Boglárka Bánné Gál[13]

The impact of investments on the economic performance of Borsod-Abaúj-Zemplén county in relation to the 2014-2020 European Union development cycle

In my study, I examined the territorial dimensions of Hungary's economic performance between 2013 and 2021. The choice of the time interval was based on a conscious methodological choice. The evaluation of the EU development cycle 2014-2020 requires knowledge of the economic situation before that period, so it was justified to choose 2013 as the starting year. This year can be considered as a record of the situation prior to the allocation of development funds, which provides a basis for an objective assessment of the economic situation prior to the interventions. The year 2021 was used as the upper limit for the period under consideration, as it already partly reflects the economic impact of the investments of the 2014-2020 development cycle. EU funds often have a multi-stage, longer-term impact on the local economy, so a timeframe beyond one year is necessary to measure results (ESF, 2018). Thus, analysing the period up to 2021 provides an opportunity to examine the after-effects of the funds in more detail and to capture structural changes.
Keywords: county economic power, investments, European Union grants, Borsod-Abaúj-Zemplén county
JEL code: R11; R12; R58

https://doi.org/10.32976/stratfuz.2025.21

Introduction

For this purpose, I have used district-level small district estimates of GDP data, which I refer to in the literature as *district economic power*. I investigated how the economic power of districts changed between 2013 and 2021, whether the spatial structure of the Hungarian economy changed, including the position of the districts of Borsod-Abaúj-Zemplén county, and what role the investments in the period 2014-2020 played in the changes. Finally, I used the example of Borsod-Abaúj-Zemplén county to examine the stimulative effects of EU funding between 2014-2020.

The analysis covered the whole territory of Hungary, including 175 districts and 22 districts of Budapest. Within the spatial comparison, Borsod-Abaúj-Zemplén county was given special attention as the central case study of the study.

My results show that between 2013 and 2021, economic spatial inequalities in Hungary decreased slightly, but this change hardly altered the ranking of economic power between districts.

Between 2014 and 2020, a quarter of the districts concentrated 80% of investment. The relative differences in investment are due at least as much to differences within counties as between counties. The analysis shows that investment also plays a key role at district level. In nine tenths of the districts, investment determines in part or in whole the economic growth potential.

Between 2014 and 2020, the economic stimulus from EU funds in the districts of Borsod-Abaúj-Zemplén county lagged significantly behind non-EU investments. In the districts where EU investment has become dominant, less substantial economic improvement is visible. A territorial alignment of the two sources could in the future achieve a higher rate of regional economic growth.

[13] PhD student, University of Miskolc Faculty of Economics Institute of World and Regional Studies; email: banne.gal@gmail.com

Regional changes in district economic power in Hungary between 2013 and 2021

In order to assess the economic activity of the country's districts from a macroeconomic perspective, detailed territorial data are needed. A breakdown of GDP by county is regularly published by the HCSO at[14] .
The territorial accounts are compiled by sector and industry, based on the methodology of the production accounts of the national accounts. Its sources are output and its uses are intermediate consumption, the difference being gross value added. GDP, as a macroeconomic indicator, by definition, cannot be provided in a precise form more detailed than at county level (Dusek & Kiss, 2008) and no other stable and complex economic indicator exists at district level. However, there is a well-known estimation procedure of district GDP values in the literature, called district economic power (JGE) (Lőcsei & Nemes Nagy, 2003; Tóth, 2024).
The procedure for estimating district GDP/JGE is as follows:

- The first step was to determine the share of the districts belonging to each county on the basis of the total taxable income of the county, the volume of local taxes and the number of active enterprises. That is, the following calculations were made for county j:

$$\frac{J_{ij}^{A}}{\sum_{i=1}^{n} J_{ij}^{A}};\ ;\ .\frac{H_{ij}^{A}}{\sum_{i=1}^{n} H_{ij}^{A}}\frac{V_{ij}^{M}}{\sum_{i=1}^{n} V_{ij}^{M}}$$

whereJ_{ij}^{A} is the total taxable income of district i of county j;H_{ij}^{A} is the total local taxes of district i of county j;V_{ij}^{M} is the total number of active enterprises of district i of county j; n is the number of districts in county j.

- In a second step, I calculate the estimated GDP of each district in relation to the county GDP, as reported by the CSO, based on the average of the shares (percentage share). This ensures that the total JGE of the districts belonging to a given county is equal to the county GDP (Tóth, 2024).

$$JGE_{ij} = \left\{ \frac{\frac{J_{ij}^{A}}{\sum_{i=1}^{n} J_{ij}^{A}} + \frac{H_{ij}^{A}}{\sum_{i=1}^{n} H_{ij}^{A}} + \frac{V_{ij}^{M}}{\sum_{i=1}^{n} V_{ij}^{M}}}{3} \right\} * GDP_{j}$$

In Hungary, KSH data show that nominal GDP increased by 82% between 2013 and 2021, so all districts increased their JGE by a minimum of 1.3 (Szentgotthárd district) and a maximum of 10 times (Budapest 5th district). 54% of districts had an increase below the national average, while the rest had an increase above the national average (44 districts had an increase of 70-90% of the national average and 62 districts had an increase of 90-100% of the national average). For 61 districts, the increase in district economic power relative to the national increase was 100-115%, for 20 districts 115-130% and for 10 districts above 130%: Budapest 5th district, Szigetvár, Cigandi, Kazincbarcikai, Szikszó, Kisteleki, Mórahalmi, Bicskei, Gárdonyi and Gyáli districts).

[14] https://www.ksh.hu/stadat_files/gdp/hu/gdp0077.html

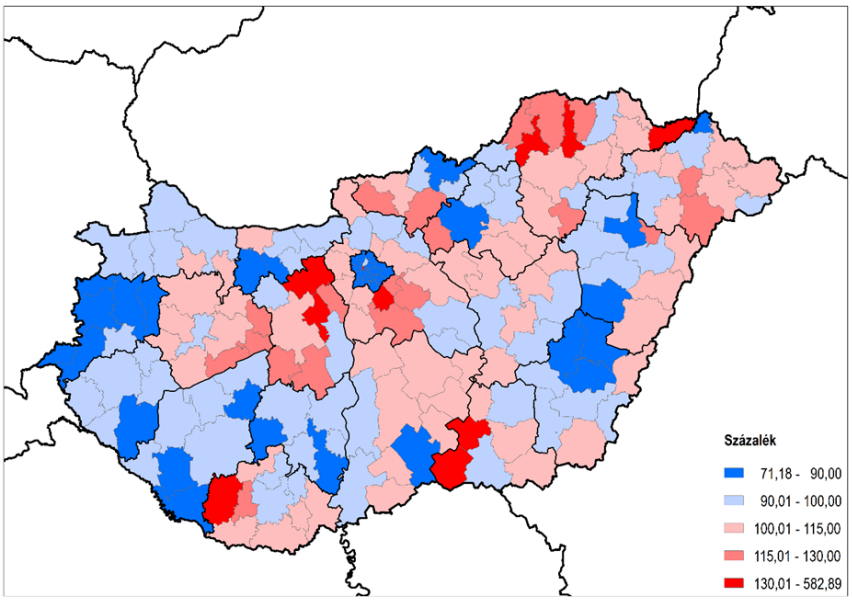

Figure 1: Change in JGE between 2013 and 2021 as % of national change
Source: based on KSH own editing

In terms of district economic power, of the 16 districts in Borsod-Abaúj-Zemplén county, the districts of Gönc (99.2%), Ózdi (99.5%) and Tiszaújváros (95.4%) performed below the national average, while the other 13 districts performed above the average. The districts of Cigándi (132.7%), Szikszó (157.5%) and Kazincbarcikai (145.4%) were outstanding (Figure 1). Thus, the districts of Borsod-Abaúj-Zemplén county followed a catching-up path during the period under study (Kocziszky & Szendi, 2021; Varga Á., 2023; Tóth & Varga, 2022), while most of Budapest and Vas counties recorded below-average growth.
Spatial disparities decreased slightly between 2013 and 2021 (similar to the research of Dobó and Pintér, 2022), with below-average increases in most parts of Budapest, Győr, Zala, Somogy and Vas counties, and above-average increases in most districts of Pest, Fejér, Veszprém, Borsod-Abaúj-Zemplén, Bács-Kiskun, Baranya and Szabolcs-Szatmár-Bereg counties.
Table 1 shows the change in average JGE for each group between 2013 and 2021 by district quintile calculated from the 2013 JGE. The two districts in the lowest and highest quintiles showed above national average increases, while the middle (2nd and 3rd) quintiles showed below average increases. So, in general, the districts with the lowest base had the most dynamic increase in JGE, which is also due to the low base value.

Table 1: Change in the JGE value of districts between 2013 and 2021 according to the 2013 JGE quintile

Ötöd	Change (%)
1	190,5
2	184,4
3	176,6
4	173,6
5	184,5
Total	181,9

source: own calculation

Changes in dynamics were examined by rank correlation according to the order of economic power between districts:

$$\rho = 1 - \frac{6*\sum_{i=1}^{N} d_i^2}{N^3 - N} \quad , \quad d_i = x_i - y_i$$

where x: the order of districts in 2013, y: the order of districts in 2021 based on the JGE, N: the number of districts, ρ: the economic power between districts is the Spearman rank correlation coefficient.

In the present case, there is a very close (ρ=0.98), almost deterministic relationship between the order of the two periods.

Overall, there was a slight reduction in spatial disparities over the period, but this change only slightly altered the ranking of economic power between districts (Figure 2).

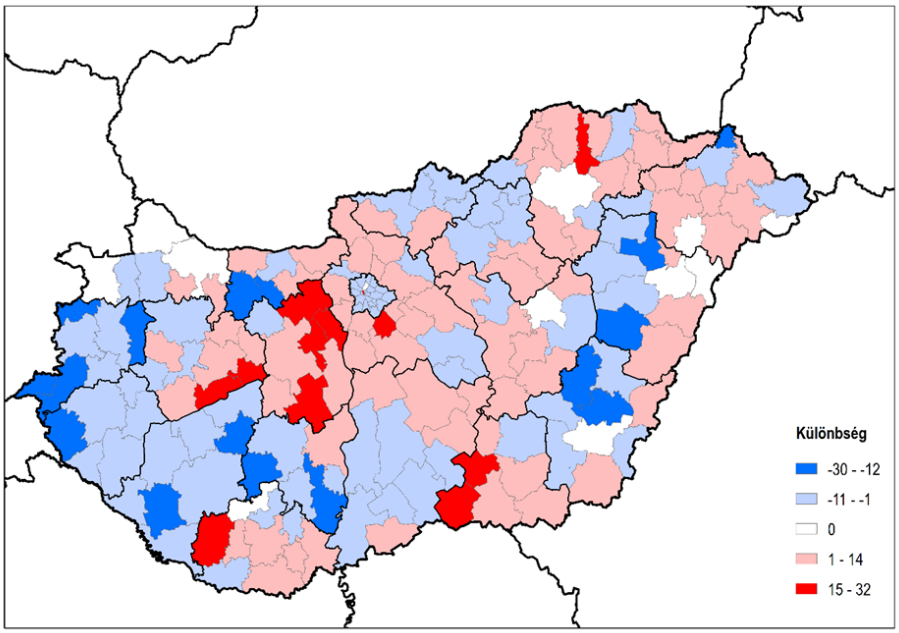

Figure 2: Change in JGE district ranking between 2013 and 2021*

* The difference in the order of the JGE between the two periods (1 being the weakest, 197 the strongest). The positive signs thus represent the degree of improvement from 2013 to 2021, while the negative numbers measure the slippage in the ranking compared to the other districts.

Source: based on KSH own editing

District difference in investment between 2013 and 2020

High added value investments are an important prerequisite for sustainable economic growth and adaptability (Nagy et al., 2022; Kocziszky, 2024). Therefore, it is essential to examine the spatial distribution of investments in addition to the economic strength of the district (investment data include data on enterprises, budgetary and budget-regulated entities and non-profit organisations with legal personality, by investments in the given district), including EU subsidies.

Between 2014 and 2020, the districts invested HUF 46 thousand billion (an average of HUF 233 billion per district), with a differentiated territorial pattern (Figure 3). Most investments were made in the 13th district of Budapest (HUF 6.3 thousand billion), the 11th district of Budapest (HUF 2 thousand billion) and Győr (HUF 1.9 thousand billion). The least investments were made in the districts of Szécsényi, Bélapátfalva, Téti and Cigándi (less than HUF 13 billion per district). The Partetto principle also applies here, with a quarter of investments made in 2% of districts and 80% of investments concentrated in a quarter of districts

(Table 2). In Vas-, Somogy-, Zala-, Békés- and Nógrád counties, the amount of investments was significantly below the national average. However, the larger investments were generally diversified in Budapest and in the cities with county status.

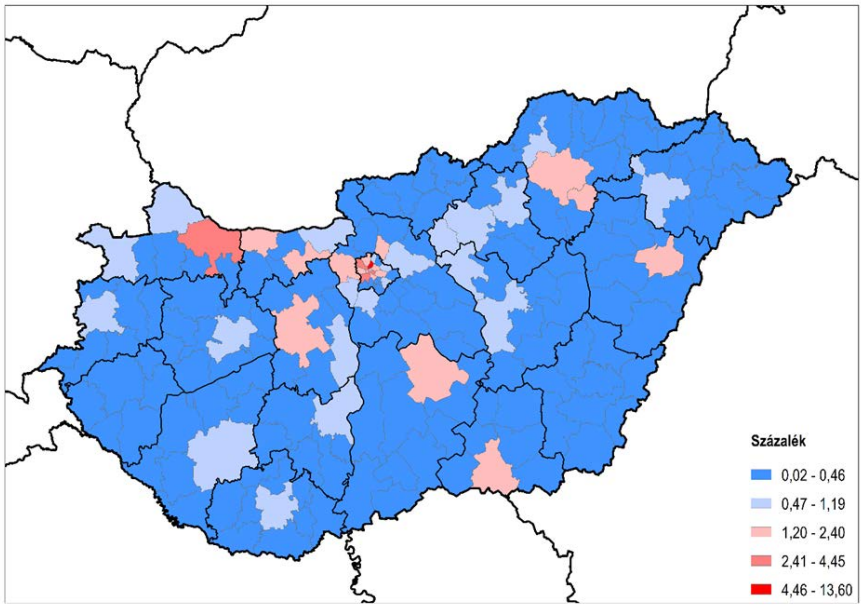

Figure 3: Breakdown of investment in Hungary between 2014 and 2020 (country total =100)
Source: based on KSH own editing

Table 2: Quantified distribution of districts by district average investment between 2014 and 2020 (national district average = 100)

National average %	Districts (pcs)
0-50	130
50-100	21
100-150	9
150-200	11
200-X	26
Total	**197**

source: own calculation

In Borsod-Abaúj-Zemplén county, compared to the national average, most investments were made in Miskolc (343% of the national average), Tiszaújváros (253%), Kazincbarcikai (141%), while the lowest were in Cigándi (3.5%), Encsi, Mezőcsáti and Putnok districts (6-6%).
Total investment between 2014 and 2020 is one and a half times GDP in nominal terms compared to 2013. Compared to the national average, there are also significant regional differences in the relative indicator, but the picture is much more balanced than for investment (Figure 4). For 96 districts, the amount of investments made over the whole period is lower than their 2013 JGE, while for 101 districts, these investments exceed the 2013 territorial JGE.

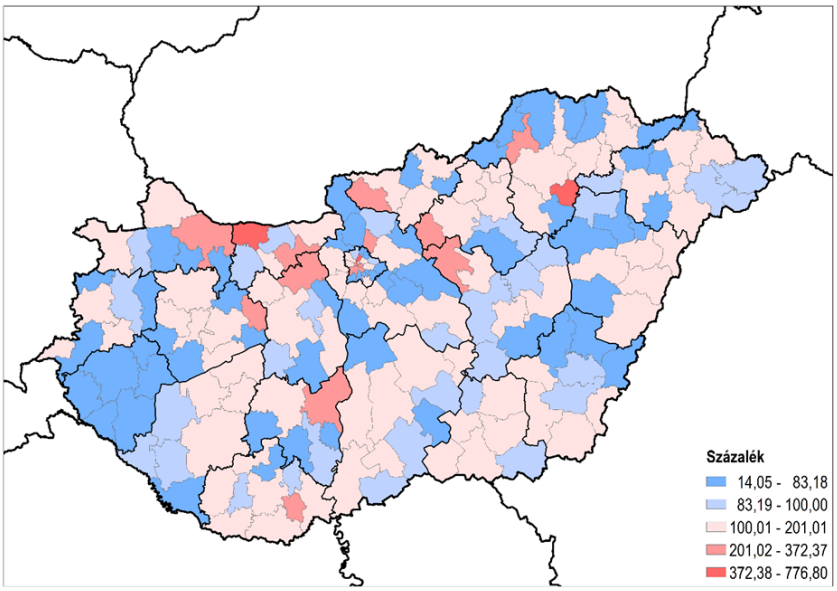

Figure 4: Investments 2014-2020 as % of JGE 2013
Source: own editing

All counties except Zala had above average and below average JGE ratio investments. In other words, the relative differences in investment are due as much to differences within counties as between counties. Below-average areas include cross-county regions in Somogy - Zala - Vas - Győr-Moson-Sopron - Komárom-Esztergom - Veszprém and parts of Bács-Kiskun - Csongrád - Jász-Nagykun-Szolnok - Heves - Hajdú-Bihar, while coherent clusters of above-average JGE-ratio areas are much smaller.
In Borsod-Abaúj-Zemplén county, seven districts have an investment value of less than 100% of the JGE ratio, while 9 have an investment value above 100%. The lowest values are in the districts of Cigándi (67%), Encsi (59%) and Ózdi (70%), while the highest are in the districts of Tiszaújváros (411%), Kazincbarcikai (248%), Tokaji (182%) and Sárospatak (152%).

Linking investment to the economic strength of the district

Investment plays a decisive role in economic performance (Bágер & Cseh, 2020; Halmai, 2023). The question is how strong this correlation is at the district level. Plotting the change in JGE between 2013 and 2021 by investment, I measure a weak relationship of R^2= 0.21. That is, only 21% of the variance in the change in district economic power is explained by investment between the two periods. Here I find two outliers, both for Budapest districts. One is the 13th district, where a unique, specific investment was made. The other is district 5, where low investment also leads to high JGE. This is because this district is the financial centre of Hungary and Budapest (Figure 5).

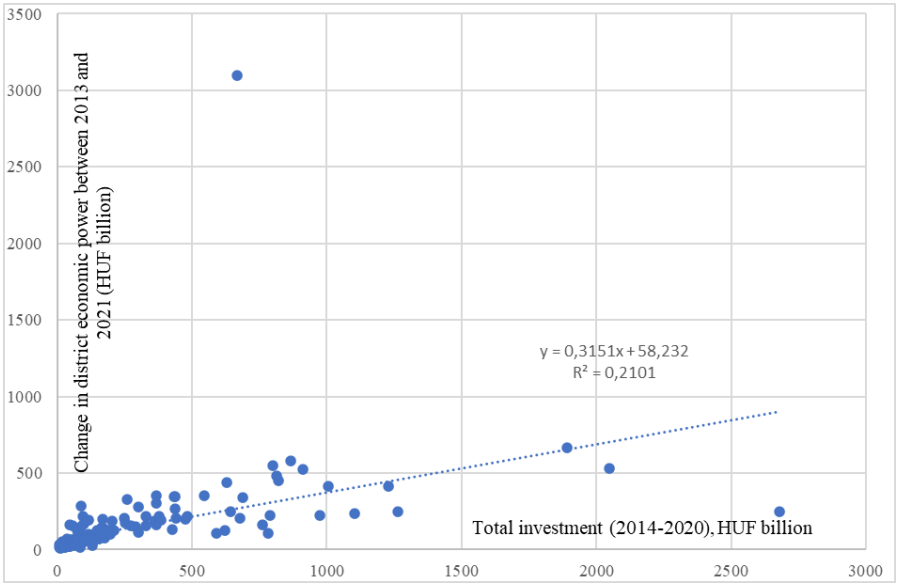

Figure 5: Changes in district economic power as a function of investment
source: based on KSH own editing

When the question outlier is removed, a stronger correlation (R^2=0.65) between the two variables is found. Thus, a moderately strong relationship between investment and economic power at the district level can be observed (Figure 6).

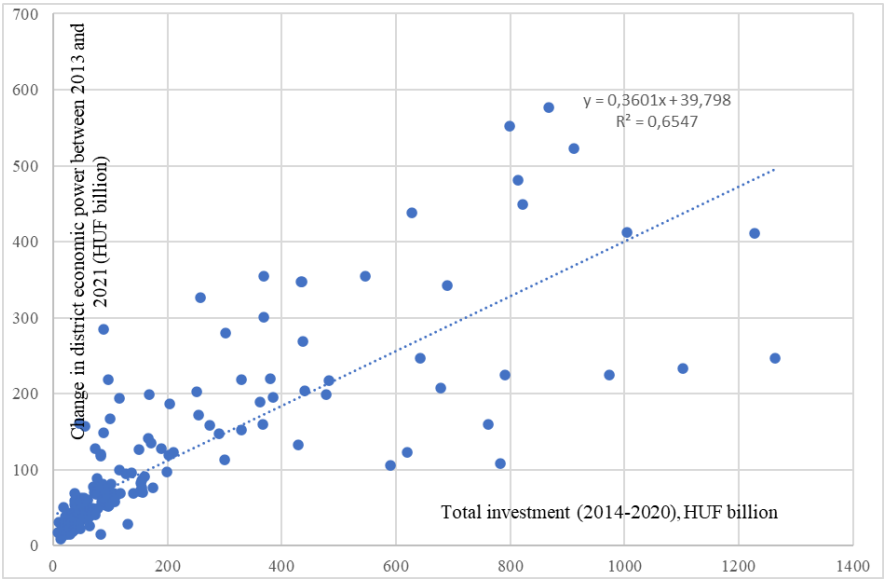

Figure 6: Change in district economic power as a function of investment (without outliers)
source: based on KSH own editing

If I group both JGE changes and investments into clusters (below average and above average), I can distinguish four clusters between districts in the comparison of investment and JGE (without the two outliers). The results are summarized in Table 3.

Table 1: Number of districts in the JGE and investment change groups*

Category	Number of districts
Above average investment and above average JGE increase	45
Above average investment, below average JGE increase	3
Below average investment, above average JGE increase	15
Below average investment, below average JGE increase	132
Total	195

* Except for the two outlier districts
Source: own calculation

In other words, in 90% of districts, investment partly or entirely determines the rate of change in economic performance. In 45 districts, above-average investment was associated with above-average increases in JGE, while in 132 districts, below-average investment was associated with below-average increases in JGE. In three districts (1st district of Budapest, Bajai-, Tiszaújváros districts), higher investment did not induce a significant increase in GDP, while in 15 districts, below average investment also led to an above average increase in GDP. The latter areas are mostly clustered around Budapest and its agglomeration (e.g. Budapest districts 15, 17, 19, 20, 21, 22, Monori, Vecsési).
Among the districts of Borsod-Abaúj-Zemplén county, the districts of Kazincbarcik and Miskolc fall into the first category (above average investment and JGE growth), the district of Tiszaújváros into the second (above average investment and below average JGE growth), while the other districts are in the fourth group (Figure 7).

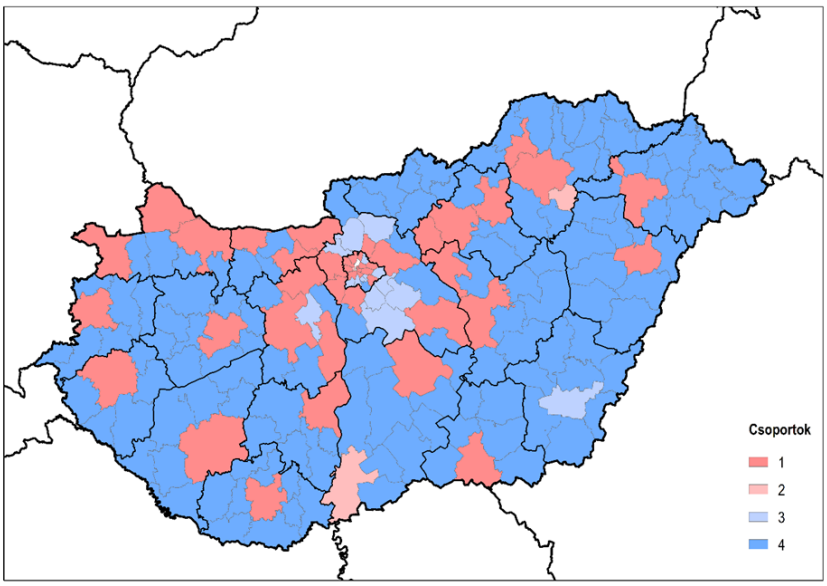

Figure 7: Groups of districts by JGE and changes in investment
source: own editing

The role of EU grants in the economic development of Borsod-Abaúj-Zemplén county

In the county, one fifth of investments in the period 2014-2020 were financed by EU funds (Figure 8). The three best performing districts in economic terms had the lowest share of EU funds in total investments: the district of Kazincbarcik (8.4%), the district of Tiszaújváros (3.4%), the district of Miskolc (21.5%), and the highest share of EU funds in the districts of Cigánd and Encsi (above 95%).
Overall, it can be concluded that EU investments alone cannot explain the change in the economic strength of the districts, and thus they have not been able to influence the economic processes in the districts in any meaningful way. This is partly due to the fact that EU funds have not only economic but also, where appropriate, social and environmental objectives.
With HUF 173 billion of investment in the Miskolc district, the percentage of economic growth was similar to that of the Tokaj district, where the amount of EU TOP, GINOP and EFOP projects between 2014 and 2020 was below HUF 20 billion.

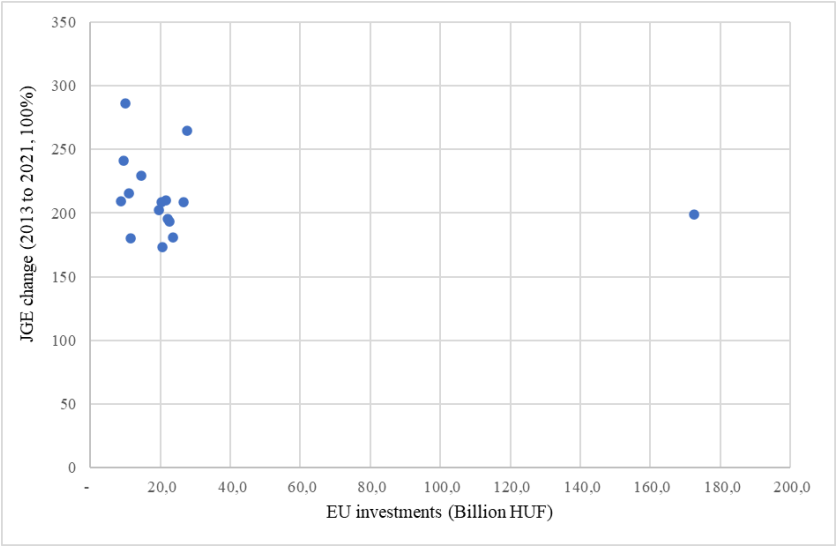

Figure 1: Change in district JGE by value of EU investments
source: based on KSH own editing

A similar finding holds true for changes in economic power and the share of EU funds in total investment. The share of EU funds is almost invariant with the increase in the economic power of the district (Table 4).

Table 4: Relationship between EU investment rates and changes in economic power in Borsod-Abaúj-Zemplén county

Share of EU investment in district investment (%)	Average JGE change between 2013 and 2021 (%)
0-25	208,0
25-50	213,4
50-75	200,0
75-100	228,7
Total County	**212,4**

source: own calculation

This apparent discrepancy stems from differences in the size and territorial coverage of EU and non-EU investments. Table 5 shows that regions with a low share of EU investment had a high share of non-EU investment. The regions with an EU investment rate below 25% (Kazincbarcik, Mezőkövesdi, Miskolc, Tiszaújváros districts) accounted for 82% of total county investment in 2014-2020.

Table 5: Share of EU investment by total district investment, 2014-2020

Share of EU investment in district investment (%)	Total investment (HUF billion)
0-25	1814,4
25-50	288,4
50-75	61,3
75-100	36,4
Total County	**2200,4**

Source: own calculation

In other words, EU investment alone can only have a moderate stimulating effect on economic growth and development, and can help the economy perform better where the role of market investment is stronger and the conditions are favourable for economic actors. Where there is no major non-EU investment, the economic impact of European Union projects is smaller. More effective development takes place in regions where economic actors see opportunities. EU aid alone can only reduce the dynamics of the gap, but there is also a need to stimulate domestic investment. In the future, more targeted synergies and coordination of both types of investment at district level (Jakobi et al., 2024) can make a major contribution to promoting regional economic development.

Table 6: Summary data of the districts of Borsod-Abaúj-Zemplén county

Go to	JGE national ranking*, 2013	JGE national ranking*, 2021	Difference in order between 2021 and 2013**	Change in JGE between 2013-2021 (%)	Change in JGE between 2013-2021 as % of national change (national= 100)	Investments 2014-2020 (total county=100)	Investment between 2014-2020 (country total=100)	Investment between 2014-2020 (national district average = 100)	Investments between 2014-2020 as % of JGE2013 (JGE2013= 100)	Relationship between JGE and investment during the period under review***	EU investments between 2014-2020 (county=100)	EU investment as a share of total investment between 2014-2020
Cigandi	1	3	2	241,4	132,7	0,4	0,02	3,5	67,2	4	2,1	75-100
Edelényi	46	53	7	210,2	115,6	1,3	0,06	12,4	78,9	4	4,9	50-75
Encsi	22	31	9	229,2	126,0	0,6	0,03	5,9	58,7	4	3,3	75-100
Gönci	21	13	-8	180,4	99,2	0,8	0,04	7,8	79,7	4	2,6	50-75
Kazincbarcikai	137	151	14	264,5	145,4	15,0	0,72	141,2	248,5	1	6,3	0-25
Mezőcsáti	5	8	3	215,6	118,6	0,7	0,03	6,3	83,2	4	2,5	75-100
Mezőkövesdi	106	114	8	195,3	107,4	4,3	0,21	40,6	118,5	4	5,0	0-25
Miskolc	188	188	0	198,7	109,2	36,3	1,74	342,5	143,0	1	39,0	0-25
Ózdi	103	102	-1	181,0	99,5	2,2	0,11	20,9	69,9	4	5,3	25-50
Putnoki	9	12	3	209,3	115,1	0,6	0,03	6,0	72,9	4	2,0	50-75
Sárospataki	55	64	9	208,5	114,7	2,9	0,14	27,3	152,3	4	4,6	25-50
Sátoraljaújhely	62	63	1	193,2	106,2	2,5	0,12	23,4	122,2	4	5,1	25-50
Szerencsi	80	93	13	208,4	114,6	2,8	0,13	25,9	108,0	4	6,0	25-50
Sicily	13	36	23	286,4	157,5	1,0	0,05	9,2	103,4	4	2,3	25-50
Tiszaújváros	142	138	-4	173,5	95,4	26,8	1,28	252,8	411,2	2	4,6	0-25
Tokaji	16	17	1	202,7	111,4	1,8	0,09	16,8	182,1	4	4,4	25-50

* from the district with the lowest value to the highest; ** positive improvement, negative deterioration;*** 1=above average investment and above average GDP growth; 2=above average investment and below average GDP growth; 3=below average investment and above average GDP growth; 4=below average investment and below average GDP growth,

Source: based on KSH own editing

Summary

In the first part of my study, I investigated the changes in district economic power between 2013 and 2021, as well as the spatial distributions of investment and the relationship between them, obtained from small area estimates of the GDP value of Hungarian counties. In the second part, I analysed the stimulus effects of EU and Hungarian investments in Borsod-Abaúj-Zemplén county and their differences.

In 2013, the top ten districts with the highest economic performance accounted for a quarter of the country's GDP and 37% of districts accounted for 80% of GDP. I find that the regional differences in economic performance between districts have narrowed slightly over the period. However, this has not been accompanied by a significant shift in the balance of power between districts. Thus, the narrowing of spatial development gaps is not necessarily associated with a substantial reordering of the economic hierarchy between regions - a finding confirmed by recent research on European regions, which points to the persistent nature of economic concentration (Iammarino et al., 2019). In districts where key economic resources are already present, such as high employment, skilled labour, developed infrastructure, services and institutions, positive feedback processes are established. These factors attract additional investment and labour, further increasing the competitiveness of the region. In our country, the Budapest, Győr, Debrecen, Székesfehérvár, Miskolc, Szeged and Kecskemét districts continue to dominate. The overwhelming majority of districts in Borsod-Abaúj-Zemplén county grew at a higher rate than the national average (Table 6).

Due to the nature of the investments, they were differentiated by area (mainly in Budapest and the cities with county status), with 80% of their value concentrated in a quarter of the districts. In Borsod-Abaúj-Zemplén county, compared to the national average, most investments were made in the districts of Miskolc (343% of the national average), Tiszaújváros (253%) and Kazincbarcika (141%).

In 96 districts, the amount of investments made over the whole period was lower than their 2013 JGE value, while in 101 districts it was higher. All counties except Zala have investment rates above the national average and below the national average. The relative differences in investment are due at least as much to differences within counties as between counties.

I find a medium-strong relationship between investment between 2014 and 2020 and the district values of JGE changes between 2013 and 2021, so investment plays a crucial role in the dynamics of economic performance at the district level. In nine tenths of the districts, investment determines the future economic growth potential in part or in whole. In Borsod-Abaúj-Zemplén county, the districts of Kazincbarcik and Miskolc have above average investment and JGE growth rates.

Between 2014 and 2020, one fifth of the investments in Borsod-Abaúj-Zemplén county were financed by EU funds. I found that the stimulating effect of EU funds in the county's districts lags behind non-EU investments by businesses, budget and budget-managed entities. There are several reasons for this: firstly, the purposes for which EU funds are used are more diversified than those of Hungarian investments, and secondly, the volume and location of EU and non-EU investments differ significantly. In those districts where EU investment dominates, there is less evidence of substantial economic improvement. Domestic investment plays a dominant economic role. In the future, greater territorial coordination between the two types of investment could contribute more effectively to the economic development of the county. This is also in line with international regional development guidelines, which argue that a decentralised and strategic approach to development based on local specificities significantly increases the effectiveness of interventions (Pike et al., 2017).

References

BÁGER, G., & CSEH, T. (2020). Beruházási csúcsteljesítmény a magyar gazdaságban. (Peak investment performance in the Hungarian economy). *Pénzügyi Szemle*, *2020*(1), 83–109. https://doi.org/10.35551/PSZ_2020_1_7

DOBÓ, R., & PINTÉR, T. (2022). Regionális különbségek alakulása különböző területi szinteken értelmezve Magyarországon (Regional differences at different territorial levels in Hungary). In *BGE Szemelvények (Proceedings of Budapest University of Economics and Business)* (pp. 58–63). Budapest: Budapest University of Economics and Business. https://doi.org/10.29180/978-615-6342-49-2_6

DUSEK, T., & KISS, P. J. (2008). A regionális GDP értelmezésének és használatának problémái. (*Problems of interpretation and use of regional). Területi Statisztika, 11(48)*(3), 264-280. https://real.mtak.hu/194015/1/ts2008_03_03.pdf

ESF. (2018). *Selection and monitoring of ERDF and ESF projects for the period 2014-2020* (No. 21). European Court of Auditors. https://www.eca.europa.eu/Lists/ECADocuments/SR18_21/SR_PROJECT_PERFORMANCE_EN.pdf

HALMAI, P. (2023): Fenntartható növekedés, növekedési potenciál — A potenciális növekedés irányzatai az Európai Unióban (Sustainable growth, growth potential). *Pénzügyi Szemle = Public Finance Quarterly*, *69(*1), 47-64. https://doi.org/10.35551/PSZ_2023_1_3

IAMMARINO, S., RODRÍGUEZ-POSE, A., & STORPER, M. (2019). Regional inequality in Europe: Evidence, theory and policy implications. *Journal of Economic Geography*, *19*(2), 273–298. https://doi.org/10.1093/jeg/lby021

JAKOBI, Á., SZABÓ, M., MISZLIVETZ, F., & MORVAY, SZ. (2024). A területi stratégiai gondolkodás egy lehetséges komplex közelítése: a „Kreatív Város Fenntartható Vidék" koncepció friss tapasztalatai. (A possible complex approach to spatial strategic thinking: recent experiences of the "Creative City Sustainable Countryside" concept). *COMITATUS*, *34*(250), 137-146. https://doi.org/10.59809/Comitatus.2024.34-250.137

KOCZISZKY GY. (Ed.) (2024). A jövő fenntarthatósága – A fenntarthatóság jövője. (The Future of Sustainability - The Future of Sustainability). Budapest: Budapest Metropolitan University.

KOCZISZKY, GY., & SZENDI, D. (2021). Quo vadis Észak-Magyarország? A régió lehetséges fejlődési pályáinak ex-ante vizsgálata (Quo vadis North Hungary? An ex-ante analysis of possible development paths in the region). *Területi Statisztika*, *61*(6), 679-711. https://doi.org/10.15196/TS610601

NAGY, Z., TÓTH, G., & SZÉP, T. (2022). A magyarországi városok rezilienciájának vizsgálata (Examining the Resilience of Hungarian Cities). *Észak-magyarországi Stratégiai Füzetek*, *19*(3), 84–99 https://doi.org/10.32976/stratfuz.2022.37

PIKE, A., RODRÍGUEZ-POSE, A., & TOMANEY, J. (2017). Shifting horizons in local and regional development. *Regional Studies*, *51*(1), 46-57. https://doi.org/10.1080/00343404.2016.1158802

TÓTH, G. (2024). A társadalmi innovációs potenciál és a területi jóllét számszerűsítésének lehetőségei. (Possibilities of quantifying social innovation potential and territorial well-being). *Statisztikai Szenle (Statistical Review)*, *102*(7), 679–713. https://doi.org/10.20311/stat2024.07.hu0679

VARGA, Á. (2023). A gazdasági függőséget meghatározó tényezők területi egyenlőtlenségeinek változása Borsod-Abaúj-Zemplén vármegyében, 2000–2020 (Changes in the spatial inequalities of the determinants of economic dependence in Borsod-Abaúj-Zemplén county, 2000-2020). *Területi Statisztika*, *63*(6), 758–797. https://doi.org/10.15196/TS630605