food features**

Variable (baby food feature)	Factor		
	1	2	3
Product composition	0.734	0.332	-0.138
Information on the label	0.698	0.287	-0.085
Food ingredients from organic farming	0.669	-0.165	0.373
Absence of artificial colourings	0.887	0.031	0.090
Absence of artificial aids	0.896	0.021	0.104
Price	-0.104	0.698	0.125
Brand	0.135	0.696	0.153
Flavour	0.337	0.562	0.093
Packaging and design	-0.023	0.100	0.860
Presentation of labelling	0.121	0.317	0.676

Note: In the table, the three colours represent different factors.

Source: Own calculation based on the 2017 survey results.

Based on the obtained factors, the following three groups were formed: 1. conscious consumers who pay attention to the information on the product labels; 2. consumers who focus on price or loyal to a special brand; and 3. consumers who base their selection on the appearance of the product.

We also asked the mothers if they found any error in the Hungarian translation of the labels of the foreign products or any difference between the information included in the translated labels and that of the original ones (in a foreign language). In the case of a product, 29 people felt that the information indicated on the foreign language label differed from that of the Hungarian translation. Therefore, 26 of them stopped buying that product. Several respondents experienced that there was a difference between the original and the translated versions of the labels regarding age recommendation, and many people had problems with the translation of 'Eiweiss' (protein), too. Additionally, in some cases, the Hungarian labels did not indicate the common name of the fish species among ingredients and did not provide information on added sugar either as compared with the original labels. Some people mentioned that the original foreign (German) labels contained more information than the Hungarian ones.

## Conclusions

Nourishment constitutes an essential element of the trendy health-conscious lifestyle. Unfortunately, there are many people who can only consume special foods due to their various allergies or food intolerances. Thus, information on product labels is very important as it facilitates the identification of product components. While earlier food purchases were nothing more than a routine selection of products, nowadays they are the question of rationality. For example, a lactose or gluten-sensitive person will make a rational decision when he/she prioritises lactose- or gluten-free products while purchasing his/her daily use food items.

Our eating habits are influenced by our flavour preferences developed during childhood. Food sensitivity may also develop at a very young age (during infancy). Therefore, the selection of superior quality baby food products is especially important. Based on the answers given by the respondents of our survey to the research questions, we found that the main motivations driving customers' choice of jarred baby foods are feeding infants while travelling, lack of time to prepare baby foods at home, and making the children's diet diversified. Those mothers who do not use ready-to-use baby foods trust in their own choice of ingredients and prepare food at home for their children (RQ1). The main problems with the labelling are the missing information, and in certain situations the ambiguous translations and the small letters (RQ2). According to our research, 88.6% of the Hungarian mothers taken part in the survey buy ready-to-use baby foods for their



children and pay attention especially to the ingredients and shelf life of such products (RQ3). Based on the extent of paying attention to product label information, the following groups of mothers could be formed: 1. those who only deal with information on ready-to-use baby food products; 2. those who are attentive primarily to the product composition; and 3. those who mainly give regard to the appearance of the product (RQ4).

It is surprising that the foreign-language descriptions of the products manufactured abroad are often more detailed than their Hungarian translations. Therefore, we recommend paying more attention to the quality of such translations in the future.

### Acknowledgement

The authors wish to thank Zsuzsa Săplăcan for her useful advice on the development of the questionnaire structure.

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