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Evaluation of the effectiveness of high-speed rail projects in the Czech Republic in terms of their integration potential

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Abstract

The paper deals with the evaluation of the effectiveness of the construction of high-speed rails/HSR in the Czech Republic with an emphasis on the perception of their potential impact on labour market integration. The introductory part analyses the position of the main Central European metropolises in the HSR network as a tool for transnational integration, where the leading position of German and Swiss metropolises was confirmed. The main goal of the paper is assessing the impact of HSR construction projects on the work attractiveness of Czech metropolitan regions using the model of marginal rate of labour mobility model determined by the ratio of income and cost increases (including variant scenarios of lost time costs as negative externality). Its application combines economic and geographic analysis and thus contributes to the integration of space and time into economic theory. The performed analyses demonstrate the most significant positive impacts of the construction of HSR on the work attractiveness of Prague, followed by Brno. Regarding the adequate effects of the operating speed, it is possible to evaluate them as secondary due to the small distances of the affected residential centres. Overall, we expect that the implementation of the discussed projects will not have a significant impact on the labour mobility of the population and it is therefore necessary to pay attention to their other benefits.

Highlights for public administration, management and planning:

- Evaluating the effectiveness of public projects is one of the most important tasks of public administration, aiming to ensure optimal allocation of financial resources.
- The cross-border links of the planned HSR should be respected, with an emphasis on the spatial distribution and position of the Central European metropolises within the existing HSR network.
- Managing the development of modern railway infrastructure should take greater account of its role in spatial mobility, with particular reference to the supply of regular passenger transport and its competitiveness.
- The evidence-based analysis of the integration potential of planned HSR in terms of the creation of supra-regional labour markets confirmed the practical applicability of the methodology for evaluating the effectiveness of infrastructure projects.

Keywords

High-speed rail/HSR,
Integration,
Metropolises,
Labour mobility,
Marginal rate

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1 Introduction

The Czech Republic has one of the densest rail networks in the world, but its capacity is not fully being utilizing. The main reason is its neglect, where the total degree of depreciation of the infrastructure is around 60% (Tikman & Vachtl 2010) and the delayed technical development with negative impacts on the competitiveness of rail transport with other

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modes of transport (Körner 2019; Horňák & Kraft 2015). Due to the insufficient volume of available investment funds, their concentration on the modernization of the main traffic lines, started by still unfinished construction of the so-called transit railway corridors in 1993, seems to be optimal. In 2017, the Government of the Czech Republic approved the Program for the Development of fast connections/FC (Ministry of Transport 2019), whose assessment in terms of impacts on spatial integration, with an emphasis on commuting to the defined Czech metropolises and other regional centres, is the main objective of the article. FC tracks unlike HSRs, which usually denote new railway lines with an operating speed of 200 or more km/h, also include upgraded conventional lines with a speed of 160 to 200 km/h. It should be noted, however, that according to the audit results of fourteen HSRs in the EU carried out by the European Court of Auditors, the average speed reaches only 45% of the maximum capacity and only two of them reach a speed of over 200 km/h (European Court of Auditors 2018). In accordance with the ongoing discussion on the technical parameters of the planned railway lines, the abbreviation HSR/FC is preferred in this article.

2 Evaluation of the position of Central European metropolises in the HSR network and plans for its construction in the Czech Republic

The population density reflecting location of major metropolitan areas determining transport demand is logically considered as the primary factor of effectiveness of building (see, for example, Lüttmerding & Gather 2013; Hlaváček 2017). In the context of the historical and geographic region of Central Europe comprising a total of nine countries, an indicative threshold of a population of 750 thousand was determined concerning the so-called functional urban development areas/FUA was determined (OECD 2018). The smallest capital cities, i.e. Bratislava and Ljubljana, were also included among these metropolises. For a definition of the working macroregion of Central Europe, the publications The World Factbook, The Encyklopaedia Britannica and Brockhaus Enzyklopädie were used as the main documents. At this point, however, it is necessary to draw attention to the problematic information capacity of any delimitation resulting from the complex history of Central Europe and its cultural and political ties with the surrounding regions. In the case of metropolises of secondary importance, a population of 500 thousand is most often referred to as the lower limit (e.g. Brezzi et al. 2012). In total, 27 Central European metropolitan areas were identified (12 of them located in Germany). To evaluate their significance, an original methodology was developed involving three components in which metropolises were divided into three classification groups (Viturka et al. 2017):

- the population size of metropolises (input assumption of starting metropolization processes)
- the economic profile of metropolises (reflection on the representation of knowledge-based industries and services)
- the general attractiveness of metropolises (the perception of metropolitan development assumptions).

According to the identified aggregate position within the above components, the metropolises were classified into three types:

- Dominant metropolis (6) – Berlin, Frankfurt/M., Munich, Rhein-Ruhr (Düsseldorf, Köln/R., Dortmund and others), Zürich, Hamburg.
- Established metropolis (11) – Vienna, Warsaw, Budapest, Prague, Stuttgart, Geneva, Nürnberg, Hannover, Basel, Mannheim, Górny Śląsk (Katowice and others).
- Elementary metropolis (10) – Bratislava, Ljubljana, Bremen, Leipzig, Dresden, Gdańsk, Kraków, Poznań, Wrocław, Łódź.

According to the positioning in networks including mixed high-speed and conventional railways (information is taken from Interrail maps 2018) Central European metropolises aggregated by country were divided into three classification groups. The first group with the strongest status is represented by the German and Swiss metropolises connected on average to four directions (Berlin and the metropolitan area Rhein-Ruhr with six directions occupy the best position). The second group includes the Polish and then the Austrian and Hungarian metropolises connected on average to three directions (the best Warsaw with five potential directions). The third group includes the Czech, Slovak and Slovenian metropolises, which are not connected to HSR and, accordingly,

the solution of their construction seems to be increasingly urgent. In this respect, Prague is primarily the only established metropolis within the group. From Fig. 1 (mixed routes are not included among the operated HSR for easier orientation) it follows that in the case of Prague, the closest metropolises in the north direction are Dresden, Leipzig and the dominant metropolis Berlin, in the west direction Nürnberg and the dominant metropolis Munich, in the south direction Bratislava and Vienna and in the east direction Wrocław and the metropolitan area Górny Śląsk/Katowice. Of course, the Czech plans for the construction of HSR/FC, which include the HSR/FC routes 1 Prague − Brno (linking to the southern HSR/FC route 2 → Vienna, Bratislava) − Ostrava → Katowice, HSR/FC 3 Prague − Plzeň → Munich, HSR/FC 4 Prague − Ústí/L. → Dresden and the alternative route FC 5 Praha → Wrocław, whose construction does not appear realistic and therefore is not discussed in the following text (SŽDC 2018).

The above-mentioned construction projects primarily take into account the investment and residential attractiveness of Czech development poles, represented almost without exception by the centres of NUTS3 regions, as the main bearers of integration processes. Of course, the Prague metropolis, followed by the secondary metropolises Brno and Ostrava (FUA), occupies a leading position within them. The intensity of their mutual links, together with the overall efficiency of the rail transport organization system, has a decisive impact on the profitability of operations (Ministry of Transport 2018). In this context, based on the analyses carried out and taking into account the current trends, the overall ratio of domestic and international passenger transport characterized by a significantly higher proportion of irregular journeys was set to 1: 0.2. This ratio was determined on the basis of the experiences of European countries, see, e.g. Klodt (2004) or generally Medeiros (2019). with a developed HSR network, that confirms the established assumption of a dominant position of national ties (Beria 2017).

The analysis of the potential impacts of the planned construction of HSR/FC in the Czech Republic on the development of cross-border metropolitan networks is based on three complementary components: general economic interactivity, tourist attractiveness and transport connectivity (for more details see Šauer et al. 2019). Their synthesis, based in the case of first two components on the gravity models and in the case of transport connectivity component on the combined evaluation of motorway time availability and airline capacity, takes into account the metropolitan typology as a basic long-term development framework. From this point of view, the best development prerequisites of HSR/FC 4 are corresponding to the metropolitan axis Prague − Dresden − Berlin (Hamburg) and then HSR/FC 3 connecting Prague and Munich (the most important metropolis located on the metropolitan axis Prague − Nürnberg − München − Zürich) and with a clear distance following HSR/FC 2 which together with HSR/FC 1 corresponds to the metropolitan axis Prague - Vienna.

According to the available statistical information on rail passenger transport for 2017 (Ministry of Transport 2018) links with the capital city of Prague dominate in all regions, which are directly affected by the planned construction of HSR/FC except for Vysočina region with predominant ties to Brno. From the point of view of two-way intensity of ties with Prague, the Moravian-Silesian region ranks first among them with 3.1 million persons/year, followed by the South Moravian region with 2.2 million persons/year, the Ústí/L. region with 1.8 million persons/year, the Pilsen region with 1.3 million persons/year and Vysočina region with 0.5 million persons/year (the Olomouc region, whose centre is outside the planned routes, was deliberately not included here). As for the regional cities themselves, only a slightly different order of Ostrava, Brno, Pilsen, Usti/L. and Jihlava can be assumed. If we sum up all the above data aggregated for the whole regions, we get to the total volume of transport about 8.9 million passengers/year. The threshold of profitability based on an audit of 14 HSR with approximately half of their total length within the EU is 9 million passengers per year - but nine lines don´t reach this critical threshold (European Court of Auditors 2018). Under these assumptions, it is logical to conclude that the profitability of the planned HSR/FC routes is due to the lack of passenger potential not probable (but partial passenger flows can be taken over mainly at the expense of long-distance bus transport). Possible suggestions for the solution of this problem through the creation of other benefits include, in particular, their effective connection with the European network of HSR and the use of the planned routes for freight inland and cross-border transit, as is the case for example in Austria (but this option in more rugged terrain significantly increases the price of their construction). In this context, it is also desirable to pay relevant attention to positive externalities, in particular, a lesser carbon footprint, higher security compared

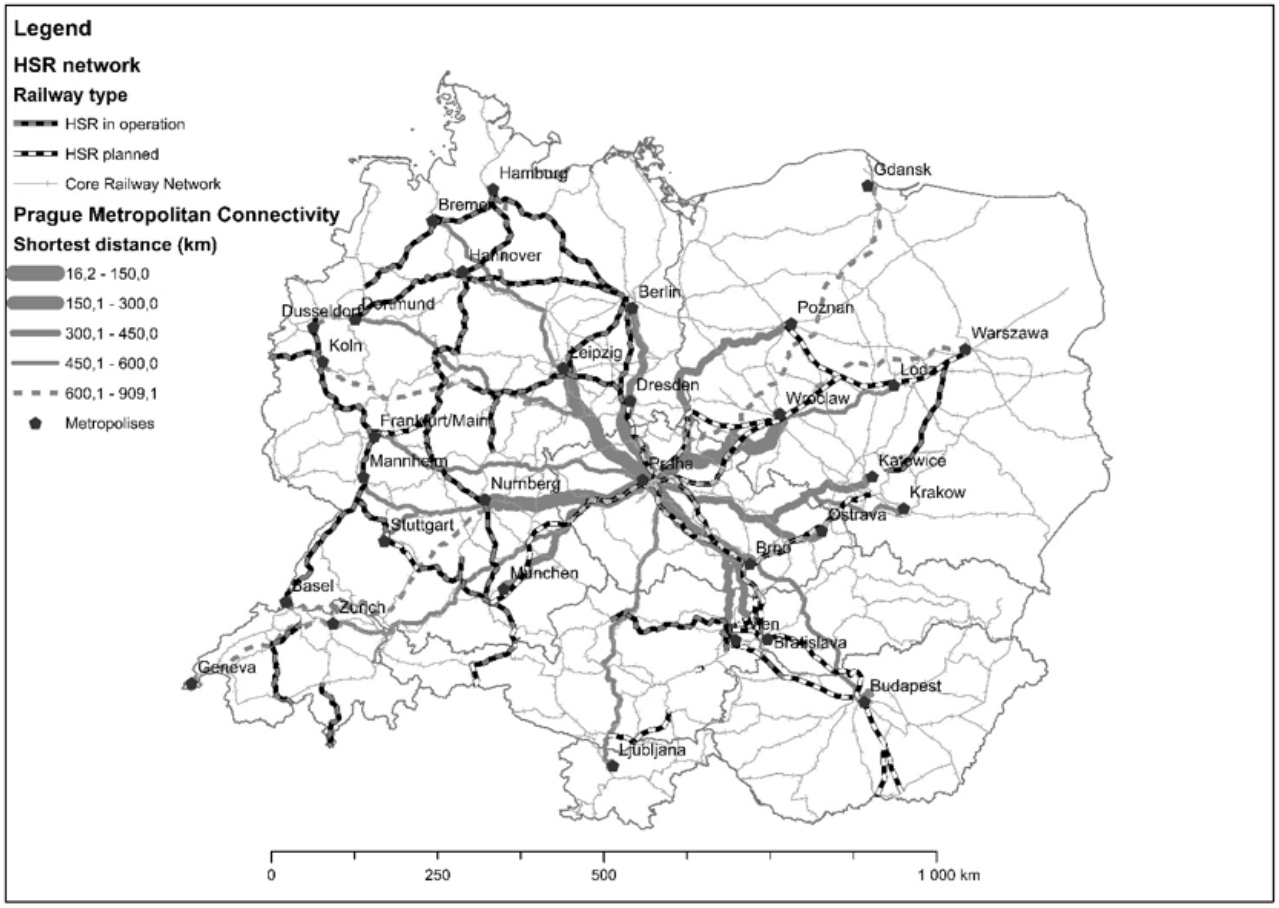

Fig. 1 Location of Prague in the HSR network of Central European metropolises. Source: CIESIN (2013); ArcDATA (2019); UIC (2019); own research and calculations.

to other modes of transport or the location of terminals in city centres.

3 The economic concept of integration - the marginal rate of labour mobility

Among the diverse processes of spatial integration, labour mobility undoubtedly occupies a prime position through which the historical disproportions between the distribution of residential and working functions are addressed. In this context, the main emphasis is placed on the corresponding role of centres of higher importance. Therefore, the case analysis of national labour mobility is primarily focused on regional centres located on planned HSR/FC routes which are also associated with the most important similarly located railway junctions (Přerov, Břeclav, Havlíčkův Brod) and relatively close regional centres whose accessibility and transport links will be significantly affected by the construction of new infrastructure (Olomouc and the conurbations of the regional centres of Hradec Králové and Pardubice).

An important advantage of the approach used to evaluate integration potential is its theoretical anchoring through the application of the concept of the marginal rate of labour mobility. The created model interconnects economic and spatial analysis in terms of imperfect competition generated by the uneven distribution of key production factors, and in this respect seeks to integrate space and time into economic theory. Behavioural models show that the basic precondition for deepening the spatial mobility of labour is their economic motivation, which is based on a significantly higher level of commuting-related income compared to induced costs (Taylor 2003). In this context, our attention is focused on perspective changes in commuting to work into the Czech metropolises, i.e. Prague, Brno and Ostrava, supplemented by Pilsen caused

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by the construction of planned HSR/FC routes, based on which potential impacts on the integration of regional labour markets can be estimated. The main disadvantage of given concept is its concentration only on the economic component of mobility. In this context, however, we can state that assessment of other mobility motives, especially irregular routes, has no relevant theoretical anchoring. Corresponding calculations of model relationships between the increase of income generated by commuting to work and both markets and non-market (commuting time value) costs associated with the construction of HSR/FC lines are given in Tables 1 to 3 below. Thus, the marginal rate of labour mobility is defined by an elementary relationship that can be written as follows (Pařil et al. 2015):

$$Mm = \frac{Ir}{Ic} \quad (1)$$

where Mm = marginal rate of labour mobility, Ir = income increase, Ic = cost increase. The component Ir is equal to the wage differential between designated commuting centres (Praha, Brno, Ostrava, Plzeň) and selected sources of commuting. For the calculation of the wage differential, due to the territorially limited data base, it was necessary to use the average wage in the region in which the city is located (only in the case of towns Břeclav, Přerov and Havlíčkův Brod) were median wages taken into account. Otherwise the results would be distorted by the introduction of the unrealistic assumption of the equality of wages between Brno and Břeclav, Přerov and Olomouc and Havlíčkův Brod and Jihlava). The market-based value of Ic includes only the travel costs paid by the passenger, calculated at the annual subscription of the IN 100 ticket of the most significant carrier, i.e. České dráhy, whose current amount is CZK 19,990 (České dráhy 2019). This approach de facto takes into account the zero cost of lost time and therefore, does not take into account the distance between centres. Of course, regular commuting to work (especially in the case of long-term commuting to longer distances) has demonstrable negative psychological and health impacts, which thus assume the character of negative externalities. This can be seen as a crucial argument for including these costs in the analysis of the marginal rate of labour mobility.

However, the value of time lost by commuting and its ratio to benefits is a very complicated issue (Batarce et al. 2016). Due to the absence of a theoretically convincing hypothesis, the qualified estimates of the relevant values depend on the subjective choice of influencing factors, which practically makes it impossible to achieve a general consensus (Belenky 2011; Krčál et al. 2019). Our approach to addressing this issue therefore prefers simplicity (for example, local transport is not included due to lack of relevant data), while emphasizing the specific context of the planned construction of HSR/FC, especially the links to potential time savings. Following the analyses that take into account many foreign studies (e.g., Bickel et al. 2006; Hensher 2004; Small 2012; Wardman 2004), the following principles were adopted:

- personal time spent commuting to work is not part of working time, unlike business trips, but it is linked to it by which reaches a position of a negative externality
- the effective use of this time to solve work problems is greatly limited and, accordingly, it is primarily a loss of time
- due to causal dependence on working hours and insufficient availability of relevant information, the value of lost time is derived from the current average gross wage achieved in the target commuting regions.

Taking into account the limited predictive power of lost time estimates, the method of variant scenarios was chosen for the relevant analyses and subsequently extended to the average target speed on the HSR/FC. In the first case, the created scenarios reflect the fact that estimates of the time loss by commuting are usually variating between 30 and 50% of the average gross wage (estimates to some extent reflect the above-average quality of travelling in high-speed trains). Taking this into account, time loss of 15%, 30% and 60% of the average wage are alternatively considered. In the latter case, the variant scenarios are defined by the parameter of the average speed of 160 and 200 km/h (set limit value between FC and HSR) and further 250 km/h (the fastest European HSR).

Overall, it can be stated that the described methodology corresponds to the set objective, i.e. the assessment of the HSR/FC construction in terms of their integration potential. The values of the marginal rate of labour mobility can be negative when income decreases for a given commuting relationship. These negative values are not taken into account (and are therefore not listed in the following tables), as workers in this case lose their economic motivation to commuting. To achieve sufficient economic motivation, the value of Mm > 1 needs to be achieved, when income is significantly higher than commuting costs (according to STEM/MARK's 2018 survey, wage increases of at least 20% are considered relevant).

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Table 1 The marginal rate of labour mobility to selected commuting centres at 160 km/h. Font explanation in text.

Value of Time	0 % wage				15 % wage				30 % wage				60 % wage			
Origin / Destination	Brno	Ostrava	Plzeň	Praha	Brno	Ostrava	Plzeň	Praha	Brno	Ostrava	Plzeň	Praha	Brno	Ostrava	Plzeň	Praha
Brno			0.23	**5.92**			0.09	**2.36**			0.05	**1.47**			0.03	0.84
Ostrava	**1.37**		**1.59**	**7.29**	0.78		0.51	**2.35**	0.54		0.30	**1.40**	0.34		0.17	0.77
Plzeň				**5.69**				**3.40**				**2.43**				**1.54**
Jihlava	**0.98**		**1.21**	**6.90**	0.59		0.56	**3.52**	0.42		0.36	**2.36**	0.27		0.21	**1.42**
Havlíčkův Brod	**2.66**	**1.29**	**2.89**	**8.58**	**1.71**	0.59	**1.35**	**4.76**	**1.26**	0.38	0.88	**3.29**	0.83	0.22	0.52	**2.04**
Olomouc	**1.54**	0.17	**1.77**	**7.46**	**1.04**	0.12	0.66	**3.00**	0.79	0.09	0.41	**1.88**	0.53	0.06	0.23	**1.08**
Přerov	**3.23**	**1.87**	**3.46**	**9.15**	**2.36**	**1.38**	**1.25**	**3.50**	**1.85**	**1.09**	0.76	**2.16**	**1.30**	0.77	0.43	**1.23**
Pardubice	**1.37**		**1.60**	**7.29**	0.81		0.80	**4.50**	0.58		0.53	**3.25**	0.37		0.32	**2.09**
Hradec Králové	0.76		**0.99**	**6.68**	0.44		0.48	**3.96**	0.31		0.32	**2.81**	0.19		0.19	**1.78**
Břeclav	**2.35**	***0.98***	**2.58**	**8.27**	**1.84**	0.55	***0.87***	**2.88**	**1.52**	0.38	0.52	**1.75**	**1.12**	0.24	0.29	***0.98***
Ústí nad Labem	**1.10**		**1.33**	**7.02**	0.44		0.65	**4.22**	0.28		0.43	**3.02**	0.16		0.26	**1.92**

Source: ČD (2019); ČSÚ (2019); own research and calculations.

Table 2 The marginal rate of labour mobility to selected commuting centres at 200 km/h. Font explanation in text.

Value of Time	0 % wage				15 % wage				30 % wage				60 % wage			
Origin / Destination	Brno	Ostrava	Plzeň	Praha	Brno	Ostrava	Plzeň	Praha	Brno	Ostrava	Plzeň	Praha	Brno	Ostrava	Plzeň	Praha
Brno			0.23	**5.92**			0.10	**2.68**			0.06	**1.73**			0.04	1.02
Ostrava	**1.37**		**1.59**	**7.29**	***0.85***		0.59	**2.72**	0.62		0.36	**1.67**	0.40		0.20	**0.94**
Plzeň				**5.69**				**3.40**				**2.74**				**1.81**
Jihlava	***0.98***		**1.21**	**6.90**	0.64		0.62	**3.90**	0.48		0.42	**2.72**	0.31		0.25	**1.69**
Havlíčkův Brod	**2.66**	**1.29**	**2.89**	**8.58**	**1.84**	0.66	**1.51**	**5.22**	**1.41**	0.44	**1.02**	**3.75**	***0.96***	0.27	0.62	**2.40**
Olomouc	**1.54**	0.17	**1.77**	**7.46**	**1.12**	0.13	0.76	**3.41**	***0.88***	0.10	0.48	**2.21**	0.61	0.07	0.28	**1.30**
Přerov	**3.23**	1.87	**3.46**	**9.15**	**2.49**	**1.45**	**1.43**	**3.99**	**2.03**	**1.19**	***0.90***	**2.55**	**1.48**	***0.87***	0.52	**1.48**
Pardubice	**1.37**		**1.60**	**7.29**	***0.89***		***0.89***	**4.87**	0.65		0.62	**3.66**	0.43		0.38	**2.44**
Hradec Králové	0.76		***0.99***	**6.68**	0.48		0.54	**4.31**	0.35		0.37	**3.18**	0.23		0.23	**2.09**
Břeclav	**2.35**	0.98	**2.58**	**8.27**	**1.93**	0.60	**1.00**	**3.32**	**1.63**	0.44	0.62	**2.07**	**1.25**	0.28	0.35	**1.19**
Ústí nad Labem	**1.10**		**1.33**	**7.02**	0.50		0.73	**4.59**	0.33		0.50	**3.41**	0.19		0.31	**2.25**

Source: ČD (2019); ČSÚ (2019); own research and calculations.

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Table 3 The marginal rate of labour mobility to selected commuting centres at 250 km/h. Font explanation in text.

Value of Time	0 % wage				15 % wage				30 % wage				60 % wage			
Origin / Destination	Brno	Ostrava	Plzeň	Praha	Brno	Ostrava	Plzeň	Praha	Brno	Ostrava	Plzeň	Praha	Brno	Ostrava	Plzeň	Praha
Brno			0.23	**5.92**			0.11	**3.01**			0.07	**2.02**			0.04	1.22
Ostrava	**1.37**		**1.59**	**7.29**	***0.92***		0.67	**3.11**	0.69		0.43	**1.97**	0.47		0.25	**1.14**
Plzeň				**5.69**				**3.98**				**3.06**				**2.09**
Jihlava	***0.98***		**1.21**	**6.90**	0.69		0.69	**4.27**	0.53		0.48	**3.09**	0.36		0.30	**1.99**
Havlíčkův Brod	**2.66**	**1.29**	**2.89**	**8.58**	**1.97**	0.73	**1.67**	**5.67**	**1.56**	0.51	**1.17**	**4.23**	**1.10**	0.32	0.74	**2.81**
Olomouc	**1.54**	0.17	**1.77**	**7.46**	**1.18**	0.14	***0.86***	**3.83**	***0.96***	0.11	0.56	**2.57**	0.70	0.08	0.34	**1.55**
Přerov	**3.23**	1.87	**3.46**	**9.15**	**2.61**	1.52	**1.62**	**4.50**	**2.19**	**1.28**	**1.06**	**2.98**	**1.66**	***0.98***	0.63	**1.78**
Pardubice	**1.37**		**1.60**	**7.29**	***0.95***		***0.98***	**5.22**	0.73		0.70	**4.06**	0.50		0.45	**2.81**
Hradec Králové	0.76		***0.99***	**6.68**	0.52		0.59	**4.64**	0.39		0.42	**3.55**	0.26		0.27	**2.42**
Břeclav	**2.35**	0.98	**2.58**	**8.27**	**2.00**	0.65	**1.14**	**3.77**	**1.74**	0.49	0.73	**2.44**	**1.38**	0.33	0.43	**1.43**
Ústí nad Labem	**1.10**		**1.33**	**7.02**	0.56		***0.80***	**4.93**	0.38		0.57	**3.80**	0.23		0.36	**2.60**

Source: ČD (2019); ČSÚ (2019); own research and calculations.

The standard font in Tables 1 to 3 shows relations with Mm values of less than 0.85, i.e. from the perspective of a commuter with a negative motivation to work mobility; for comparison, the values are also shown without taking into account the time lost. In a certain boundary range, relations printed in bold italics can be considered where Mm ranges from 0.85 to 1.15 (in these cases, other economic or non-economic factors usually play a role in commuting decisions). In this context it should be noted, that the model calculations in the tables are based on the assumption that the other parameters affecting labour mobility remain unchanged (expressed in economic texts by the ceteris paribus clause). Mm values greater than 1.15 are highlighted in bold and represent positive work mobility motivations. The results indicate that, with the increasing value of lost time, the potential commuter is increasingly less motivated toward labour mobility. The results thus demonstrate strong links between the potential increase in income and the temporal distance of the place of residence from the place of work. A higher speed of transport then logically increases the attractiveness of the assessed commuter centres to some extent, which is associated with a noticeable increase of construction costs. The increase in speed has then the greatest positive impact in the case of Prague (mainly the variant of the highest value of lost time in the amount of 60% of wages). Regarding other commuting centres, more positive impacts can only be identified in the case of Brno.

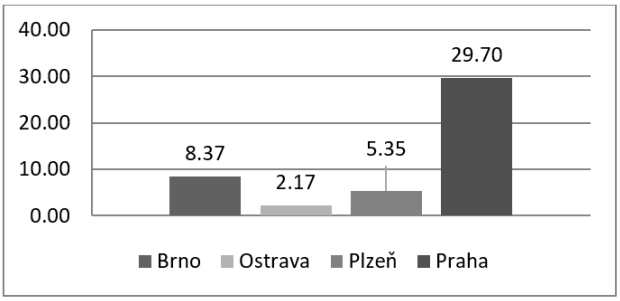

Fig. 2 The attractiveness of work commuting centres. Source: ČD (2019); ČSÚ (2019); own research and calculations.

The Fig. 2 expresses the attractiveness of the four main residential centres of the Czech Republic by aggregating the relevant potential marginal rate of labour mobility within the medium variant of costs of lost time in the amount of 30% of hourly wage and an average speed of 200 km/h. Of these centres, Prague logically has the best position, where potential income growth significantly exceeds commuting costs. In second place by a considerable distance is Brno, followed by Pilsen (with a geographical handicap, situated hidden behind Prague) and Ostrava. Concerned a source of commuting with links to the planned HSR/FC routes, the highest potential of labour mobility targeted to the main residential centres within the medium variant costs of lost time and average speed achieve railway junctions Přerov, Havlíčkův Brod, Břeclav together with the regional centre Pardubice (see Fig. 3). It should be noted that the zero value in Prague reflects the highest level of its work attractiveness.

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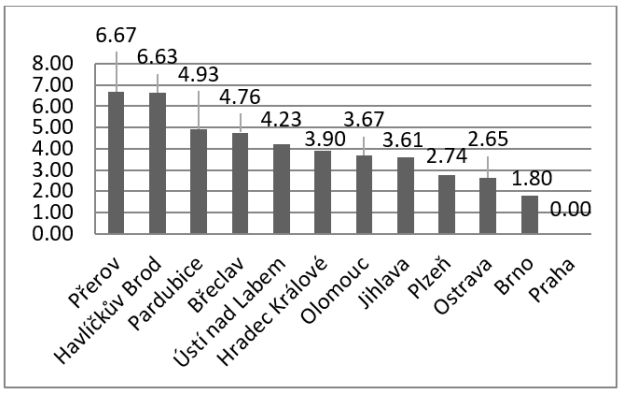

Fig. 3 The potential of labour mobility. Source: ČD (2019); ČSÚ (2019); own research and calculations.

Based on the obtained results, it can be concluded that the calculations of the marginal rate of labour mobility are an important basis for assessing potential changes in demand conditioned by the construction of the HSR/FC infrastructure. In this respect, it is likely that from the perspective of the whole of the Czech Republic these changes will not be fundamental. It should be noted that the future development of labour mobility will, of course, be influenced by the diverse (and practically unpredictable) effects of a number of other factors, such as the increase in the average age, the development of housing prices and foreign labour migration.

4 Discussion and conclusion

Our paper deals with the construction of HSR, whose potential parameters are primarily determined by the character of the settlement structure of individual countries – in this respect, we can state that support of the construction of transport infrastructure plays an important role in traditional and modern theories of regional development. The main research question is the evaluation of the potential impacts of HSR/FC on labour mobility and/or commuting to work. In this context, it is necessary to pay special attention to the general and partial deficiencies of the input data taken from the results of Census 2011 (ČSÚ 2012), which will be supplemented and updated by the data of mobile operators using the experience from available foreign studies (see Kvizda et al. 2017). In this respect, contractual cooperation has already been established with T-Mobile from which data on the movement of SIM cards have been taken over (the location of users is based on their registration to transmitters, which will be territorially optimized in accordance with the research objective). It should be noted here that due to the inability to define causal dependencies solely on the basis of quantitative data, even such an extended database will not create the necessary preconditions for problem-free traffic growth predictions. From practical questions, it is necessary to discuss in particular the potential risks associated with the coincidence of investments aimed at eliminating existing motorway network deficits with the projected deadline of 2035 with investments in the construction of HSR/FC and subsequently to adopt relevant measures (Körner 2019). To start the construction of new railway infrastructure it is crucial to have multi-source funding, for which the funding instrument Union's Connecting Europe Facility allows co-financing up to 40% of total investment. However, it is necessary to clearly define the added value of relevant projects for the EU with an emphasis on their integration benefits.

High-speed railways are undoubtedly an important phenomenon of modern transport infrastructure, which reflects the social demand for fast, secure and convenient long-distance connections. In the opinion of many experts, it is necessary to complement the traditional financial analysis with multi-criteria evidence-based analysis of their effectiveness, understood as the primary component of the 3E principle - effectiveness, efficiency, economy (purposeless projects cannot be efficient). Application of this approach is necessary for objective decisions on the implementation of proposed construction projects. The created original model of the evaluation of the effectiveness of projects, verified on the example of multi-criteria evaluation on the construction of Czech motorways (see Viturka & Pařil 2015), logically includes the criterion of spatial or regional integration. In our opinion, the introduction of the mandatory application of evidence-based approaches would create the suitable preconditions for a realistic assessment of political proclamations on the key development importance of HSR/FC construction (however, it should be noted that this construction cannot per se bring economic development to the regions). From a geopolitical point of view, it seems to be increasingly urgent to increase the compatibility of hitherto rather "nationally" focused HSR/FC programs with the strategic objectives of EU policies, in particular by promoting convergence within cohesion policy and promoting sustainable development within environmental policy.

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