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Inter-urban Commuting to Work in the Czech Republic: Higher Incomes or Last Chance?

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Abstract: Commuting to work is understood to expand the geographic scope of the individual labor market, thereby increasing the likelihood of employment and higher earnings. However, it is also associated with additional transport costs. In this study, data collected from a 2011 survey of Czech employees were used to assess the profitability of inter-urban commuting by comparing the income gained from commuting with the costs of travel by car and public transport. Through this approach, the most cost-effective strategy for inter-urban commuting in the Czech Republic was identified. Although commuting generally results in higher income, car travel was found to lead to a net financial loss even for short distances. By contrast, commuting by public transport was shown to yield a financial gain, provided that suitable connections between the place of residence and the place of work are available.

Keywords: commuting to work, Czech Republic, employment, labor market, wage returns.

JEL classification: J21, J22, J31, R40

Introduction

Few things are more typical for weekday mornings in Czech cities than rush, crowds, ubiquitous traffic jams, and overcrowded public transport. These phenomena have a common denominator - commuting to work. Most adults need to commute to work every day. According to the results of the 2011 Population Census, 2,062,124 workers commuted to work (45.02% of all employed persons in the Czech Republic), of which 1,099,928 persons (24.01% of employed persons) commuted to work in other municipalities than their place of residence (CZSO 2013). Commuting outside one's municipality is the result of an individual decision, shaped by factors such as travel time, costs, and expected wage returns. Workers also decide whether to travel by car or by public transport. Here, fuel prices and fares, travel time, availability of transport at both ends of the journey, comfort during commuting, and personal preferences all play a role. Willingness to commute expands a person's effective labor market, increases the likelihood of employment, and often improves wage prospects (Stigler 1961). Commuting is also the simplest way to overcome a lack of local job opportunities.

The issue of commuting is studied from various perspectives, but its benefits and costs are often analyzed separately (see empirical literature review). The aim of this study is to assess both the financial benefits and costs of commuting at the same time. This makes it possible to evaluate the net financial returns to commuting by different modes of transport and with different cost components. This constitutes the main contribution of the study, as no comparable analysis has yet been carried out for the Czech Republic. The results also make it possible to measure the financial motivation behind commuting, which can be particularly important for less-skilled workers.

For this purpose, data from a 2011 survey of Czech employees were used, combined with wage-return estimates for inter-urban commuting published by Vontroba et al. (2020). These were supplemented with approximate data on the costs of commuting by car and public transport.

Car commuting costs were estimated using a single average rate for the entire country, while public transport costs were based on regional-level data. For some regions without available data, averages from other regions were used as approximations.

The results show that commuters earn higher average wages than those who both live and work in the same municipality. However, the costs of commuting by car exceed these wage returns, resulting in a net financial loss, even for short commutes. Car commuting only becomes profitable when costs are shared among multiple workers. Public transport commuting is less expensive and generally yields a net financial gain, provided the commute does not exceed roughly 37 km. Yet, these findings hold only when direct financial costs are considered. Once the value of commuting time is factored in, commuting becomes irrational in cases where employment is available in one's place of residence, regardless of transport mode.

1 Empirical literature review

Although commuting to work is spatial in nature-movement from the place of residence to the place of work-its key dimension is economic. This focus is reflected in most empirical studies on commuting. For example, Vontroba et al. (2020) analyzed wage returns to commuting in the Czech Republic, using three different data sources at both the national level and in the city of Ostrava. They found that workers commuting outside their place of residence earn higher wages than those who live and work in the same municipality. Their study also revealed a positive correlation between wages and commuting time by car, with commuting time influencing wage levels even within the city of Ostrava. In that case, wages were linked to commuting duration regardless of whether private or public transport was used. Vontroba et al. (2020) further reported that wage returns to intermunicipal commuting peak at 35.1 kilometers or 31.5 minutes by car, even though the actual average commuting distance is significantly shorter. This shows that commuting behavior reflects a compromise between the economically rational preference for shorter distances and the need to secure suitable employment. Overall, the study demonstrates that commuting is financially worthwhile in the Czech Republic, both within and between municipalities.

Other research supports similar findings. Axisa et al. (2012) also found that commuting workers tend to earn higher wages and that rising household income increases willingness to accept longer commutes. Morris and Zhou (2018) observed that higher income from one spouse's commute can enable the other spouse to stay at home. Interestingly, they found no significant effect of children on commuting distance. This contrasts with findings by Axisa et al. (2012), who argued that longer commutes may actually benefit families with small children by enabling them to live in suburban areas. They also noted that commuting distances tend to increase as children grow older and require less direct care. Similarly, Skora et al. (2020) found that women often reduce their commuting distances after becoming mothers, even at the cost of wage penalties. In line with this, Borghorst et al. (2024) observed that women are more likely to quit their jobs if those involve long commutes after childbirth.

However, wage returns are not the only effect of commuting. Clark et al. (2019), studying commuting workers in England, found that longer commutes reduce job satisfaction, especially among women—a result that may explain why women typically commute shorter distances (Axisa et al. 2012). By contrast, Zhao et al. (2012), in a survey at University College London, reported that women's ideal and actual commuting times are longer than men's, since they often use the journey for activities such as reading or listening to music. These conflicting results on satisfaction are complemented by Morris and Zhou (2018), who found no statistically significant relationship between commuting and overall life satisfaction. They argued this is

because better-paying jobs do not necessarily bring fulfillment. Clark et al. (2019) added that commuting most strongly reduces satisfaction with free time, which decreases as commuting lengthens—except for moderately high—income workers, who are more willing to sacrifice free time for higher wages. Longer commutes are also linked to higher stress and poorer mental health, both among car and public transport users. Still, Clark et al. (2019) pointed out that although long commutes negatively affect many aspects of subjective well-being, they do not significantly reduce overall life satisfaction, likely because higher incomes from commuting improve the household's financial situation. Guidon et al. (2018) reached a similar conclusion, showing that workers are willing to accept longer commutes to maintain proximity to their social networks.

The choice of transport—car or public transport—is another crucial factor in commuting. Accessibility and density of public transport play a decisive role, both strongly influenced by population size in each area (Morris and Zhou 2018). Vermesch et al. (2021) studied this issue in Montreal, Canada, focusing on low-income workers for whom car ownership is a considerable financial burden. These workers are concentrated in the outer suburbs, while public transport is denser in the inner suburbs and central city, where the metro is available. As a result, public transport is scarce or absent in many areas with high concentrations of low-income workers. Increasing bus connections in these areas was found to reduce car use among low-income workers, a phenomenon described as "forced car ownership."

In the Czech context, Horák et al. (2014) analyzed differences in public transport availability across regions, paying special attention to shift workers, who represented 28% of commuters in 2011. They found that public transport is most accessible for morning shifts starting at 6 or 8 a.m. but less available for shifts beginning at 9 a.m. This drop was most pronounced in Pardubice, South Bohemia, and Vysočina, whereas in Prague and its surroundings availability increased before 9 a.m. For night shifts, public transport availability decreased sharply in all regions except Prague and nearby districts, with slightly better availability in industrial areas of northwestern Bohemia and northeastern Moravia.

Commuting costs also influence transport choices. Eriksson et al. (2010) conducted an experiment at the University of Karlstad, Sweden, showing that higher costs of car commuting increase the likelihood of switching to public transport. In a second experiment, commuting to the university was replaced with simulated commuting to work combined with childcare or shopping. Students had to choose between driving, using public transport, or walking, with the goal of minimizing commuting costs. The results showed that higher public transport availability increases willingness to use it instead of cars, but this willingness decreases when commuting must be combined with non-work obligations.

Interestingly, Abrahams and Mabli (2023) found that for US workers, especially low-wage ones, commuting posed a barrier to employment. Specifically, they mentioned that commuting reduced effective wages even before accounting for opportunity costs of time. The role of opportunity costs of time was observed by Van Landeghem et al. (2024) who reported that job seekers were willing to accept longer commutes in exchange for better schedule flexibility and the possibility to work from home. Work from home or telework became more pronounced in literature especially after the COVID-19 pandemic. Nagler et al. (2024) performed an experiment in Germany and found out that workers were willing to sacrifice part of their earnings to avoid physical commuting. This was particularly true for highly educated and high-earning ones. Moreover, they claim that telework might attract workers that live too far to be willing to commute.

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In summary, while commuting has been studied from many perspectives, most research examines wage returns and costs separately. This creates an opportunity to combine these perspectives by analyzing the "profitability" of commuting—that is, the wage gains from commuting minus its costs, across different modes of transport. The next section of this article focuses on quantifying this net financial effect of commuting in the Czech Republic.

2 Data and methods

2.1 Approximation of wage returns

Vontroba et al. (2020), whose results this article builds upon, estimated the wage returns to commuting in the Czech Republic using data from a custom survey conducted in October and November 2011. The survey covered a representative sample of Czech employees aged 25–54, selected through quota sampling based on age, gender, education, region, and municipality size. The data were supplemented with information on commuting distance, approximated using the online mapping service *Mapy.cz*. Specifically, the shortest distance between the centers of the place of residence and the place of work was measured—allowing only for the analysis of inter-urban commuting. The corresponding travel times by car and by public transport were then estimated for a Monday at 7 a.m. (see Vontroba et al. 2020).

Building on these data, this article supplements the wage-return estimates from Vontroba et al. (2020) with commuting cost information to analyze the overall profitability of commuting. After accounting for potential collinearity, the working sample included 761 respondents who met the following criteria: commuting outside their municipality of residence, working full-time, car commuting time under 60 minutes, and commuting distance under 50 kilometers. Respondents from Prague were excluded because the distance between municipalities is approximated by the distance between their centers, which can be misleading in Prague. One respondent with a gross monthly salary exceeding 70,000 CZK was also removed as an outlier likely to bias the estimates.

Table 1: Wage returns to commuting

VARIABLES	(Model 1) gross monthly wage	(Model 2) gross monthly wage
Commuting		
Length of the shortest route (km)	278.1500***	249.3630***
	(71.635)	(70.166)
Length of the shortest route squared	-5.5972***	-4.6723***
	(1.510)	(1.461)
Education, work experience and cognitive skills [I.]	yes	yes
Physical characteristics [II.]	yes	yes
Non-cognitive skills and life preferences [III.]	yes	yes
Family and background characteristics [IV.]	yes	yes
Employer and job characteristics [V.]	yes	no
Location [VI.]	yes	yes
Constant	13,430.5310	-9,262.5525*
	(16,848.498)	(5,283.218)
Observations	761	761
Adj. R^2	0.472	0.387

Source: Authors, based on models in Vontroba et al. (2020)
Notes: Robust standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1;
I - Years of schooling, Tenure, Tenure squared, Other work experience, Other work experience squared, Grades from math at age 15; II – Gender, Health limitation of work performance, Difference between individual's height and average gender height, BMI, BMI2; III - Strong need to excel and be better than others, Persistence in following difficult goals, Self-esteem, Locus of control, Feeling of personal responsibility for ensuring an adequate income, Feeling of personal responsibility for ensuring everyday housework and taking care of children, Highest

life priority (family, work, free time); IV - Relationship status, Number of children in 5 age categories, Number of siblings, Mother tongue; V - Number of employees, Ownership, Natural person dummy, Age of firm/institution, Prevailing economic activity (1-digit NACE), Occupation (1-digit ISCO), Field of education and job match, Workload (scheduled working hours per week), Difference in number of hours really devoted to work and official workload, Rate of subjectivity in wage system, Absenteeism, Relation with superior/manager; VI - Region according to Nomenclature of Territorial Units for Statistics (NUTS 3), Residence town size, Job opportunities

The estimation of wage returns to commuting follows Model 2A introduced by Vontroba et al. (2020), modified here to explain gross monthly wages in CZK rather than their logarithms (see Model 1 in Table 1). This specification allows the estimation of the average increase in gross monthly wages associated with each additional kilometer commuted. Model 1 controls for a broad set of job- and employer-related characteristics, implying that the worker is assumed to hold the same job with an employer of similar characteristics as if employed locally. While this is useful for isolating the net wage effect of commuting, it is also reasonable to expect that a broader geographic labor market increases the probability of obtaining a better or different job—an effect captured by Model 2.

Since both models predict changes in gross monthly wages, the estimated increases by commuting distance were converted to approximate net wage changes to enable comparison with commuting costs. The conversion follows the 2011 net wage calculation method: the gross wage increase is first raised by 34% to obtain the super-gross wage; from this, a 15% tax advance and an additional 11% of the gross wage increase (reflecting employer social and health insurance contributions) are deducted.

2.2 Approximation of the commuting costs by car

Commuting costs by car were calculated according to Decree No. 429/2011 Coll., which sets compensation rates for road vehicle use and meal allowances and defines the average fuel price for travel allowances (hereafter "the decree"). The decree specifies the price of 1 liter of Natural 95 gasoline as 34.90 CZK and the wear-and-tear compensation for a private car as 3.70 CZK per kilometer. To determine average fuel consumption, a Škoda Octavia was selected as the reference vehicle—the best-selling model in 2011, according to the Car Importers Association (2012). Average consumption was set at 6.3 liters per 100 km, corresponding to Škoda Octavia models with a 1.4 TSI gasoline engine manufactured up to 2011 (AAA AUTO 2022). Under these assumptions, the average commuting cost per kilometer is 5.90 CZK. The average monthly cost of car commuting (42 trips over 21 working days; average number of working days in 2011) is given by the following formula, where *km* denotes commuting distance in kilometers.

$$c_{auto} = (34.9 \cdot 0.063 \cdot km + 3.7 \cdot km) \cdot 42 \quad (1)$$

2.3 Approximation of the commuting costs by public transport

Commuting costs by public transport are based on the shortest distance between the place of residence and the workplace, regardless of the actual route of public transport. Considering the shortest possible commuting distance may underestimate the commuting costs by public transport, but the lack of data on actual commuting distances by public transport between locations in 2011 necessitates this approximation.

The calculation of commuting costs was based on regional fare structures valid in 2011. Since conditions differed across regions, the procedures also varied:

- Moravian-Silesian Region – A per-kilometer rate applied: the fare consisted of a 9 CZK flat boarding fee plus 1 CZK per tariff kilometer. Data were provided by *Koordinátor ODIS s.r.o.*, the operator of the integrated transport system.

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- Zlín Region – No integrated transport system existed in 2011. Costs were therefore approximated from the average rates of individual carriers for selected distances, based on information from *Koordinátor veřejné dopravy Zlínského kraje, s.r.o.*
- Liberec Region – Fares were derived from the 2011 IDOL tariff for paper tickets. Prices depended on tariff units, which correspond to tariff kilometers.
- Hradec Králové and Pardubice Regions – Both regions have been covered by the IREDO system since 2011, but a separate 2011 fare schedule is not available. Approximation was made using the tariff map published in *Králický Zpravodaj* (2011), with the number of tariff units derived from the 2020 tariff.
- South Moravian Region – Information was provided by *KORDIS JMK, a.s.*, which oversees the integrated system. Fares were determined by tariff zones or sections: one section up to 4 km, two sections up to 6 km, and a one-hour ticket for two zones up to 8 km. Additional zones were calculated every 7 km. All data refer to the 2011 tariff.
- Remaining eight regions – No precise 2011 data were available. Monthly commuting costs were therefore approximated as the average across the regions listed above.

It should be noted that this approximation does not fully capture the situation of workers commuting to Prague, as fares to the capital were based on higher rates than those applied for the same distance within the Central Bohemian Region. The average monthly cost of commuting by public transport. The average monthly costs of commuting by public transport (42 trips within 21 working days) are given by Equation 2.

$$c_{mhd\_single} = 42.85 \cdot km + 416.98 \quad (2)$$

While single tickets may be suitable for irregular commuters, regular commuters are more likely to use monthly passes, which typically offer lower fares. Therefore, public transport costs were also estimated based on monthly pass prices. The approximation of tariff zones followed the same method used for single tickets. Unfortunately, no data were available for the Moravian-Silesian and Zlín regions. The average monthly costs of commuting by public transport (based on monthly passes) are presented in Equation 3.

$$c_{mhd\_pass} = 30.178 \cdot km + 283.14 \quad (3)$$

2.4 Approximation of time costs

This study also considers opportunity costs—specifically, the wages an employee could earn during the time spent commuting. Assuming 42 trips over 21 working days, the average alternative monthly cost can be calculated using Equation 4, where *t* represents commuting time in hours and $\frac{w}{168}$ is the net average hourly wage.

$$c_{alt} = \frac{w}{168} \cdot t \cdot 42 \quad (4)$$

2.5 Accounting for hybrid work arrangements

The analysis also models potential effects of telework on the net returns to commuting, given that telework can both expand individuals' access to wider labor markets (Nagler et al. 2024) and reduce commuting costs. To reflect the possibility of hybrid work—understood as a combination of remote work and physical commuting—commuting costs were proportionally adjusted based on the number of commuting days (e.g. one-fifth of the total costs when commuting once per week). However, this estimate should be regarded as hypothetical, as precise data on the prevalence of hybrid work were not available.

2.6 Limitations

Several methodological and data-related limitations must be acknowledged. First, the analysis relies on cross-sectional survey data collected in 2011, that is, before a period of broader social and technological developments with potential effects on commuting behavior—such as transformations in labor-market organization following the COVID-19 pandemic, the expansion of telework, the rise of electromobility, and substantial shifts in fuel prices and inflation. The results should therefore be interpreted as a historical benchmark reflecting the cost–benefit structure of commuting at that time rather than as evidence of current conditions.

Second, the dataset does not combine all types of information ideally needed for a comprehensive assessment of commuting decisions—namely, detailed spatial data on exact home-to-work locations, regionally disaggregated transport costs, and individual psychological or preference-based variables. Distances and travel times were approximated using the shortest routes between municipal centers for Monday at 7 a.m., which accounts for typical traffic conditions. However, the analysis is limited to *inter-urban* commuting and therefore does not capture *intra-urban* travel within large cities. Similarly, public-transport costs were reconstructed from regional tariff data available for 2011; in regions without integrated systems, approximate averages had to be used.

Third, the study focuses exclusively on the financial dimension of commuting. Although this focus was intentional—its aim being to quantify net monetary profitability—it does not address non-financial aspects such as time stress, satisfaction, or quality of life. The inclusion of opportunity costs partially reflects the value of time lost while commuting, yet this remains a monetary approximation rather than a full measure of subjective or behavioral differences in valuing time.

Finally, the section modelling hybrid work represents a hypothetical simulation rather than an empirically observed behavior, as no reliable data on the prevalence or structure of hybrid arrangements were available for 2011. Despite these constraints, the analytical framework provides a coherent and transparent approach that can be readily extended once more detailed longitudinal data linking economic, spatial, and psychological variables become available.

3 Results

In 2011, the average gross wage for commuting workers was 20,276 CZK, compared to 19,104 CZK for non-commuting workers—a statistically significant difference (t = –3.27, d.f. = 1530.63, p = 0.0011). Among men, 52.66% commuted to work, compared to 47.16% of women, with this gender difference also statistically significant (t = 2.12, d.f. = 1539, p = 0.0343). However, commuting distances were nearly identical for men and women—16.07 km and 15.74 km, respectively—with no significant difference (t = 0.42, d.f. = 769, p = 0.6746).

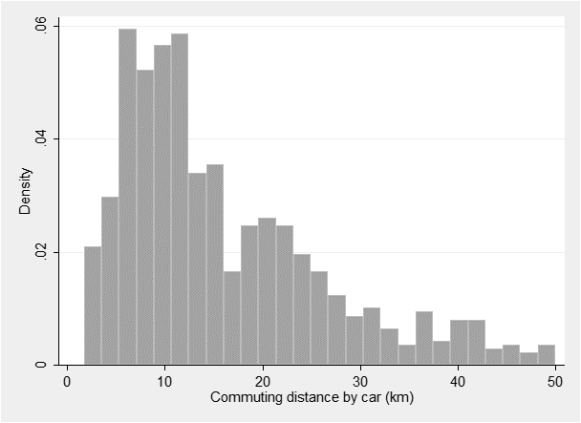
By contrast, educational attainment did not affect the likelihood of commuting (χ^2 = 2.698, d.f. = 4, p = 0.6096), but it did influence commuting distance (χ^2 = 18.842, d.f. = 4, p = 0.0008; see Table 2). It is also worth noting that more than half of respondents commuted less than 13 km (see Figure 1).

Table 2: Differences between commuting workers based on educational attainment

Educational attainment (ISCED)	Share of commuting workers	Average commuting distance
Lower secondary	43.84 %	15.29 km
Upper secondary	49.39 %	14.56 km
Upper secondary (with "Maturity Diploma")	50.75 %	16.85 km
Tertiary (Non-University – Bachelor's or equivalent)	57.95 %	14.88 km
Tertiary (University - Bachelor's /Master's)	49.21 %	18.76 km
Total	**50.03 %**	**15.92 km**

Source: Authors

Figure 1: Histogram of commuting distances



Source: Authors

3.1 Costs and wage returns to commuting to work

Although daily commuting is often associated with higher wages, it remains unclear whether these wage gains cover the costs of getting to work. To explore this question, average wage returns to commuting, summarized in Table 1, were supplemented with commuting costs.

First, Model 1, which assumes that commuters work in the same occupations as they would in their place of residence, was applied. According to this model, wage returns reach their maximum at a commuting distance of approximately 25 km, corresponding to an average net wage gain of 2,381 CZK per month. At the average commuting distance of 15.92 km, the estimated wage return is 2,074 CZK. Model 2, which assumes that commuting may also allow workers to change occupations (for example, by finding a different or better job), indicates a slightly lower maximum return of 2,292 CZK per month at a distance of 27 km, and 1,919 CZK at the average distance of 15.92 km. The smaller wage benefit observed in Model 2 suggests that, for many commuters, the primary motivation for traveling to work lies not in higher pay but in greater employment opportunities.

The costs of car commuting, calculated using Equation 1, show that for the average commuting distance of 15.92 km, monthly costs amount to 3,944 CZK. When wage returns and commuting costs are compared (see Figure 2), the results are clear: the cost of commuting by car exceeds the wage gains at all distances. In other words, while commuters may earn more, those additional wages do not compensate for the higher costs of car travel, even for short distances. These findings are consistent with Abrahams and Mabli (2023), who similarly concluded that the monetary returns from longer commutes do not fully compensate for the associated travel costs.

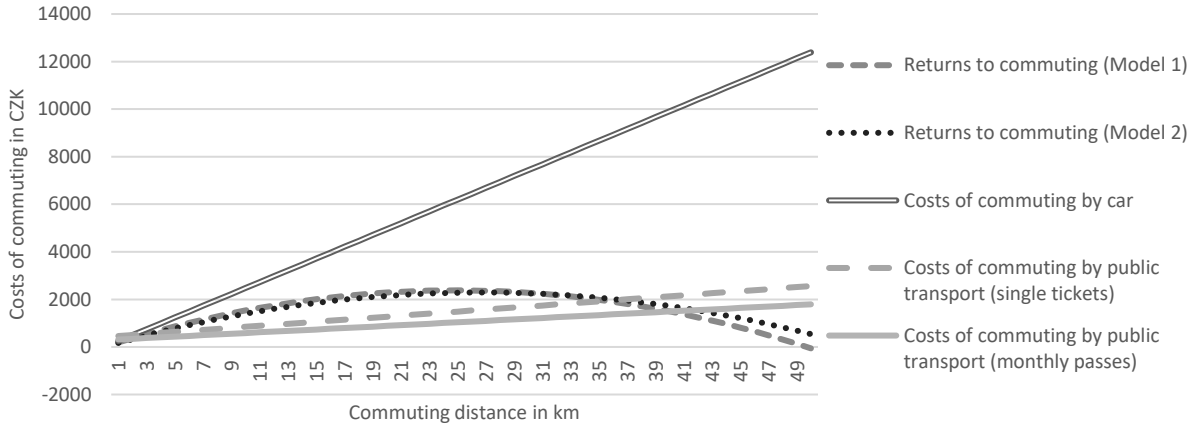
This finding, together with the psychological downsides of commuting—such as higher stress levels and lower job satisfaction (Clark et al. 2019)—helps explain why most workers commute shorter distances, even though wage gains peak around 25 km. From a purely financial

perspective, it appears more rational to avoid commuting by car. However, for some workers, commuting is not a choice but a necessity due to limited local job opportunities. In such cases, the entire wage earned might be considered a return to commuting, though this alternative scenario is beyond the scope of this analysis.

In contrast, commuting by public transport is far less costly (see Figure 2). When using single tickets, commuting becomes financially worthwhile between 4 and 35 km based on Model 1, and between 4 and 36 km according to Model 2. Within these ranges, the wage benefits outweigh the travel costs, making public transport commuting profitable.

When monthly passes are used instead, the financial advantage extends even further. Under Model 1, commuting remains profitable between 2 and 40 km, and under Model 2, between 3 and 41 km. Because the differences between the two models are minimal, subsequent analyses focus only on Model 2, which better reflects real-world conditions by allowing for changes in both job and employer.

Figure 2: Costs and wage returns to commuting to work



Source: Authors

For the average commuting distance of 15.92 km, the monthly cost of public transport in 2011 was 1,099 CZK when using single tickets. Based on Model 2 and the public transport cost function (Equation 2), the maximum wage profit, that is, the difference between wage returns and commuting costs, was 875 CZK at a commuting distance of 20 km (see Figure 3).

When monthly passes are considered, the highest profit increases to 1,275 CZK at a distance of 22 km (see Figure 3). Importantly, at the average commuting distance of 15.92 km, monthly pass users spent 764 CZK on travel—336 CZK less than commuters using single tickets. This clearly indicates that regular commuters are financially better off using monthly passes. It also shows that relying on single tickets tends to overestimate public transport costs. Therefore, all further analyses in this study are based on monthly pass fares.

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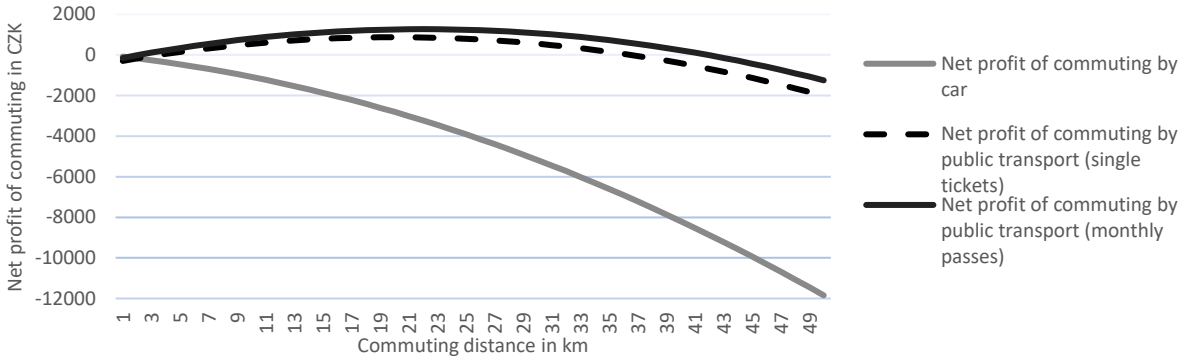
Figure 3: Net wage profits from commuting to work



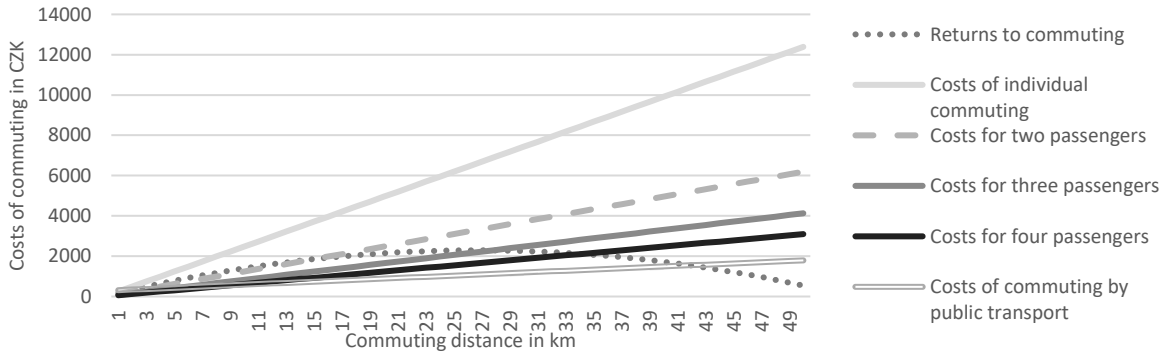
Source: Authors

3.2 Carpooling as an alternative to individual car commuting

As mentioned earlier, commuting by car is not only economically disadvantageous but also environmentally unsustainable due to its significant carbon footprint. Public transport offers a greener alternative, yet it also comes with several practical limitations. To begin with, not every commuter lives close to a public transport stop. Even when access is available, there is often no direct or convenient connection between home and work. Such gaps in accessibility increase travel time and add to the daily burden of commuting. Regional disparities further complicate this situation, as smaller towns and rural areas tend to have fewer or less frequent services.

A major challenge lies in the uneven distribution of connections throughout the day. The largest number of connections typically serves workers on the morning shift (Horák et al. 2014). This means that employees working irregular hours or in three-shift systems often face poor time availability or even a complete absence of suitable connections. Consequently, many workers may find public transport impractical due to long walking distances, inconvenient schedules, or lack of direct routes. In such cases, individuals may resort to what is known as "forced car ownership" (Vermesch et al. 2021)—owning and using a car not out of preference, but out of necessity. This is particularly common among workers who combine commuting with other daily responsibilities, such as childcare, shopping, or leisure activities, since these additional trips are difficult to coordinate with public transport (Eriksson et al. 2010).

Figure 4: Costs of carpooling for multiple people



Source: Authors

A potential compromise between car use and public transport is carpooling—commuting with several people in the same vehicle. Carpooling not only reduces environmental impact but also lowers costs, as expenses are shared among passengers. However, it requires enough employees living in the same or nearby municipalities, working in the same or neighboring locations, and with same or similar schedules. In practice, up to four people can comfortably share one car.

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Based on wage returns estimated in Model 2, the financial benefits of carpooling depend strongly on the number of passengers and commuting distance.

- When two workers share a car, commuting remains profitable up to 14 km, with the highest wage profit at 7 km.
- With three workers, the profitable range extends to 27 km, and the maximum profit occurs at 14 km.
- When four workers share the ride, commuting stays profitable up to 34 km, with the peak profit at 17 km.

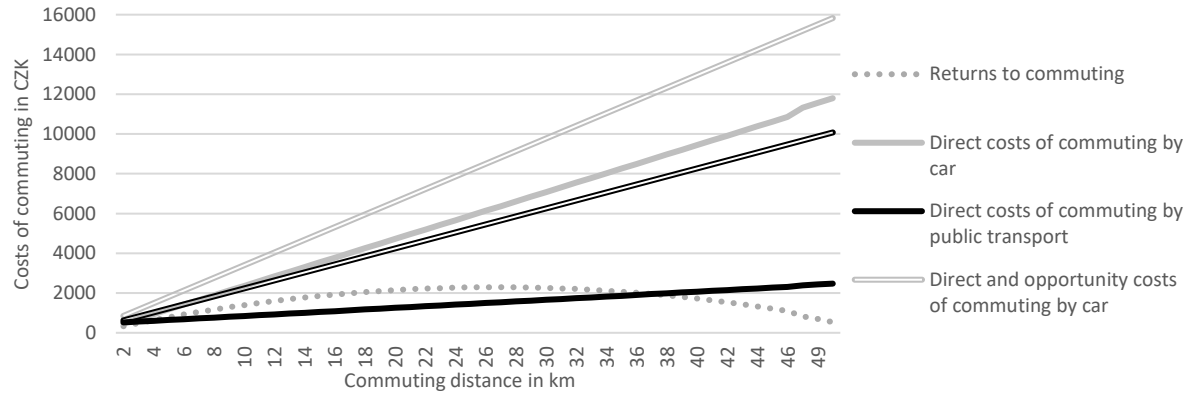
A natural question arises whether carpooling can be cheaper than public transport. According to Figure 4, the answer is only partly yes. Compared with public transport, carpooling is cheaper only at very short distances—up to 3 km when two people share a car, 5 km when three people share, and 8 km when four people share. In summary, carpooling offers a more economical and environmentally sustainable option than individual car commuting. However, it remains less cost-effective than public transport, particularly given the average commuting distance of 15.92 km.

3.3 Profitability of commuting to work when considering commuting time

Direct costs represent only part of the total costs of commuting. To capture the full picture, it is also necessary to account for the value of time spent commuting, the so-called opportunity costs. Once these are included, the question arises whether car travel, despite its higher direct expenses, might be more financially efficient because of its greater time savings. On average, car commuters travel 0.91 km per minute, while those using public transport cover only 0.52 km per minute. For an average commuting distance of 15.92 km, this translates into a travel time of 17.5 minutes by car and 30.9 minutes by public transport. The longer duration naturally increases the opportunity cost of commuting by public transport.

These higher opportunity costs may lead some workers, especially those who value their free time highly (Clark et al. 2019), to prefer the faster but more expensive option, namely commuting by car. At first glance, this choice might seem economically rational. However, as shown in Figure 5, the opposite is true (commuting distances of 1 km and 47 km were excluded from the analysis because no workers in the sample traveled these distances, making it impossible to calculate opportunity costs for them).

Figure 5: Comparison of commuting costs (including opportunity costs)



Source: Authors

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When both direct and opportunity costs are considered together, car commuting clearly results in higher total costs than public transport, despite the latter being slower. Although total costs for public transport are lower, they still exceed the wage gains from commuting, meaning that commuting is financially unprofitable in both cases. From this perspective, if there is an opportunity to work locally, commuting does not pay off at all once opportunity costs are considered.

Aside from alternative costs, it should also be mentioned that a higher paying job is not always fulfilling for workers (Morris and Zhou's 2018).

3.3 Profitability of commuting to work when considering hybrid work

Workers who prefer to avoid physical commuting may opt for telework—that is, working remotely for an employer based outside their municipality of residence. In such cases, the entire wage return discussed in Section 3.1 can be achieved without incurring any commuting-related costs. Although remote work is not always feasible, some employees may have access to hybrid arrangements that combine working from home with occasional on-site presence.

As shown in Table 3, hybrid work represents the only scenario in which individual car commuting can be financially profitable. When opportunity costs are not considered, commuting by car remains profitable up to a distance of approximately 37 km when performed once per week, and up to 22 km when performed twice per week. However, once costs of time are considered, profitability declines sharply—car commuting remains financially justified only within 9 km when undertaken once per week and becomes unprofitable beyond twice-weekly commuting.

In contrast, commuting by public transport is financially viable under a wider range of conditions. Even after including opportunity costs, profitability persists up to 5 km for once-weekly commuting and 2 km for twice-weekly commuting. Nevertheless, the marginal advantage diminishes with frequency: beyond three commuting days, public transport is no longer profitable even with monthly passes.

Table 3: Profitability of individual commuting under hybrid work arrangements

Frequency of commuting	Profitable range	Most profitable distance	Profitable when considering alternative costs
Telework – no physical commuting	1-50 km	27 km	Yes
Car			
1 day per week	1-37 km	19 km	Up to 9 km
2 days per week	1-22 km	11 km	Up to 2 km
3 days per week	1-7 km	4 km	No
4 days per week	Not profitable	-	No
5 days per week	Not profitable	-	No
Public transport			
1 day per week	1-50 km	25 km	Up to 5 km
2 days per week	2-46 km	24 km	Up to 2 km
3 days per week	2-43 km	23 km	No
4 days per week (using monthly passes)	3-41 km	22 km	No
5 days per week (using monthly passes)	3-41 km	22 km	No

Source: Authors

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These findings suggest that the financial rationale for commuting substantially weakens with increased frequency, particularly for car users. While hybrid work may thus offer an economically optimal compromise for workers who live too far from the employer (Nagler et al. 2024) or do not wish to commute every day (Van Landeghem et al. 2024), access to such arrangements remains limited—especially for manual employees and occupations requiring on-site presence.

Conclusion

The willingness to commute shapes the spatial extent of the labor market accessible to each worker, enhancing employability and increasing the likelihood of higher wages. When suitable local employment is unavailable, commuting often represents the most practical way to secure work, as relocation or entrepreneurship typically entail higher costs or greater risks. This study contributes to the literature by jointly examining the financial benefits and costs of inter-municipal commuting in the Czech Republic—an approach rarely applied in previous research. By comparing estimated wage returns with both direct and opportunity costs across different modes of transport, the net financial profitability of commuting was evaluated. The analysis was based on survey data collected from Czech employees, supplemented with detailed estimates of commuting distances and transport-related expenses.

It was confirmed that commuters tend to earn higher wages than those employed in their municipality of residence. Specifically, wage returns peaked at 2,292 CZK per month for a commuting distance of 27 km. However, once commuting costs were considered, car travel was found to be consistently unprofitable. Public transport, by contrast, emerged as a more affordable and, within certain distance ranges (3–41 km), financially viable alternative—particularly when monthly passes were used instead of single tickets. For the average commuting distance of 15.92 km, the wage return amounted to 1,919 CZK, while average monthly costs were estimated at 3,944 CZK for car travel and 764 CZK for public transport.

Carpooling was evaluated as a compromise between individual car use and public transport. When commuting costs were shared among multiple workers, profitability increased, though carpooling generally remained more expensive than public transport.

When opportunity costs—defined as the value of time lost while commuting—were incorporated, car travel was found to be more time-efficient yet still the most expensive mode overall. Notably, after accounting for both direct and opportunity costs, commuting, regardless of mode, was not financially advantageous when local employment opportunities existed.

Telework offers an alternative to conventional commuting, allowing workers to reduce travel-related costs. While full remote work eliminates commuting expenses entirely, hybrid arrangements—combining remote and on-site work—can substantially lower them. The analysis indicates that hybrid work represents the only setting in which individual car commuting remains financially viable, and even then, only at low commuting frequencies. In contrast, public transport proves to be the more cost-effective option overall.

From a policy perspective, promoting public transport should be prioritized as the most cost-effective and environmentally sustainable alternative to individual car commuting. In areas with limited public transport coverage, carpooling can serve as a complementary measure, reducing both commuting expenses and carbon emissions. Furthermore, collaboration between employers and local authorities is essential to expand and improve transport networks, particularly in regions with poor accessibility. At the firm level, offering telework or hybrid

work options—where job characteristics allow—can further decrease commuting-related costs and environmental impacts.

Although based on data from 2011, this study makes an original contribution by jointly assessing the financial benefits and costs of inter-municipal commuting in the Czech Republic. It provides a unique benchmark for evaluating the net profitability of commuting by different modes of transport and under emerging forms of hybrid work. Although subsequent social and technological changes—most notably the COVID-19 pandemic, the spread of telework, inflation, the rise in fuel prices, and electromobility—have transformed commuting behavior, the analytical framework used here remains applicable. Future research should build on this approach by employing longitudinal panel data that would allow capturing temporal changes in commuting patterns and the evolving economic context. Incorporating non-financial outcomes such as job satisfaction, work–life balance, and mental well-being would also enrich the analysis, reflecting the broader social dimensions of commuting. Finally, the growing adoption of electric vehicles offers another promising line of inquiry, as it may substantially alter the cost structure and profitability of commuting in the near future.

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