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Commuting subsidies in Belgium
Implementation in the PLANET model

October 2016

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Abstract – This paper seeks to quantify the size and traffic effects of commuting subsidies in Belgium. To this end we implement the most recently available data on both the personal income tax treatment of commuting reimbursement and subsidies to rail commuters in the PLANET model. We find that subsidy rates by tend to differ strongly by mode and by type of reimbursement. Commuting by own car is generally subsidized at low levels, if it enjoys any subsidy at all. Commuting by company car, bike and public transport enjoy relatively high levels of subsidization. Policy simulations show the importance of commuting subsidies in steering the modal split. Both the exemptions for commuting reimbursements as well as subsidies for rail commuters moderately steer traffic away from private transport, while also lengthening the average commute.

Table of contents

List of tables

Executive summary

This paper seeks to quantify the size and traffic effects of commuting subsidies in Belgium. To this end we implement the most recently available data on both the personal income tax treatment of commuting reimbursements and direct subsidies for rail commuters in the PLANET model.

The personal income tax treatment of commuting reimbursements in Belgium is quite complex, with extensive differentiation in the rules per commuting mode. Moreover, different reimbursement schemes, such as the company car regime and the third payer system for rail, seem to co-exist with standard conventional arrangements. In general, various policies seem to attempt to encourage public transport use at the expense of the car, while the generous fiscal treatment for company cars runs counter to this objective.

Using survey data on the prevalence of commuting reimbursements and publicly available data on the level of reimbursements, the PLANET model is adapted to take the most common subsidy schemes into account. We show that expressed as per kilometre values, subsidy rates tend to differ strongly by mode and by type of reimbursement. Commuting by own car is in general subsidized at relatively low levels, if it enjoys any subsidy at all. Commuting by company car, bike and by public transport modes enjoy relatively high subsidy levels.

Illustrative policy simulations show the importance of commuting subsidies in steering the modal split. A recent tax reform, increasing the maximum tax exemption for car commuting, has increased the market share of car in commuting by 0.4 percentage point. Likewise, the direct subsidy for rail commuters through the third payer system increases the share of rail by 0.5 pp. The entire tax expenditure due the exemption of commuting reimbursements serves to steer commuting traffic slightly away from the car to public modes, while at the same time lengthening the average commute.

Synthèse

Le présent document de travail se propose de quantifier l'ampleur des subventions liées aux déplacements domicile-lieu de travail en Belgique ainsi que l'impact de ces subventions sur le trafic. À cet effet, nous avons adapté le modèle PLANET en tenant compte des données les plus récentes disponibles sur le traitement fiscal à l'impôt des personnes physiques des remboursements des frais de déplacement domicile-lieu de travail et sur les subventions directes aux navetteurs ferroviaires.

En Belgique, le traitement des remboursements des frais de déplacement domicile-lieu de travail à l'impôt des personnes physiques est assez complexe, notamment en raison des règles sensiblement différentes selon le mode de déplacement. En outre, différents systèmes de remboursement, comme le régime applicable aux voitures de salaire et le système du tiers payant pour le transport ferroviaire, coexistent avec les conventions collectives de travail. De manière générale, diverses politiques semblent encourager l'utilisation des transports en commun au détriment de la voiture, mais le traitement fiscal généreux des voitures de société va à l'encontre de cet objectif.

Le modèle PLANET, qui est alimenté en données d'enquêtes sur la fréquence des remboursements des frais de déplacement domicile-lieu de travail mais aussi en données publiques sur l'ampleur des remboursements, est parfaitement adapté pour tenir compte des systèmes de subvention les plus courants. Nous montrons qu'exprimés en valeurs par kilomètre, les taux de subvention tendent à être sensiblement différents selon le mode de déplacement et le type de remboursement. En général, se déplacer avec sa propre voiture est relativement faiblement subsidié, voire pas du tout. En revanche, les niveaux de subvention sont relativement élevés dans le cas des déplacements en voiture de société, en vélo et avec les transports en commun.

Des simulations de politiques montrent toute l'importance des subventions dans l'orientation voulue quant au choix du moyen de transport à privilégier pour les déplacements domicile-lieu de travail. Une réforme fiscale récente, augmentant l'exemption d'impôts maximum pour les déplacements en voiture, a ainsi accru la part de marché de la voiture dans les déplacements domicile-lieu de travail de 0,4 point de pourcentage. De même, la subvention directe pour les voyageurs ferroviaires accordée via le système du tiers payant accroît la part du rail de 0,5 point de pourcentage. L'ensemble des dépenses fiscales visant à exonérer les remboursements des frais de déplacement domicile-lieu de travail de l'impôt sur le revenu ont pour effet de détourner légèrement les usagers de la voiture au profit des transports en commun, bien qu'ils augmentent la longueur de la navette moyenne.

Synthese

Deze studie wil de budgettaire grootte en verkeerseffecten van overheidssubsidies voor pendelverkeer in België in kaart brengen. Om dit te bereiken, implementeren we de meest recent beschikbare data voor zowel de behandeling van terugbetalingen voor woon-werkverkeer door de werkgever in de personenbelasting, als directe subsidies voor pendelverkeer via het spoor in het PLANET-model.

De behandeling van terugbetalingen in de personenbelasting in België is zeer complex, met regels die verschillen el naargelang de gebruikte modus. Bovendien bestaan diverse statuten, zoals het regime voor salariswagens en het derde betalersysteem voor het spoor, naast standaard bij CAO geregelde systemen. In het algemeen lijken verschillende maatregelen het openbaar vervoer en duurzame modi te bevoordelen, terwijl de gulle fiscale behandeling van salariswagens tegen dit objectief ingaan.

Op basis van surveydata over de verspreiding van terugbetalingen voor woon-werkverkeer en publiek aanwezige data over het niveau van de bedragen die hiermee gemoeid zijn, wordt het PLANET-model aangepast om de belangrijkste pendelsubsidies in rekening te brengen. We tonen dat, uitgedrukt per kilometer, de mate van subsidiëring sterk verschilt per modus en type terugbetaling. Pendelen met de eigen wagen wordt eerder gesubsidieerd met relatief lage bedragen, als het al terugbetaald wordt. Pendelen met de salariswagen, fiets en per openbaar vervoer geniet dan weer van relatief hoge subsidievoeten.

Illustratieve beleidsscenario's met PLANET tonen het belang van pendelsubsidies in het sturen van de modale split. Een recente hervorming die de maximale vrijstelling voor pendelverkeer met de wagen gevoelig optrok, zou het marktaandeel van de wagen in het woon-werkverkeer met 0,4 pp hebben verhoogd. De staatstoelage in het derdebetalerssyteem van de NMBS heeft het marktaandeel van het spoor met 0,5 pp verhoogd. De gehele fiscale uitgave als gevolg van de vrijstelling van terugbetalingen stuurt het pendelverkeer licht weg van de wagen in de richting van publieke modi, hoewel ze de lengte van de gemiddelde pendelafstand vergroten.

1. Introduction

Commuting expenses are known to take a large part of an employee's wages. For example, in the US, commuting expenses account for more than 4% of the median worker's wage. For working poor, this rises to more than 8% when commuting by car (Roberto, 2008). In the UK commuting expenses as a percentage of the wage vary between 1% to more than 20%, depending on the locality, commuting distance and position within the company of the worker. (Hay Group, 2012)

In Anglo-Saxon countries, explicit reimbursements of commuting costs by the employer are uncommon. In countries where such reimbursements do exist, whether partially or fully, the amounts involved tend to be significant as well. For example, in the Netherlands, the average monthly reimbursement is 133 euro, or 4.6% of net monthly wages. This percentage rises to almost 10%, when commuting times are more than 60 minutes. (Rouwendal and Van Ommeren, 2007).

When the sums involved are so large, a natural question that arises is how the personal income tax regime should take these expenses into account. Many countries have tax regimes in place that make allowance for commuting expenses or exempt reimbursements from taxation. Again, these tax expenditures tend to be large in terms of foregone tax revenue. For example, in Germany, in 2007 the commuting allowance cost 6 billion euro per annum. As Freund e.a. (2015) point out, this sum amounts to 0.6% of total public expenditure, or the same amount as that is being spent on active labour market policies in Germany. In Austria, the system is more modest, but still quite significant with a cost of between 250 and 320 million euro. (Withana e.a. (2012)) In Belgium, the tax expenditure on commuting reimbursements is estimated at 370 million euro.

Such large public expenditure is unlikely to be non-controversial. Indeed, commuting allowances are labelled as one of potential 'harmful environmental subsidies', in a European wide review (Withana e.a. (2012)). On the other hand, there is by now a large theoretical literature that deals with the question of whether commuting costs/reimbursements should be made deductible/exempt from the income tax, and if so, whether full or only partial costs should be deducted.

In principle, the answer depends on what causes commuting, or more precisely, whether the residential decision of the commuter is taken as given or not. If the residential location of the commuter is fixed, then there is an obvious case for the deductibility of commuting costs on efficiency grounds. If commuting costs are not deductible, the worker may turn down job opportunities on locations that are relatively far away or difficult to reach, on the basis that the net wage is too low compared to the disutility of commuting. From a societal viewpoint, this would result in a loss, since the vacancy that is not filled would yield tax revenue from the income tax. The crucial point here is that deductibility arises from the distortion of the income tax: the individual worker makes a decision based on the net wage, while from the viewpoint of society, the product from labour measured by the gross wage matters. (see Donges e.a. (2008)) Commuting costs should therefore be deducted.

The former conclusion is completely reversed, when not the location of residence but instead the location of employment is given. In that case commuting deductibility, would give the commuter an incentive to choose a residence located relatively far away, causing excessive commuting, which results in a misallocation of resources in the real-estate market, or urban sprawl.

Given these conflicting conclusions, Wrede (2004) based on a priori reasoning recommends a partial deductibility of commuting costs, at a rate well below true cost (variable costs only for car commuting). This would strike a balance between conflicting objectives, namely 'greasing' the labour market and mitigating excessive urban sprawl.

The same recommendation of partial tax deductibility arises from other models, in which labour supply plays a key role. For example, Wrede (2000) considers a case where commuting costs are a time saving expenditure. High speed transportation saves time which would allow for more (tax revenue yielding) work. In that case, partial deductibility is warranted, as a way of stimulating labour supply.

This line of reasoning applies also in models where commuting subsidies are employed in the context of a congestion charge. When leisure-related travel makes up a large part of rush hour traffic, a congestion charge should be differentiated per trip purpose. The reason is that a tax on commuting may alleviate congestion, but will also make supplying labour more expensive. A tax on leisure trips will not have that additional negative effect. Taxing commuting less will strike a balance between the congestion-alleviating effect, and the labour supply-discouraging effect. When real time differentiation per trip purpose is not feasible, a congestion charge may be accompanied by an increase in the income tax deductibility. Again, only partial deductibility is the goal. (Calthrop, 2000 and Van Dender, 2003)

In any case, it is clear that the 'optimal', exact amount of deductibility is a matter for numerical analysis, and should be backed up by empirical research. (See e.g. Hirte and Tscharaktschiew (2011)) This is not the goal of this paper yet. We do stress however, that any reform of the regime for commuting taxation should be based on an analysis that takes its interaction with policies in different markets into account. We will in turn discuss the housing market and the transport market.

It has already been suggested that the amount of deductibility should go up, the less people are inclined to change residence, or the less mobile is the housing market. It should be stressed that this may itself be induced by the tax system or land use policies. For example, Isebaert (2014) argues that the Belgian housing market is particularly immobile and recommends policy changes to remedy these effects. If this is the case, it would be wrong to argue in favour of a deductibility of commuting costs, if commuting is caused by inefficient policies.

The same can be said of the interaction on the transport market. It is well known that Belgium is a country that suffers particularly from congestion costs. In the meantime, 'first best' policies that are particularly well placed to tackle congestion issues, such as smart kilometre charging, are not being implemented. Instead, a series of second best policies are implemented to somewhat alleviate congestion. Most notably, public transport is being subsidized to keep traffic from the congested road. This is primarily done by providing public companies with funds that allow them to keep prices low, but – as we shall see – also by deploying personal income taxation rules to make commuting by public transport

more attractive. Not surprisingly, both forms of subsidization can be understood as a second-best solution to the congestion problem, that could be done away with if road pricing were more efficient.

Conversely, unilaterally lowering the exemption of reimbursements for public transport, or raising the deductibility for those who do not receive any reimbursement at all, as suggested by the rule of partial deductibility without a wholesale reform of transport pricing, may induce unwanted effects in the transport market.

These impacts on traffic levels and modal choice will be the focus of this paper. To that end we will implement recent figures on commuting reimbursements and tax exemptions in the PLANET model, a large-scale model for long term forecasting in the transport sector. The approach of our study resembles that of MuConsult (2012), which introduces personal income tax measures in the Dutch LMS model, to analyse the impact of abolishing the allowance for commuting reimbursements.

Section 2 of this paper will briefly outline the current tax regime for commuting expenses in an international perspective, while section 3 will discuss wage bargaining practices that are needed to understand the setting of employer commuting reimbursements. The goal is to present a broad picture of different ways by which commuting is being explicitly subsidized. The focus will be on tax expenditure through the personal income tax system, but we briefly touch upon other systems as well.

Section 4 presents facts and figures from different sources on the incidence and level of employer reimbursements by commuting mode. Section 5 presents the implementation of these figures in the PLANET model and the numerous hypotheses that have been made. Per mode of transport, per kilometre commuting subsidy rates are derived. A last section presents some policy simulations, which will illustrate the role of the current tax regime in steering transport decisions.

2. The Belgian tax system in an international perspective

According to the OECD (2014), the personal tax treatment of commuting costs can follow two ideal viewpoints, depending on whether commuting expenses can be considered as a personal expense, borne from the individual choice of the commuter. If this is the case, then commuting costs incurred by the employee should not be deductible from taxable income and conversely, reimbursements for commuting costs should be considered as ordinary wages and be added to taxable income. Conversely, if commuting costs are considered to be a work-related expense, reimbursements should be exempt from taxation and commuting costs borne by the employee should be made fully deductible.

In practice, few OECD countries seem to adhere to a strict viewpoint. Mostly, the tax system is a mix of both viewpoints, allowing for partial deductibility and special rules for specific cases. Very often, a default rule is followed, for which exceptions apply. Another issue that arises in real-world applications is whether real expenses should be deducted, or whether an imputed value is used.

As for the deductibility of commuting expenses borne by the *employee*, quite a few countries opt for non-deductibility. Most Anglo-Saxon countries fall in that category. Among continental European countries, tax deductibility is far more common, even though a wide variety of rules applies by country. Table 1 presents the general deduction rules by mode for 4 European countries.

Table 1   Tax rules for employee – paid commuting expenses

	Personal car	Bicycle	Walking	Carpool	Public Transport
Belgium	Flat rate deduction, or actual costs (up to 15 cent/km)			Flat rate, or full actual costs	
Netherlands	No deduction			Deductions in excess of 10 km	
France	Flat rate deduction or kilometre scale			Flat rate	
Germany	Kilometre allowance (30 cents per kilometre)				

Source: OECD (2014), Fiscaal Memento (2016)

Most countries seem to favour public transportation, applying more generous deductibility rules, or making the deductibility of car commuting conditional on the non-availability of public transport. In theory, Belgium also follows this practice, by allowing commuters to opt for a relatively low 15 cents per kilometre charge for car and full deductibility for carpooling and public transport. Employees in Belgium can also opt for the flat rate deduction for work expenses, which is mostly a declining function of gross income only (with a maximum of 3900 euros for employees). In this case, there is hardly any differentiation according to distance travelled or mode chosen.

In a few countries, the deduction rate also depends on the commuting distance, either explicitly or with fixed sum deductions. Some countries, such as the Netherlands and Sweden, allow deductibility for commuting expenses only for distances more than a certain level. Others take the inverse stand. For example, the kilometre deduction in Norway drops significantly above a certain kilometre level (on a yearly basis), while the deduction level in Luxembourg is capped to a certain amount, de facto penalizing long commutes as well.

In Belgium, long-distance commuters are granted an additional deduction on top of the standard flat rate deduction, if the one-way commute is more than 75 km. The additional amount varies between 75 and 175 euro.

The same diversity in rules is found when considering the tax treatment of *employer* reimbursements. Even when in many countries full taxability is the general rule; full or partial exemptions may still apply to public transportation. Again, Belgium seems to be a special case in that it heavily distinguishes by mode of transportation. As is common in other countries, public transportation is fully exempt. Commuting alone by car is exempt up to a limit (380 euro in 2015), whether commuting is done by an employer-provided vehicle or not. Carpooling is exempt up to a limit (a train pass for an equivalent distance). The use of a bicycle is exempt for 22 cents per kilometre. It is important to note that employees that are reimbursed by their employer enjoy the same flat rate deduction for working expenses as employees that fully bear the costs of their own commuting. In fact, eligibility for exemption of employer reimbursements depends on accepting the flat rate deduction.

The diversity in deductibility rules in Belgium is striking. For each commuting mode, different exemption rules apply. The use of a personal car is exempt up until a maximum amount of 380 euros per year, no matter whether the commuting is done own car or by company car. This rule would obviously serve to discourage long-distance commutes. The bicycle is exempt for an amount per kilometre and carpool for an equivalent train ticket. Public transport is fully exempt, which is a practice in some other countries as well.

Table 2   Tax rules for employer – paid commuting expenses

	Personal car	Bicycle	Walking	Carpool	Public Transport
Belgium	Exempt up to 380 euro	Exempt up to 22 cents per km	No exemption	Exempt up to the cost of a train ticket	Fully exempt
Netherlands	Exempt for 19 cents per km				Fully exempt
France	Fully exempt				
Germany	Taxed at 15%				

Source: OECD (2014), Fiscaal Memento (2016)

Clearly, there seems to be a strong modal bias in Belgian fiscal rules, mostly in favour of public transport. Despite these schemes however, car commuting enjoys favourable tax treatment as well, when it is done by employer provided company car. Since the imputed value for tax purposes of this benefit in kind is well below the true cost to the employer, and since the reference marginal labour income tax in Belgium is relatively high, the annual tax subsidy according to the OECD stands at 2763 euro per person per year, an OECD record. (Harding, 2014). It should come as no surprise then that company cars are prevalent, and that they are intensively used for commuting (Laine and Van Steenbergen, 2016).

From this casual review, it should be clear that taxation of commuting costs is frequently used as a transport policy variable. More specifically, despite the wide range of practices across countries, favouring public transport, and other modes possibly as well, seems to be a frequent policy objective. Belgium is no exception in this respect. The personal income tax deduction scheme co-exists with the company car regime, which heavily favours car transport, pointing to an inconsistency in policy objectives.

The relation of tax rules with distance is also not clear cut. In some cases, distance is rewarded, such as the extras for the flat rate deduction, in other cases it is explicitly discouraged, such as in the exemption for personal car transport.

3. Employer reimbursements: standard practices

Whereas in many countries commuting reimbursements are done implicitly through higher wages for people with longer commutes, Belgium is a typical continental European country that explicitly allows for compensation for commuting. The level of these compensations are usually set by collective bargaining agreements, which can be concluded either at the national, sectoral or even firm level. Generally, lower level agreements may differ from those concluded at a higher level only if it benefits the employee.

For commuting in the private sector, the national collective agreement 19-octies applies. This stipulates that reimbursement for rail commuting should be set minimally at rates averaging 75% of the price of a standard rail pass. For other public modes, a rate of 71.8% of the ticket price is used if the reimbursement is not linked to distance, which is the case for network passes.

This national agreement does not allow for reimbursement of car transport or bike commuting. However, many sectoral agreements have been concluded that fill that gap, suggesting that employers do value the use of reimbursements as part of their recruitment strategy. A full review of all possibilities is beyond the scope of this paper, but frequently the amount of the reimbursement for car is expressed as a percentage of an equivalent rail ticket. 60% seems to be a good average (CRB, 2016) When bike reimbursements are allowed for, it is often set at levels at or close to the legally exempted amount.

In practice, the conventional rules for train commuting are complemented by a direct subsidy scheme called the third payer system. If the employer choses to provide a reimbursement of 80%, the government pays the remainder of the 20%, rendering rail commuting effectively free for the employee. While originally more popular among public sector employers, last years have seen a rise in the number of private sector contracts as well. (CRB, 2016)

Whereas collective agreement 19octies mainly applies to private sector workers, public sector agreements feature different rules. In many instances, public transport is effectively free of charge to the employee, while the reimbursement for bike in many cases equals the maximum exempted amount.

Government employees do seem to face stricter rules on the use of the car for commuting. As a rule, car commuting is not reimbursed at the federal or regional level. In many cases, exceptions can be made, when access to public transport is particularly difficult, or when the employee in question has particular needs. While certainly not prohibitive, these rules seem to be particularly restrictive, suggesting a conscious effort by the government to limit car uses among its employees.

4. Data

In this section, we will review briefly the available data on commuting costs and reimbursements. We will document who gets reimbursed by their employer, by what amount. We also collect data on the tax exemption levels that are available. These data will be useful for the implementation of the tax system in PLANET.

4.1. Who gets reimbursed?

The BELDAM survey on mobility behavior in Belgium allows to investigate the prevalence of commuting reimbursements by employers. More precisely, its individual questionnaire contains an item asking if the employee is reimbursed or not, and in which way. Moreover, the questionnaire allows to cross this information with the commuting distance, net family income and the main commuting mode. No information is available on whether multiple modes are reimbursed.

Table 3 presents the proportion of people with a fixed working address that are reimbursed and the average kilometers driven (one way).

Table 3   Proportion of population with a fixed working address by reimbursement type and daily km driven

	% of population	Daily km (one way)
Reimbursed through company car	16.4%	30.4 km
Partially reimbursed	42.5%	17.3 km
Fully reimbursed	15.0%	23.3 km
Employer organised transport	1.0%	16.4 km
Self-employed	3.6%	15.7 km
No reimbursement	26.9%	14.0 km

Source: own calculations using the BELDAM Survey

The table shows that partial reimbursement is most prevalent. Full reimbursement – outside of company cars – is done for only 15% of the working population. 27% enjoy no reimbursement by the employer at all.

The following table breaks down the population by commuting reimbursement and main commuting mode.

Table 4   Main commuting mode by reimbursement type

	Car/driver	Car/passenger	Train	Bus/tram/metro	Bike	Other
Reimbursed through company car	89.9%	1.1%	2.2%	1.3%	1.4%	4.1%
Partially reimbursed	63.9%	4.4%	4.3%	7.0%	11.2%	8.8%
Fully reimbursed	26.6%	5.9%	29.2%	15.8%	10.8%	6.1%
No reimbursement	70.1%	5.5%	1.8%	3.1%	5.1%	14.5%

Source: own calculations using the BELDAM Survey

The results show that, as expected, close to 90% of company car users use the car as their main mode of transportation, even though a non-negligible part also uses other modes as well. It is not clear from the data whether they also enjoy reimbursements for these other modes.

Among those that are partially reimbursed, the car is also the main mode, followed by BTM. Full reimbursement is mainly done for public modes, namely train and BTM. It should be noted that many of these reimbursements take place via the so-called third payer system, whereby the employer only pays 80% of a rail ticket, while the remainder is paid by additional government subsidies to the national railway company. It is not clear whether respondents have taken into account this subtlety while answering this question, but 'full reimbursement' in this case should be interpreted from the viewpoint of the employee itself, who does not pay anything out of pocket. It is also not clear how 'partial' and 'full' reimbursement should be interpreted in the case of the bicycle. It may very well be that people have the level reimbursement with respect to the fiscal exemption rule in mind when answering this question.

Among those that receive no reimbursement at all, the car remains the prime mode of transport, followed by 'other' modes, of which walking is the most important part.

The following table breaks down the incidence of commuting reimbursement by commuting distance. To this end, the population is broken down in distance related quartiles based on the length of the total commute.

Table 5   Reimbursement type by commuting distance

	Quartile 1 (shortest)	Quartile 2	Quartile 3	Quartile 4 (longest)
Reimbursed through company car	5.6%	7.6%	11.4%	20.0%
Partially reimbursed	39.7%	46.8%	47.0%	37.4%
Fully reimbursed	12.5%	14.4%	14.0%	19.6%
No reimbursement	36.3%	25.8%	23.8%	19.8%

Source: own calculations using the BELDAM Survey

The table confirms a by now well-know fact that people making longer commutes are more likely to be reimbursed. In distance quartile 1, 36% of the employed receive no reimbursement, while this share is only 20% for those with the longest commutes.

The following table presents the incidence of reimbursements by monthly family income. Obviously, the possession of a company car is positively related to income: 22.0% of those with a family income larger than 5000 euro appear to have access to a company car. Somewhat surprising is the fact that higher income households have a larger propensity of having no reimbursement at all.

Table 6   Reimbursement by family income

	Company car	Partial reimbursement	Full reimbursement	No reimbursment
< 1500	3.8%	45.9%	17.4%	28.9%
1500-1999	6.0%	49.0%	15.5%	25.0%
2000-2499	7.8%	44.8%	15.3%	25.1%
2500-2999	7.1%	51.0%	16.2%	20.9%
3000-3999	13.5%	42.4%	16.6%	25.0%
4000-4999	14.9%	36.4%	13.3%	31.5%
> 5000	22.0%	30.1%	4.9%	33.0%

Source: own calculations using the BELDAM Survey

Especially noteworthy is the prevalence of reimbursement by sector of the economy. BELDAM allows to distinguish by three broad sectors: the private and public sector, and the associative sector. Table 7 reveals that there are large differences in reimbursement rates between the private sector and the government. Most strikingly, non-reimbursement is far less prevalent in the private and associative sectors than in the government. Full reimbursement is more common in the public sector, while 47% of respondents state that they receive no reimbursement at all.

Table 7   Reimbursement type by sector

	Total	Private sector	Public sector	Associative sector
Reimbursed through company car	11.0%	16.4%	2.2%	5.9%
Partially reimbursed	42.5%	49.2%	29.1%	61.1%
Fully reimbursed	15.0%	12.0%	20.2%	15.8%
No reimbursement	26.9%	16.4%	46.7%	13.9%

Source: own calculations using the BELDAM Survey

Table 8 shows how the main commuting mode among those that are reimbursed in the private and the public sector. The population excludes those with a company car. The table shows that reimbursement for car transport is far more prevalent in the private sector. This confirms the suspicion that car use is discouraged in the public sector.

Table 8   Main commuting mode by sector (subpopulation of those that are reimbursed)

	Private sector	Public sector
Car (driver and passenger), moto	74.3%	37.9%
Rail, BTM, bike, …	25.7%	62.1%

Own calculations on the basis of the BELDAM Survey

4.2. The taxation or employee-paid commuting costs

As we have seen, in the case of employee-paid commuting expenses the employee has the choice to opt for deduction of real costs (up to a limit if not by shared transport) or through the imputed flat rate deduction for work related expenses. In the latter case, the deduction amount is solely based on income except for very long commutes. The amount therefore does hardly depend on commuting distance, nor on commuting mode so that is seems to have limited effects as an instrument for transportation policy.

Moreover, the amount of the flat rate deduction is relatively high. At the time of writing, it mainly depends on income with a maximum of 3900 euro, compared to a maximum of 1000 euro in Germany.

With an average one-way commute of 22 kilometres, and 255 workdays, an employee would already find it worth the while to opt for the flat rate deduction from a yearly gross income of 6500 euros onwards. A recent reform will substantially increase the maximum amount to about 4500 euro, applicable to a wide range of employees.

Few data are readily available on the incidence of the deduction for work-related expenses, let alone for commuting costs. We know, however, that few employees actually opt for the declaration of real work related expenses. Decoster e.a. (2005) document that in fiscal year 2002, only 0.3% of employed households opted for the declaration of real expenses, as opposed to 64% of self-employed households and, and 15.4% of those with a mixed income. It is not clear from Decoster e.a. (2005), whether those households that *do* declare real expenses do so mainly for commuting purposes. As for the total tax expenditure, in 2014 this have been estimated at 4.5 billion euro in terms of forgone tax revenue (FPS Finance, 2015).

Given that so few employees opt for the deduction of real expenses and since there are few links with meaningful transport related variables, it is unlikely that the flat rate deduction regime has much influence on transportation decisions, or conversely that small changes in the formula for the flat rate deduction or of the per-kilometre allowance would influence commuting decisions by much.

4.3. The taxation of employer reimbursements

The BELDAM dataset, while providing rich insights on commuting behavior, does not provide any information of the level of reimbursement and the exact mode that has been reimbursed. Nor is any information available on the exemption for tax purposes, if this is applicable. For the implementation in PLANET, we need information on monetary values per kilometer as well.

As we will see in section 5, for modes other than the private car the fiscal rules themselves are clear enough on the exemption level, while enough external data exist to make plausible assumptions exist on the reimbursement level.

As for commuting by own car, we resort to imputing the yearly reimbursement value in BELDAM. Even though there is no obligation on the national level to provide such a reimbursement, many sectoral agreements do provide one. A plausible hypothesis is that these reimbursements are on average 60% of an equivalent rail pass (CRB, 2016). Since the monthly price of a rail pass depends on distance (according to the most recent schedules taken from www.nmbs.be) we can use the one-way distance in BELDAM to impute a yearly value. By assuming people work 225 days a year, per kilometer values can be derived.

Using the tax rules, we can easily derive tax exemption levels. We do so for the current rules, which exempt a maximum of 380 euro per year and the rules before a tax reform in 2009, which exempted only a maximum of 185 euro.

The following table present average per kilometer reimbursements and exemption levels using the method described above. We also present the figures for various distance classes.

The aggregate per kilometer reimbursement for own car amount to about 5 cents per kilometer, of which 3.5 cents are exempted per current rules.

The breakdown per commuting distance show reimbursement rates declining strongly with distance. Since the tax exemption is capped at a relatively low amount, exemption levels decline more strongly. Whereas for short distances at current rules the entire reimbursement amount is exempt from taxation, for long commutes the exemption is hardly 50% of the reimbursement, which illustrates that this feature of the tax system serves to penalize long-distance commutes.

Table 9   Private transport: per kilometre reimbursement and tax exemption level (current and former rules)
Euro per kilometre

|	Reimbursement	Exemption (Current rules)	Exemption (Former rules)
Aggregate	0.051	0.035	0.019
Quartile 1 (shortest)	0.136	0.136	0.097
Quartile 2	0.080	0.079	0.045
Quartile 3	0.055	0.042	0.023
Quartile 4 (longest)	0.040	0.019	0.009

Source: own calculations using the BELDAM Survey

5. Implementation in PLANET

In order to analyse the effects of current taxation rules on the transport market, we will implement the main features of the current tax rules in the PLANET model using data described in the previous paragraph.

As described in Mayeres e.a. (2008), the PLANET model is a long term projection model for transport demand in Belgium. It follows the structure of a classic four stage model, where transport demand is generated based on demographics and macro-economic variables and distributed across Belgium's 44 districts ('arrondissements'). These trips are then allocated across modes and time period. This last model for commuting transport is the focal point of our present analysis.

The decision process of passenger transport is given in the figure below. It follows a standard nested CES function, whereby transport is distributed across two time periods (peak and off-peak) and 8 modes (car-driver, car-passenger, bus, tram, metro, rail, moto and slow modes, which includes bike and foot).
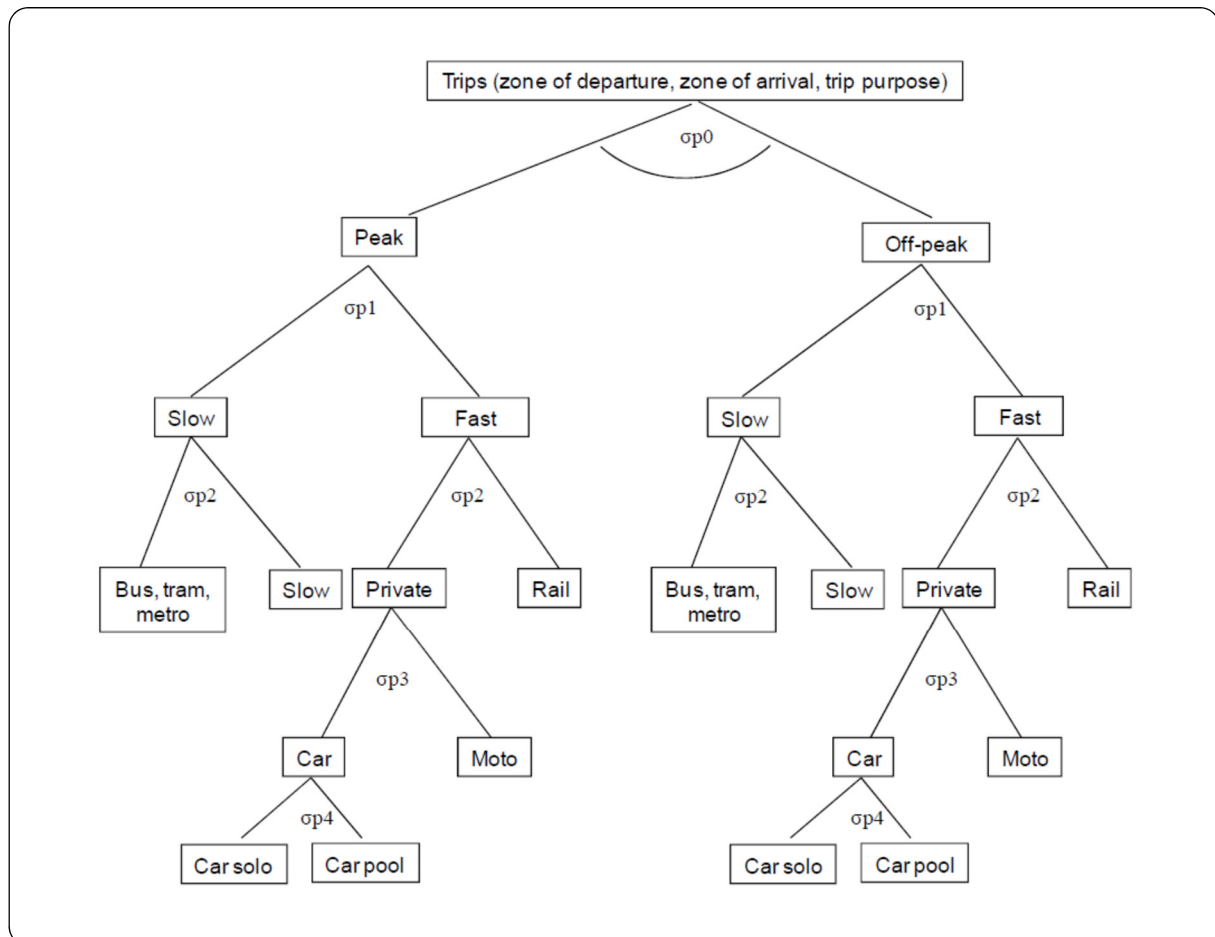
Households make their decisions based on the generalized cost of transport per kilometre, which is simply the sum of monetary costs and time costs. Monetary costs will be the focus of the analysis.

Monetary costs themselves include the resource cost of transport, adjusted by various taxes and subsidies. In general, these per km costs include both fixed and variable costs. For example, car costs include both fuel price, excise rates, vehicle purchase costs and recurrent annual taxes. Rail costs are net of operational subsidies provided by the government. Interestingly, current subsidy rates for public transport do not include the additional government subsidy for commuter rail passes (the so-called third payer system, see above) Taxes and subsidies do not include any measures related to direct taxation yet, such as personal income taxes, social security contributions and company cars.

In order to introduce the Belgian personal income tax rules outlined above, we need to accommodate the way tax policy influences the behaviour of different types of workers. Those that do not receive any reimbursement are de facto not influenced by tax rules: their imputed working expenses deduction is not linked to any transport variable, be it modal choice or commuting distance. We will therefore assume that they pay the full cost of transport themselves, so that no adjustment of the PLANET model is necessary.

Those that do receive a reimbursement are likely to be influenced by the highly differentiated tax system as outlined above. Moreover, we should consider that not a few workers are reimbursed by means of a company car, for which other, arguably more generous, exemption rules apply.

For workers that are reimbursed, we assume a simple model that served as the theoretical framework for the provision of company cars in WP 3-16, itself derived from Gutierrez and Van Ommeren (200x).

A commuting reimbursement is seen as a purchase by the company of a transport good x with a price p to the benefit of the employee, which competes with other goods y. Both the employee and her employer bargain on the composition of a compensation package, consisting of ordinary wages and a transport good x. In doing so, the tax treatment of good x is crucial. It is assumed that in calculating the tax liability the tax administration values good x by H, which can be equal or lower than its market price p.

From this problem, it can be shown that the relevant price of commuting by mode x equals p, minus a correction of tax revenue saved by paying the employee in units of good x, instead of ordinary wages.

$$p - \tau(p - H)$$

$(p - H)$ can be seen as the tax exemption for commuting costs that is a frequent policy parameter in real-world rules. τ is the relevant marginal income tax rate. The term $\tau(p - H)$ is the tax subsidy per kilometre through the personal income tax system.

This model assumes that the reimbursement of the employer is always at the full market price. This model does not allow for endogenous partial reimbursement of commuting costs. However, when a partial reimbursement rate is assumed that is taken as given, the result is the same.

In practice, the entire population does not enjoy a tax exemption, since they are not reimbursed. Given that we cannot model the probability to be reimbursed as a function of fiscal parameters, we need to apply an ad-hoc assumption in PLANET. More specifically, we will assume a fixed proportion α of kilometres per mode is driven by people with a reimbursement. In that case the relevant price is:

$$P = p \cdot (1 - \alpha) + [p - \tau(p - H)] \cdot \alpha$$

For cars, a further breakdown can be made β between kilometres driven by those owning a car or not. If H_{COCA} and H_{OWNCAR} are the imputed value of a reimbursement by company car and own car respectively, the formula becomes:

$$P = p \cdot (1 - \alpha - \beta) + [p - \tau(p - H_{COCA})] \cdot \alpha + [p - \tau(p - H_{OWNCAR})] \cdot \beta$$

This approach yields three types parameters that are of policy interest. The imputed value of a reimbursement – or conversely, the tax exemption is an obvious policy parameter. We should note that this parameter does not influence the number of persons reimbursed, or the parameters α and β. This setup does not allow to endogenously model the choice between different types of reimbursement. For example, we cannot model whether people will cease to be reimbursed at all, when exemption rules become less generous.

Instead, α and β can be treated as policy parameters as well. For instance, one can imagine policies aimed directly at expanding the scope of reimbursement, by making reimbursement obligatory, either by law, or through collective bargaining agreements.

Another policy parameter is the personal income tax rate. Adjusting this rate will indirectly alter the value of the tax exemption.

Note that the reimbursement rate does not directly enter the analysis. For this model, whether the costs are borne by employer or employee does not influence the modal choice, since they jointly decide on how much transport to consume. Only the tax rules set by the government as a third party to the bargain will influence the outcome.

To implement the model, we need information about the share in the number of kilometres by mode driven by people whose costs are reimbursed, i.e. the **parameters α and β**. These are taken from the BELDAM survey, making use of questions inquiring whether people are reimbursed and the main commuting mode by employees with a fixed working address. The total number of commuting kilometres by mode driven can then be divided among people who state that they receive a reimbursement, be it in the form of a company car or by other means. The results are presented in table 10. Reimbursement rates are particularly high for people who commute mainly by public transport, trams excluded. Almost 30% of km driven by car is done by those owning a company car. Note that the figures imply that the clear majority of km driven by those having *no* reimbursement at all is done by car.

A peculiarity from these data stands out, namely the fact that a non-negligible number of people commuting mainly by other modes than car state that they are reimbursed by company car. For example, among those commuting by rail, 4% state that they receive their reimbursement by company car. The data do not allow to derive whether these company car owners receive a rail pass as well, since the questioning does not allow for double counting. We will assume that they don't.

Table 10 Share of commuters with reimbursements in total pkm driven by mode, and total kilometres without reimbursement
%, million

	Company Car	Employer reimbursement (except company car)	No reimbursement	Total pkm without reimbursement (mio)
Car – Driver	**29.8%**	**47.0%**	23.3%	11.9
Car – Passenger	3.6%	**67.9%**	28.6%	0.6
Train	4.1%	**90.6%**	5.3%	0.5
BTM	2.0%	**66.9%**	31.1%	0.8
Bus	3.7%	**87.4%**	8.9%	0.1
Tram	0.0%	**41.9%**	58.1%	0.7
Metro	2.6%	**78.6%**	18.8%	0.0
Bicycle	2.2%	**76.0%**	21.8%	0.4
Moto	0.0%	**85.6%**	14.4%	0.2

Source: own calculations using the BELDAM Survey

Second, the **tax exemption** ($p - H$) per mode needs to be calculated, as a per kilometre value for compatibility with the PLANET approach.

For the level of the reimbursement for the private car, we make use of the figures for table 9. We use the aggregate number for all trips in the model.

For train, we use data and assumptions based on CRB (2016). More precisely, we know that more 150000, or 60.3% of rail commuters with a reimbursement[1] fall under the so-called third payer system, where 80% of the rail price is being reimbursed by the employer and the remainder taken care of by the government. This renders a rail ticket effectively free for a commuter. For the remaining rail commuter, we assume that they are being reimbursed by the default formula, covering on average 71.8% of the price.

For Bus-Tram-Metro, we also rely on data from CRB (2016). Their data show that the average employer reimbursement among the three regional public transport companies for the year 2014 stood at some 360 euro. Given that we know that the average one-way distance by BTM from Beldam is 11.3 km, and again assuming that an employee works 225 days per year, the per kilometre reimbursement is about 7 cents per kilometre. This is higher than the monetary costs in PLANET, possibly since reimbursements are done by way of network passes (especially in the Brussels region), whose scope may cover more than the strict commuting distance. We therefore assume that commuting by BTM is fully reimbursed.

For commuting by company cars, we rely on data from Harding (2014). From that paper, the average imputed value for the personal income tax exempts 46.5% of the capital costs, and 100% of the variable costs. Since Harding (2014) does not take into account the 380 euro allowance for car commuting, we deducted that amount from the imputed value as well. Using the maximum amount is no problem, since the imputed value is constrained to be minimum 1230 euro per annum. All this implies an exemption rate of about 69.1%.

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[1] Our source for total rail commuters in 2012 is the labour force survey. Moreover, we know from BELDAM that some 92% of commuters using rail as the main mode are reimbursed in some way. For users of the third payer system in 2012, we use …. (2016)

Table 11 confronts the resulting reimbursement rates per km with the gross per kilometre monetary costs from PLANET. These include resource costs and direct taxes and subsidies. The table also includes tax exemptions. The exemption for own car follow from table 9. For public transport, it follows from the tax rules. For bike, we take the lowest level found in sectoral collective bargaining agreements, namely 20 cents per kilometre. The reimbursement by train is an average of the third payer system and the conventional arrangement.

Table 11   Monetary costs, average reimbursements and tax exemption (2012)
Euro per pkm

	Unit monetary costs PLANET	Per km reimbursement	Per km tax exemption
Car – Driver / Own car	0.343	0.051	0.035
Car – Driver / Coca	0.343	0.343	0.238
Train (average)	0.068	0.053	0.053
BTM (BXL region)	0.058	0.058	0.058
Moto	0.546	0.053	0.034
Bike	0.226	0.200	0.200

Source: PLANET and own calculations

To arrive at a tax subsidy per kilometre, we need to evaluate the tax exemptions with some reference **marginal tax rate**. We make use of the yearly calculation of tax expenditures by the FPS Finance. Using a microsimulation model, they calculate the change in tax expenditure in the personal income tax by abolishing all exemptions for commuting reimbursements. For the year 2012, this amounted to 351 million euro. (FPS Finance, 2016) The implicit marginal tax rate derived from that simulation is 40%.

This rate could be used in our model to evaluate the derived tax exemptions for every mode. Note however that the relevant marginal tax rates may differ across modes, if there are large income differences among people that use different modes. This is most certainly true for company car users, but also for other modes, as the analysis in section 4 shows.

For company cars, we actually dispose of an implicit marginal income tax rate. A simulation with the microsimulation model of FPS Finance showed that increasing the imputed value by 100 for every worker with a company car, would increase the tax liability with 51, so we use for company car users a tax rate of 51%. To ensure consistency, we decrease the relevant marginal tax rate for other employees to 38.3%, so that the total tax expenditure remains the same.

Table 12 provides the resulting tax subsidy per km, and confronts that value with the old PLANET monetary costs. The table shows that taking personal income taxes into account greatly matters for the relative price of public transport modes and company cars. It shows that subsidy rates through the personal income tax system can be substantial, depending on the mode. For company cars, bikes and public transport, the subsidy varies from one fifth of the unit cost to nearly one half. For privately owned modes, the subsidy rate is far less.

For train, we distinguish between those commuting through the third payer system, and those through the conventional system. For the former, we also included the direct subsidy of 20% of the ticket price by the federal government. Considering this additional value, the subsidy rate rises to about 50%.

Table 12   Monetary costs and derived tax subsidy (2012)

	Monetary costs PLANET	Per km personal income tax subsidy	Per km subsidy (third payer)	Subsidy in % of costs	Percentage of commuters
Car – Driver / Own car (no reimbursement)	0.343	0.000	0.000	0.0%	19%
Car – Driver / Own car (conventional reimbursement)	0.343	0.013	0.000	3.8%	33%
Car – Driver / Company car	0.343	0.119	0.000	34.7%	10%
Train (third payer)	0.068	0.020	0.014	50.4%	6%
Train (conventional)	0.068	0.020	0.000	29.4%	
BTM (BXL region)	0.058	0.022	0.000	37.9%	5%
Moto	0.546	0.013	0.000	2.4%	1%
Bike	0.226	0.077	0.000	34.1%	7%

Source: PLANET and own calculations

6. Policy results

In this section, we present the results of illustrative policy simulations. One is a historical simulation, based on a tax reform in 2008-2009. The others serve to calculate the impact of current commuting subsidy schemes: the direct state intervention through the third payer system, and the tax exemption for employer interventions.

– Pre 2009: A drop of the exemption for car transport from maximum 380 euro per year to 185 per year, which was the exemption level before a reform in 2009. The measure applies to employees commuting by company car as well as personal car. The tax subsidy for private car falls from 1.3 to 0.7 cents per kilometre, while that for company car users falls from 11.9 to 11.2 cents per kilometre.

– RAIL: Abolishing the direct state subsidy to commuters via the third payer system. This leads to a price increase of 1.4 cents per kilometre for those currently within the system. Their reimbursement level remains at 80% so the personal income tax subsidy is unaffected.

– PIT: A drop in the reference personal income tax rate, with 1 percentage points. This would decrease the value of the tax subsidy for every mode.

– ABOLISH: All commuting reimbursements are taxed as ordinary wages. For company car users, the 380 euro exemption disappears, while the current imputed value remains the same.

Table 13 reports the impact of these scenarios on number of pkm driven, the market share of each mode in commuting transport and the average speed at peak period. The impact on the tax expenditure is given, too.

Not surprisingly, reverting to the low exemption level for car transport would decrease car use. The 0.4% drop in market share is rather high, which may be explained by the fact that a large number of people is hit by such a policy. Not only commuters by private car are affected, but those commuting by company car, too. All other modes gain, with the closest substitutes (rail and car passenger) relatively more. Bus (and tram) travel, which in PLANET is highly sensitive to congestion, is indirectly favoured by rising speed levels, hence the rise in kilometres by BTM. All-in-all, the policy would yield 105 million euros in revenue.

Table 13 Impact of different policies on the number of commuting PKM, modal split, average speed levels at peak and change in the tax expenditure
Change wrt. Baseline in 2016

	Pre 2009	RAIL	PIT	ABOLISH
PKM (%)				
Bus-Tram-Metro	1.0%	0.2%	0.3%	-0.5%
Car – Driver	-0.6%	0.3%	-0.2%	0.3%
Car - Passenger	3.3%	0.3%	1.5%	8.9%
Moto	-0.2%	0.4%	0.6%	1.3%
Slow	0.7%	0.4%	-0.6%	-14.4%
Train	0.7%	-4.8%	-0.2%	-7.4%
Total	-0.2%	-0.2%	-0.1%	-0.4%
Market share (pp)				
Bus-Tram-Metro	0.0%	0.0%	0.0%	0.0%
Car – Driver	-0.4%	0.4%	-0.1%	0.5%
Car - Passenger	0.1%	0.0%	0.1%	0.4%
Moto	0.0%	0.0%	0.0%	0.0%
Slow	0.0%	0.0%	0.0%	-0.2%
Train	0.1%	-0.5%	0.0%	-0.8%
Speed peak period (%)	0.4%	-0.3%	0.1%	-0.3
Change in tax expenditure (million euro)	105	20	56	337

Abolishing the direct subsidy to rail commuters in the third payer system would obviously have a negative impact on rail travel. Total pkm by rail drops by almost 5%, while its market share in commuting drops by one half percentage point. Speed is negatively affected. This simulation illustrates the importance of current public transport subsidies to alleviate congestion levels. Since congestion is high, there is a case to subsidize public transport, be it through operational subsidies to the railway company, directly to commuters through the third payer system, or indirect ones through the personal income tax system.

Lowering the personal income tax level would make the tax exemption of reimbursements less valuable to the employee. Since cars are highly subsidised in absolute terms due to the company car regime, this would erode the subsidy to car commuting more quickly than for other modes, leading to a slight shift away from the car to other modes.

Abolishing all exemptions for commuting reimbursements while maintaining the current imputed value for company cars leads to a moderate rise in car use, while rail, bike and BTM lose. For BTM, this is due to lower subsidies as well as higher congestion. These two negative effects dominate, even though their most direct substitute, bike, loses even more in relative terms. The total gain in tax revenue is estimated at 340 million euro. The simulation shows how the tax system attempts to favour public modes compared to private modes, at least when the favourable regime for company cars is not taken into account.

7.   Conclusions

This paper has studied the use of tax expenditure through the personal income tax for commuting in Belgium. We documented its size, its incidence and its effects on steering transport decisions.

One of the primary lessons learned is that there is a wide range of different ways at which commuting is subsidized. These are not always consistent form a transport policy perspective. While public transport and bike commuting seem to be favoured with different degrees, car commuting is heavily subsidized as well, if it is done through a company car. On the contrary, car commuting by own car enjoys a far less favourable treatment, or is not being subsidized at all.

Simulations with the PLANET model show that current rules have non-negligible effects on the modal split for commuting. For example, a recent reform of the exemption for car commuting reimbursements has led to an increase of the market share of car-driver of 0.4%, with adverse effects on congestion and speed levels.

As a whole, when disregarding the preferential treatment of company cars, the tax regime seems to favour public transport by moderately steering people away from car transport, albeit at a cost of about 380 million euros.

This paper has only considered the effects of commuting subsidies on commuting transport. In the case of company cars, but also of public network passes, one can expect that these are being used for other, private motives as well.

The paper has not considered other forms of subsidizing commuting, beyond the tax treatment of explicit commuting reimbursements. For example, employer provided parking is often cited as another benefit in kind which in many countries, including Belgium, is not taxed at all. Determining the exact value of this additional subsidy may be a topic for other research.

Another suggestion for follow-up research concerns the use of other direct tax instruments to steer transport decisions. While this paper has mainly studied the use of the personal income tax (and the state intervention through the third payer system), the exemption from social security contributions presents an obvious other channel of subsidization. Deductibility rules in the corporate income tax are another candidate for closer study.

The paper has ignored distributional issues, by assuming that users of different modes face the same reference marginal income tax rate. This is certainly a problem for company car users, who have on average higher incomes and face large marginal tax rates, so that the derived subsidy rate is probably too low.

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