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The Role of Transport in Catching Up of New Member States

A közlekedés szerepe az új tagállamok felzárkózásában

New members joined the European Union in 2004 in the hope of catching up. One of the fields where new members are lagging is transport. After joining the EU, investments in transport infrastructure and transport equipment have risen remarkably, mainly due to EU funding. At the same time, GDP growth of new members has exceeded the EU average. This paper examines the connection between investment in transport and economic growth in the European Union focusing on the group of its Central and Eastern European new members. Direct effects of investments, indirect effects on productivity and welfare, as well as crowding in effects on further investments are considered. This paper aims to identify issues for further research and to give an outlook for the decade of the 2020s.

JEL codes: F43, H54, L91, O41, R42
Keywords: transport, investments, economic growth, the EU, Central and Eastern Europe

2004-ben és azt követően a felzárkózás reményében csatlakoztak új tagok az Európai Unióhoz. A közlekedés olyan terület, ahol az új tagok lemaradásban vannak a régiekhez képest. Az EU-csatlakozást követően jelentősen nőttek a közlekedési infrastruktúrába és szállítási eszközökbe történt beruházások, főként EU-támogatással. Ugyanekkor az új tagok GDP-jének növekedése az EU-átlag felett volt. Ez a tanulmány a közlekedési célú beruházások és a gazdasági növekedés kapcsolatát vizsgálja az Európai Unióban, az új közép- és kelet-európai tagokra összpontosítva. A közvetlen hatásokat, a termelékenységre és a jólétre gyakorolt közvetett hatásokat, valamint a további befektetések vonzását veszi tekintetbe. A tanulmány igyekszik beazonosítani további kutatási kérdéseket, és kitekintést adni a 2020-as évekre.

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Kulcsszavak: közlekedés, beruházások, gazdasági növekedés, EU, Közép- és Kelet-Európa

1. Introduction

A group of Central and Eastern European countries (Bulgaria, Croatia, the Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Romania, Slovakia and Slovenia) joined the European Union between 2004 and 2013. These eleven countries (also referred to as the CEE11), regarding their tendencies of catching up to the EU average are in the focus. This paper does not deal with Cyprus and Malta also joining in 2004 because of their different geographic and historic features.

An unprecedented amount of investment has been directed towards the transport sectors of the CEE countries, the main source being the EU funds provided in the 2007–2013 and 2014–2020 multiannual frameworks. Investments fuelled the relatively rapid economic growth. Effective absorption of these investments should appear in increasing productivity related to transport and in crowding in further investments through making the region and attractive location for investors. Some of these effects may be identified for the EU as whole, other factors may play a role in catching up of new members.

Besides productivity effects, welfare effects are also worth analysing. Economic growth enables increased consumption. Scrutinising the changing share of transport related elements of consumption patterns helps us to understand the complexity of the relationship between economic growth and transport development. The attitude of consumers in the new member states differs from the average EU citizen. For instance, people in Central and Eastern Europe tend to spend their additional income on personal cars. By using them, they cause bottlenecks making further investments in transport infrastructure necessary.

The Coronavirus had enormous effects on transport. International passenger transport has been paralysed. Some effects may last for years, the financial plans of the European Union addressing the economic consequences of the pandemic promise huge amounts of investments mostly financed by debt. By turning green and digital, these investments will have a different character compared to previous periods. Technological changes related to industry 4.0 also drive the demand for transportation in new directions.

2. Literature overview

Many authors have dealt with the effects of transport investments. Making one transport connection between two points shorter and/or faster enables a transport company to carry more goods between two points by proportionally lower costs. Transport companies increase their productivity. Other companies benefit from lower transport

prices. The costs of transport development, the existence of transport networks, as well as social and environmental factors make the picture more complex.

Investments in transport infrastructure are mostly financed by state budget; some further investments in transport (for example, rolling stock) are often at least partially covered by tax revenues. Economists have been discussing long whether state investment 'crowd out' private investments. Sometimes, the same amount spent by private entities could bring more welfare. Concerning transport investments 'crowding in' are more often the case: better availability attracts private investors. Literature based on the U.S. experience also discusses 'crowding out' effects limited to the transport sector: public investments discouraging private investors to build roads. In Europe this has little relevance. Agglomeration effects, a phenomenon often mentioned by the literature, may cause local concentration of investments and labour and abandoning other localities.

David Aschauer can be mentioned as a classical author on economic growth caused by infrastructure investment.[1] He points on the productivity effect of new infrastructure on transport industry if bottleneck points are considered properly. This may lead to investments (of the transport companies), may lower production costs (of other industries). Johannes Bröcker and Piet Rietveld[2] point on the high impacts of infrastructure development on construction material production and construction, later generating effects on maintenance activities and productivity of several sectors. Elena Cigu, Daniela Agheorghiesei, Anca Gavriluță and Elena Toader emphasise the role (the quality) of public sector performance, warn not to look at the relationship between development and growth unidirectionally, and not to forget about sustainability.[3]

According to Tamás Fleischer, accelerating infrastructure development does not help economic boom.[4] Infrastructure is important in securing economic stability, not growth. Functional infrastructural network and a balance between its development and its maintenance is a prerequisite for prosperity. He points on the strategic importance of infrastructure and the need to seek the harmony of various development goals including parallel improvement of several levels and modes of transport.

Scholars and empirical findings tend to let us see the growth effects of infrastructure construction limited to a few years (the period of construction and the first years after completion). In case of the most developed countries and regions even negative correlation appears. Political decision-making and institutional imperfections of implementation are also more and more in the focus of analysis. Crowding in private investments and their impact on economic growth may be realised several years after the completion of a transport investment.

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1 One of his relevant articles: David Alan Aschauer, 'Highway capacity and economic growth', Economic Perspectives 14, no 5 (1990), 14–24.

2 Johannes Bröcker and Piet Rietveld, 'Infrastructure and development', in Handbook of Regional Growth and Development Theories, ed. by Roberta Capello and Peter Nijkamp (Cheltenham: Edward Elgar, 2009) 152–189.

3 Elena Cigu, Daniela Tatiana Agheorghiesei, Anca Florentina Gavriluță (Vatamanu) and Elena Toader, 'Transport Infrastructure Development, Public Performance and Long-Run Economic Growth: A Case Study for the Eu-28 Countries', Sustainability 11, no 67 (2019), 1–22.

4 Tamás Fleischer, 'Infrastruktúra-fejlesztés és gazdasági növekedés', Vélemények, Kommentárok, Információk no 40 (2002), 1–2.

Zeynep Elburz, Peter Nijkamp and Eric Pels performed a meta-analysis.[5] They summarised the findings of 42 studies. Only 45 per cent of these studies have proved positive correlation between infrastructure development and economic growth, 44 per cent even negative correlation, 11 per cent no clear relation. Most of the cases where construction of infrastructure did not cause economic growth (at least locally) were related to the U.S. Pavle Petrović, Milojko Arsić and Aleksandra Nojković have made an estimation of the marginal productivity of public investment in the CEE11 countries and found it higher than that in the EU15.[6] Their study was not limited to infrastructure. Nebojša Stojčić, Zoran Aralica and Ivan-Damir Anić in their analysis of post crisis recovery of 56 NUTS regions in the CEE find infrastructure and knowledge diffusion being key factors of growth, foreign direct investments and digitalisation being the driving forces.[7]

In the case of Central and Eastern European member states of the European Union, marginal factor productivity of infrastructure construction has been found significantly positive by research. The outlook for the 2020s is similar but with some limitations. Investments focusing on bottlenecks and cross-border connections are still needed throughout the region. Issues like climate change and digitalisation will be interconnected with the development. Well-founded political consideration will be needed. Daniel Albalate, Germà Bel and Xavier Fageda warn us: Spain with overcapacities is not an example to follow.[8]

3. Hypothesis

The general hypothesis of this paper is that a significant linkage between (1) the proportionally higher investments in the transport infrastructure of the new EU members in the 2010s and (2) the higher than the EU average GDP growth can be proved based on the available data on investment, productivity and consumption.

Based on the literature, this would mean that in Central and Eastern European member states of the EU: (a) further investments are 'crowded in' by transport related investments in new member states; (b) productivity of transport industry and productivity of using transport by other industries have improved more in the new member states than in the other EU countries; (c) transport related welfare effects of growth create further demand for transport in a sustainable way.

Apart from examining this hypothesis, some new tendencies of the 2020s are detected, modulating the importance of transport investments in the catching up process of the new EU members.

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5 Zeynep Elburz, Peter Nijkamp and Eric Pels, 'Public infrastructure and regional growth: Lessons from meta-analyses', Journal of Transport and Geography no 58 (2017), 1–8.

6 Pavle Petrović, Milojko Arsić and Aleksandra Nojković, 'Increasing public investment can be an effective policy in bad times', Economic Modelling 94 (2021), 580–597.

7 Nebojša Stojčić, Zoran Aralica and Ivan-Damir Anić, 'Spatio-temporal determinants of the structural and productive transformation of regions in Central and East European countries', Economic Systems 43, no 3 (2019), 100715–100726.

8 Daniel Albalate and Germà Bel and Xavier Fageda, 'When supply travels far beyond demand: Oversupply in Spain's Transport Infrastructure', Transport Policy 41 (2015), 80–89.

4. Methodology

First of all, we have to check if the two statements in the hypothesis are valid, namely if investments in transport in new member states were really higher than in the other EU countries, further: if GDP growth of new member states exceeded the EU average. There is a focus on the construction of transport infrastructure, but broader categories of investments related to transport are identified as well. Euro values and quantities expressed in physical units are presented. As for GDP growth, nominal, real and purchasing power parity (PPP) values are considered, paying attention to the role of prices.

Investments appear in national accounts as gross fixed capital formation. Transport related investments are gross fixed investments of the transport industry and gross fixed investments of general government in transport. It is also worth checking gross fixed capital formation by asset type with special regard to construction other than dwellings and transport equipment. Crowding-in effect may be assumed if investments are not related directly to transport growth. The question is the share of the CEE11 countries within the EU in such investments has increased. Still, this is not enough; a lasting shift of capital formation towards this region should be proven.

Productivity improvement of the transport sector should lead to higher revenue efficiency reflected in higher increase of gross value added compared to the increase of the output of the transport industry. Productivity improvement of other sectors should mean increasing cost efficiency mirrored in the decreasing quotient of the total use of transport services per total less transport gross value added.

Consumption pattern of households shows the transportation effects of growing welfare in spending more on travel. A substantial increase in the number of personal cars on the roads is not only a sign of welfare but also creates bottlenecks deteriorating the effectiveness of transport services. People spending more on passenger transport services also give a feedback on higher quality (comfort, speed).

The source of data where not mentioned otherwise is Eurostat. Eurostat itself is forced to replace missing data with its own estimates; some own estimates are used in this paper as well. Because of the lack of full data series for all the countries, and with regard to the relatively simple hypothesis, complex statistical methods of comparison were not used here.

The year 2020 is a turning point both because of the consequences of the pandemic influencing the innovations of the 2021–2027 multiannual financial framework of the European Union. The breakthrough of new technologies (internet of things, artificial intelligence, 3D printing etc.) also put transportation in a new context. It is early to estimate the exact effects of transport related new phenomena on supply and demand, but we can at least identify some of the trend changing factors.

5. Results

Based on the available data, the new EU members' tendency of catching up in terms of transport infrastructure and economic output can be proven, but only a limited role of improvements in transport causing economic growth can be underpinned. The data available and the methodology chosen are insufficient to prove or traverse underlying crowding-in and productivity effects. Central and Eastern European consumers' attitude generally does not support the sustainability of the development of transport.

The hypothesis is based in the assumption that new members invest more in transport and they have a higher economic growth. The second statement is easily proved by GDP data be it in current prices or PPS. As presented in Figure 1, the share of the eleven Central and Eastern European new members in the GDP of today's EU (EU27) in current market prices was 9.0 per cent in 2010 and 10.6 per cent in 2019, rising continuously. In purchasing power standards this share has grown from 15.0 per cent to 16.9 per cent. Since the share of these CEE11 countries within the EU27 population has shrunk to 22.9 per cent by 2019, the trend of the 2010s shows a convergence of new members' GDP per capita towards the EU average as also shown in Figure 2.

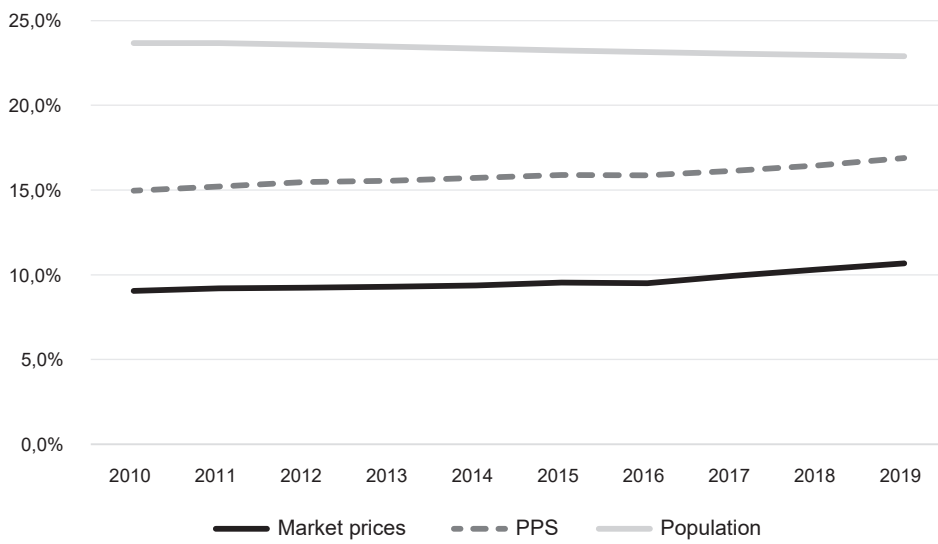

Figure 1
Share of the CEE11 in the EU27 GDP and population
Source: Compiled by the author based on Eurostat.[9]

[9] https://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=nama_10_gdp&lang=en and https://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=demo_gind&lang=en

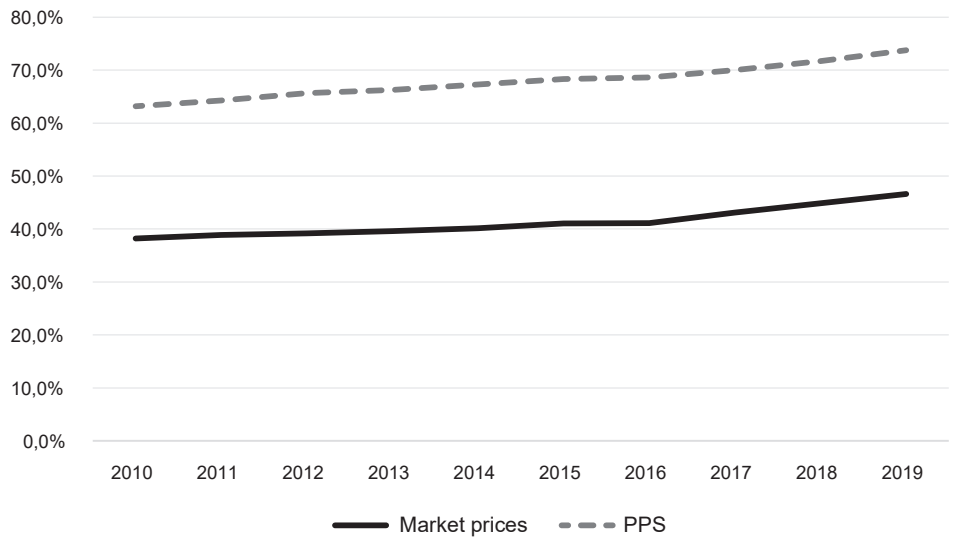

Figure 2
The CEE11 GDP per capita; percentage of the EU27
Source: Compiled by the author based on Eurostat.[10]

Statistics on transport investments also shows a growing share of new members, but the definition of transport investments is less trivial. Gross fixed capital formation of the transport industry is part of this; member states except for Croatia and Cyprus provide GFCF data (Figure 3). The share of the CEE10 (without Croatia) in the EU25 (EU27 minus the two countries not providing data) grew from 14.4 per cent in 2010 to 17.0 per cent in 2015, but from 2016 this share has been lower again. Even so, the share of gross capital formation of the transport industry has remained above 2 per cent in the CEE10, while it has not been higher than 1.5 per cent in the EU25.

[10] Based on the same dataset as Figure 1.

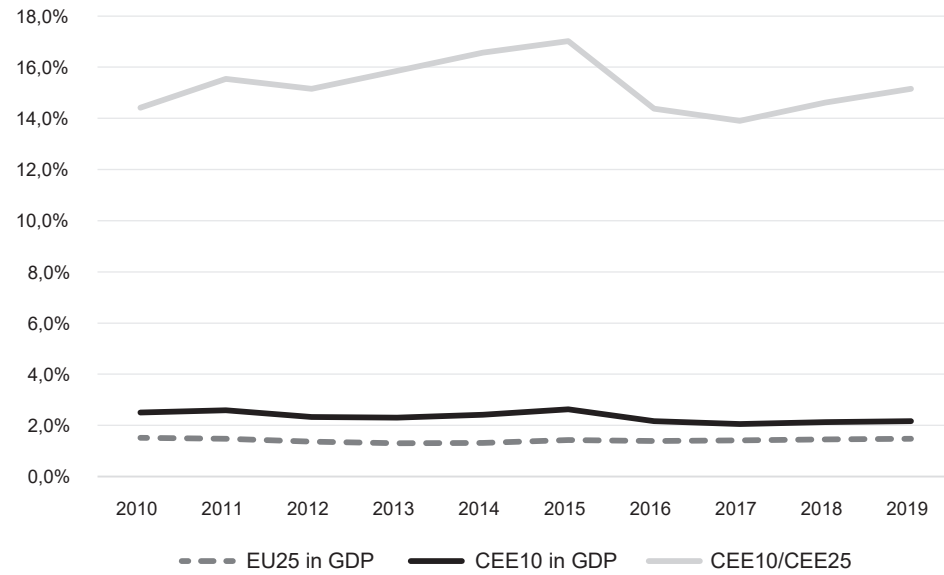

Figure 3

Gross fixed capital formation of transport and storage; share in GDP, the CEE10 share in the EU25

Source: Compiled by the author based on Eurostat.[11]

Transport investments do not always appear in the accounts of transportation companies. Gross fixed capital formation by assets gives another approach. Investment in infrastructure falls in the category of other buildings and structures (construction minus dwellings). This category is broader than investments in transport infrastructure. The CEE10 (no data for Croatia) countries had a 13.6 per cent share within the EU26 (without Croatia) in 2010, and 15.1 per cent in 2019, with an uneven growth between. In the case of the other relevant asset: transport equipment, the CEE10 share in 2010 was 9.9 per cent and 10.7 per cent in 2019, in certain years it was even higher (Figure 4). Gross fixed capital formation in the general government expenditure by function data also reflect a high of the CEE11 share under the transport function (included in Figure 4).

[11] https://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=nama_10_gdp&lang=en and https://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=nama_10_a64_p5&lang=en; missing data estimated extrapolating the previous five years' average nominal change.

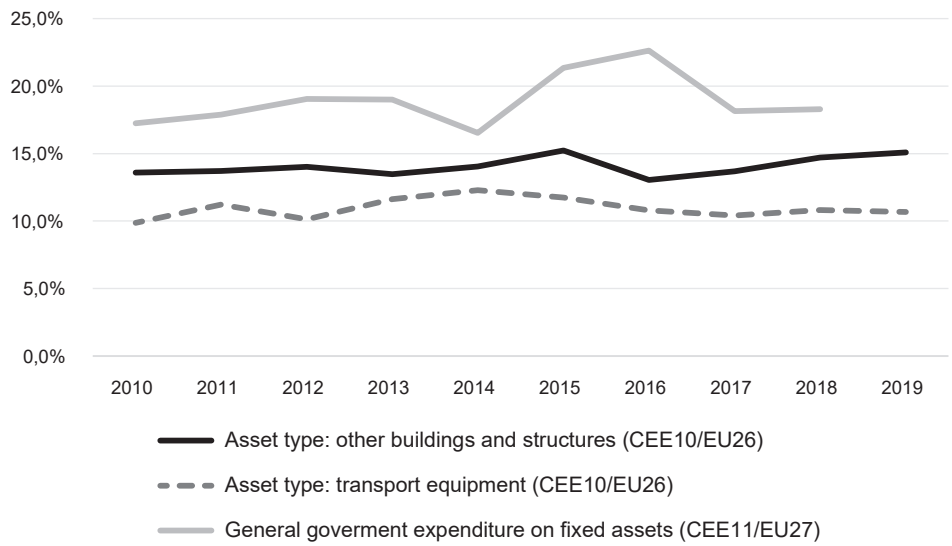

Figure 4

Gross fixed capital formation by asset type; government expenditure on fixed assets

Source: Compiled by the author based on Eurostat.[12]

CE Delft has collected transport infrastructure investment, operation, and maintenance expenditure data from a huge number of sources for the period 1995–2016.[13] They also found data for the CEE11 proportionally high values for the last decade, even the expenditures in Euros per inhabitant has been over the EU average. All sources show that investments in the CEE transport were near the level of the 2010s already from 2007.

Summing up the above: the share of the Central and Eastern European new members has been increasing, while several data series related to transport investment show a similar but less continuous tendency of growth regarding the CEE countries' share in the European Union. The period of 2011–2015 can be identified with a high investment ratio in transport in the new member states. Apart from investment value discussed hitherto, some natural measures also demonstrate this. The rapid increase in the length of motorways, electrified and modernised railways can also be quantified in kilometres; the regional fleet of lorries (especially in Poland and in Romania) also has shown an impressive rise. Eurostat does not have the data for some old members complicating exact comparison.

12 https://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=nama_10_an6&lang=en and https://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=gov_10a_exp&lang=en

13 Arno Schroten, Lisanne van Wijngaarden, Marco Brambilla, Marco Gatto, Silvia Maffii, Frank Trosky, Holger Kramer, Reinhard Monden, Damaris Bertschmann, Maura Killer, Vitalie Lambla, Kareen El Beyrouty and Sofia Amaral, *Overview of transport infrastructure expenditures and costs* (European Commission, 2019).

Any further significant investments crowded in by transport investments would mean, they should be reflected by a rise of such investments lagging few years behind the rise of transport investments. What we find is a parallel tendency of investments in transport and other than transport. An immediate crowding-in effect is possible theoretically; investors may base their decisions on information regarding future improvements of transport. But this does not seem to be the case. Capital formation in the new member states is determined by the EU transfers, the changes in capital formation follows the cycles in the EU budget programming. Both transport and other investments depend on EU funding. Although the CEE non-transport capital formation was higher than the EU average until 2015, from 2016, in all the other years, it has been under the average (Figure 5). No breakthrough in capital formation founding a base for catching up within the EU can be identified.

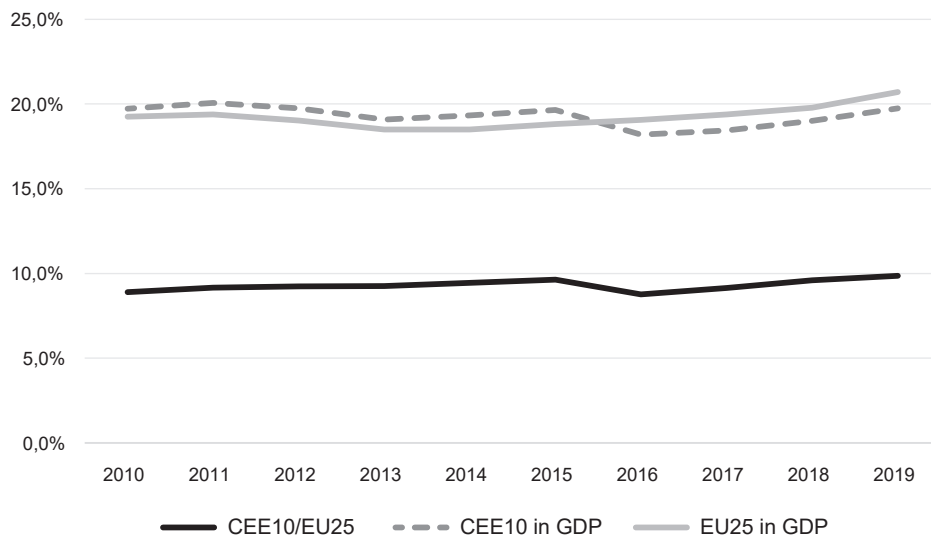

Figure 5
Non-transport gross fixed capital formation
Source: Compiled by the author based on Eurostat.[14]

Improving productivity of transport services should lead to revenue efficiency: growing share of value added in output. This is only true for the period of 2011–2015 for the CEE11 region. Revenue efficiency of the CEE11 was higher than that of the EU27 between 2012 and 2017.

[14] https://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=nama_10_gdp&lang=en and https://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=nama_10_a64_p5&lang=en; missing data estimated extrapolating the previous five years' average nominal change.

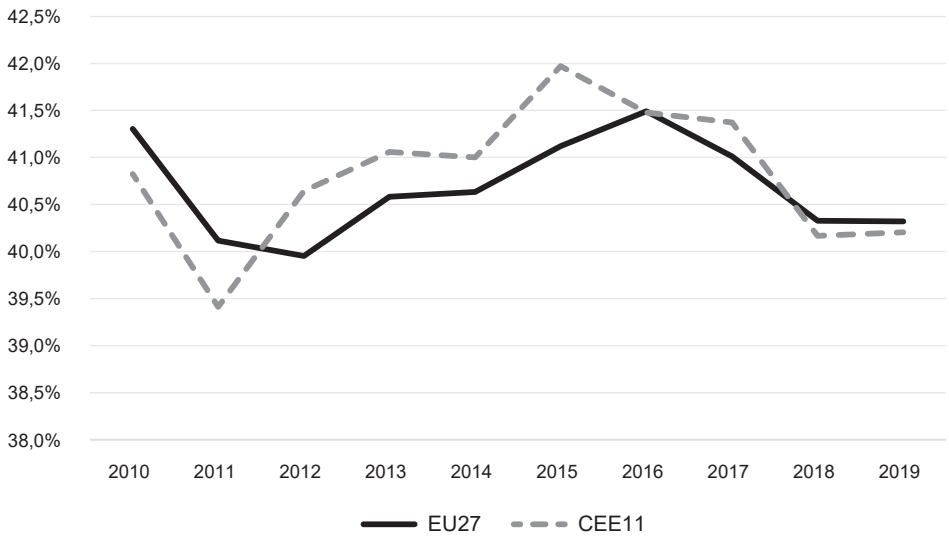

Figure 6

Share of gross value added in transport output (transport revenue efficiency)

Source: Compiled by the author based on Eurostat.[15]

If the non-transport part of the economy gains efficiency through relatively cheaper transport services, this should be reflected in cost efficiency: decreasing inputs of transport services relative to aggregate gross value added less transport value added. Eurostat input–output tables are incomplete; especially data from 2017 are missing. Eurostat publishes estimates of the EU27 aggregates. According to these estimates there has not been any improvement of cost efficiency at the level of the European Union, rather some slight worsening (Figure 7). Very rough own estimates, extrapolating tendencies of the years covered by Eurostat, give the opposite tendency: continuous improvement in the effective use of transport services in Central and Eastern European new member states.

[15] https://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=nama_10_a64_p5&lang=en; missing data estimated extrapolating the previous five years' average nominal change.

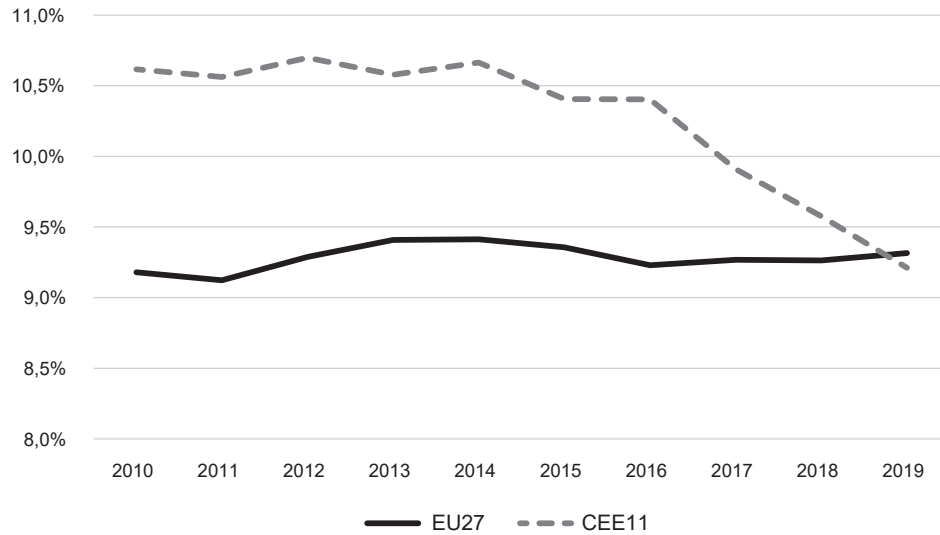

Figure 7

Use of transport services in non-transport gross value added (transport cost efficiency)

Source: Compiled by the author based on Eurostat.[16]

The above findings are not supported by a different methodology better based on data. The share of transportation and storage within the gross value added of today's European Union (EU27) has been constantly 5 per cent (4.9 per cent in 2011 and 5.1 per cent in 2015, see Figure 8) throughout the 2010s while gross value added has permanently grown (except for a slight annual drop in 2012). The proportionally growing consumption of households (Figure 9) implies a decreasing share of intermediate consumption, so Eurostat's use (input) estimates are in contradiction with other, complete data sets. The share of transport within value added has grown in Central and Eastern Europe while the share in consumption has decreased. The picture based on gross value added and consumption statistics does not support the findings based on the fragmented data of input–output tables.

[16] https://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=nama_10_a64_p5&lang=en, https://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=naio_10_cp1610&lang=en; missing data estimated with various methods.

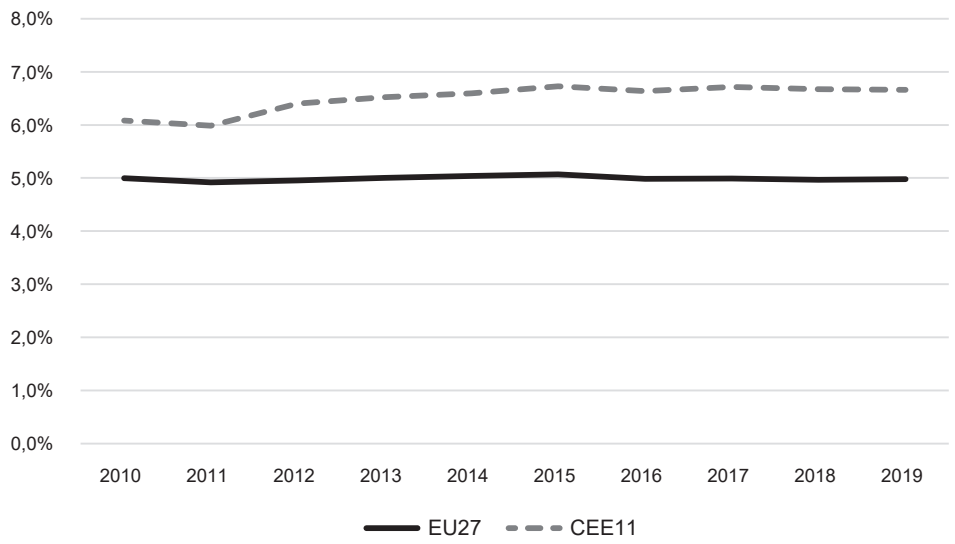

Figure 8
Share of transport and storage in gross value added
Source: Compiled by the author based on Eurostat.[17]

Consumption patterns worth further analysis, increasing welfare enables more consumption in the field of transportation. The share of transport services in consumption has grown from 2.0 per cent to 2.2 per cent between 2010 and 2019, purchase and operation of vehicles made 10.8 per cent of consumption both in 2010 and 2019, and there was a slight increase package holidays (from 1.0 per cent to 1.1 per cent). The consumption patterns of the CEE11 countries are different from the EU average. The share of transport services dropped after 2015 after a period of convergence to the EU average, while purchase and operation of vehicles increased from 9.0 per cent to 10.0 per cent between 2010 and 2019. Operation of vehicles made a 6.1 per cent in 2010, 7.0 per cent (reaching the EU average) in 2018. In this group of countries welfare effects focus more on the purchase of passenger cars, fuel the expansion of transportation and holiday services less. Romania is an exception with a clear relative growth of consumption of transport services (1.9 per cent to 3.1 per cent), decreasing expenses on vehicles (8.9 per cent to 7.6 per cent) and a slight drop of value added by transportation and storage (7.1 per cent to 6.8 per cent) indicating a sound role of a developing transport sector in gaining efficiency and contributing to welfare.

[17] https://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=nama_10_a64_p5&lang=en and https://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=nama_10_gdp&lang=en

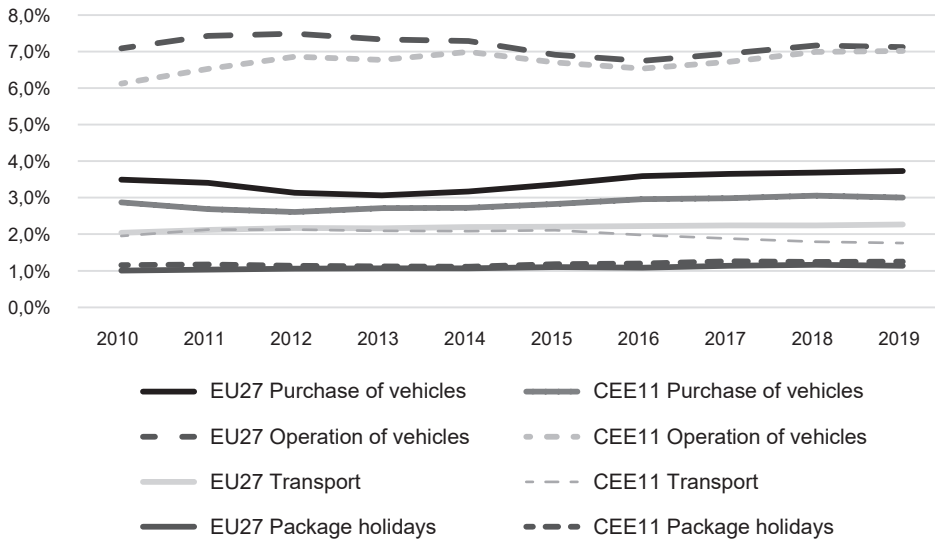

Figure 9
Transport related consumption of households
Source: Compiled by the author based on Eurostat.[18]

The focus on passenger cars in Central and Eastern European consumption has contributed to a substantial increase of the number cars, creating bottlenecks in the roads. By 2018, the number of passenger cars[19] per 10 inhabitants increased in the CEE11 from 3.7 (year 2010) to 4.9 in contrast to the EU27 (members today) from 4.8 to 5.3. Consumption patterns also tell us much about the negative environmental externalities of this increase in car stock. As can been seen in Figure 9, the CEE11 people spend substantially less on buying more cars. This reflects cheaper, mainly used cars. Convergence in operating costs also suggest cars with higher fuel consumption thus more pollution.

6. Discussion

As the research by CE Delft demonstrates, the CEE11 countries in the EU could invest in transport infrastructure more four times (the EU28 countries one and a half times) of their 1995 level between 2008 and 2011.[20] This paper approaches investment in transport in a broader sense and uses different data sources indicating record high levels throughout the first half of the 2010s. Several authors, like Ákos Kengyel point out that less EU transfers for transport development were available in the period 2014–2020 compared

18 https://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=nama_10_co3_p3&lang=en
19 https://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=road_eqs_carhab&lang=en
20 Schroten et al., *Overview of transport infrastructure expenditures and costs.*

to 2007–2013.[21] All data series examined above underpin that transport related investments in new member states had been over the EU average until 2015. This corresponds with the 2007–2013 multiannual financial frameworks (regarding that payments were due by year 'n + 2'). Data for the years 2016 and after do not show the continuity of tendencies of the first half of the decade. At the same time, catching up in terms of GDP even accelerated slightly. Theoretically investments of the first half of the decade my influence the growth of the second half of the decade.

One of the proofs of such an effect could be investments (other than in transport) crowded in. Our above analysis has shown that non-transport investments of the CEE11 countries were above the EU average just until 2015 coinciding with the boom of transport investments and remained under average since 2016. Locally, several crowding-in cases may be found not influencing the overall picture of the region. An analysis of FDI flows and case studies of foreign investments may convince us that better accessibility attracts foreign investors, but aggregate gross fixed capital formation do not reflect this at the CEE11 level. It is much more evident that the EU transfers to new members boosted transport and non-transport investments by 2015, overtaking old members, but this did not have substantial leverage on aggregate investment activities after 2016.

Further argument supporting growth effects of transport investments can be some evidence of increasing productivity of transport services. Gross value added increasing faster than output between 2011 and 2015 in the CEE11 and between 2012 and 2016 EU-wide, can be linked to such a phenomenon. It needs further examination what has happened in the second half of the decade with transport companies in Central and Eastern Europe. Transport and storage services output has grown even faster than in the first half, but the increase of costs has outpaced the rapid growth of income. An analysis of these costs may bring us closer to longer term productivity issues of these companies.

The third direction of approbation of the linkage between transport investments and economic growth was the search of productivity gains of non-transport companies through more effective use of transport services. The shortcomings of input–output tables available limit us to conclude, especially for the years after 2016, still a decreasing use (input) of transport services can be revealed in the case of Central and Eastern European economies. Another method, comparing the share of transport in value added and the share of transport in the consumption of households makes a mending tendency of effective use of transport services likely at the EU27 level. Further research can explain contradicting results of these two methods, and the fast rise of transport services export surplus of the CEE11 can be considered in further analyses of productivity effects in East and West.

The consumption pattern of the CEE11 countries and the rapid growth of vehicle stock are not encouraging regarding sustainability. Romania may seem as an exception, but there the high number of Romanian citizens working in distant countries create demand also within Romania (for transport services) while they buy and operate their cars abroad.

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[21] Ákos Kengyel, 'Közlekedéspolitika', in *Európai Uniós politikák,* ed. by Ákos Kengyel (Budapest: Akadémiai Kiadó, 2020).

As we have learned from the literature, more developed countries have less chance to boost economic growth through transport investments. Even if productivity effects can be detected both at the EU27 level and among the new members, theory and evidence (from the U.S.) teaches us to expect decreasing marginal factor productivity of transport investments. As the Polish Institute for Structural Research quantified it, 'old' members benefit from the EU transfers to new member states in a large extent.[22] This is also a reason not to expect catching up of the CEE11 countries based on the EU funded investments.

The future development of these networks depends on the availability of the EU funds. The level of direct transfers will further decrease, while new members will better access debt-creating financial sources. The Multiannual Financial Framework for 2021–2027 does not provide the level of funding for new members as before. The extension of the MFF by the Next Generation EU tool (creating debt for members and the EU as a whole) and an increasing activity of the EIB enables most of the EU members, including the CEE countries, to expect similar financial flows towards transport from the EU in the first half of the 2020s compared to the 2010s. A game changing new wave of transport investments including high-speed railways seems to be more realistic to expect in 2030s. Corinne Blanquart and Martin Koning remind us that such huge investments need especially thorough consideration of costs and benefits.[23]

Not only the expansion of transport networks, but demand for it, too, may be at a lower level compared to the 2010s. People began to travel significantly less during the Covid-19 crisis. Home office and video conferences become a standard of several companies surviving the crisis; tourism may need several years to regain momentum. Industry 4.0 with digitalisation, 3D printing and other smart solutions may reshape the need for transport as well. In the world of artificial intelligence, 5G and internet of things, secure just in time communication between devices may need an increasing level of investments, while traditional investments in infrastructure like motorways may lose in importance.

It is not just a 'dictate from Brussels' to direct relatively less funds for transport infrastructure and focus more on sustainability and digitalisation. As Stojčić, Aralica and Anić have found, an analysis of regional development at NUTS2 level underpins the need for infrastructure, first of all digital infrastructure to be accompanied by knowledge transfers secured by direct investments and education.[24]

In the 2010s, labour force mobility from the CEE countries to the Western part of the EU[25] also gave impetus to demand for transport. No new wave of labour migration like 10 years ago is not to be expected. The Covid-19 crisis split many families for months. More of them might return to the CEE countries than leave their home country for good.

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22 Piotr Bartkiewicz, Anna Matejczuk, Henryk Kalinowski, Magdalena Ośka, Andrzej Regulski and Julian Zawistowski, How do EU-15 Member States Benefit from Cohesion Policy in the V4? (Instytut Badań Strukturalnych, 2016).

23 Corinne Blanquart and Martin Koning, 'The local economic impacts of high-speed railways: theories and facts' European Transport Research Review 9, no 12 (2017), 1–14.

24 Stojčić et al., 'Spatio-temporal determinants'.

25 For the extent of migration see Martin Kahanec and Klaus F Zimmermann, 'Post-Enlargement Migration and the Great Recession in the E(M)U: Lessons and policy implications', *Maastricht University UNU-MERIT Working Paper Series* no 66 (2016), 1–34.

7. Conclusions

During the 2010s, Central and Eastern European members of the European Union have converged successfully towards the average GDP of today's EU, reaching the level of Greece, Portugal, and Spain. If this tendency continues, by 2030 most of the new members might have a GDP lagging not much behind the EU average. In the first half of the 2010s, the level of transport investments in the CEE11 was proportionally over the EU average. Since 2016 this level has been still higher than in the previous decades but has converged to the level of other EU members. Keeping transport investments proportionally over the EU average level in the 2020s will depend on their readiness to finance it increasingly by debt creation.

It is a common perception among politicians that investment in transport infrastructure bolsters up economic growth. If the short construction sector gets an impetus, in the mid-term, companies around new infrastructure gain in efficiency, welfare of local people increases. Scholars more and more often point on the limits of such effects, especially in the case of developed countries. In Europe, Spain has overtaken all others in the length of motorways and high-speed train network while the purchasing power of their GDP has sunk recently.

For the EU as a whole, the 2010s was a period of increasing investments in transport infrastructure and period of economic growth that can be linked by reason. The CEE countries were a main target of such investments and enjoyed GDP growth over the average of the EU. The above analysis has shown that both efficiency effects and welfare effects related to the improvement of transport services through investments are limited.

Theory still owes a clear answer if transport infrastructure development causes economic growth or vice versa. The developments of the 2010s have given us some evidence that infrastructure may have helped growth; the 2020s might be a time for the EU to accumulate strength and prepare a comprehensive plan for transport of the future. For Central Europe, the 2020s should be a time for overcoming bottlenecks and completing routes interconnecting the countries of the region with each other and with the Western part of the EU.

In the 2020s relatively less investment in transport infrastructure, and lower transport infrastructure development related growth effects can be expected. In the meantime, this decade may be suitable to rethink transport needs for Europe of 2030s. Some major projects like a high-speed railway network extended to the Eastern part of Europe might bring a new wave of transport related growth, if planned properly.

Transport development is not a magic tool in catching up. Getting rid of the main obstacles, organising better access to resources and markets helps in reaching a higher income level, but skilled human resources, innovation, and effective organisation are the key. The inevitable infrastructure of the next decade is digital infrastructure. Challenges around energy supply should not be overseen either. Central Europe may become competitive with today's motorways and airports, too. High speed trains will get their roles in the decades of the 2030s and 2040s.

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