Study on the economic effects of the current VAT rules for passenger transport

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List of Acronyms and Abbreviations

AEA	Association of European Airlines
ALSA	Automóviles Luarca, S.A.
CAPA	CAPA - Center for Aviation
CES	Constant Elasticities of Substitution
CGE	Computable General Equilibrium Model
DG CLIMA	Directorate-General for Climate Action
DG ENTR	Directorate-General for Enterprise and Industry
DG ENV	Directorate-General for the Environment
DG MOVE	Directorate-General for Mobility and Transport
DG TAXUD	Directorate-General for Taxation and Customs Union
EDIP	Economic Model for Distribution and Inequality Effects of Economic Policies
ELTIS	European Local Transport Information Service
ETIS	European Transport Policy Information System
EUROSTAT	Statistical Office of the European Communities
EU13	"New" Member States of the EU (after 2004)
EU15	"Old" Member States of the EU (prior to 2004)
FP6	Sixth Framework Program
GDP	Gross Domestic Product
HGV	Heavy Good Vehicle
HHI	The Herfindahl–Hirschman Index
HMRC	Her Majesty's Revenue and Customs
HSR	High-Speed Rail
IEA	International Energy Agency
IMF	International Monetary Fund
LRT	Light Rapid Transit
MS	Member State of the European Union
NETP	Non-Established Taxable Persons
NUTS	Nomenclature of Territorial Units for Statistics
OECD	Organization for Economic Cooperation and Development

PKM	Passenger Kilometres
SAM	Social Accounting Matrix
SMR	Single Market Regulation
TKM	Ton Kilometres
TREMOVE	Transport and Emissions Simulation Model
UIC	International Union of Railways
UITP	International Union of Public Transport
VAT	Value Added Tax
VATA	VAT Act
VATD	VAT Directive
VKM	Vehicle Kilometres
WIOD	World Input Output Database

Executive Summary

Objective

The objective of this study is to provide an economic assessment of the impact of the current VAT regimes and the likely effects of alternative VAT regimes in order to assist the Commission in making policy choices.

Background

In December 2011 the European Commission set out the fundamental features of a future VAT system, one of the key priorities of which was that it should be more efficient than the current system. In respect of passenger transport services, this system, with its many exemptions and special and reduced rates, has resulted in the application of a multiplicity of different rates depending on the transport modes, the transport markets and the Member States. The current rules for passenger transport have long been believed to result in many competitive distortions. These output distortions are exacerbated by the complexity of the current place-of-supply rules, which are believed to result in high compliance costs and voluntary or involuntary non-compliance. These impacts are greater for passenger transport than most other economic activities because of the international nature of many of the services provided.

Two approaches to resolving these issues are possible – maintaining the status quo with some fine-tuning or adopting a fresh start with many fewer exemptions and compliance barriers.

This study contributes to the debate on possible options for reform by providing a summary of the current state of the passenger transport market, a review of the current VAT regime, an assessment of the impact of many of the perceived distortions and an evaluation of some of the alternative VAT structures on which a future VAT regime for the transport sector might be based[1].

Main Messages

Since the last large-scale review in 1997, the passenger transport sector has changed in a considerable way, as a result of the greater impacts of airline deregulation, implementation of rail concessioning, and the deregulation of bus transport. The cruise industry has also changed and experienced high growth.

This study provides an update on the structure of the passenger transport industry as it relates to VAT, an assessment of the distortions arising from the current VAT rules and regulations, and an evaluation of some of the changes that might be considered to address those distortions.

The assessments carried out in this report indicate that the distortions are generally small- or medium-sized. For the distortions on output, part of the explanation is in the low elasticities of demand; while for input distortions, it is the ability of operators to reclaim any VAT incurred on inputs, so the only cost is that of financing these costs between when they are paid and when they are rebated. These costs are relatively small because of the reduced times between payment and reimbursement and the current low interest rates on that financing.

[1] There are other taxes and subsidies than those pertaining to the VAT regime in the sector (most importantly subsidised infrastructure and the system of charges related to that). This report concentrates exclusively on the current VAT rules.

The study identifies one set of measures that addresses the **output** distortions with regard to different VAT rates and the place of supply rules and another to address the **input** distortions. These changes would require a large amount of consensus among Member States and the European Commission.

The study also provides valuable insights for tax administrations. It reveals the enormous potential of the application of VAT in the passenger transport sector with regard to generating revenue and the limited impact of applying reduced VAT rates and exemptions on the demand for passenger transport services due to low elasticities of demand and pass-through rates that vary between 7% and 50%.

We can conclude that the above mentioned characteristics of the passenger transport sector suggest a simplified and harmonised application of VAT to all modes and markets. At least the benefits from changing the place of supply rules can be obtained at virtually no cost.

Demand For and Supply of Passenger Transport

The demand for and supply of passenger transport services were considered in terms of four markets: urban, other domestic, intra-EU (between Member States), and extra-EU (between Member States and non-EU countries), and each of these from the perspective of each Member State.

The first two markets dominate, accounted in 2010 for more than 99% of total passengers, of which about two-thirds (63.1%) are urban and 36.0% are other domestic. Intra-EU passengers account for only 0.7% of the total and extra-EU passengers for only 0.2%. However, because of different trip lengths, urban passengers account for only 24% of passenger kilometres (PKM), other domestic passengers for 41%, intra-EU for 15%, and extra-EU for 20%.

- Within the urban market, metro passengers account for about 46% of passengers, but only 24% of PKM, bus passengers for 41% of passengers and 38% of PKM, while rail accounts for only 13% of passengers, but 35% of PKM;
- Air transport accounts for a small share of domestic passengers (0.5%), but a much larger share of PKM (7.1%), the largest share of intra-EU passengers (72%) and an even larger share (87.2%) of PKM, and a dominant share of both extra-EU passengers (91.5%) and PKM (98.6%);
- Bus transport accounts for the largest share of domestic passengers (81%), but a smaller share of domestic PKM (59.4%), and the smallest share of intra-EU passengers (8%) and PKM (4.1%) and extra-EU passengers (3.6%) and PKM (4.1%); and
- Rail has the second largest share of domestic passengers (15%) and PKM (33.5%), as well as of intra-EU passengers (20%) and PKM (8.8%). It has a slightly higher share of extra-EU passengers than bus (5%), but about the same small share of PKM (0.7%).

These market and mode shares are important in assessing the overall significance of the market distortions attributable to differences in VAT rates. Although the intra-EU and extra-EU markets attract more attention in terms of these distortions, since they account for less than 1% of all passengers, their overall impact on competitive distortions is small. The difference in market shares of PKM shows that the two international markets (intra-EU and extra-EU), which together account for 35% of the total, will be more important in assessing the impacts of any market distortions on VAT revenues.

There are four features of all passenger transport markets within the European Union that impact the competitiveness of both their demand and supply:

- They tend to be concentrated;
- Demand is more heterogeneous than supply;
- Providing transport services is highly capital-intensive; and
- There are large economies of scale, resulting in competitive advantages for larger operators and significant barriers to entry for new competitors.

While competition between modes is influenced by VAT distortions, competition within modes is less so as operators face the same VAT rates on their outputs. Within air markets, competition between airlines increased significantly after deregulation, but has since slowed down.[2] Within bus markets there is a wide range of competition, greater than for airlines. In most rail passenger markets the nature of competition is rather different; for most Member States, it is competition "for markets" (through competition for concessions) rather than competition "within markets" (through competition between different operators on the same tracks).

The Current VAT Regime

Currently the taxation of passenger transport services falls within the competence of the Member State where the transport takes place. Consequently, in the case of cross-border passenger transport, the service will be subject to the VAT rules of multiple Member States. In this case, the allocation is to be made proportionately in terms of the distances covered in each Member State.

Chapter 3 of this report provides an overview of the VAT rates in the European Union as applied to passenger transport services. For each mode of transport (road, rail, inland waterways, maritime shipping, and air), we distinguish between domestic, intra-EU, and extra-EU transport. In the case of domestic transport, a further distinction is made according to type of transport (e.g. bus, taxi, tram, metro, or scheduled or unscheduled services).

While standard VAT rates in Member States range from 15% (Luxembourg) to 27% (Hungary), passenger transport services are frequently taxed at lower rates, or even zero-rated or exempt from VAT.[3]

With respect to domestic passenger transport, six Member States apply the standard rate to all domestic passenger transport services (Bulgaria, Croatia, Estonia, Hungary, Romania, and Slovakia). In 12 Member States, (primarily) reduced rates are applied (Austria, Belgium, Finland, France, Greece, Italy, Netherlands, Poland, Portugal, Slovenia, Spain, and Sweden).[4] Luxembourg is the only Member State that taxes all domestic passenger transport at a super-reduced rate of 3%. Denmark and Ireland exempt most domestic passenger transport services and in the UK, a large majority are zero-rated. The remaining six Member

[2] Competitiveness is measured using the Herfindahl-Hirschman Index (HHI). The HHI has a scale between 0 and 1, with a lower value indicating a more competitive market. In the period 2003 to 2010, for the five Member States for which data is available, the HHI reduced from 0.39 to 0.32.

[3] Passenger transport is among the supplies that may be taxed at the reduced rate according to the VAT Directive. In addition, intra-EU and extra-EU passenger transport services are exempt with credit (i.e. effectively zero-rated) in many Member States based on derogations in the VAT Directive.

[4] With the following exceptions: Belgium: maritime shipping is zero-rated; Italy: urban transport services by taxi and ship are exempt (without credit); Netherlands: domestic air transport is taxed at the standard rate, certain ferry services can opt for VAT exemption.

States use different criteria to distinguish between various types of domestic services, which are also subject to different VAT rates.[5]

Currently there are no differences with respect to VAT rates between intra-EU and extra-EU passenger transport services, as they are treated as international transport. While all 28 Member States zero-rate international passenger transport by maritime shipping and air, other modes are frequently subject to positive rates. International passenger transport by road is taxed in 10 Member States (Austria, Belgium, Croatia, France, Germany, Greece, Netherlands, Poland, Slovenia, and Spain)[6] and international passenger transport services by rail are subject to a positive VAT rate in 7 Member States (Austria, Belgium, Croatia, Germany, Greece, Netherlands, and Spain).[7] Most of these countries apply a reduced rate, with the exception of Croatia (road and rail), Denmark (non-scheduled bus services), and Germany (long-distance services), with international passenger transport taxed at the standard rate.

In the case of business travel, VAT incurred on passenger transport services is usually deductible. This, however, does not hold for France, Greece, Italy, and Portugal. Other Member States also apply restrictions in certain cases.

Aside from the VAT taxation of the actual passenger transport service itself, consideration must also be given to the taxation of inputs, such as means of transport and fuel. Article 148 of the VAT Directive provides exemptions from VAT for certain inputs to maritime shipping and international aviation, which are valid, with only minor implementation-specific differences, in all Member States. Other inputs are, as a general rule, subject to the standard VAT rules and, therefore, taxed at the standard rate, with VAT deductibility for the buyer. There are, however, certain exceptions from that rule (e.g. a few Member States extend provisions of Article 148 to other vessels due to special derogations, and some Member States restrict deduction with respect to certain inputs, especially passenger cars and fuel).

Other taxes on passenger transport, aside from VAT and user charges, are mostly on air transport. Air passenger taxes are currently in place in Austria, France, Germany, Italy, and the UK. Usually, they are levied per embarking passenger and the rate mostly depends on flight distance (e.g. Austria, France, Germany, and the UK), but sometimes also on the travel class (e.g. France and the UK). A special case is the tax for air taxi services in Italy, which is only applicable to chartering the whole aircraft. The highest rates are currently charged in the UK and the lowest are charged in Italy and France.

Competitive Distortions Resulting from the Current VAT Regime

> *A distortion is defined as the unequal treatment of passengers and/or operators with respect to any of the parameters composing the VAT regime in force in Member States in the passenger transport sector, and which leads to economic, social, and/or environmental changes in behaviour.*

There are four groups of distortions deriving from the current VAT regime, those resulting from different:

[5] Often scheduled services are taxed at a lower rate than unscheduled services. This is the case in the Czech Republic, Latvia, Lithuania, and Malta. In Germany, the main factor is the distance, whereas in Cyprus, the mode of transport and the location are decisive.

[6] Additionally Denmark taxes non-scheduled bus services.

[7] Additionally France taxes certain international rail services.

- VAT rates between transport services provided in different modes, markets, and Member States;
- Member States in the way they define passenger transport services and their associated inputs;
- Treatments by Member States of inputs in the passenger transport services by different modes in different markets; and
- VAT rates and regulations regarding the place of supply of transport services and their inputs.

1a) Different VAT Rates within One Mode at the Domestic Level

Twelve Member States have some form of this distortion. The distortion can apply to a specific mode (e.g. short distance buses and taxis might have a different rate than those used on longer distance routes), vehicle size (e.g. passengers using some sizes of vehicle might or might not be eligible for lower VAT rates than those using other sized vehicles), or scheduled versus unscheduled services.

1b) Different VAT Rates between Modes at the Domestic Level

This distortion is not very common. Unambiguous examples include: the Netherlands, where domestic air travel is taxed at the standard rate of 21%, whereas all other modes benefit from a reduced rate (6%); Belgium, where maritime shipping is zero-rated, while other modes are taxed at 6%; and Cyprus, where the standard rate (19%) is applied to transport by air and inland waterways, and maritime shipping is taxed at the reduced rate of 9%. Road transport in Cyprus is subject to three different rates (19%, 9%, and 5%).

1c) Different VAT Rates within One Mode of Transport between Domestic, Intra-EU, and Extra-EU Transport

This distortion is one of the most widespread, and, for some Member States, the differences between domestic and intra-EU VAT rates are quite high. All but three Member States apply a lower effective VAT rate to at least one mode of intra-EU or extra-EU passenger transport than they do for that mode in domestic transport.

Fourteen Member States zero-rate all international services irrespective of mode of transport; while at the same time applying a positive VAT rate to all modes of domestic transport. One Member State has a different rate for four modes, four Member States for three modes (maritime shipping and inland navigation are included as two more modes, although the passengers are not included in the statistics of numbers of passengers), five Member States for two modes, and two Member States for one mode.[8] The practical impact of the distortion is less than its potential, as there is only limited competition between the markets that could be influenced by transport fares.

Transport cost is not the main criterion for choice of destination (and therefore of travel market) for most non-business passengers, and even less so for businesses passengers. Hence, differences in VAT rates for a given transport mode between transport markets do not have a significant impact on the choice of market for travel. The overall assessment of the distortion is that it is large, due in great measure to the distortion

[8] Two Member States (Denmark and Ireland) have the same effective VAT rate for passenger transport outputs (exempt for domestic and zero for intra-EU and extra-EU), so this makes a difference on how VAT is assessed on inputs.

in the domestic air market compared to the international air market. Other modes are less affected by this distortion.

1d) Different VAT Rates between Different Modes of Transport for Intra-EU and Extra-EU Travel

Whereas all Member States zero-rate intra-EU and extra-EU air and maritime passenger transport, 10 Member States apply positive tax rates to extra-EU road passenger transport, 7 to rail transport, and 6 to inland navigation. The gap between the rates applied to the different modes of intra-EU and extra-EU passenger transport within the same Member State ranges from 5 to 25 percentage points.

The extent of the distortion was quantified in terms of numbers of passengers and revenue to operators, but the extent of the distortion depends on what it is compared to. We have compared the current VAT rates with a situation in which all modes would be zero-rated, since 80% of the Member States and mode combinations in the two international markets are zero-rated.

The impact of this distortion is considered to be of medium impact. There would be a loss of some 0.5 billion PKM for these two modes, less than 1% of the total, but a rather greater percentage of loss of operator revenue of between 2% and 3%, and greater still for operators specializing in international passenger transport. These losses are measured against the 2013 numbers of passengers and mode shares, but as high speed rail (HSR) and international bus services expand to compete more with air services, the losses might be expected to be slightly greater.

1e) Different Delimitation between Domestic, Intra-EU, and Extra-EU (Two-Sector Trips)

This distortion results from some Member States (e.g. Belgium, Denmark, France, Germany, Netherlands, Poland, Slovenia, and Spain) applying the domestic VAT rate to the domestic part of an international passenger trip.

Even where the domestic section of an international trip can be identified, the addition of the national VAT to the fare has only a small impact on competitiveness. For a typical intra-EU trip,[9] the fare increases by about 2.4%, which results in a reduction of number of trips by 0.8%, as compared to a no-VAT case. Nevertheless, the number of multi-sector trips where the first section is domestic is a small proportion of the total, even for the Member States that currently apply this distortion. We thus assess the extent of the distortion as small for the Member States involved and very small for the EU as a whole.

1f) Lower VAT Rates Applied in Certain Regions

Some Member States apply a lower VAT rate for passenger travel within or to and from some of their less developed regions. The differences in VAT rates are small. Portugal applies 5% VAT for travel in Madeira and the Azores (and zero-rates travel to and from the islands), instead of the usual 6% for domestic passengers, and France applies a 0% rate to Corsica instead of the national reduced rate of 10% (except the section within continental France).[10] The fare reduction through the application of a lower VAT rate as a

[9] With an average trip length of 1,540km, of which 300km are in the origin Member State, and an average fare of EUR 0.15/km including an average VAT rate of 12%.

[10] Travel within Corsica is VAT rated at 2.1%.

percentage of the total cost of a tourist trip to the affected regions is less than 1%. However, the proportion of national tourists (international tourists are mostly subject to zero rates for their air and maritime travel) to each of the two destinations is quite high, at about one-third for Madeira[11] and about two-thirds for Corsica.[12]

2a) Definition of Passenger Transport and Related Incidental Services

Most Member States have a clear directive in their legislation regarding which passenger services are subject to VAT. Other Member States are less clear, particularly with respect to vehicles that are not used exclusively for passenger transport. For example, some exclude rental cars without a driver, while others apply a lower limit on vehicle size. The extent of this distortion is small, as the majority of passenger travel falls clearly within or outside Member State VAT regulations.

2b) Consumption On Board Ships, Aircraft, or Trains

This distortion is not included in the assessment, since it is covered in another report[13] and was not included in the terms of reference.

3a) Exemptions Following Article 148 of VAT Directive – Delay in Processing VAT Refunds

Article 148 of the VAT Directive provides the framework for the zero-rating of supplies for maritime and international aviation, but not to the same supplies for international bus and rail services.

The impact on operators' costs is not as great as might first appear. While these two modes do not have to pay VAT on their qualifying inputs, the competing modes of rail and bus transport can reclaim such VAT. Their additional costs derive only from the financing costs of VAT for the period between when the payments are made and the reimbursements are received.

The impact of this distortion has been measured as the total avoided cost of financing the VAT liability maritime and air passenger operators would have incurred if Article 148 were not operational. The combination of the ability of operators to recover VAT on inputs when the outputs are positively rated, the relatively short periods within which input VAT is now reimbursed by most Member States, and the current low interest rates that apply to funding the VAT during this period, result in a small overall cost impact of this distortion (EUR 121 million).

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[11] Anuario Estadistico da Regiao Autonoma de Madeira, 2012.

[12] Ministère des Transports de Equipment du Tourisme et de la Mer, Ministère délègue au Tourisme, France.

[13] For further information, see EC Report COM (2012) 605 final available on: http://ec.europa.eu/taxation_customs/resources/documents/taxation/vat/key_documents/reports_published/com_2012_605_en.pdf and the "Expert study on the issues arising from taxing the supply of goods and the supply of services, including restaurant and catering services, for consumption on board means of transport" by PWC available on: https://circabc.europa.eu/w/browse/59941dff-4fd3-47bb-8ee9-c502cab5b7b6. The report does not cover the distinction between the supply of goods and services and does not clarify if the supply of services might be covered by the derogation listed under Annex X, Part B, Point 9 of the VAT Directive.

3b) Specification of Vehicle Use for Passenger Transport for Purposes of Input VAT

All Member States allow for the deduction of input VAT on vehicles used for the provision of commercial passenger transport services (except for cases where passenger transport services are exempt). A few Member States apply restrictions, though, mainly in connection with private cars that are used for passenger services. The effect of these restrictions is most likely not relevant for competition, as they address the possibility of abuse of deductions. We evaluate it as not relevant for purposes of this study.

3c) Tax Incentives for Fuel and Electricity

To encourage the use of public transport, in general, and, in select transport modes and in certain Member States, to have lower VAT rates and reduced tax and duty rates for other inputs. While possibly helping to achieve this objective, these lower rates can introduce distortions.

Energy is about 10% to 12% of train operating costs, up to 20% for bus operations, and about 30% for air passenger operations. However, all VAT expenditures on fuel used as an input to passenger transport operations can be reclaimed (other than in the Member States where services are exempt from VAT without the right to reclaim).

As with VAT on other inputs to passenger transport operations, those for energy are refundable, so the only cost distortion is that of financing the difference in energy cost from those operators who do not benefit from the distortion. Even when the refund period is long, the financial cost is a small percentage of total operator cost. The overall impact of this distortion is very small.

4a) Place of VAT Liability: Complexity of Calculating Place of Supply (Distance) of Extra-EU and Intra-EU Rail and Road Transport

The place of VAT liability has attracted much attention for the administrative costs that it is believed to impose on transport operators for its collection and distribution to the various Member States through which passenger trips pass.

Measuring VAT according to distance obliges companies in the bus and railway passenger transport sector to determine VAT for each trip separately. Whereas the use of informatics tools allow for such calculations, they do involve start-up and maintenance costs. The costs are a handicap for small operators that cannot so easily make use of professional software tools.

The correct calculation of the distances passengers travel in each country is particularly important for small Member States whose passenger travel VAT revenue is largely earned from transit passengers. This proportion is higher for Member States located closer to the geographic centre of the EU territory.

4b) Additional Compliance Costs

Although there are four different distortions in this group, they were assessed together as no data was found for the individual distortions. Supplying passenger transport services in certain Member States necessitates higher administrative costs than in others.

Coping with these differences is particularly onerous for small operators. Based on the data for the UK (the only Member State where compliance by company size was found), compliance costs for small and large companies is about the same, but several times higher than that for medium-sized companies. From three other Member States, it was found that compliance costs are higher when there are more VAT rates

to be dealt with. Overall, the impact of this distortion is small, but it does result in some discrimination against small transport operators.

4c) Different Treatment of Sections in or above International Areas outside the EU

Each Member State has its own regulations for determining the VAT liability for passenger transport that takes place in international water or airspace when it forms part of a domestic trip. Distortions also derive from the different ways of differentiating between domestic and international trips and from measuring the domestic part of the distance when VAT is applied to that part of an international trip.

A variation of this distortion is where domestic passengers might extend their trip a short distance to an international destination and then make a return international trip to their real destination. There are very few instances of this being feasible.

Although there are anecdotal instances of each variation of this distortion occurring in practice, when taken together, they account for a very small proportion of total trips and PKM.

4d) Difficulty in Determining Place of Supply (Distance) of Extra-EU and Intra-EU Air and Sea Transport

This distortion is different to the others in that it does not yet occur and would only occur if air or maritime international passenger transport were to be subject to VAT. If this were to be implemented, it could be difficult to determine what distance had been travelled in the territorial water or air space of transited Member States and what VAT liabilities would be incurred. Rail and, to a lesser extent, road transport is constrained in its distances and routes by the fixed infrastructure that it uses, which subsequently limits the complexity of calculating the distances travelled in each Member State. Sea and air transport are less constrained in this sense.

However, technology has greatly simplified such calculations and software used by airlines to assess their liability to Eurocontrol charges could easily be adapted to assess VAT liabilities. Similar software is available to ferry and cruise line operators. This is, therefore, unlikely to be an important distortion. However, small operators might incur proportionally higher administration costs than large operators, particularly in dealing with trips that end up taking different routes to those expected when the passenger ticket was purchased and VAT liability first estimated.

Overall Assessment of Distortions

Six of the distortions have been assessed on the basis of the quantification of their impact on passenger demand, and through that on operator costs and Member States VAT revenues. Of the others, three have be assessed by the order of magnitude of their impacts, one has already been considered by other studies and actions and not considered further, and the remaining five could only be described quantitatively. None of the fifteen was found to have a large impact on passengers, operators, and Member States, but three were assessed to have a medium impact, seven a small impact, and three a very small impact.

Two of the three distortions that have a medium impacts are among those related to different VAT rates on passenger services: within one mode between domestic, intra-EU, and extra-EU services, and between modes for the same three markets. The third is the distortion that results from different delimitations between the three markets.

Table ES.1 - Summary and Assessment of Distortions

Distortion	Description	Impact on PKM or Operating Costs	Comment	Assessment
1 - Different VAT Rates				
1a	Different VAT rates within one mode at the domestic level		Little impact on competition, except Germany	Very Small
1b	Different VAT rates between modes at the domestic level		Only applies to three MS	Very Small
1c	Different VAT rates within one mode between domestic, extra-EU, and intra-EU	-1.8 billion	Reduced PKM from distortion	Medium
1d	Different VAT rates between modes for domestic, extra-EU, and intra-EU	-0.5 billion	Reduced PKM from distortion	Medium
1e	Different delimitation between domestic, extra-EU, and intra-EU (two-sector trips)	Limited		Small
1f	Lower VAT rates applied in certain regions at the domestic level			Small
2 - Scope of Passenger Transport Services and Associated Supplies				
2a	Definition of passenger transport and related incidental services	400 million	Excess VAT collected on taxis etc. in UK	Small
2b	Consumption on board ships, aircraft, or trains	n.a.	Not addressed in this study	
3 - Treatment of Inputs in the Passenger Transport Sector				
3a	Exemptions following Article 148 of VAT Directive - Delay in processing VAT refunds	121 million	Estimate of possible added financial cost to operators	Small
3b	Specification of vehicle use for passenger transport for purposes of input VAT deductibility		Aimed at avoiding abuse of deductions	Not relevant for competitive purposes
3c	Tax incentives on fuel and electricity between Member States			Very Small
4 - Place of Supply				
4a	Complexity of calculating the place of supply (distance) of extra-EU and intra-EU rail and road transport			Small
4b	Additional compliance costs (proportion of distance, multiple registration)[14]	2 million		Small

[14] E.g. different registration and documentation requirements, invoicing rules, VAT returns, and languages.

4c	Different treatment of sections in or above international areas outside EU			Small
4d	Difficulty in determining the place of supply (distance) of extra-EU and intra-EU air and sea transport			Medium

Scenarios

Eleven indicative VAT scenarios have been used to help assess the impacts of possible ways to address the distortions. None of these scenarios address all distortions; hence, no scenario could be considered a candidate for an alternative VAT regime. The scenarios have been designed only to help determine whether each could be designed and how it might influence the three main players in passenger transport: the users, the operators, and the Member States. Some of the scenarios were amenable to quantification, others only to an order of magnitude estimate, while some could only be described quantitatively.

Scenario 1: Output VAT on all modes of passenger transport in the urban, other domestic, and intra-EU markets is set at national standard rates. VAT rates on extra-EU passengers and on all inputs to the operation of passenger transport are unchanged.

Scenario 2: Similar to Scenario 1, but with the output VAT rates set to the reduced national rates.

Scenario 3: The same as Scenario 1, but the place of taxation is changed from the Member State in which the transport service is provided to the Member State of passenger departure.

Scenario 4: The same as Scenario 2, with a change in place of taxation as in Scenario 3.

Scenario 5: Applies current VAT rates, but with the place of taxation as per Scenario 3.

Scenario 6: Applies current output VAT rates, but abolishes Article 148 of the VAT Directive exempting VAT on inputs to air and maritime intra-EU and extra-EU services.

Scenario 7: The same as Scenario 6, but instead of removing the exemptions of Article 148, it extends its provisions to inputs for bus and passenger rail services.

Scenario 8: Is similar to VAT Scenario 4, which applies national reduced VAT rates to passenger outputs, uses the Member State of passenger departure for where VAT liability is incurred, and extends that liability to the extra-EU passenger trips.

Scenario 9: is similar to VAT Scenario 8; however, the VAT liability for VAT on extra-EU passengers is based on the fare before user charges or taxes are added, with specific ticket taxes eliminated as they are replaced by VAT.

Scenario 10: Retains current input and output VAT rates, but implements the one-stop-shop provision for passenger transport VAT transactions.

Scenario 11: Applies current domestic VAT rates on inputs and outputs, but harmonizes the output VAT rates on intra-EU and extra-EU passengers to zero (or provides an exemption with the right to deduct).

Assessment of Scenarios

Table ES.2 presents an overview of the highlights of the results of the model simulations, which are discussed in detail in the main text of this report.

By design, the various scenarios eliminate one or several of the distortions that have been identified and discussed or quantified. Thus, to the extent that the elimination of these distortions could be a desirable policy objective, the objective would be accomplished. The simulations displayed in Table ES.3, therefore, have to be considered as a quantification (to the extent possible) of the effects of the elimination of such distortions. If the elimination of the distortion is a benefit, the simulations give us an indication of the potential costs associated with these benefits. Not all of the consequences, however, are in the form of costs. While different scenarios may be associated with reductions in transport volume, employment, or even (modestly) GDP, there are also benefits accruing from the scenarios, for instance, in the form of reduced environmental emissions and increased VAT revenues (at least in some of the scenarios), which can then, in turn, be used for other purposes by national governments.

With this caveat, Table ES.3 shows that the scenario with the largest economic and environmental impact is Scenario 1, which is not surprising in view of the fact that it provides the largest shock to the existing system. Overall demand for transport declines by between 0.7% and 4.8% by 2030 (for the EU28, with wide variations across Member States). VAT revenue from passenger transport almost trebles as a result of the increase to national standard rates. However, transport operator revenue decreases by 3% (short term, full pass through) up to 10% (long term, limited pass through) when compared to the reference scenario, where the current VAT rules are maintained.[15] In addition, economy-wide effects on GDP are minor because of the hypothesis that compensatory tax reductions or transfer increases cushion households from a negative fiscal shock. However, employment in the sector declines, sometimes substantially, according to mode.

Scenario 2 has a much more moderate effect on all of the variables that have been discussed, since the increases in rates are more limited and apply to fewer Member States and modes (i.e. many Member States already use reduced rates).

Scenarios 3, 4, 5, and 8 provide information on the consequences of a change in the place of taxation. The main message here is that, if such change were to be desirable for policy purposes, its effects would be rather marginal and we presume easily handled with minor compensatory mechanisms.

Scenarios 6 and 7 explore the consequences of removing or extending the provisions of Article 148 to all operators. Our conclusion is that the consequences are trivial.

Scenario 9 shows that using VAT based on pre-tax fares and national reduced rates for all transport modes and on the Member State of departure would not have a significant impact (on fares, demand, and competitiveness between or within modes) compared to VAT based on final ticket prices. One further option would be to replace the already existing ticket taxes by VAT.

Scenario 10 argues that the introduction of a single window for passenger transport VAT issues might be desirable, but cannot be evaluated without a specific study. We argue that such a scheme could be offered on a voluntary basis and then assessed on the basis of accumulated experience.

Finally, Scenario 11, which is the closest to the principle of subsidiarity, in that it would only affect international travel, has minimal consequences on relevant variables affecting the demand or supply of passenger transport.

[15] This reference scenario is referred to in the Report as "Business as Usual" or the BAU Scenario.

Table ES.2 – Overview of Assessment of Scenarios

Scenario	Description of VAT Scenario	Distortions Addressed	Method of Assessment	Main Highlights (comparison to the BAU Scenario)
1	The national standard rates will apply to outputs of all modes of urban, other domestic, and intra-EU passenger transport.	**1**	**Q**	Total transport demand declines by between 0.7% and 4.8% by 2030 (for the EU28, with wide variations across Member States). Business demand, however, increases due to deductibility of VAT for business passenger transport purposes. VAT revenue almost trebles as a result of the increase to national standard rates. However, revenue of transport operators decreases by 3% (short term, full pass through) up to 10% (long term, limited pass through) when compared to the BAU Scenario. Economy-wide effects on GDP minor. Employment in the sector declines, sometimes substantially according to mode. Environmental effects are generally positive and proportional to the reduction in different forms of passenger transport modes.
2	The national reduced rates will apply to all modes of urban, other domestic, and intra-EU passenger transport. If no reduced rate exists, the standard rate will apply.	**1**	**Q**	Total transport demand declines slightly or increases slightly (depending on the scenario). The increase in VAT revenues is more modest than in Scenario 1 (about 23% for full pass-through in 2030), and so is the decline in revenues of operators. In some Member States, VAT revenues decline. GDP effects are minimal. Employment effects in the sector are also smaller than in Scenario 1.
3	As for Scenario 1, but with the place of taxation changed to the Member State of departure/arrival.	**1, 4a, 4d**	**Q**	This Scenario extends Scenario 1. Results are identical except that a redistribution of revenues among Member States occurs, limited to revenues from international tariffs. Smaller Member States tend to see an increase in their revenues at the expense of the larger ones.
4	As for Scenario 2, but with the place of taxation changed to the Member State of departure/arrival.	**1, 4a, 4d**	**Q**	Same as in Scenario 3, with very few differences.

5	Current VAT rates, but the place of taxation changed to the Member State of departure/arrival.	**4a, 4d**	**Q**	Effects of Scenario consist of re-distribution of international travel revenues among Member States. In practice, the resulting changes are small, and no Member States gain or lose more than 1% of its revenues.
6	Exemptions according to Article 148 of the VAT Directive abolished.	**3a**	**O**	Minimal effects on the air and sea transport industries, provided right of deduction is allowed.
7	Exemptions according to Article 148 of the VAT Directive extended to buses and trains.	**3a**	**O**	Would allow the recovery of capital costs for buses and trains more speedily. Magnitude of the effect hard to estimate, but likely of minor importance.
8	As for Scenario 4, but with an obligation to VAT extended to extra-EU passengers departing from a Member State.	**1, 4a, 4c, 4d**	**Q**	Relatively small impacts given that the long-term fare elasticities of demand are quite low.
9	As for Scenario 8, but with VAT applied to pre-tax fares as for the Air Passenger Duty.	**1, 4a, 4c, 4d**	**O**	Relatively small impacts once all transport modes are liable for VAT at the same rates.
10	Implementation of One-Stop-Shop for all VAT transactions.	**4a, 4b**	**D**	The reform would be desirable, although estimating its quantitative impacts would require a separate study.
11	Current rates apply on all domestic transport, intra-and extra-EU rates set to zero for all operators.	**1d, 4b**	**Q**	Minimal impact on PKM and on VAT revenues from this Scenario, given the low share of bus and rail in international travel.
Q = Quantitative; O = Order of Magnitude; D = Description.				

Chapter 1. Introduction

This is the Final Report for the "Study on the economic effects of the current VAT rules for passenger transport," under FWC No. TAXUD/2010/CC/104. This study was conducted by CASE (Center for Social and Economic Studies, Warsaw), IHS (Institute for Higher Studies, Vienna), and TML (Transport and Mobility, Leuven).

Objective

The objective of this study is to provide an economic assessment of the impact of current VAT regimes and the likely effects of alternative VAT regimes to assist the Commission in making policy choices.

Background

In December 2011, the Commission published its "Communication on the Future of VAT" ((COM2011) 851 Final). In the communication, the Commission sets out the fundamental features of a future VAT system and priority areas for further work. One key priority is a more efficient VAT system. For this, broadening the tax base and limiting the use of reduced rates would promote tax neutrality and improve economic governance either by generating new revenue streams or by facilitating a reduction in standard rates without adverse revenue consequences. For passenger transport activities, public consultation has confirmed that the current situation (where services are VAT exempt or subject to reduced rates in Member States, variable by means of transport involved) creates distortions of competition. Even where exemption or reduced rates do not apply, the complexity of current place-of-supply rules increase compliance costs (in particular, for activities that extend across two or more Member States) and may cause voluntary or involuntary non-compliance. Consultation responses highlighted two possible but conflicting approaches: maintaining the status quo with minor changes to apply exemptions in a more uniform way or abolishing the exemptions. The latter option is more in line with the objective of increasing the neutrality and efficiency of the tax. The Commission's preference is for a more neutral, consistent, and simple VAT framework for passenger transport activities.

Passenger transport activities are always, in principle, subject to VAT. Nevertheless, the European Council's VAT Directive has a range of provisions allowing for either exemptions or reduced rates. Several of these provisions flow from derogations accorded to Member States on the basis of exemptions already in place on 1 January 1978 or at the time of accession. These exemptions are in Articles 371 to 390 and Articles 390a and 390b.[16]

Businesses supplying international passenger transport services across several Member States must be familiar with the specific VAT rules for each Member State. That these rules can vary depending on the means of transport used not only adds to its complexity, but is also at odds with neutrality (e.g. VAT may be due on coach services but not on airline services).

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16 All legislative references are to Council Directive 2006/112, the VAT Directive.

However, these are not the only exemptions affecting passenger transport services. Other provisions allow certain service providers (e.g. international sea and air transport) to make VAT-exempt purchases. There are two types of VAT purchase exemptions:

- *Output Exemption*: the exemption of passenger transport provided by transport providers to their customers, subject to certain conditions, and
- *Input Exemption*: the exemption of select supplies to transport providers, subject to certain conditions.

These exemptions create an additional level of complexity and cause administrative burdens for both economic operators and tax administrations. The input exemption provides a cash flow advantage to the sector concerned, as it does not have to pre-finance the VAT on its purchases (notably, investment goods such as the means of transport itself).

Finally, passenger transport is taxed according to where the transport effectively takes place, proportionate to the distances covered (Article 48), and may be subject to reduced rates as provided for in point (5) of Annex III, leading to further complexity in cross-border operations.

Passenger Transport Services

All passenger transport services are potentially subject to VAT. In practice, certain Member States have chosen to exempt services based on the size of vehicle used or the geographic region where the service is operated. For reasons that were originally related to not inhibiting international trade, international passenger travel by air and sea are also exempt from output VAT.

For the purposes of the analyses made here, passenger transport is defined as all passenger trips that would be subject to VAT if there were no exemptions. This includes passenger travel by public transport vehicles in urban areas (urban passengers), on inter-urban travel within the country where the trip originates (other domestic passengers), intra-EU travel (between the territory of one Member State and another, and extra-EU travel (between the territory of a Member State and non-member state).

This assessment includes travel by all modes of transport; however, in our quantitative analysis using three scenario models, analysis is constrained by available data. The data excludes passenger travel where making the trip is an essential part of the reason for traveling (e.g. travel by tourist coaches and ships). The data also excludes travel by hired cars, with or without a driver.[17] The data on the number of passengers on maritime cruises is available outside of the models; hence, the impact of different VAT regimes on these trips can be quantified, but outside of the models used for the other passenger travel.

The data source used does include travel between the EU-28 Member States and third countries, so the impact of different output VAT regimes on these passenger trips can be estimated in the same way as urban, other domestic, and intra-EU passenger trips.

Structure of the Report

The structure of this report is as follows:

[17] Hired cars without drivers are generally considered as hiring of means of transport and not passenger services.

- Chapter 2 discusses the demand and supply in the EU's passenger transport market and examines several issues concerning the competitiveness of the market according to relevant dimensions.
- Chapter 3 analyses the passenger transport sector's VAT regime as applied by Member States across the EU, as well as a brief discussion of other taxes affecting passenger travel.
- Chapter 4 discusses the competitive distortions that are at the centre of the analysis of alternative VAT regimes and provides an assessment of their relevance.

  Input and output VAT exemptions can lead to distortions from an ideal or preferred market context. We identify 15 potential distortions and assign them to 4 groups:

  - Group 1: six distortions derived from different output VATs within or between modes of transport or based on geography or between markets.
  - Group 2: two distortions related to the definition of passenger transport services and associated supplies.
  - Group 3: three distortions derived from VAT exemptions on inputs to operators of particular modes of transport or the time taken to process VAT rebates.
  - Group 4: four distortions related to the place of supply and the administration VAT costs on passenger transport, mostly input VAT, and derives from the system of determining VAT based on the distance travelled in each country, the differences between transport modes, and the treatment of VAT on travel outside the EU.

- Chapter 5 discusses proposed VAT reform policy options to address select distortions.

  In the past, many measures have been considered to address VAT distortions and a few have been implemented. However, these measures have addressed VAT distortions in general, and not those specific to the transport sector. In Chapter 5, we discuss 11 VAT reform scenarios that have the potential to address the identified distortions. The scenarios consist of changes to rates (with the aim of better harmonization) and changes to other administrative rules of passenger transport VAT. Each scenario is evaluated by a baseline run for the year 2010 (2013 for the city-pairs model) and at two points in time (2020 and 2030) to capture impact and long-term effects of reforms.

  There are several VAT distortions derived from the VAT rules that apply to all economic activities which have a greater impact on transport operators than on other producers of goods or services. Potential remedies to these distortions are not covered in the analyses of this study, as their remedies lay in measures not specific to the transport sector. Such distortions include the high administrative costs of providing documentation in a language that is not widely used.

  Other distortions that are not addressed in this report are those that have already been the subject of recent and detailed studies. One example is that of the place of taxation for the supply of goods and services consumed aboard means of transport (PWC 2012).

- Chapter 6 discusses the results of the simulations and other assessments of the 11 policy scenarios.

In addition, Annex 1 provides a complete analysis of VAT legislation at the EU level. Annex 2 contains a methodological note on the date employed in the report. Annex 3 discussed the models used to simulate the various policy scenarios. Finally, Annex 4 provides a more detailed discussion of the estimation of the pass-through factors estimated for the different policy scenario.

This report is complemented by Volumes 2 and 3. Volume 2 contains a detailed series of country fiches on the VAT regime with regard to passenger transport in each EU Member State and country fiches containing detailed information on passenger transport statistics. Volume 3 (in Excel format) contains the detailed results of the simulations of Scenarios in Chapter 6 for all Member States.

Chapter 2. Passenger Transport Demand and Supply in the EU

In this Chapter, we (i) review the features of the demand and supply of passenger transport services in the European Union and (ii), using a number of different concepts of competition, we discuss the degree of competitiveness of the individual markets for passenger transport.

A. Demand for Transport in the European Union

There are two widely used measures of demand for transport in the EU: number of passengers and number of passenger kilometres (PKM). We provide data on both measures. Using two large datasets containing information on transport volumes, expressed in PKM and number of trips (based on EUROSTAT official statistics, see Box 2.1), we explore the importance of the main modes of purchased transport: bus, rail, metro, and air. For the purposes of this study, the transport market was split into submarkets by product: urban transport, other domestic or intercity transport, international intra-EU transport, and international extra-EU transport. These submarkets are distinct and suppliers are faced with very different conditions.

No data was collected for water-based transport or taxis due to a lack of consistent and readily available datasets. While these modes are often subject to special treatment from legislators, their market share is not projected to be significant. This is confirmed by the EC Statistical Pocketbook,[18] which states the passenger sea transport 2011 market share is 0.6%, based on PKM, and is primarily concentrated in three regions: the Aegean Sea, the North Sea Channel, and the Baltic Sea.

Starting from a set of tables with aggregated figures for all EU28 countries, the most important information for each of the markets is discussed. For each market, we show the modal volumes and shares for the applicable modes. Not all modes are present in all Member States (and for one Member State, one market is not identified in the data source):

- Metros or trams are not available in all urban areas,
- Two countries (Malta and Cyprus) have no rail network, and
- Two countries (Luxemburg and Cyprus) have no predominantly urban zones according to DG REGIO's classification (Box 2.1).

Urban Transport

Purchased transport in cities consists of three modes: metro and tram, standard rail, and bus. The total amount of urban trips in the EU28 in 2010 was approximately 35.6 billion (equivalent to 385 billion PKM). The largest urban market under both parameters is Germany (6.4 billion trips and 80.4 billion PKM). The second largest urban market under both parameters is the UK (5.4 billion trips and 48.8 billion PKM); however, the gap is notably smaller for trips than for PKM, which implies that urban trips made in the UK are markedly shorter than in Germany.

[18] See: http://ec.europa.eu/transport/facts-fundings/statistics/pocketbook-2013_en.htm

Box 2.1 – Datasets for Demand Analysis

Two datasets served as the sources for the analysis of transport demand in the EU: the TREMOVE model (for PKM) and ETISplus (for number of trips). Both are based on EUROSTAT, with additional post-processing conducted to fit the needs of the application of the data in its respective contexts.

TREMOVE is a policy assessment model used to study the effects of different transport and environmental policies on the emissions of the transport sector. The model estimates the transport demand, modal shifts, vehicle stock renewal, and scrappage decisions as well as the emissions of air pollutants and the welfare level for policies as road pricing, public transport pricing, emission standards, and subsidies for cleaner cars. The model covers passenger and freight transport in 31 countries and covers the period from 1995-2030. It has been applied in projects for DG MOVE, DG CLIMA, DG ENV, and DG ENTR.

The transport volumes included in the current version of the model (3.5c) were provided by the EC's JRC-IPTS in the context of the assessment of the 2011 Transport White Paper. They contain aggregated statistical data (EUROSTAT) up to 2009 and projections thereafter. For this project, the first projection year used was 2010 (the data of which match well with EUROSTAT/ETiF (European Transport in Figures) aggregated totals).

The data extracted from TREMOVE are PKM (passenger kilometres), equivalent to the number of trips multiplied by the average trip length, split over a number of relevant parameters, including region, distance, and motive.

TREMOVE has a built-in distinction between urban, non-urban short distance, and non-urban long distance transport (among others). There is, however, no way to establish the amount of cross-border transport included in these totals. An additional data source was needed for that.

The additional data source used was ETISplus (date of access: April 2013), a recently-completed EC Seventh Framework Program (FP7) project (managed by DG MOVE), which delivered (among other things) an online database containing detailed transport volumes in and between Nomenclature of Territorial Units for Statistics Level 3 (NUTS3) zones, split by transport mode, for the years 2005 and 2010. The unit in which the volumes were delivered is passenger trips. The data is also based on EUROSTAT, but on different tables, with substantial additional reviews and validation. From the volumes between zones, it is easy to identify international transport. With some processing, this allows for the distinction of international transport volumes within TREMOVE data.

What ETISplus does not have is a proper identification of urban transport. To solve this, we consulted a list published by DG REGIO (See: http://epp.eurostat.ec.europa.eu/statistics_explained/index.php/Urban-rural_typology_update) that classifies all NUTS3 zones as one of three types: predominantly urban, predominantly rural, or intermediate. All intra-zonal trips within a zone classified as predominantly urban were marked to be urban. This may, in some cases, lead to unexpected results, like countries with no urban transport (if none of its zones are marked as predominantly urban) or countries with excess intercity transport (when a single urban area consists of several NUTS3 zones). See Annex 1 about dataset compatibility.

The largest markets for metro transport are Germany (3.7 billion trips) and France (2.9 billion trips). In the UK, the dominant urban transport mode is bus (3.7 billion trips). This is also is the largest market for urban bus trips in the EU. However, for bus PKM, Germany is the largest, followed first by Italy and then the UK. This confirms the trend of longer urban trips in Germany.

Almost half the urban trips in the EU are done by metro (45%), yet they only represent 24% of distance. On the other hand, only 13% of trips are made by rail, but they cover 38% of the pkm. For urban buses, the numbers are 41% and 38%.

Complete lists of figures are presented in the Tables 2.1 and 2.2 below.

Table 2.1 - Transport Volumes Urban Transport

	Trips (10^3)				PKM (10^6)			
	Metro	Bus	Rail	Total	Metro	Bus	Rail	Total
AT	891,731	157,647	163,278	1,212,656	4,199	2,603	4,791	11,593
BE	343,192	426,810	140,474	910,476	1,226	5,144	5,914	12,284
BG	183,298	75,836	16,397	275,531	504	1,622	888	3,013
CY	0	0	0	0	0	248	0	248
CZ	1,252,300	323,110	33,914	1,609,323	8,308	2,224	2,623	13,155
DE	3,727,375	1,832,791	1,709,324	7,269,490	16,759	26,339	37,279	80,377
DK	52,000	42,269	49,033	143,302	193	2,049	1,838	4,080
EE	30,276	57,729	2,546	90,550	86	493	88	667
ES	1,242,814	1,536,670	484,105	3,263,589	7,130	12,910	8,536	28,576
FI	113,023	79,486	50,133	242,642	525	2,521	0	3,046
FR	2,914,714	1,766,299	581,600	5,262,612	14,061	19,326	13,503	46,890
GR	219,479	456,855	4,968	681,302	1,797	6,428	0	8,225
HR	183,000	36,744	34,977	254,721	708	272	488	1,468
HU	677,629	407,167	25,950	1,110,746	2,444	2,421	3,096	7,961
IE	32,375	94,427	21,808	148,610	204	1,786	116	2,105
IT	1,055,804	2,085,398	426,267	3,567,470	6,377	20,874	20,614	47,866
LT	0	158,954	1,104	160,058	0	665	133	798
LU	0	0	0	0	0	414	0	414
LV	41,007	67,177	13,495	121,679	300	470	294	1,064
MT	0	35,604	0	35,604	0	104	0	104
NL	410,665	615,645	177,731	1,204,040	1,934	2,958	8,653	13,544
PL	1,165,859	838,456	58,947	2,063,262	4,770	5,224	6,549	16,543
PT	235,511	310,450	136,213	682,174	1,079	1,069	1,795	3,943
RO	803,670	399,796	7,348	1,210,814	7,397	1,790	2,675	11,862
SE	435,212	142,740	78,733	656,684	2,414	3,666	7,457	13,538
SI	0	26,544	9,193	35,737	0	413	366	779
SK	89,630	76,109	4,401	170,140	418	1,014	790	2,223
UK	1,266,242	3,653,842	904,214	5,824,299	9,409	20,289	19,113	48,811
EU28	17,366,807	15,704,555	5,136,152	38,207,514	92,241	145,336	147,600	385,177
Sources: EUROSTAT; TREMOVE; ETISplus								

Table 2.2 - Market Share for Urban Transport

	Trips			PKM		
	Metro	**Bus**	**Rail**	**Metro**	**Bus**	**Rail**
AT	73.5%	13.0%	13.5%	36.2%	22.5%	41.3%
BE	37.7%	46.9%	15.4%	10.0%	41.9%	48.1%
BG	66.5%	27.5%	6.0%	16.7%	53.8%	29.5%
CY	0.0%	0.0%	0.0%	0.0%	100.0%	0.0%
CZ	77.8%	20.1%	2.1%	63.2%	16.9%	19.9%
DE	51.3%	25.2%	23.5%	20.9%	32.8%	46.4%
DK	36.3%	29.5%	34.2%	4.7%	50.2%	45.1%
EE	33.4%	63.8%	2.8%	12.9%	73.9%	13.2%
ES	38.1%	47.1%	14.8%	25.0%	45.2%	29.9%
FI	46.6%	32.8%	20.7%	17.2%	82.8%	0.0%
FR	55.4%	33.6%	11.1%	30.0%	41.2%	28.8%
GR	32.2%	67.1%	0.7%	21.8%	78.2%	0.0%
HR	71.8%	14.4%	13.7%	48.2%	18.6%	33.2%
HU	61.0%	36.7%	2.3%	30.7%	30.4%	38.9%
IE	21.8%	63.5%	14.7%	9.7%	84.8%	5.5%
IT	29.6%	58.5%	11.9%	13.3%	43.6%	43.1%
LT	0.0%	99.3%	0.7%	0.0%	83.3%	16.7%
LU	0.0%	0.0%	0.0%	0.0%	100.0%	0.0%
LV	33.7%	55.2%	11.1%	28.2%	44.2%	27.6%
MT	0.0%	100.0%	0.0%	0.0%	100.0%	0.0%
NL	34.1%	51.1%	14.8%	14.3%	21.8%	63.9%
PL	56.5%	40.6%	2.9%	28.8%	31.6%	39.6%
PT	34.5%	45.5%	20.0%	27.4%	27.1%	45.5%
RO	66.4%	33.0%	0.6%	62.4%	15.1%	22.6%
SE	66.3%	21.7%	12.0%	17.8%	27.1%	55.1%
SI	0.0%	74.3%	25.7%	0.0%	53.0%	47.0%
SK	52.7%	44.7%	2.6%	18.8%	45.6%	35.6%
UK	21.7%	62.7%	15.5%	19.3%	41.6%	39.2%
EU28	45.5%	41.1%	13.4%	23.9%	37.7%	38.3%

Other Domestic and Intercity Transport

Other domestic transport is defined as all domestic trips not taking place within urban areas, while intercity transport (only trip data from ETISplus available) is defined as between NUTS3 zones that are predominantly urban within a country. In cases where only one such zone exists, there will be no intercity transport in the data.

The relevant modes are rail, bus or coach, and air transport. Bus is generally used for the shorter trips (approximately 20 km or less) in rural areas, while rail is, by far, the predominant mode transport for longer travel between cities. However, the intercity market is only a small part of the total other domestic market, making bus the overall largest mode for non-urban domestic transport. Rail sees its highest market shares in the UK and the Netherlands (40% and 39%, respectively, based on number of trips). In France, rail has a 26% share based on trips, but an over 60% share based on PKM.

The market share of domestic air transport is negligible in most Member States, except in very large countries or countries with a less extensive long distance rail network, such as Spain or Italy.

In terms of number of trips, the other domestic market is 43% smaller than the urban market, but 70% larger in terms of PKM.

Tables 2.3 to 2.5 below show the market share and transport volumes by mode for other domestic and intercity transport.

Table 2.3 - Transport volumes "Other domestic transport"

	Trips (10^3)				PKM (10^6)			
	Air	Bus	Rail	Total	Air	Bus	Rail	Total
AT	393	341,607	69,026	411,026	24	6,773	3,145	9,941
BE	29	220,385	62,589	283,002	1	12,095	1,967	14,062
BG	138	408,405	15,065	423,607	189	9,139	1,384	10,712
CY	0	39,860	0	39,860	0	1,092	0	1,092
CZ	71	916,857	107,064	1,023,991	19	13,624	3,292	16,934
DE	16,506	2,923,405	623,232	3,563,143	1,443	41,067	36,827	79,338
DK	943	243,335	129,576	373,854	4	5,291	3,968	9,263
EE	0	94,617	2,394	97,011	0	2,081	169	2,250
ES	26,981	631,728	71,444	730,153	15,755	46,388	11,571	73,714
FI	1,312	228,566	16,581	246,459	367	4,840	3,232	8,439
FR	20,061	1,387,600	499,550	1,907,212	12,739	26,925	59,363	99,028
GR	4,502	535,516	7,290	547,309	2,916	15,610	1,895	20,420
HR	254	196,971	30,442	227,666	512	1,822	533	2,866
HU	1	584,621	105,166	689,788	2	13,658	4,023	17,683
IE	227	169,767	17,332	187,326	19	5,122	1,700	6,841
IT	24,185	3,553,349	415,203	3,992,737	7,754	82,575	26,475	116,805
LT	0	219,518	3,173	222,690	0	2,786	235	3,021
LU	0	38,052	17,075	55,126	0	437	172	609
LV	0	87,828	6,369	94,197	0	1,952	553	2,506
MT	0	0	0	0	0	414	0	414
NL	6	256,028	163,811	419,845	0	9,110	6,250	15,360
PL	671	2,375,112	205,255	2,581,038	160	22,210	13,246	35,616
PT	1,526	343,161	20,241	364,928	960	9,597	1,950	12,508
RO	729	707,632	58,250	766,611	382	10,075	4,354	14,811
SE	3,967	529,486	97,195	630,648	860	4,791	2,532	8,182
SI	1	77,099	6,236	83,336	2	2,783	341	3,126
SK	58	601,745	41,315	643,118	10	7,586	1,176	8,771
UK	12,552	698,864	466,076	1,177,492	2,258	29,850	29,948	62,056
EU28	115,112	18,411,113	3,256,947	21,783,172	46,374	389,695	220,299	656,367

Sources: EUROSTAT; TREMOVE; ETISplus

Table 2.4 - Market shares "Other domestic transport"

	Trips			PKM		
	Air	Bus	Rail	Air	Bus	Rail
AT	0.1%	83.1%	16.8%	0.2%	68.1%	31.6%
BE	0.0%	77.9%	22.1%	0.0%	86.0%	14.0%
BG	0.0%	96.4%	3.6%	1.8%	85.3%	12.9%
CY	0.0%	100.0%	0.0%	0.0%	100.0%	0.0%
CZ	0.0%	89.5%	10.5%	0.1%	80.4%	19.4%
DE	0.5%	82.0%	17.5%	1.8%	51.8%	46.4%
DK	0.3%	65.1%	34.7%	0.0%	57.1%	42.8%
EE	0.0%	97.5%	2.5%	0.0%	92.5%	7.5%
ES	3.7%	86.5%	9.8%	21.4%	62.9%	15.7%
FI	0.5%	92.7%	6.7%	4.4%	57.4%	38.3%
FR	1.1%	72.8%	26.2%	12.9%	27.2%	59.9%
GR	0.8%	97.8%	1.3%	14.3%	76.4%	9.3%
HR	0.1%	86.5%	13.4%	17.8%	63.6%	18.6%
HU	0.0%	84.8%	15.2%	0.0%	77.2%	22.8%
IE	0.1%	90.6%	9.3%	0.3%	74.9%	24.8%
IT	0.6%	89.0%	10.4%	6.6%	70.7%	22.7%
LT	0.0%	98.6%	1.4%	0.0%	92.2%	7.8%
LU	0.0%	69.0%	31.0%	0.0%	71.8%	28.2%
LV	0.0%	93.2%	6.8%	0.0%	77.9%	22.1%
MT				0.0%	100.0%	0.0%
NL	0.0%	61.0%	39.0%	0.0%	59.3%	40.7%
PL	0.0%	92.0%	8.0%	0.4%	62.4%	37.2%
PT	0.4%	94.0%	5.5%	7.7%	76.7%	15.6%
RO	0.1%	92.3%	7.6%	2.6%	68.0%	29.4%
SE	0.6%	84.0%	15.4%	10.5%	58.6%	30.9%
SI	0.0%	92.5%	7.5%	0.1%	89.0%	10.9%
SK	0.0%	93.6%	6.4%	0.1%	86.5%	13.4%
UK	1.1%	59.4%	39.6%	3.6%	48.1%	48.3%
EU28	0.5%	84.5%	15.0%	7.1%	59.4%	33.6%

Table 2.5 - Transport Volume and Market Share for Intercity Transport

	Trips (10^3)				Market Share		
	Air	Bus	Rail	Total	Air	Bus	Rail
AT	207	3	4,165	4,375	4.7%	0.1%	95.2%
BE	18	7	29,894	29,918	0.1%	0.0%	99.9%
CZ	0	845	1,373	2,218	0.0%	38.1%	61.9%
DE	6,190	1,800	93,377	101,367	6.1%	1.8%	92.1%
DK	38	0	0	38	100.0%	0.0%	0.0%
ES	11,101	3,152	16,545	30,798	36.0%	10.2%	53.7%
FR	8,222	10	74,317	82,548	10.0%	0.0%	90.0%
GR	810	787	495	2,091	38.7%	37.6%	23.7%
IT	7,422	459	24,869	32,751	22.7%	1.4%	75.9%
LV	0	1,045	1,167	2,212	0.0%	47.2%	52.8%
NL	1	21	89,187	89,209	0.0%	0.0%	100.0%
PL	266	2,482	15,722	18,470	1.4%	13.4%	85.1%
PT	741	962	2,034	3,737	19.8%	25.8%	54.4%
RO	0	39	1,014	1,052	0.0%	3.7%	96.3%
UK	6,344	19,401	220,701	246,446	2.6%	7.9%	89.6%
EU28	41,359	31,012	574,859	647,231	6.4%	4.8%	88.8%
Sources: EUROSTAT; TREMOVE; ETISplus							

International Intra-EU Transport

The international intra-EU transport market is heavily dominated by air transport, with 72% of trips. Still, the market share for rail transport is important as well at 20%. The highest market shares for rail are found in smaller Western (Luxemburg, Belgium) and Central (Austria, Slovenia) European countries. The highest market shares for air transport can be found in countries at the borders of the EU, notably in the East.

The largest markets for international intra-EU transport are the UK, Germany, and Spain (by amount of trips). Of these three, Germany has the lowest share of air transport and the highest share of rail transport. Intra-EU travellers to and from Spain generally fly the farthest, followed by the UK and Greece. With Spain and Greece among the EU's primary touristic countries, this is not unexpected. The largest market for intra-EU rail transport is France. Its central location with fast railway connections to the EU's largest countries is a determining factor.

The relative market size of the intra-EU international market versus the domestic market in terms of trips is about 0.6%, but 24% in terms of distance.

A small note on the methodology of data collection: the PKM values presented are not a direct output of TREMOVE. These were derived as follows:

- TREMOVE has distance classes for trips greater than 500 km and less than 500 km.
- For both classes, ETISplus data was consulted to find the international trips starting in a given country. The trips were split into two groups, greater than 500 km and less than 500 km, the same distance classes of trips as defined in TREMOVE.
- The ratio of the PKM for international trips and the PKM for all trips (from ETISplus) was then taken as a measure of the share of international trips in TREMOVE as well.
- The PKM from TREMOVE were then split according to these ratios. Logically, for many small countries, almost all of the PKM in the distance class greater than 500 km was assigned to international transport.

Tables 2.6 and 2.7 below show the transport volume and market share by mode for intra-EU transport.

Table 2.6 - Transport volumes international transport (Intra-EU)

	Trips (10^3)				PKM (10^6)			
	Air	**Bus**	**Rail**	**Total**	**Air**	**Bus**	**Rail**	**Total**
AT	4,696	694	5,592	10,981	2,596	365	1,193	4,153
BE	6,341	660	10,082	17,083	2,384	1,414	1,955	5,753
BG	1,787	1,525	95	3,408	2,516	592	70	3,178
CY	2,543	0	0	2,543	6,031	0	0	6,031
CZ	3,355	994	2,943	7,293	5,009	245	482	5,735
DE	32,098	3,595	11,689	47,382	18,800	941	2,183	21,924
DK	5,018	265	4,181	9,463	4,057	61	350	4,468
EE	479	55	20	554	338	57	6	401
ES	44,572	2,345	1,823	48,740	58,136	269	1,000	59,405
FI	3,767	3	33	3,803	4,207	197	263	4,667
FR	22,928	4,189	13,919	41,036	12,272	1,243	6,547	20,062
GR	9,317	530	39	9,887	20,525	91	18	20,634
HR	1,102	358	427	1,888	864	19	88	971
HU	2,916	494	1,741	5,150	2,025	821	1,368	4,213
IE	9,175	17	317	9,508	5,396	260	66	5,722
IT	25,727	4,690	3,352	33,769	13,197	199	1,793	15,189
LT	846	205	219	1,270	689	139	32	860
LU	447	108	1,021	1,576	237	6	138	381
LV	1,173	62	99	1,334	774	69	35	878
MT	1,233	0	0	1,233	2,109	0	0	2,109
NL	10,716	688	3,934	15,339	3,455	285	1,201	4,941
PL	6,970	2,940	1,051	10,960	3,579	510	243	4,331
PT	7,311	689	841	8,842	9,514	173	193	9,879
RO	3,338	1,546	292	5,176	3,627	603	199	4,429
SE	8,236	225	3,807	12,268	5,928	68	160	6,156
SI	416	73	438	927	244	51	122	418
SK	1,478	757	1,508	3,743	581	126	183	890
UK	48,515	842	3,960	53,317	27,948	1,323	1,981	31,251
EU28	266,498	28,550	73,425	368,473	217,039	10,123	21,867	249,029

Sources: EUROSTAT; TREMOVE; ETISplus

Table 2.7 - Market shares international transport (intra-EU)

	Trips			PKM		
	Air	Bus	Rail	Air	Bus	Rail
AT	42.8%	6.3%	50.9%	62.5%	8.8%	28.7%
BE	37.1%	3.9%	59.0%	41.4%	24.6%	34.0%
BG	52.4%	44.8%	2.8%	79.2%	18.6%	2.2%
CY	100.0%	0.0%	0.0%	100.0%	0.0%	0.0%
CZ	46.0%	13.6%	40.4%	87.3%	4.3%	8.4%
DE	67.7%	7.6%	24.7%	85.8%	4.3%	10.0%
DK	53.0%	2.8%	44.2%	90.8%	1.4%	7.8%
EE	86.4%	9.9%	3.7%	84.3%	14.1%	1.6%
ES	91.4%	4.8%	3.7%	97.9%	0.5%	1.7%
FI	99.0%	0.1%	0.9%	90.1%	4.2%	5.6%
FR	55.9%	10.2%	33.9%	61.2%	6.2%	32.6%
GR	94.2%	5.4%	0.4%	99.5%	0.4%	0.1%
HR	58.4%	19.0%	22.6%	89.0%	2.0%	9.1%
HU	56.6%	9.6%	33.8%	48.1%	19.5%	32.5%
IE	96.5%	0.2%	3.3%	94.3%	4.5%	1.2%
IT	76.2%	13.9%	9.9%	86.9%	1.3%	11.8%
LT	66.6%	16.1%	17.3%	80.2%	16.1%	3.7%
LU	28.4%	6.8%	64.8%	62.3%	1.5%	36.2%
LV	88.0%	4.6%	7.4%	88.2%	7.9%	4.0%
MT	100.0%	0.0%	0.0%	100.0%	0.0%	0.0%
NL	69.9%	4.5%	25.7%	69.9%	5.8%	24.3%
PL	63.6%	26.8%	9.6%	82.6%	11.8%	5.6%
PT	82.7%	7.8%	9.5%	96.3%	1.7%	1.9%
RO	64.5%	29.9%	5.6%	81.9%	13.6%	4.5%
SE	67.1%	1.8%	31.0%	96.3%	1.1%	2.6%
SI	44.9%	7.9%	47.2%	58.5%	12.2%	29.3%
SK	39.5%	20.2%	40.3%	65.3%	14.2%	20.5%
UK	91.0%	1.6%	7.4%	89.4%	4.2%	6.3%
EU28	72.3%	7.7%	19.9%	87.2%	4.1%	8.8%

International Extra-EU Transport

Most trips between EU and non-EU countries are made by air (see Table 2.8). Only for countries at the edges of the territory do other land-based modes reach a market share of more than 10%. The average market share for air transport is 91.5%. The market share for bus and rail transport are 3.6% and 4.9%, respectively, in terms of number of trips. Land-based modes of transport each represent less than 1% of transport volume in terms of PKM.

Among border countries, we can identify two groups: Central countries (Austria, Germany, Italy), which register a large amount of land-based trips to neighbouring Switzerland, and Eastern countries (Czech Republic, Croatia, Latvia, Poland, Romania, Slovenia, Slovakia), where trips are mainly further eastward. Among the first group, most land-based trips are made by rail, while bus is the dominant land mode for the second group of countries.

The total amount of extra-EU trips is just under 40% of the amount of intra-EU trips, yet extra-EU trips cover almost 30% more distance. The largest market for extra-EU trips is the UK, with many trips covering long distances. Germany is the second market, but with a significant portion covering a short distance. The gap between the UK and Germany is considerably larger in terms of PKM than in amount of trips. Neighbouring Switzerland is likely the main cause of that.

Tables 2.8 and 2.9 below show the transport volume and market share by mode for extra-EU transport.

Table 2.8 - Transport volumes international transport (Extra-EU)

	Trips (10^3)				PKM (10^6)			
	Air	Bus	Rail	Total	Air	Bus	Rail	Total
AT	2,412	83	669	3,163	5,495	116	51	5,663
BE	4,163	44	63	4,269	5,920	268	33	6,222
BG	535	18	147	700	1,795	67	109	1,971
CY	1,617	0	0	1,617	2,886	0	0	2,886
CZ	1,238	280	18	1,536	6,294	165	7	6,467
DE	21,673	1,455	2,135	25,263	46,666	164	370	47,200
DK	2,293	50	42	2,385	5,787	3	14	5,804
EE	289	11	13	313	510	38	8	556
ES	10,208	113	23	10,344	41,175	124	19	41,318
FI	1,360	4	32	1,396	4,562	7	293	4,862
FR	18,502	197	1,186	19,884	41,914	29	555	42,499
GR	2,632	30	54	2,715	10,707	28	24	10,759
HR	439	170	25	633	959	57	4	1,020
HU	1,114	66	54	1,235	2,153	149	59	2,362
IE	1,768	0	0	1,769	6,444	0	0	6,444
IT	12,151	664	1,640	14,455	27,672	23	441	28,136
LT	237	9	51	297	352	9	8	368
LU	233	2	22	256	437	1	6	443
LV	401	47	46	494	466	54	19	539
MT	133	0	0	133	562	0	0	562
NL	7,329	160	33	7,522	11,608	12	27	11,647
PL	2,741	805	129	3,675	3,893	335	42	4,269
PT	2,058	0	0	2,058	8,775	0	0	8,775
RO	790	529	170	1,489	1,901	136	157	2,194
SE	3,747	10	322	4,079	7,587	53	48	7,688
SI	237	51	6	295	219	45	5	270
SK	583	110	19	711	1,076	32	11	1,120
UK	27,427	89	18	27,534	68,011	136	17	68,163
EU28	128,310	4,995	6,916	140,221	315,826	2,052	2,326	320,204
Sources: EUROSTAT; TREMOVE; ETISplus								

Table 2.9 - Market shares international transport (Extra-EU)

	Trips			PKM		
	Air	**Bus**	**Rail**	**Air**	**Bus**	**Rail**
AT	76.2%	2.6%	21.1%	97.0%	2.0%	0.9%
BE	97.5%	1.0%	1.5%	95.2%	4.3%	0.5%
BG	76.4%	2.6%	21.0%	91.1%	3.4%	5.5%
CY	100.0%	0.0%	0.0%	100.0%	0.0%	0.0%
CZ	80.6%	18.2%	1.2%	97.3%	2.6%	0.1%
DE	85.8%	5.8%	8.4%	98.9%	0.3%	0.8%
DK	96.2%	2.1%	1.8%	99.7%	0.1%	0.2%
EE	92.3%	3.4%	4.3%	91.8%	6.8%	1.4%
ES	98.7%	1.1%	0.2%	99.7%	0.3%	0.0%
FI	97.4%	0.3%	2.3%	93.8%	0.1%	6.0%
FR	93.0%	1.0%	6.0%	98.6%	0.1%	1.3%
GR	96.9%	1.1%	2.0%	99.5%	0.3%	0.2%
HR	69.3%	26.8%	3.9%	94.0%	5.6%	0.4%
HU	90.3%	5.4%	4.4%	91.2%	6.3%	2.5%
IE	100.0%	0.0%	0.0%	100.0%	0.0%	0.0%
IT	84.1%	4.6%	11.3%	98.4%	0.1%	1.6%
LT	79.7%	2.9%	17.3%	95.6%	2.4%	2.1%
LU	90.8%	0.8%	8.4%	98.6%	0.2%	1.3%
LV	81.1%	9.5%	9.4%	86.5%	10.1%	3.5%
MT	100.0%	0.0%	0.0%	100.0%	0.0%	0.0%
NL	97.4%	2.1%	0.4%	99.7%	0.1%	0.2%
PL	74.6%	21.9%	3.5%	91.2%	7.8%	1.0%
PT	100.0%	0.0%	0.0%	100.0%	0.0%	0.0%
RO	53.1%	35.5%	11.4%	86.6%	6.2%	7.2%
SE	91.9%	0.2%	7.9%	98.7%	0.7%	0.6%
SI	80.5%	17.4%	2.1%	81.3%	16.8%	2.0%
SK	82.0%	15.4%	2.6%	96.1%	2.9%	1.0%
UK	99.6%	0.3%	0.1%	99.8%	0.2%	0.0%
EU28	91.5%	3.6%	4.9%	98.6%	0.6%	0.7%

Business Transport

There are many factors affecting the choice of transportation mode for passenger travel. One of the more important mode characteristics influencing choice is fare, but the effective fare itself depends on the reason the travel is undertaken. Business trip related expenses are often recoverable for VAT purposes and, in that case, those who pay for the tickets will not feel the consequences of any change in output VAT policy. It is, therefore, useful to illustrate the importance of this part of the market in relation to the full market (see Table 2.10, based on ETISplus dataset). Business travellers typically place more value on time efficiency and comfort and this has an impact on their mode choice.

In the urban market, the share of business trips is very small (just under 2.4% of all urban trips are business trips), and the largest mode for these trips in most countries is metro or tram. The share of urban business trips is somewhat larger in the EU13 (new Member States); however, most urban trips are for commuting or other private purposes.

The dominant mode in business intercity transport is rail. The share of business trips in intercity transport is approximately 17.5%, with some of the larger countries with well-established high-speed intercity connections at more than 25% (France and Italy). In countries with a low share of business trips, private transport (cars) likely accounts for most of the volume. This becomes evident in the difference between the EU15 and EU13 countries. In the EU15, with generally denser infrastructure and higher service frequencies, the share of business trips in purchased transport is 6% higher than in the EU13.

The share of international business trips is higher in the market for intra-EU trips (29.3%) than for extra-EU trips (27.9%), which is probably explained by the fact that business relations are mainly established in countries with similar working conditions, and thus occur more between neighbouring countries. Without exception, air is the most dominant mode for extra-EU trips. However, for intra-EU trips, rail is the dominant mode in six countries (Austria, Belgium, Czech Republic, France, Luxemburg and Slovenia) – with the exception of France relatively small countries sharing borders with the EU's largest Member States with high-quality rail networks. The difference between EU15 and EU13 becomes greater with distance, at 6.5% and 9.1% for intra-EU and extra-EU trips respectively.

Table 2.10 – Business Passenger Transport

	Urban	Main mode	Intercity	Main mode	Intra-EU	Main mode	Extra-EU	Main mode
AT	0.87%	rail	18.57%	rail	32.97%	rail	22.17%	air
BE	2.37%	tram/metro	17.94%	rail	46.55%	rail	28.32%	air
BG	3.41%	tram/metro			19.26%	air	26.09%	air
CY					20.21%	air	17.16%	air
CZ	3.67%	tram/metro	3.79%	rail	21.94%	rail	17.38%	air
DE	1.14%	rail	19.32%	rail	27.08%	air	24.23%	air
DK	4.38%	tram/metro	33.33%	air*	16.61%	air	25.83%	air
EE	1.98%	tram/metro			23.53%	air	22.22%	air
ES	2.22%	rail	17.17%	rail	23.42%	air	23.11%	air
FI	3.46%	rail			32.14%	air	33.33%	air
FR	3.56%	tram/metro	32.78%	rail	38.57%	rail	30.43%	air
GR	2.39%	tram/metro	21.71%	rail	18.39%	air	19.27%	air
HR	3.03%	tram/metro			29.47%	air	9.06%	air
HU	3.24%	tram/metro			31.40%	air	26.01%	air
IE	3.85%	tram/metro			30.08%	air	32.82%	air
IT	1.66%	rail	25.98%	rail	30.53%	air	29.68%	air
LT	0.85%	bus			18.14%	air	17.72%	air
LU					32.99%	rail	25.43%	air
LV	2.26%	tram/metro	4.87%	rail	22.52%	air	26.11%	air
MT	0.51%	bus			32.93%	air	30.93%	air
NL	2.33%	tram/metro	12.42%	rail	28.64%	air	28.85%	air
PL	3.14%	tram/metro	12.11%	rail	24.61%	air	21.58%	air
PT	1.97%	tram/metro	21.56%	rail	26.71%	air	24.75%	air
RO	3.08%	tram/metro	23.51%	rail	23.99%	air	15.28%	air
SE	3.12%	tram/metro			21.06%	air	28.14%	air
SI	1.39%	rail			22.54%	rail	20.52%	air
SK	3.03%	tram/metro			16.38%	air	24.77%	air
UK	3.91%	tram/metro	12.80%	rail	33.44%	air	35.45%	air
EU15	2.45%	tram/metro	17.73%	rail	30.06%	air	28.83%	air
EU13	3.16%	tram/metro	11.17%	rail	23.57%	air	19.70%	air
EU28	2.58%	tram/metro	17.49%	rail	29.27%	air	27.88%	air

Source: ETISplus

**Likely due to data anomaly*

B. The European Passenger Transport Market from the Operators' Perspective

The structure of the European passenger transport market is rather different from the perspective of the supply of services to that of the outcome of the interaction of that supply with demand, as reflected in the amount of travel (Section A of this Chapter). The supply of passenger transport services and, in particular, the competition between modes and operators, is the topic of this section of this Chapter.

There are common features of passenger transport markets within the EU that affect the competitiveness of its supply.[19] First, markets within transport modes tend to be concentrated, with oligopolistic interactions between operators interfering even where the markets appear to be competitive (e.g. airline and intercity bus alliances reflect this tendency). Competitive market equilibriums tend to be unstable and quickly decline into some form of oligopoly. Many of the EU's transport policies and regulations are designed to address these tendencies, with increasing success in most cases (e.g. railways), but slower progress in others (e.g. ferries).

Second, demand is more heterogeneous than supply. Each passenger has an individual set of attributes (e.g. income, family circumstances, and value of time) that weigh differently for each trip for which a service is sought, while at the same time the balance of attributes of the service being sought (e.g. fare, time, frequency, and comfort) is also different for each trip. In contrast, relatively few suppliers can provide the required services. Transport operators have become skilled at market differentiation, being able to offer a wide range of fares and service characteristics to satisfy distinct market segments. However, service operators should be selective in the vehicles they use to provide a wide range of services. One result is the now common practice of yield management through which revenue per vehicle kilometre is maximized through a wide range of options offered for seats on the same vehicle.

Third, providing transport services is a capital-intensive activity. For network-based transport modes (e.g. rail and metro), the costs of fixed infrastructure are higher than for the other modes, which use non mode-specific infrastructure (e.g. roads, seas, and airspace). However, even for the users of common infrastructure, the operator is often required to cover at least the marginal costs of infrastructure use and, where the infrastructure is provided as a commercial venture, the operators between them must cover the full costs of the infrastructure used. Investments in buses, railway coaches, rolling stock, road vehicles, or aircraft, in one way or another (e.g. debt or equity), comprise between 15% and 25% of operating costs. These costs are borne directly by operators and must be recovered by fare revenue, except where the service is provided for social rather than commercial reasons and can attract a subsidy (e.g. in the form of payment of a public service obligation). With large long-term fixed costs in long-lived infrastructure and average-term large investments in vehicles, operators face a wide gap between average and marginal costs and, therefore, must have a sophisticated tariff scheme to operate in competitive markets.

In part because of the high fixed costs of transport operations, providers of transport services face significant economies of scale and network benefits. Both of these characteristics offer competitive advantages to larger operators and create substantial barriers to entry for new competitors. The response of smaller operators is often to operate a form of joint marketing that may or may not include other forms of

[19] A more extensive description of these common features is given in Sevy (2010).

cooperation. For example, at least two large marketing associations for smaller transport operators have emerged in the EU intercity bus market. In one association, participants include select services in a jointly marketed program, while competing with these services in other operations.[20] The joint marketing of services is also becoming more prevalent between operators in different transport modes in order to compete with large transport operators that offer inter-modal connections. Several of the EU's larger bus companies are also major rail operators (e.g. Arriva is a multinational public transport company with bus, rail, tram, and urban ferry services in 14 EU countries, and is now a subsidiary of Deutsche Bahn). Most members of the European Passenger Transport Association have similar profiles.

Even where there appears to be multiple operators (e.g. on intercity bus routes in Central Europe), numerous operators are likely to be members of a marketing group that in one way or another reduces competition. Where there appears to be competition between modes, in practice, the same company may operate the competing services. The various forms of market integration make it difficult to assess the level of competition in many passenger transport markets. Less competition is not necessarily a wholly negative outcome of service integration. Passengers benefit from operators offering a more extensive range of routes and services and from the ability to book travel to destinations that are not served directly by one operator or mode from their home city. The more choices offered in terms of routes, schedules, modes of transport, and tariffs, the more competitive are its offerings.

All of these considerations should be taken into account when looking at the supply of transport services in particular markets. More available modes or operators do not necessarily indicate more competition.

Transport Markets

The passenger transport market in EU Member States is not sufficiently homogenous to permit a single profile to describe the demand or supply of transport services or to address sensitivity to price changes, the impacts of VAT exemption or reduced rates, market distortions arising from policy differences between modes, the presence of powerful incumbents or alliances, or of operators established or supplying services in different Member States.

Most previous transport comparisons in Member States have focused on national statistics. We have also started from this same point as it is the level at which the most reliable data on the demand for and supply of passenger transport services can be found.

However, national statistics can hide a wide-ranging variability in passenger transport market characteristics. For example, in terms of demand, the mixture of journey purposes, length of trips, and frequency of travel are different for urban and inter-urban travel; in terms of supply, few urban vehicles are suitable for international transport, but the level of competition between modes and operating companies is

[20] Eurolines is a network of 29 cooperating companies serving more than 600 destinations in 38 countries, offering partially integrated ticketing and inter-connected services. In some Member States, Eurolines has only one participating operator (such as Bus Éireann in the Republic of Ireland), but several operators in others Member States. Although it requires minimum service standards, the quality of service depends on the particular operator. Its bus services are strong competitors with rail in some shorter intercity routes; however where trip lengths are longer, its bus services are less competitive. Bus Europe is a less integrated marketing association of 40 bus operators and bus terminals. Bus Europe markets its services to about 1,200 destinations in 19 countries. Its participants maintain more independent operations than those of Eurolines.

usually greater than in other markets. For example, in urban transport there are up to seven different modes of transport available (e.g. bus, trolleybus, tram, light rapid transit, conventional rail, ferry, and funicular) and many passenger trips involve combinations of two or more modes of transport. Other markets typically have, at most, four modes available (e.g. air, bus, rail, and ferry) and few trips involve more than two modes of transport.

In addition, the market for any particular passenger trip is not the urban, domestic, national, intra-EU, or extra-EU market, but that between the place that the passenger is traveling from and to. The ETISplus transport model uses almost 1,300 zones as trip origins and destinations, giving a theoretical 1.5 million possible combinations. The model also allows for four purposes of travel. For each possible combination of an origin and destination zone, the parameters that determine market competitiveness are similar to those at the more aggregate levels.

Our detailed assessment of competition from the passenger perspective combines the four purposes of travel from the ETISplus model into two (business and non-business) with 220 possible origin and destination zones. For each mode of travel, passenger market perception is influenced by fare and time required to make the trip along with the frequency of service.[21]

For travel between certain Member States and city pairs, ferry transport plays an important role for select market segments (e.g. bus services to and from the UK and Ireland and between Cyprus, Malta, and other Member States). However, other than for travel between port cities, ferry travel is part of multi-modal travel and is included in the data for bus travel.[22] In the passenger market for travel between most Member States and non-member countries (extra-EU travel), air services predominate. Still, rail and bus services are significant for travel between some Member States and cities, and that significance is increasing with the expansion of high-speed rail (HSR) and the liberalization of bus markets.

An analysis undertaken merely at the national level would overlook many of these differences. Although most data relating to passenger transport supply is available only at the national level, we have disaggregated the national data into four submarkets to allow for differences in supply competitiveness.[23]

Measures of Passenger Transport Supply

Three indicators of capacity measure supply: number of vehicles, number of seats (static capacity), and number of seat kilometres (dynamic capacity). As estimates progress from the simplest (e.g. vehicles) to the most useful (e.g. dynamic capacity), additional variables must be estimated, and each of these additions

[21] There are other characteristics of the possible trip by each mode that the passenger takes into account but which we have not measured here. These include the number of times there is a change of vehicle (such as between a bus and a train, or even between two trains) and the reliability of the time taken for the travel. The time reliability can be influenced by the performance of a particular transport operator and external factors such as road congestion and weather.

[22] In our city pair analysis, ferry transport is included in that of other modes, as for most trips (but not necessarily most ferry trips), ferry travel is a component of a trip that is mostly by bus. We do not include trips made by passengers in cars, as their main mode of transport is private and not usually included in a passenger transport market from a VAT perspective.

[23] This analysis excludes the travel markets between small cities within and between the Member State and the rural transport market. While important from economic and social perspectives, these markets do not have VAT distortions that are covered by the other markets included in the analysis.

may reduce the reliability of the final indicator. In addition, there is a trade-off between reliability and usefulness in deciding which measure to use.

For example, using number of vehicles as the measure of capacity often overlooks large differences in vehicle size, either in the same mode (e.g. passenger aircraft sizes range from less than 30 to more than 500 seats) or between modes (e.g. the average bus has a significantly smaller capacity than the average ferry).

To overcome this problem, the next best measure is number of seats (static capacity), which can be derived by multiplying the number of vehicles by its average size. Size estimates are disaggregated as far as the data will allow. Although estimates of average size at the EU-level can be made with some confidence, providing estimates for each of the four submarkets (and city pairs) becomes increasingly less reliable.

The third measure of supply capacity is seat kilometres (dynamic capacity), which takes into account the greater utilization of vehicles in certain circumstances. A small passenger aircraft of 65 seats might fly for up to seven hours per day for more than 250 days per year at an average speed of 350 km per hour, traveling a total distance of more than 600,000 km in a year. A bus of the same size used in the urban transport market might operate for five hours per day for 200 days per year and at an average speed of less than 20 km per hour, thus traveling for only 20,000 km per year.

The aircraft, therefore, provides a more effective annual capacity per seat (i.e. it can transport more passengers in any period of time). Estimates of the dynamic capacity measure, obtained by multiplying the average seats per vehicle by the average distance travelled in a year, are the most useful of the three measures of capacity. However, they are also the least reliable, as estimates of average distance travelled by vehicle type per year is very specific to the market and circumstances in which it is operating.

How to Measure Passenger Transport Capacity

Not only are there different measures of capacity, but also there are two very different methods of to estimate capacity. One method utilizes published data on the number of registered vehicles of each type in each country, makes assumptions about vehicle size to estimate number of seats, and then applies vehicle utilization to reach an estimate of dynamic capacity. The second method begins from the other end of the process, with demand measured in terms of PKM, and subsequently utilizes estimates of vehicle occupancy and size to derive estimates of seat kilometres and the inverse of vehicle utilization to reach number of vehicles. Both methods provide estimates of the same three measures of capacity. The first method, which we have used for the results presented here, is presumed to be more accurate because its starting point is actual data (i.e. the number of registered vehicles), while the second method utilizes estimated numbers (i.e. those of the originating passengers in each Member State). We use the second method to verify the results of the first method.

Since we have segmented the EU passenger transport market into four submarkets, capacity estimates are required for each. Capacity estimates are also required for each of the 220 city pairs in our database, since this is the basic level at which we are estimating the impacts of alternative VAT regimes. At this detailed level of analysis, we can introduce service frequency as another measure of capacity that is not available at the more aggregate levels. However, at the city pair level, we have to exclude the dynamic seat capacity measure, as it does not apply when the distance over which the capacity is being measured is fixed.

Estimates of Number of Vehicles

In the first method of estimating passenger transport supply, the starting point is EUROSTAT data on number of vehicles for road, rail, and air in each Member State.[24] No data is available from this source on the number of ferries registered or operating within the EU28 and its territorial waters.

Published data on the number of registered transport vehicles in each Member State requires careful interpretation. The number of vehicles registered is not necessarily the same as the number of vehicles providing services in a Member State. This is particularly applicable to aircraft and ferries, with many registered in one Member State but providing most of its supply in other Member States or outside the EU. Buses and railway coaches are more likely to provide a large proportion of its services in its country of registration, although even for these vehicle types, further integration of EU passenger services is leading to increased use outside of its Member State of registration. Urban transport vehicles have the highest probability of all of its supply being provided in its Member State of registration.

In 2010, there were 4,110 civil aircraft, 818,000 registered buses and coaches, and 102,168 rail passenger coaches of various types registered in Member States. The data is available at the level of Member State, as presented in Table 2.11. The data on number of aircraft is provided in four size ranges, but no data on vehicle size is available for other modes.

This data is the starting point for our estimate of vehicles available for scheduled public passenger transport that is subject to VAT. The operation of vehicles used for other passenger transport is subject to VAT at the standard rate and is considered a separate part of our analysis of distortions.

The data on buses and coaches and aircraft includes those not used for scheduled services, but for private hire or charter services. These are not subject to the derogations of VAT rates for passenger transport and must be separated in our analyses. We estimated that these represented 25% of all registered buses and coaches, 6% of metro vehicles, 10% of aircraft, and 2% of rail passenger coaches.

[24] EU Transport in Figures, Statistical Pocketbook, 2012

Table 2.11 – Number of Vehicles by Member State				
	Air	**Bus**	**Rail**	**Total**
AT	110	9,600	2,974	12,684
BE	81	16,200	3,412	19,693
BG	40	24,500	1,369	25,909
CY	11	3,400	0	3,411
CZ	49	20,400	4,514	24,963
DE	673	76,500	18,565	95,738
DK	101	14,500	1,307	15,908
EE	9	4,200	189	4,398
ES	336	62,400	5,665	68,401
FI	97	13,700	1,071	14,868
FR	443	96,200	16,890	113,533
GR	359	27,300	718	28,377
HR	15	4,900	523	5,438
HU	60	17,600	3,136	20,796
IE	359	8,200	592	9,151
IT	255	99,900	12,465	112,620
LT	14	13,700	337	14,051
LU	16	1,600	214	1,830
LV	37	13,700	491	14,228
MT	20	1,200	0	1,220
NL	177	11,300	2,824	14,301
PL	71	97,000	6,926	103,997
PT	95	15,600	965	16,660
RO	55	40,900	3,037	43,992
SE	101	13,900	871	14,872
SI	13	2,400	355	2,768
SK	10	9,400	1,530	10,940
UK	804	111,500	11,751	124,055
	4,411	831,700	102,691	938,802

Source: European Transport in Figures, 2012

After excluding these vehicles, the next task was to separate urban transport vehicles, as they are, to a large extent, captive to their market and their characteristics are quite different from those used in the other markets. Nearly all trams, metros, and LRT (light rapid transit) vehicles are used in urban transport, while no passenger aircraft are used in this market.

Urban Transport Vehicles

The estimate of vehicles used in urban transport was based on the data available in Jane's Urban Transport Systems (JUTS 2013). This presents a description of the organization of urban transport in each major city of every Member State (as well as for other countries). From the text, it is possible to estimate the number of vehicles available for most modes in most cities, other than for rail passenger transport where this is provided by a national railway. While certain national railways operate separate vehicle fleets for

urban areas, for many, the rail service is part of a regional service and is not possible to separate the vehicles used only in urban services or to allocate part of those used in regional services to urban routes.

To resolve the issue of lack of data, we ran a simple regression analysis using number of vehicles as the dependent variable and total city population and urban area as independent variables.[25] From this regression, we were able to estimate the number of rail passenger vehicles in the cities where the statistic was not available.

With the estimate of number of vehicles by mode for major cities in each country, the next task was to scale this estimate to a national total. This was done using a multiplier of the total national urban population to the urban population of the cities included in the database.[26]

A similar approach was used with another data source: the UITP's Mobility in Cities Database (UITP). This database also provides estimates of the number of different types of vehicles used in major cities, but on a more consistent basis and by using a more rigorous definition of vehicle type. Unfortunately, the data is for the year 2000, and there have been some significant changes in the supply of urban passenger transport since that time. However, by using vehicles and vehicle seats per capita and by updating the population data to 2010, it was possible to obtain an alternative estimate of the number of urban transport vehicles. Both the JUTS and UITP data distinguish between types of urban transport vehicles, including buses, trolleybuses, trams, light rapid transport, metros, and rail. Occasionally, the specifications between these types are rather subjective, so to avoid errors, the data has been aggregated into three vehicle types: metro, bus, and rail, which is compatible with the demand data by mode presented earlier in this Chapter.

The resulting estimates of number of vehicles used in urban transport are 87,849 metro vehicles, 222,400 buses, and 72,400 railway coaches, accounting for 27% of the total buses and 72% of the total railway coaches.

Table 2.12 – Share of Total Registered Vehicles Available for Passenger Services

Vehicles	Metro	Air	Bus	Rail	Total
Number of Vehicles	93,340	4,110	818,600	102,168	1,018,218
Available for Passengers	87,849	3,686	622,472	100,512	814,519
% Included	94%	90%	76%	98%	80%
For Urban Transport	87,849	0	222,400	72,400	382,649
For Non-Urban Transport	0	3,686	400,072	28,112	431,870

[25] This followed the practice of the UITP in its Mobility in Cities (MiC) database, which included capacity per mode per capita and per unit of area as benchmark statistics. We used the MiC data projected to 2010 as a check but not as a primary source as the base year for the data was 2001.

[26] These populations were available from JUTS and were generally larger than population estimates for the metropolitan areas of the cities. Part of the explanation is that the transport agencies and operators typically cover an area larger than the metropolitan area.

Allocation of Remaining Vehicles among Other Markets

There is no data source that provides the allocation of passenger transport capacity between markets. In part, this is attributable to fluidity in allocation, with passenger aircraft, buses, and railway passenger coaches being interchangeable between the three markets. One way to assess the relative sizes of these three markets is to use the distribution of satisfied passenger demand (i.e. numbers of passengers or PKM) between them for each of the three principal modes.

Table 2.13 – Allocation of PKM by Mode among Non-Urban Markets

	Air	Bus	Rail
Domestic	8%	97%	90%
Intra-EU	37%	3%	9%
Extra-EU	55%	1%	1%
Total	100%	100%	100%

This information was provided by the TREMOVE model's demand estimates and was described in the first section of this Chapter. The allocation of capacity between markets is made using the same allocation of PKM as with the demand estimates. Approximately 8% of air passenger capacity is given for domestic travel, whereas domestic travel accounts for nearly 97% of bus and 90% of the overall capacity of these vehicle types. The remainder of this first method of estimation is relatively straightforward, using industry estimates of average vehicle size and utilization.

The second method, which begins with estimates of passenger demand, was used to verify the results of the first method. The estimates of dynamic capacity from the first method corresponded to those of the second method (within 5%), while the estimates of number of vehicles from the second method corresponded to the numbers of vehicles used as a starting point for the first method (also within 5%), other than for the number of buses. The estimate from the second method was about 18% less than the starting number of vehicles in the first method. The conflict was addressed by assuming a greater share of available bus capacity was used for charter services than was originally assumed.

Seat Capacity

With vehicles allocated between markets, it was possible to better estimate seats per vehicle using vehicle size estimates from previous transport sector studies and operator statistics.

The average capacity of passenger aircraft was estimated using the distribution of number of seats in the EUROSTAT data, with the average for each size group assessed using knowledge of aircraft types. A similar approach was used for bus and passenger railway coach seat capacities; however, these figures were developed using a single statistic rather than a distribution of vehicle size groups. As average trip length increases, both buses and passenger railway coaches tend to provide greater legroom per vehicle to increase comfort level, though this reduces capacity in terms of numbers of seats per vehicle, offsetting an opposing tendency for the vehicles to be longer.

Table 2.14 – Assumed or Derived Seat Capacity per Passenger Vehicle

Mode	Domestic	Intra-EU	Extra-EU	Average
Air	59	142	280	159
Bus	42	50	48	46
Rail	68	64	60	66

By applying seat capacity by vehicle type and market to the distribution of vehicles by Member State and market, it was possible to estimate the second measure of capacity: number of seats. Estimates were prepared for each Member State, market, and mode.

To convert static seat capacity to dynamic seat capacity, it is necessary to multiply seat kilometres per mode in each market by an estimate of the vehicle utilization (i.e. the distance the vehicle travels in one year).

Results of Capacity Estimates

A summary of the results of the capacity estimates showing the share of each vehicle type in each market is shown in Table 2.15.[27] The capacity indicators are in the order they are estimated by the first method, starting with the number of vehicles, then seats and ending with the seat capacity. The first assessment is of the distribution of capacity.

The distribution of vehicles in Table 2.15 is by market for each mode, to show how the total supply at the national level was allocated to markets. The percentages in the table are the result of the sum of data for each Member State.

Table 2.15 – Summary of Three Measures of Capacity

Vehicles	Metro	Air	Bus	Rail	Total	Vehicles
Urban	100%	0%	36%	70%	47%	382,261
Domestic	0%	25%	62%	27%	50%	411,077
Intra-EU	0%	48%	2%	3%	2%	17,311
Extra-EU	0%	27%	0%	0%	0%	3,871
Total	100%	100%	100%	100%	100%	814,520
Vehicles	87,849	3,686	622,472	100,512	814,519	
Seats	**Metro**	**Air**	**Bus**	**Rail**	**Total**	**Seats**
Urban	100%	0%	38%	68%	49%	21.87
Domestic	0%	2%	60%	28%	48%	21.27
Intra-EU	0%	23%	2%	3%	2%	0.89
Extra-EU	0%	75%	0%	0%	1%	0.59
Total	100%	100%	100%	100%	100%	44.63
Seats (mill.)	*5.21*	*0.59*	*32.30*	*6.53*	*44.63*	
Seat km (mill.)	**Metro**	**Air**	**Bus**	**Rail**	**Total**	**Seat km (mill.)**

[27] The percentages shown in Table 2.14 are not those usually used. Instead of showing the modal share for each market, they show for each mode how the demand and capacity is allocated between the markets. The more usual shares are shown in Table 2.15

Urban	100%	0%	18%	47%	21%	595,304
Domestic	0%	1%	80%	48%	53%	1,523,740
Intra-EU	0%	20%	2%	5%	7%	189,469
Extra-EU	0%	79%	0%	0%	20%	565,639
Total	100%	100%	100%	100%	100%	2,874,152
Seat km (mill.)	134,460	707,881	1,702,475	329,335	2,874,152	

Source: Vehicle data from Eurostat, JUTS (2013), and UITP

The most important feature is that the distribution of seats is more concentrated in the markets with average longer trip lengths than is the distribution of vehicles, as those used in these markets tend to utilize larger vehicles. For example, domestic aircraft account for 25% of all passenger aircraft but only 2% of aircraft seats. Similarly, seat kms are even more concentrated on markets with longer trip lengths as the vehicles used on longer trips tend to have higher utilizations, they travel longer distances each year as they spend less time in terminals and stations.

The capacity provided by each mode tends to be concentrated in two markets. Aircraft capacity is mostly in the intra-EU and extra-EU markets, with its combined share in these markets increasing from 73% through 98% to 99% as the measure of capacity changes from vehicles through seats to seat kms. Bus capacity is heavily concentrated in the urban and domestic markets, its capacity allocated to these markets remaining constant at 98% independent of the capacity measure. Rail capacity is concentrated in the same two markets, their accounting for 97% of vehicle capacity and reducing by only 1% point with each change of the capacity measure changes (Table 2.15).

These market distributions are important for understanding the competitiveness of the markets, as the use of seat and seat km capacity as indicate lower competitiveness than using vehicles as the measure of capacity. The use of the single indicator of a number of vehicles would not have given a dependable estimate of supply competition.

The data used for Table 2.16 is the same as in Table 2.15, but instead of showing how the capacity of each mode is distributed between the four markets, it shows how the capacity of each market is made up by that of each of the modes[28].

Table 2.16 – Transport Supply by Market and Indicator

Vehicles	**Metro**	**Air**	**Bus**	**Rail**	**Total**
Urban	23%	0%	59%	18%	100%
Domestic	0%	0%	93%	7%	100%
Intra-EU	0%	10%	72%	18%	100%
Extra-EU	0%	26%	65%	9%	100%
Total	11%	0%	76%	12%	100%
Vehicles	*87,849*	*3,686*	*622,472*	*100,512*	*814,519*
Seats	**Metro**	**Air**	**Bus**	**Rail**	**Total**

[28] So that the row totals rather than the column totals are 100%

Urban	24%	0%	56%	20%	100%
Domestic	0%	0%	91%	9%	100%
Intra-EU	0%	15%	60%	24%	100%
Extra-EU	0%	75%	20%	4%	100%
Total	12%	1%	72%	15%	100%
Seats (mill.)	*5.21*	*0.59*	*32.30*	*6.53*	*44.63*
Seat km (mill.)	**Metro**	**Air**	**Bus**	**Rail**	**Total**
Urban	23%	0%	51%	26%	100%
Domestic	0%	1%	89%	10%	100%
Intra-EU	0%	75%	17%	8%	100%
Extra-EU	0%	99%	1%	0%	100%
Total	5%	25%	59%	11%	100%
Seat km (mill.)	134,460	707,881	1,702,475	329,335	2,874,152

Source: Vehicle data from Eurostat, JUTS (2013), and UITP

As illustrated by the data above, the domestic market is dominated by bus capacity, but with its share falling from 93% to 91% and 89%, respectively, as the measure of capacity changes. The intra-EU market is relatively balanced between air, bus, and rail when measured by number of vehicles; however, as the measure of capacity progresses through seats (15%) and seat kilometres (75%), we attribute this to the fact that aircraft in this market are significantly larger than buses or railway coaches and have a higher utilization rate. The extra-EU market is dominated by air travel whichever measure of capacity is used, and reaches almost 100% in this market using the seat kilometres indicator.

The indications from this assessment by market share strongly reinforce those from the vehicle-type share: the level of competitiveness between markets changes according to the measure of capacity used, and the measure of capacity by number of vehicles overestimates market competition as compared with the other measures.

Modal Share by Market Supply

The three measures of transport supply give rather different indications for each of the four markets. When measured in terms of vehicles, buses dominate the overall supply with 76% of capacity, followed by railcars and metro vehicles (12% and 11% respectively) and less than 1% by aircraft. The shares of seats ae not very different, but when seat kms are used the bus share falls to 59% while the aircraft share increases to 25%.

Urban Supply

Buses have the largest share (59%) of urban transport vehicles market, with metro coaches having a slightly higher share (23%) than railway coaches (18%). When supply is measured by seats rather than vehicles, the bus share reduces slightly (to 56%) with metro and rail shares each increasing slightly (to 24% and 20% respectively). Using seat kms as the measure of capacity, bus share falls further (to 51%) the metro coach share falls slightly to 23%, but the rail share increases to 26%. The changes between vehicles and seats are attributable to the different seat capacity of vehicles in different modes, while the difference

between seats and seat kms is a consequence of the different vehicle utilizations, with that of railway coaches being much higher than the other modes.

Domestic Supply

The domestic pattern of supply is more concentrated with buses being 93% of the vehicles and railcars only 7% and aircraft being less than 1%. On domestic routes the size of aircraft used is not much greater than the size of buses and is slightly smaller than rail coaches, so using the seat measure of capacity the aircraft share hardly changes, while the bus and rail shares change with a transfer of 2% from bus to rail. When seat kms are used as the capacity measure, the aircraft share increases to 1% while the bus share falls to 89% and the rail vehicle share increases to 10%. The increased air share measured in seat kms is attributable to its much higher utilization (kms per year), which comes from aircraft being operated for many more hours per year than are buses or rail coaches, combined with their much higher speed.

Intra-EU supply

Aircraft have a 10% vehicle share of the intra-EU market, a 15% share of seat capacity, and comprise 75% of the seat kilometre capacity. Buses dominate the market when capacity is measured by vehicles (72%) and seats (60%), but not when measured by seat kilometres (the share falls to 17%). Rail coaches comprise 18% of intra-EU vehicles, 24% of seat capacity, and 8% of seat kilometres.

Despite the recent growth of high-speed rail (HSR), rail coaches still only comprise 3% of the intra-EU supply, while the deregulation of bus travel has resulted in its supply comprising 8% of the total. However, these averages conceal significant differences between Member States.

Since most of the quantifiable distortions of the VAT regime are most apparent in intra-EU passenger transport, the rather different distribution of seat kilometres for this market as compared to the total market by Member State is of particular significance (Table 2.17)

Table 2.17 – Modal Share of Supply (Seat km) in the Intra-EU Market

Country	Air	Bus	Rail	Total
AT	78%	8%	15%	100%
BE	63%	20%	17%	100%
BG	57%	41%	2%	100%
CY	100%	0%	0%	100%
CZ	80%	11%	10%	100%
DE	93%	4%	3%	100%
DK	97%	2%	1%	100%
EE	90%	8%	2%	100%
ES	97%	1%	1%	100%
FI	88%	6%	6%	100%
FR	80%	15%	5%	100%
GR	99%	1%	0%	100%
HR	80%	7%	12%	100%
HU	70%	19%	12%	100%
IE	98%	2%	0%	100%
IT	91%	3%	7%	100%
LT	56%	40%	4%	100%

LU	90%	1%	9%	100%
LV	87%	12%	1%	100%
MT	100%	0%	0%	100%
NL	91%	6%	2%	100%
PL	62%	36%	2%	100%
PT	92%	6%	2%	100%
RO	64%	31%	4%	100%
SE	98%	1%	1%	100%
SI	82%	4%	15%	100%
SK	45%	15%	40%	100%
UK	93%	5%	1%	100%
EU28	89%	8%	3%	100%

Seven Member States have less than 75% of their Intra-EU seat kilometres provided by aircraft (Hungary, Romania, Belgium, Poland, Bulgaria, Lithuania, and Slovakia) and of these, six have more than 15% provided by buses (Bulgaria, Lithuania, Poland, Romania, Belgium, and Hungary). Seven Member States, including three of those with low aircraft supply, have more than 10% provided by rail coaches (Slovakia, Belgium, Slovenia, Austria, Croatia, Hungary, and the Czech Republic). Only four Member States have at least 10% of seat kilometres provided by all three intra-EU modes (Belgium, the Czech Republic, Slovakia, and Hungary).

While there are many other contributing factors to the dominance of air transport supply in this market, and there are several other transport and taxation issues that work in an opposite direction, the VAT advantages enjoyed by air transport relative to other modes of transport is probably one of the more important contributing issues. For example, bus and rail are only effectively competing modes when their travel times are comparable with those by air. This rules out competition on a high proportion of routes, despite the potential of HSR and express bus services. Our assessment of capacity at the city pair level is expected to shed more light on the reasons for the current pattern of supply.

Extra-EU Supply

In the extra-EU market, aircraft supply 26% of vehicles. The higher seat capacity of aircraft increases its share of seats to 75%, and its higher utilization rate brings its share of seat kilometres in this market to close to 100%. Buses account for most extra-EU vehicles (65%); however, its relatively smaller size reduces its seat share to 20%, and its lower utilization rate (as compared to aircraft) contributes to a 1% share of seat km. Rail coaches comprise 9% of extra-EU vehicles, 4% of seats, and a negligible share of seat km.

Total EU Market

The total EU28 market is the sum of these submarkets; accordingly, vehicle shares follow the same pattern as capacity measures change from vehicles to seats to seat km. The 11% overall metro and 12% overall rail share of vehicle capacity increase slightly to 12% and 15%, respectively, of seat capacity while the 76% overall bus share of vehicles decreases to 72%. The aircraft share of both vehicle and seat capacity is negligible when the four markets are combined; however, the aircraft share of seat kilometres is 25%, with corresponding share reductions in metro (5%), buses (59%), and rail coaches (11%).

Competition within Modes

The third passenger choice, after selecting a destination and mode of travel, is to choose a service provider. In a competitive market, this choice may offer more options than simply choice of mode; however, despite many attempts to increase intra-modal competition (except in air passenger transport), operator choices are rather limited.

Competition within Air Transport

From the data available on supply, in terms of seat kilometres by airlines operating from the few Member States that we were able to collect such data, it was possible to develop a time series measure of the Herfindahl-Hirschman Index (HHI). The HHI is an indicator of competition in a market, where a lower index value indicates greater competition (Table 2.18).

Table 2.18 demonstrates a consistent increase in the competitiveness of air transport in our small sample of Member States (excluding France, where the HHI value in 2012 was almost the same as in 2005). The HHI for the UK increased after bottoming out in 2004, whereas the values for the Czech Republic, Malta, and Denmark have shown a continued increase. Unfortunately, there is insufficient data to distinguish between regular and low-cost airlines; thus, it not possible to use this analysis to determine whether it is the presence of low-cost airlines, increasing competitive pressures on regular airlines, or both which have led to increased competition. It is also not possible to determine in which markets the competition has increased, whether it is in the domestic (unlikely), intra-EU, or extra-EU markets.

Table 2.18 – Measures of HHI for Airlines in Select Member States

	Member State				
Year	**Czech Rep.**	**Malta**	**UK**	**France**	**Denmark**
1991			0.346		
1992			0.321		
1993			0.328		
1994			0.303		
1995			0.292		
1996			0.292		
1997			0.278		
1998			0.275		
1999			0.267		
2000			0.249		
2001			0.217		0.284
2002		0.403	0.214		0.278
2003	0.513	0.364	0.203		0.238
2004	0.500	0.349	0.181		0.240
2005	0.645	0.327	0.186	0.581	0.226
2006	0.623	0.363	0.187	0.582	0.215
2007	0.553	0.313	0.179	0.598	0.207
2008	0.532	0.333	0.193	0.576	0.204
2009	0.445	0.345	0.210	0.575	0.191
2010	0.338	0.313	0.212	0.547	0.185
2011		0.291	0.219	0.562	0.185
2012				0.580	0.181

Source: Based on CASE analysis of data from CAPA

Competition within Rail Transport

Even with the increased operation of HSR services, there are still relatively few international railway services other than those provided by consortia operators (such as Thalys) or monopoly concessions (such as Eurostar). However, we do expect to see more competition in this mode soon; it was announced that an additional operator will compete with Eurostar starting in 2017.

Competition within Bus Transport

The number of intra-EU bus services continues to expand to such an extent that it is difficult to know how many operators there are, even on a route between one city and another. There are at least three large cooperative bus operator marketing associations. Eurolines and Bus Europe claim to represent more than 70 individual bus companies. The third largest bus service integrator, Sindbad, appears to follow a more aggressive strategy. While at first entering into operating agreements with other bus lines, it ultimately acquires operator names and assumes their services. Other operators included in the Sindbad group are: Albatros, Janosik, Riviera, Star Turist, Nord Gydnia, Alambus, Trans-Express, and Turing Sofia. In 2010, Sindbad acquired the name Interbus and assumed operation of its routes. Sindbad currently offers services between 17 EU countries and Switzerland. There are also several sizable independent bus companies that operate large networks of intra-EU routes. More detail on competition in bus services will be available as we complete our analysis of services in city pairs' routes.

Initial indications are that the HHI for bus services is not significantly different from that of air services (Table 2.19). As with airlines, bus services in France appear to have the least competition of the four countries for which we currently have data, while Denmark appears to have the most competitive market. The Danish bus market is likely even more competitive than the estimate indicates, as there are several hundred small operators that comprise the excluded 20% of the market.

Table 2.19 – Measures of HHI for Bus Services in Select Member States

Country	Large Operators	Share of Market	HHI
Denmark	15	80%	0.120
Netherlands	7	95%	0.264
Portugal	12	92%	0.211
France	7	93%	0.404

Competition within Ferry Transport

Although not covered thus far in our market assessments, the passenger ferry markets for domestic, intra-EU, and extra-EU routes are very competitive. A recent assessment of ferry routes in the three main ferry regions: the Mediterranean, the English Channel and North Sea, and the Baltic identified more than 20 ferry operators, and there are at least as many covering services to the Greek and Balearic Islands.

Competition for the Market[29]

For many of the domestic passenger ferry services with low demand, there is competition for the market rather than in the market, as there is also for low-density urban and rural bus, rail, and even air services. The advantages of competition are believed to be largely retained by this form of competition without the risk of competition in the market being commercially destructive to those engaged in it, often to the detriment of the passengers who depend on the availability of at least one low fare operator. The passenger in this form of competition does not have a choice between competing services, but does benefit from, at least, having a commercially contested service available. Unfortunately, in many instances, there is only very limited competition for many of these low demand services, and, in some cases, there are no bidders for the concession. As a rule, it is expected that at least three bids be required to ensure adequate competition for a service.

Coach Tour and Maritime Cruise Passengers[30]

Cruise and coach tour passengers have very different travel characteristics than passengers using scheduled or regular transport services, and neither are subject to any of the derogations of passenger output VAT that are available to those using scheduled services. However, there are some VAT allowances on inputs to operators of vessels for cruise passengers, and Article 148 of the VAT Directive only requires that the vessels be for "navigation on the high seas and carrying passengers for reward."

The most reliable source of data on the number of passengers, vehicles, and companies operating in the coach tour market is contained in a study completed for DGTREN in 2009. It provides what little data is available; however, it is not always possible to distinguish coach tour data from all bus data.

One differentiation between types of bus service is based on that given in Regulation 684/92:

- Regular (domestic and international) services operate at specified times on defined routes, with specific boarding and alighting points, and are open to all;
- Special regular services operate on defined routes and at defined times, but provide for the carriage of specific types of passengers to the exclusion of others; and
- Occasional services are services which do not meet the definition of regular or special regular services, and which are characterized, above all, by the fact that they carry groups of passengers assembled on the initiative of the customer or the carrier itself. This definition comes closest to the coach tour market.

However, there are very few cases where the data is disaggregated in this way and, where it is, there are differences between Member States in how different services are classified.

The distinction between bus and coach service is particularly problematic for services other than regular services. In many Member States, all occasional and special regular services are considered coach services; still, in some cases, these may cover short distances and have characteristics that are otherwise more similar to regular bus service. In particular, since school transport accounts for a very large proportion

[29] Competition for the market is the method applicable to concessions for passenger transport services in other markets where social rather than commercial justification requires some form of public financial support (usually now referred to as a public service obligation). It widely used in urban transport and increasingly used in rural rail services.

[30] We do not yet have data on river cruise passengers or numbers of vessels or operators.

of journeys in certain Member States (such as Sweden), whether or not this is included has a large impact on the statistics.

Demand: Number of Passengers

Limited data is available for Member States on the composition of the coach market by passenger type. In fact, Lithuania is the only country with a complete dataset. Of the larger Member States, France is the only country with nearly complete data. This data shows that occasional transport accounts for the largest proportion of coach PKM (45%), but only 23% of passenger journeys, because average journey lengths are much longer for this type of journey than for other types of coach transport.

Due to a lack of available data, our report provides estimates of the sizes of the three markets by using data from the few Member States where it is available. The estimates are shown in Table 2.20:

Table 2.20 – Estimated Composition of Bus Market in the EU27 (2008)

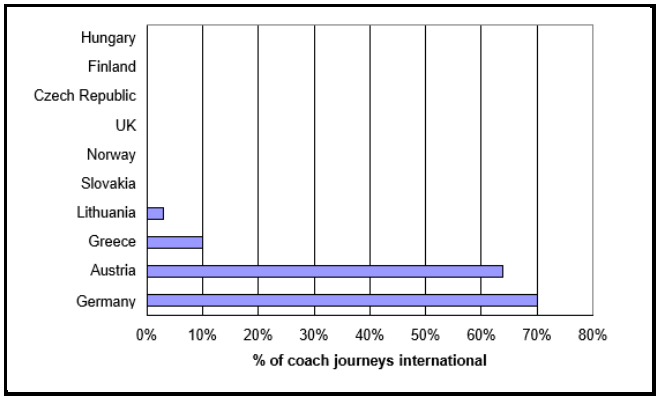
Type of Passenger	Number of Passengers	Passenger km	Trip Length	Share of Passengers	Share of Passenger km
	(million)	(million)	(km)	(%)	(%)
Regular	2,912	81,226	28	44%	38%
Special Regular	2,226	5,252	2	34%	2%
Occasional	1,484	129,185	87	22%	60%
Total	6,622	215,663	33	100%	100%

Source: Study of passenger transport by coach, Steer Davis Gleave, 2009

The coach tour market accounts for about 22% of all bus passengers; though, because average trip length for this type of passenger is considerably longer than for the special regular type of passenger, it accounts for about 60% of PKM.

In most Member States, the vast majority of coach journeys are domestic. The main exceptions are in Germany and Austria, which have very large markets for outbound international coach tours but almost no regular domestic bus market (Figure 2.1).

Figure 2.1 – Percentage of Intra-EU and Extra-EU Bus Trips for Select Member States



Source: Study of passenger transport by coach, Steer Davis Gleave, 2009

Supply: Number of Vehicles and Operators

Estimates for the EU27 (Table 2.21) indicate that there were approximately 250,000 coaches in operation out of a combined bus and coach fleet of about 680,000 vehicles in 2009 (this total is lower than that reported by Eurostat for 2010, see Table 2.12).

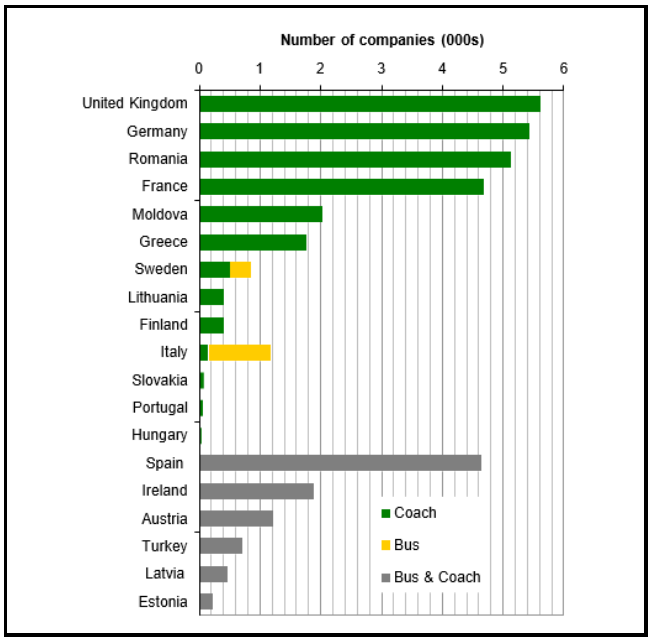
Table 2.21 - Estimated Vehicle Fleet

	Coach only	Bus and coach
EU15	180,185	457,352
EU12	68,694	221,714
EU total	**248,879**	**679,066**
Other	196,836	341,254
Total	**445,715**	**1,020,319**

Source: Study of passenger transport by coach, Steer Davis Gleave, 2009

There are a number of large coach operators in the EU (such as Alsa in Spain, which has 2,300 coaches in its fleet). However, the average size of coach companies is small. On the basis of the data available (summarized in Figure 2.2), it appears that the average coach operator has only 16 vehicles in its fleet. In some Member States, the figure is lower; for example, in the UK, there are 5,610 companies advertising coach services. Since the total coach fleet is only about 21,900 vehicles, this indicates that there are, on average, less than four vehicles per company in the UK.

Figure 2.2 – Estimated Number of Coach Operators for Select Member States



Source: Study of passenger transport by coach, Steer Davis Gleave, 2009

Maritime Cruise Market

This is another market that has only limited data available, but rather more than the coach tour market. However, the European cruise market is highly integrated with the global market, such that many cruise vessels that are used in Europe during the summer are diverted to other markets during the northern hemisphere winter.

Demand: Number of passengers

Passenger demand is measured only in numbers of passengers, as there is no data on how far each cruise passenger travels before returning to the port of origin.[31] In 2013 there were just over 6m cruise passengers, with the UK and Germany each providing more than 25% of the total and Italy having more than a 10% market share. Spain's number of passengers has fallen from more than 700,000 in 2011 to less than 500,000 in 2013, i.e. from 12% to 7% of the total.

Supply: Number of vessels and operators

During 2013 there were 43 European-based cruise lines which operated 125 cruise ships with a capacity of 144,717 berths, an average of 1,158 berths per ship. The largest operators have more than 20 ships and the smallest just 2. There were a further 24 non-European cruise lines operating in Europe with a further 73 vessels with an average of 1,430 berths each, more than 20% larger than the European based ships.

The cruise ships are not limited to any one specific market, and there were at least 166 cruise ships operating in the Mediterranean and 108 in Northern Europe during 2013. These ships ranged in size from less than 100 to more than 4,000 berths with the majority being in the range of 500 to 2,000.

Table 2.22 – European Cruise Passengers, 2011

Origin Country or Region	Number of Passengers 2011	Market Share
United Kingdom	1,700,000	28%
Germany	1,388,000	23%
Italy	923,000	15%
Spain	703,000	12%
France	441,000	7%
Scandinavia	306,000	5%
Benelux	159,000	3%
Switzerland	121,000	2%
Austria	104,000	2%
Other	224,000	4%
Total	6,069,000	100%

Source: European Cruise Council, Annual Report 2012/2013

[31] The average cruise length is just over 8 days (Cruise Line International

Chapter 3 - The VAT Regime for Passenger Transport

This Chapter provides an overview of the current VAT regime in EU Member States as encountered by providers of passenger transport services, as well as other charges affecting passenger transport. In Section A, we review output VAT (e.g. VAT rates and special regimes). In Section B, we provide initial information on other transport taxes and user charges.

Detailed country fiches for the 28 Member States are presented in Volume 2 of this Final Report.

The symbols and abbreviations used in the tables in this chapter have the following meaning:

Ⓢ	…	the standard rate is applied	normal scope of the VATD
Ⓡ	…	the reduced rate is applied.	normal scope, based on Art. 98 (2) / Annex III Item 5 of the VAT Directive
Ⓔ	…	VAT exemption	normal scope, based on Art. 132 (p) of the VAT Directive (medical and ambulance transport)
Ⓓ	…	a derogation from the VAT Directive is applied	a derogation (based on Art. 371/375-390c and Annex X, Part B, Item 10 or Art. 395 of the VAT Directive) or a special provision (Art. 110, 114, 149 of the VAT Directive) is applied
ex.	…	'exempted without credit'	
n.a.	…	'not applicable'	

For the purposes of this chapter we do not distinguish between a tax rate of zero percent ('zero-rate') and an exemption with deductibility of input VAT ('exemption with credit'), both are depicted as '0 % Ⓓ' in the following tables. [32] Detailed explanations on the subject for each Member State can however be found in Vol.2 of this report.

Numbers in brackets furthermore indicate rates (or schemes), which are either restricted to very special conditions (e.g. international bus transport of foreign travellers) or which are less frequently applied in practice.

A. Overview of VAT Rates

In this section, we provide several tables on the current VAT rates concerning passenger transport for all 28 EU Member States, as well as a general overview of VAT rates in place in Member States at present.

[32] Especially with respect to international passenger transport services, Member States frequently do not charge VAT on the transport service itself, while VAT incurred on inputs (fuel, means of transport,…) can be deducted. This has been implemented among the Member States in two different ways: Some exempt such passenger transport services from VAT and at the same time define it (i.e. the passenger transport) as an activity qualifying for deduction of input VAT ('exemption with credit'), while others state that the services are, in principle, taxable, but the tax rate is set to zero ('zero-rate'). The financial implications however are essentially identical.

We review VAT rates for each mode of transport and distinguish among domestic, extra-EU (i.e. to and from third countries), and intra-EU travel. In the case of domestic transport, a further distinction is made according to type of transport. For transport by road, the distinctions are: taxi, scheduled bus services (including trolleybuses), and non-scheduled bus services. The categories, with respect to rail transport, are: (normal) train, high-speed rail, metro or subway, and tram. For the remaining transport modes, we distinguish between scheduled and non-scheduled services. To the best of our knowledge, no Member State has implemented specific rates for round-trips (A-to-A-transports) as they occur (e.g. in the course of cruises or bus tours). For such transport, the same rate as for normal A-to-B-transport is applied.

The data used for the following tables refers to information from a number of sources: the websites of the national Ministries of Finance, documents by the European Commission, the national VAT Acts and tax legislation, country reports of the International Bureau of Fiscal Documentation (IBFD), and other studies on VAT regimes, as well as documents (e.g. guides, manuals, and application decrees) provided by the respective fiscal authorities. As a basis, recent compilations of VAT rates have been used (e.g. European Commission (2014), IBFD (2012), and Van Essen et al. (2012)) and, if necessary, updated.

Rates and special regimes relevant in rare cases are set in brackets. If multiple rates are applicable, a short explanation is given, more detailed information can be found in the country sheets in volume 2 of this report. Remaining uncertainties were addressed in a questionnaire to the VAT authorities of the Member States - together with the information we had collected - , to which we received responses from currently 23 Member States.

General National VAT Rates

Table 3.8 – Overview of VAT Rates Applied by Member States (%)

Member State	Standard Rate	Reduced Rate(s)	Super Reduced Rate	Parking Rate	Zero Rate
Austria	20	10	-	12	0
Belgium	21	6 / 12	-	12	0
Bulgaria	20	9	-	-	0
Croatia	25	5 / 10	-	-	0
Cyprus	19[33]	5 / 9[34]	-	-	0
Czech Republic	21	15	-	-	0
Denmark	25	-	-	-	0
Estonia	20	9	-	-	0
Finland	24	10 / 14	-	-	0
France[35]	20	5.5 / 10	2.1	-	0

[33] 18% before 13th January 2014

[34] 5 / 8% before 13th January 2014

[35] Until 31 December 2013 the rates were: standard rate: 19.6%, reduced rates: 7% / 5.5%. The super-reduced rate remained unchanged.

Germany	19	7	-	-	0
Greece	23	6.5 / 13	-	-	0
Hungary	27	5 / 18	-	-	0
Ireland	23	9 / 13.5	4.8	13.5	0
Italy	22[36]	10	4	-	0
Latvia	21	12	-	-	0
Lithuania	21	5 / 9	-	-	0
Luxembourg	15	6 / 12	3	12	0
Malta	18	5 / 7	-	-	0
Netherlands	21	6	-	-	0
Poland	23	5 / 8	-	-	0
Portugal	23	6 / 13	-	13	0
Romania	24	5 / 9	-	-	0
Slovakia	20	10	-	-	0
Slovenia	22[37]	9,5[38]	-	-	0
Spain	21	10	4	-	0
Sweden	25	6 / 12	-	-	0
United Kingdom	20	5	-	-	0

Source: National VAT legislation, European Commission (2014), Van Essen et al. (2012), IBFD (2012) and other sources; Adaptation and Demonstration: IHS, 2014.

Road Transport

Passenger transport on the road is mainly based on transport by buses and coaches, but also covers taxis and trolleybuses.[39] It includes scheduled and non-scheduled services for urban, regional, national (domestic), intra-EU, and extra-EU journeys. In cases where more than one VAT rate applies, remarks give additional information. Table 3.9 shows that the VAT rates applied to road transport services differ substantially between Member States.

Table 3.9 – VAT Rates on Road Transport

Member State	Domestic Road Transport				Intra-EU Transport	Extra-EU Transport	Remarks
	Rates Applied	Taxi	Bus (sched.)	Bus (non-sched.)			
Austria	10% Ⓡ	10% Ⓡ	10% Ⓡ	10% Ⓡ	10% Ⓡ	10% Ⓡ	
Belgium	6% Ⓡ	6% Ⓡ	6% Ⓡ	6% Ⓡ	6% Ⓡ	6% Ⓡ	
Bulgaria	20% Ⓢ	20% Ⓢ	20% Ⓢ	20% Ⓢ	0% Ⓓ	0% Ⓓ	
Croatia	25% Ⓢ	25% Ⓢ	25% Ⓢ	25% Ⓢ	25% Ⓢ	25% Ⓢ	

[36] 21% until 1st October 2013
[37] Since 1st July 2013 (before: 20%)
[38] Since 1st July 2013 (before: 8.5%)
[39] For trolleybuses, the VAT rate for buses is applied. Tramways are covered under rail transport.

Cyprus[40]	9% / 5% Ⓡ 19% Ⓢ lump sum Ⓓ	9% Ⓡ lump sum tax Ⓓ	5% Ⓡ 9% Ⓡ	9% Ⓡ	0% Ⓓ	0% Ⓓ	See footnote 40
Czech Republic	21% Ⓢ 15% Ⓡ	21% Ⓢ	15% Ⓡ	21% Ⓢ	0% Ⓓ	0% Ⓓ	15% Ⓡ: scheduled 21% Ⓢ: otherwise
Denmark	ex.[41] Ⓓ 25% Ⓢ	ex. Ⓓ	ex. Ⓓ	25% Ⓢ	0% Ⓓ 25% Ⓢ	0% Ⓓ 25% Ⓢ	25% Ⓢ: non-regular bus services ex./0% Ⓓ: otherwise[42]
Estonia	20% Ⓢ	20% Ⓢ	20% Ⓢ	20% Ⓢ	0% Ⓓ	0% Ⓓ	
Finland	10% Ⓡ	10% Ⓡ	10% Ⓡ	10% Ⓡ	0% Ⓓ	0% Ⓓ	
France	10% Ⓡ	10% Ⓡ	10% Ⓡ	10% Ⓡ	10% Ⓡ (0% Ⓓ)	10% Ⓡ (0% Ⓓ)	0% Ⓓ: certain int. bus services[43]
Germany	19% Ⓢ 7% Ⓡ	7% Ⓡ[44]	7% Ⓡ 19% Ⓢ	19% Ⓢ 7% Ⓡ	19% Ⓢ 7% Ⓡ	19% Ⓢ 7% Ⓡ special regime Ⓓ[45]	7% Ⓡ: regional[46] 19% Ⓢ: long distance
Greece	13% Ⓡ	13% Ⓡ	13% Ⓡ	13% Ⓡ	13% Ⓡ[47]	13% Ⓡ	
Hungary	27% Ⓢ	27% Ⓢ	27% Ⓢ	27% Ⓢ	0% Ⓓ	0% Ⓓ	
Ireland	ex. Ⓓ	ex. Ⓓ	ex. Ⓓ	ex. Ⓓ	0% Ⓓ	0% Ⓓ	
Italy	10% Ⓡ ex. Ⓓ	ex. Ⓓ	10% Ⓡ	10% Ⓡ	0% Ⓓ	0% Ⓓ	ex.: urban public transport with taxis[48]; 10%: otherwise
Latvia	12% Ⓡ 21% Ⓢ	21% Ⓢ	12% Ⓡ	21% Ⓢ	0% Ⓓ	0% Ⓓ	12% Ⓡ: scheduled 21% Ⓢ: otherwise
Lithuania	9% Ⓡ 21% Ⓢ	21% Ⓢ	9% Ⓡ (21% Ⓢ)	21% Ⓢ	0% Ⓓ	0% Ⓓ	9% Ⓡ: authorized public services on regular routes 21% Ⓢ: otherwise
Luxembourg	3% Ⓓ	3% Ⓓ	3% Ⓓ	3% Ⓓ	0% Ⓓ	0% Ⓓ	

[40] 5%: urban and rural buses; 9%: urban, intercity and rural taxis, tour buses, and suburban buses; flat tax scheme: city taxis; 19%: other road passenger transport

[41] exempted; exemption without the right to deduct input VAT

[42] A special scheme for non-scheduled services with foreign registered buses based on an average transport fare was abolished effective from 1 July 2014.

[43] Certain international and intra-EU bus transports of foreign travellers. For details, see the country sheet for France.

[44] 19% possible in exceptional cases (distance > 50 km).

[45] Journey-specific VAT assessment is applied to occasional bus transport with buses not registered in Germany crossing a third-country border. For details, see the country sheet for Germany. Ex-post the provider can request a recalculation based on the normal tax procedure.

[46] Within a municipality or for distances less than 50 km (in German territory).

[47] Some sources mention, that a lump sum scheme is applied in international bus transport. However we have not been able to verify this by official sources.

[48] Urban transport is defined as within a municipality or between municipalities not more than 50 km distant from each other. In rare cases taxi transport can be subject to the reduced rate of 10 %, if the distance exceeds 50 km.

Malta	0% Ⓓ 18% Ⓢ	18% Ⓢ	0% Ⓓ	18% Ⓢ	n.a.	n.a.	0% Ⓓ: scheduled bus services and certain others[49] 18% Ⓢ: otherwise
Netherlands	6% Ⓡ	6% Ⓡ	6% Ⓡ	6% Ⓡ	6% Ⓡ	6% Ⓡ	
Poland	8% Ⓡ	8% Ⓡ flat rate Ⓓ	8% Ⓡ	8% Ⓡ	8% Ⓡ	8% Ⓡ (ex. Ⓓ)[50]	flat rate Ⓓ: optional flat rate scheme for taxis
Portugal	6% Ⓡ	6% Ⓡ	6% Ⓡ	6% Ⓡ	0% Ⓓ	0% Ⓓ	
Romania	24% Ⓢ	24% Ⓢ	24% Ⓢ	24% Ⓢ	0% Ⓓ	0% Ⓓ	
Slovakia	20% Ⓢ	20% Ⓢ	20% Ⓢ	20% Ⓢ	0% Ⓓ	0% Ⓓ	
Slovenia	9.5% Ⓡ	9.5% Ⓡ	9.5% Ⓡ	9.5% Ⓡ	9.5% Ⓡ	9.5% Ⓡ	
Spain	10% Ⓡ	10% Ⓡ	10% Ⓡ	10% Ⓡ	10% Ⓡ	10% Ⓡ	
Sweden	6% Ⓡ	6% Ⓡ	6% Ⓡ	6% Ⓡ	0% Ⓓ	0% Ⓓ	
United Kingdom	0% Ⓓ 20% Ⓢ	20% Ⓢ	0% Ⓓ	0% Ⓓ	0% Ⓓ	0% Ⓓ	0% Ⓓ: ≥ 10 seats[51] or by a universal service provider 20% Ⓢ: otherwise

Source: National VAT legislation, European Commission (2014), Van Essen et al. (2012), IBFD (2012) and other sources; Adaptation and Demonstration: IHS, 2014.

Domestic Road Passenger Transport

Nineteen Member States apply the same rate to all types of domestic road passenger transport services. In 6 Member States, it is the standard rate and in 11 it is a reduced rate. Luxembourg applies a super-reduced rate of 3% and Ireland exempts all domestic passenger transport. The nine Member States that distinguish between different rates apply diverse criteria. Type of service (e.g. scheduled vs. occasional) is used in Malta, Latvia, Lithuania, Denmark, and the Czech Republic. Italy exempts urban public transport by taxi and similar vehicles. In Germany VAT rate depends primarily on distance. In the UK, the size of the vehicle is decisive in most cases. Cyprus distinguishes between urban, for which also a flat tax regime is available, and rural taxi transport and several types of bus services. Six Member States apply derogations: Malta and the UK zero-rate most services; Italy, Denmark, and Ireland apply exemptions (without credit), and Luxembourg uses a super-reduced rate. Furthermore a few Member States provide special schemes for taxi services (Cyprus, Poland). The rates in place for domestic road passenger transport range from 0% (UK and Malta) to 27% (Hungary). Generally, rates tend to be higher in the Central and Eastern European Member States.

Extra-EU and Intra-EU Road Passenger Transport

For extra-EU and intra-EU services, the picture is quite different: Intra-EU and extra-EU road passenger transport is generally zero-rated in 16 Member States, Denmark only zero-rates scheduled services. 9

[49] Scheduled bus transport and regular transport of school pupils, students and workers.

[50] Incidental international road transport by businesses established in third countries is exempt under certain conditions.

[51] There are some exceptions, for details see the country fiche for the UK.

Member States apply a reduced rate, ranging from 6% to 13%. Only in Croatia, Germany (long distance services) and Denmark (occasional bus transport) intra-community and extra-EU road passenger transport services are taxed at the standard rates (25% in Croatia and Denmark, 19% in Germany). Germany, Greece, and France apply special rates or regimes for certain types of intra-community/extra-EU road passenger transport.

With respect to the difference between the tax rates applied to domestic and international[52] services, 11 Member States apply, for the most part, the same rates. Looking at the remaining Member States, the gap between the rates applied to domestic and international services ranges from 3% (Luxembourg) to 27% (Hungary). The highest differences can be found in the Central and Eastern European Member States, which frequently zero-rate international transport while taxing domestic services at the standard rate (e.g. Slovakia, Romania, Hungary, Estonia, and Bulgaria).

Rail Transport

Table 3.10 shows the VAT rates applicable for transportation of persons by rail. Detailed rates are additionally given for high-speed rail (HSR), subway or metro, tram, and normal trains. With respect to intra-EU and extra-EU transport, this breakdown is omitted since the respective rates are the same for all types of rail transport or, in the case of metro and tram, rarely applicable. In Member States where a railway system does not exist and thus no taxation occurs (e.g. Cyprus and Malta), the term not applicable (n.a.) is noted.

Table 3.10 – VAT Rates on Rail Transport[53]

Member State	Domestic Transport					Intra-EU transport	Extra-EU transport	Remarks
	Rates Applied	Train	HSR	Metro	Tram			
Austria	10% Ⓡ	10% Ⓡ	10% Ⓡ	10% Ⓡ	10% Ⓡ	10% Ⓡ	10% Ⓡ	
Belgium	6% Ⓡ	6% Ⓡ	6% Ⓡ	6% Ⓡ	6% Ⓡ	6% Ⓡ	6% Ⓡ	
Bulgaria	20% Ⓢ	20% Ⓢ	20% Ⓢ	20% Ⓢ	20% Ⓢ	0% Ⓓ	0% Ⓓ	
Croatia	25% Ⓢ	25% Ⓢ	25% Ⓢ	25% Ⓢ	25% Ⓢ	25% Ⓢ	25% Ⓢ	
Cyprus	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	
Czech Republic	15% Ⓡ	15% Ⓡ	15% Ⓡ	15% Ⓡ	15% Ⓡ	0% Ⓓ	0% Ⓓ	
Denmark	ex. Ⓓ	ex. Ⓓ	ex. Ⓓ	ex. Ⓓ	ex. Ⓓ	0% Ⓓ	0% Ⓓ	
Estonia	20% Ⓢ	20% Ⓢ	20% Ⓢ	20% Ⓢ	20% Ⓢ	0% Ⓓ	0% Ⓓ	
Finland	10% Ⓡ	10% Ⓡ	10% Ⓡ	10% Ⓡ	10% Ⓡ	(0% Ⓓ)[54]	0% Ⓓ	
France	10% Ⓡ	10% Ⓡ	10% Ⓡ	10% Ⓡ	10% Ⓡ	0% Ⓓ (10% Ⓡ)	0% Ⓓ (10% Ⓡ)	

[52] 'International' means intra-community as well as extra-EU passenger transport services.

[53] The table concerns scheduled transport, conducted with means of transport of more than 9 seats.

[54] Currently there is no intra-EU rail passenger transport.

Germany	19% Ⓢ 7% Ⓡ	19% Ⓢ 7% Ⓡ	19% Ⓢ[55]	7% Ⓡ	7% Ⓡ	19% Ⓢ 7% Ⓡ	19% Ⓢ 7% Ⓡ	7% Ⓡ: regional[56] 19% Ⓢ: long-distance
Greece	13% Ⓡ	13% Ⓡ	13% Ⓡ	13% Ⓡ	13% Ⓡ	13% Ⓡ	13% Ⓡ	
Hungary	27% Ⓢ	27% Ⓢ	27% Ⓢ	27% Ⓢ	27% Ⓢ	0% Ⓓ	0% Ⓓ	
Ireland	ex. Ⓓ	ex. Ⓓ	ex. Ⓓ	ex. Ⓓ	ex. Ⓓ	0% Ⓓ	0% Ⓓ	
Italy	10% Ⓡ	10% Ⓡ	10% Ⓡ	10% Ⓡ	10% Ⓡ	0% Ⓓ	0% Ⓓ	
Latvia	12% Ⓡ	12% Ⓡ	12% Ⓡ	12% Ⓡ	12% Ⓡ	0% Ⓓ	0% Ⓓ	
Lithuania	21% Ⓢ (9% Ⓡ)	21% Ⓢ (9% Ⓡ)	21% Ⓢ (9% Ⓡ)	21% Ⓢ (9% Ⓡ)	21% Ⓢ (9% Ⓡ)	0% Ⓓ	0% Ⓓ	9% Ⓡ: authorized public services on regular routes 21% Ⓢ: otherwise
Luxem-bourg	3% Ⓓ	3% Ⓓ	3% Ⓓ	3% Ⓓ	3% Ⓓ	0% Ⓓ	0% Ⓓ	
Malta	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	
Nether-lands	6% Ⓡ	6% Ⓡ	6% Ⓡ	6% Ⓡ	6% Ⓡ	6% Ⓡ	6% Ⓡ	
Poland	8% Ⓡ	8% Ⓡ	8% Ⓡ	8% Ⓡ	8% Ⓡ	0% Ⓓ	0% Ⓓ	
Portugal	6% Ⓡ	6% Ⓡ	6% Ⓡ	6% Ⓡ	6% Ⓡ	0% Ⓓ	0% Ⓓ	
Romania	24% Ⓢ	24% Ⓢ	24% Ⓢ	24% Ⓢ	24% Ⓢ	0% Ⓓ	0% Ⓓ	
Slovakia	20% Ⓢ	20% Ⓢ	20% Ⓢ	20% Ⓢ	20% Ⓢ	0% Ⓓ	0% Ⓓ	
Slovenia	9.5% Ⓡ	9.5% Ⓡ	9.5% Ⓡ	9.5% Ⓡ	9.5% Ⓡ	0% Ⓓ	0% Ⓓ	
Spain	10% Ⓡ	10% Ⓡ	10% Ⓡ	10% Ⓡ	10% Ⓡ	10% Ⓡ	10% Ⓡ	
Sweden	6% Ⓡ	6% Ⓡ	6% Ⓡ	6% Ⓡ	6% Ⓡ	0% Ⓓ	0% Ⓓ	
United Kingdom	0% Ⓓ	0% Ⓓ	0% Ⓓ	0% Ⓓ	0% Ⓓ	0% Ⓓ	0% Ⓓ	if ≥ 10 seats

Source: National VAT legislation, European Commission (2014), Van Essen et al. (2012), IBFD (2012) and other sources; Adaptation and Demonstration: IHS, 2014.

The situation with respect to rail transport is very similar to road transport, with only a few exceptions. In the case of domestic transport, nearly all Member States apply the same rates as for road transport. Differing values in the tables often stem from the fact that almost all rail passenger transport is scheduled, which is why only the rate for scheduled transport is stated for the Czech Republic, Latvia and Lithuania. In the case of the UK, almost all rail passenger services will be zero-rated because of vehicle size. With

[55] 7% possible in certain cases (distance < 50 km or within a municipality).

[56] Within a municipality or for distances less than 50 km (in German territory).

respect to intra-EU and extra-EU transport, three Member States, which tax cross-border road transport at the reduced rate, primarily apply a zero-rate to cross-border rail transport (France, Poland, and Slovenia).

Five Member States tax all rail passenger transport at the reduced rate (Austria, Belgium, Greece, Netherlands, and Spain), and one (Croatia) at the standard rate. Sixteen Member States apply a positive rate to domestic services (of which 10 apply the reduced, 5 the standard, and 1 a super-reduced rate), but zero-rate extra-EU and intra-EU rail passenger transport. In the UK, both domestic and international services are zero-rated. Denmark and Ireland exempt domestic services without credit. In Germany, finally, the VAT rate depends on the distance travelled.

In summary, the tax rates applied to domestic rail passenger transport range from 0% to 27%, whereby 23 Member States apply predominantly positive rates. Extra-EU and intra-EU transport, on the other hand, is zero-rated by 19 Member States, and the remaining 7 apply rates between 6% and 25%. Cyprus and Malta currently do not operate a rail system.

Inland Navigation

Inland navigation means passenger transportation by passenger ships on rivers and lakes (i.e. inland waterways). A further distinction is made between scheduled and non-scheduled domestic services. For extra-EU and intra-EU transport, this differentiation is omitted because no Member State applies different rates. The applicable tax rates are listed in Table 3.11.

Table 3.11 – VAT Rates on Inland Navigation

Member State	Domestic Transport			Intra-EU Transport	Extra-EU Transport	Remarks
	Rates Applied	Scheduled	Non-Sched.			
Austria	10% Ⓡ	10% Ⓡ	10% Ⓡ	0% Ⓓ (10% Ⓡ)	0% Ⓓ (10% Ⓡ)	0% Ⓓ: usual rate 10% Ⓡ: on Lake Constance
Belgium	6% Ⓡ	6% Ⓡ	6% Ⓡ	6% Ⓡ	6% Ⓡ	
Bulgaria	20% Ⓢ	20% Ⓢ	20% Ⓢ	0% Ⓓ	0% Ⓓ	
Croatia	25% Ⓢ	25% Ⓢ	25% Ⓢ	0% Ⓓ	0% Ⓓ	
Cyprus	19% Ⓢ	19% Ⓢ	19% Ⓢ	0% Ⓓ	0% Ⓓ	
Czech Republic	21% Ⓢ 15% Ⓡ	15% Ⓡ	21% Ⓢ	0% Ⓓ	0% Ⓓ	15% Ⓡ: scheduled 21% Ⓢ: otherwise
Denmark	ex. Ⓓ	ex. Ⓓ	ex. Ⓓ	0% Ⓓ	0% Ⓓ	
Estonia	20% Ⓢ	20% Ⓢ	20% Ⓢ	0% Ⓓ	0% Ⓓ	
Finland	10% Ⓡ	10% Ⓡ	10% Ⓡ	{0% Ⓓ}	0% Ⓓ	currently no intra-EU services
France	10% Ⓡ	10% Ⓡ	10% Ⓡ	10% Ⓡ	10% Ⓡ	

Germany	19% Ⓢ 7% Ⓡ	7% Ⓡ[57] 19% Ⓢ	19% Ⓢ	19% Ⓢ 7% Ⓡ (0% Ⓓ)[58]	19% Ⓢ 7% Ⓡ	7% Ⓡ: approved regular regional services[59] 19% Ⓢ: otherwise
Greece	13% Ⓡ	13% Ⓡ	13% Ⓡ	13% Ⓡ	13% Ⓡ	
Hungary	27% Ⓢ	27% Ⓢ	27% Ⓢ	0% Ⓓ	0% Ⓓ	
Ireland	ex. Ⓓ	ex. Ⓓ	ex. Ⓓ	0% Ⓓ	0% Ⓓ	
Italy	10% Ⓡ ex. Ⓓ	10% Ⓡ ex. Ⓓ	10% Ⓡ ex. Ⓓ	0% Ⓓ	0% Ⓓ	ex. Ⓓ: urban transport[60]
Latvia	21% Ⓢ (12% Ⓡ)	12% Ⓡ	21% Ⓢ	0% Ⓓ	0% Ⓓ	12% Ⓡ: scheduled 21% Ⓢ: otherwise
Lithuania	21% Ⓢ (9% Ⓡ)	9% Ⓡ (21% Ⓢ)	21% Ⓢ	0% Ⓓ	0% Ⓓ	9% Ⓡ: authorized public services on regular routes 21% Ⓢ: otherwise
Luxembourg	3% Ⓓ	3% Ⓓ	3% Ⓓ	0% Ⓓ	0% Ⓓ	
Malta	n.a.	n.a.	n.a.	n.a.	n.a.	
Netherlands	6% Ⓡ ex. Ⓓ	6% Ⓡ ex. Ⓓ	6% Ⓡ	6% Ⓡ	6% Ⓡ	ex. Ⓓ: optional for ferry services 6% Ⓡ: otherwise
Poland	8% Ⓡ	8% Ⓡ	8% Ⓡ	8% Ⓡ	8% Ⓡ	
Portugal	6% Ⓡ	6% Ⓡ	6% Ⓡ	0% Ⓓ	0% Ⓓ	
Romania	24% Ⓢ	24% Ⓢ	24% Ⓢ	0% Ⓓ	0% Ⓓ	
Slovakia	20% Ⓢ	20% Ⓢ	20% Ⓢ	0% Ⓓ	0% Ⓓ	
Slovenia	9.5% Ⓡ	9.5% Ⓡ	9.5% Ⓡ	0% Ⓓ	0% Ⓓ	
Spain	10% Ⓡ	10% Ⓡ	10% Ⓡ	10% Ⓡ	10% Ⓡ	
Sweden	6% Ⓡ	6% Ⓡ	6% Ⓡ	0% Ⓓ	0% Ⓓ	
United Kingdom	0% Ⓓ 20% Ⓢ	0% Ⓓ 20% Ⓢ	0% Ⓓ 20% Ⓢ	0% Ⓓ	0% Ⓓ	0% Ⓓ: ≥ 10 seats[61] 20% Ⓢ: otherwise

Source: National VAT legislation, European Commission (2014), Van Essen et al. (2012), IBFD (2012) and other sources (see introduction to chapter 3.1); Adaptation and Demonstration: IHS, 2014.

The rates applied to passenger transport services on inland waterways are very similar to those applied in the rail sector. Noticeable differences can be found in Austria, which zero-rates most international transport on rivers and lakes while taxing international rail and road transport at the reduced rate and

[57] Ferries and other approved regular services within a municipality or for distances not exceeding 50 km.

[58] Cross-border passenger ferry services across Rhine, Danube, Elbe, Neisse and Oder.

[59] Within a municipality or for distances less than 50 km (in German territory).

[60] Urban transport (by any means of transport on the sea, lakes, rivers or in lagoons) is defined as within a municipality or between municipalities not more than 50 km distant from each other.

[61] There are some exceptions, for details see the country fiche for the UK.

Croatia, which applies the standard rate to international rail and road transport and the zero-rate to inland navigation. France and Poland on the other hand zero-rate (most) international rail transport, while inland navigation is subject to the reduced rate (10% / 8% VAT).

Member States situated in Western or Northern Europe tend to apply the reduced rate to domestic passenger transport on rivers and lakes and either the reduced or the zero-rate to extra-EU and intra-EU transport, whereas Central and Eastern European Member States more frequently apply the standard rate to domestic and the zero-rate to international services. The rates in place for domestic inland navigation range from 0% (UK) to 27% (Hungary). All Member States except for the UK (zero-rate) and Denmark and Ireland (exempt) apply positive rates. Certain services are also exempt in Italy (urban transport) and the Netherlands (optional exemption for ferry services). For extra-EU and intra-EU transport, the range is 0% to 19%, however only eight Member States apply positive rates.[62] The only Member State taxing international inland navigation at the standard rate is Germany (restricted to non-scheduled and long-distance services).

Maritime Shipping

This section covers passenger transport services by sea ships. Once again, a distinction is made between domestic and international services and, in the case of domestic services, between scheduled and non-scheduled transport. Land-locked countries are marked not applicable (n.a.). To the best of our knowledge, no Member States have adopted special tax rates for round trips (A-to-A transport) or cruises; therefore, the normal rates as stated in **Table 3.12** are applicable.

Table 3.12 – VAT Rates on Maritime Shipping

Member State	Domestic Transport			Intra-EU Transport	Extra-EU Transport	Remarks
	Rates Applied	Scheduled	Non-Sched.			
Austria	n.a.	n.a.	n.a.	n.a.	n.a.	
Belgium	0% Ⓓ	0% Ⓓ	0% Ⓓ	0% Ⓓ	0% Ⓓ	
Bulgaria	20% Ⓢ	20% Ⓢ	20% Ⓢ	0% Ⓓ	0% Ⓓ	
Croatia	25% Ⓢ	25% Ⓢ	25% Ⓢ	0% Ⓓ	0% Ⓓ	
Cyprus	9% Ⓡ	9% Ⓡ	9% Ⓡ	0% Ⓓ	0% Ⓓ	
Czech Republic	n.a.	n.a.	n.a.	n.a.	n.a.	
Denmark	ex. Ⓓ	ex. Ⓓ	ex. Ⓓ	0% Ⓓ	0% Ⓓ	
Estonia	20% Ⓢ	20% Ⓢ	20% Ⓢ	0% Ⓓ	0% Ⓓ	
Finland	10% Ⓡ	10% Ⓡ	10% Ⓡ	0% Ⓓ	0% Ⓓ	
France	10% Ⓡ (0 % Ⓓ)[63]	10% Ⓡ (0 % Ⓓ)[63]	10% Ⓡ (0 % Ⓓ)[63]	0% Ⓓ	0% Ⓓ	

[62] Thereof Austria only for shipping on Lake Constance.

[63] In case of passenger transport services to Corsica, the sections outside of continental France are zero-rated.

Germany	7% Ⓡ 19% Ⓢ (0% Ⓓ)[64]	7% Ⓡ 19% Ⓢ (0% Ⓓ)[64]	19% Ⓢ 7% Ⓡ (0% Ⓓ) [64]	0% Ⓓ	0% Ⓓ	7% Ⓡ: regional[65] 19% Ⓢ: long distance
Greece	13% Ⓡ	13% Ⓡ	13% Ⓡ	0% Ⓓ	0% Ⓓ	
Hungary	n.a.	n.a.	n.a.	n.a.	n.a.	
Ireland	ex. Ⓓ	ex. Ⓓ	ex. Ⓓ	0% Ⓓ	0% Ⓓ	
Italy	10% Ⓡ ex. Ⓓ	10% Ⓡ ex. Ⓓ	10% Ⓡ ex. Ⓓ	0% Ⓓ	0% Ⓓ	ex. Ⓓ: urban transport[60]
Latvia	21% Ⓢ (12% Ⓡ)	12% Ⓡ	21% Ⓢ	0% Ⓓ	0% Ⓓ	12% Ⓡ: scheduled 21% Ⓢ: otherwise
Lithuania	21% Ⓢ (9% Ⓡ)	9% Ⓡ 21% Ⓢ[66]	21% Ⓢ	0% Ⓓ	0% Ⓓ	9% Ⓡ: authorized public services on regular routes 21% Ⓢ: otherwise
Luxembourg	n.a.	n.a.	n.a.	n.a.	n.a.	
Malta	0% Ⓓ 18% Ⓢ	0% Ⓓ	18% Ⓢ	0% Ⓓ	0% Ⓓ	0% Ⓓ: scheduled[67] 18% Ⓢ: otherwise
Netherlands	6% Ⓡ	6% Ⓡ	6% Ⓡ	0% Ⓓ	0% Ⓓ	
Poland	8% Ⓡ	8% Ⓡ	8% Ⓡ	0% Ⓓ	0% Ⓓ	
Portugal	6% Ⓡ	6% Ⓡ	6% Ⓡ	0% Ⓓ	0% Ⓓ	
Romania	24% Ⓢ	24% Ⓢ	24% Ⓢ	0% Ⓓ	0% Ⓓ	
Slovakia	n.a.	n.a.	n.a.	n.a.	n.a.	
Slovenia	9.5% Ⓡ	9.5% Ⓡ	9.5% Ⓡ	0% Ⓓ	0% Ⓓ	
Spain	10% Ⓡ	10% Ⓡ	10% Ⓡ	0% Ⓓ	0% Ⓓ	
Sweden	6% Ⓡ	6% Ⓡ	6% Ⓡ	0% Ⓓ	0% Ⓓ	
United Kingdom	0% Ⓓ 20% Ⓢ	0% Ⓓ 20% Ⓢ	0% Ⓓ 20% Ⓢ	0% Ⓓ	0% Ⓓ	0% Ⓓ: ≥ 10 seats 20% Ⓢ: otherwise

Source: National VAT legislation, European Commission (2014), Van Essen et al. (2012), IBFD (2012) and other sources; Adaptation and Demonstration: IHS, 2014.

A common feature of maritime passenger transport and air passenger transport is that all international, both intra-EU and extra-EU, services are zero-rated. With respect to domestic services, most Member States apply the same rates as to inland navigation. Exceptions are Cyprus, which applies the reduced rate instead of the standard rate, and Malta, which zero-rates most scheduled sea passenger transport. Germany zero-rates passenger transport to and from Helgoland (0%) since Helgoland is treated as a third country for VAT

[64] Passenger and ferry services with vessels for maritime navigation between domestic seaports and Helgoland (as Helgoland is excluded from territorial scope of the VAT Directive); furthermore services starting and ending in German ports, where the German section is not longer than 20 km and the foreign section is longer than 10 km.

[65] Within a municipality or for distances less than 50 km (in German territory).

[66] Currently there are no scheduled domestic passenger services by maritime shipping in Lithuania.

[67] Scheduled inter-island sea transport of passengers by authorised carriers and other scheduled sea transport of passengers recognised as such by the Commissioner.

purposes and France zero-rates the section outside continental France in case of maritime passenger transport. The tax rates in place range from 0% (Malta and the UK) to more than 20% (Lithuania, Croatia, and Romania) for domestic transport. Intra-EU and extra-EU passenger transport services are commonly zero-rated.

Air Transport

The VAT rates displayed in Table 3.13 apply to domestic and international flights; in the case of domestic flights, a distinction is made between scheduled and non-scheduled services. For extra-EU and intra-EU transport, such a distinction is not meaningful since the same rates are in place for both scheduled and occasional services.

Table 3.13 – VAT Rates on Air Transport

Member State	Domestic Transport			Intra-EU Transport	Extra-EU Transport	Remarks
	Rates Applied	Scheduled	Non-Sched.			
Austria	10% Ⓡ	10% Ⓡ	10% Ⓡ	0% Ⓓ	0% Ⓓ	
Belgium	6% Ⓡ	6% Ⓡ	6% Ⓡ	0% Ⓓ	0% Ⓓ	
Bulgaria	20% Ⓢ	20% Ⓢ	20% Ⓢ	0% Ⓓ	0% Ⓓ	
Croatia	25% Ⓢ	25% Ⓢ	25% Ⓢ	0% Ⓓ	0% Ⓓ	
Cyprus	19% Ⓢ	19% Ⓢ	19% Ⓢ	0% Ⓓ	0% Ⓓ	
Czech Republic	21% Ⓢ 15% Ⓡ	15% Ⓡ	21% Ⓢ	0% Ⓓ	0% Ⓓ	12% Ⓡ: scheduled 21% Ⓢ: other
Denmark	ex. Ⓓ	ex. Ⓓ	ex. Ⓓ	0% Ⓓ	0% Ⓓ	
Estonia	20% Ⓢ	20% Ⓢ	20% Ⓢ	0% Ⓓ	0% Ⓓ	
Finland	10% Ⓡ	10% Ⓡ	10% Ⓡ	0% Ⓓ	0% Ⓓ	
France	10% Ⓡ	10% Ⓡ	10% Ⓡ	0% Ⓓ	0% Ⓓ	
Germany	19% Ⓢ	19% Ⓢ	19% Ⓢ	0% Ⓓ	0% Ⓓ[68]	
Greece	13% Ⓡ	13% Ⓡ	13% Ⓡ	0% Ⓓ	0% Ⓓ	
Hungary	27% Ⓢ	27% Ⓢ[69]	27% Ⓢ	0% Ⓓ	0% Ⓓ	
Ireland	ex. Ⓓ	ex. Ⓓ	ex. Ⓓ	0% Ⓓ	0% Ⓓ	
Italy	10% Ⓡ	10% Ⓡ	10% Ⓡ	0% Ⓓ	0% Ⓓ	
Latvia	21% Ⓢ (12% Ⓡ)	12% Ⓡ	21% Ⓡ	0% Ⓓ	0% Ⓓ	12% Ⓡ: scheduled 21% Ⓡ: other
Lithuania	21% Ⓢ (9% Ⓡ)	9% Ⓡ[70]	21% Ⓢ	0% Ⓓ	0% Ⓓ	9% Ⓡ: authorized services on regular

[68] International air passenger transport is not zero-rated in general, but applies only to a list of countries issued by the German Ministry of Finance. However, this list covers practically all important connections.

[69] Currently there are no scheduled domestic connections in Hungary.

[70] Currently there are no scheduled domestic flights subject to the reduced rate.

						routes 21% Ⓢ: other
Luxembourg	3% Ⓓ	3% Ⓓ	3% Ⓓ	0% Ⓓ	0% Ⓓ	
Malta	0% Ⓓ[71]	0% Ⓓ	0% Ⓓ	0% Ⓓ	0% Ⓓ	
Netherlands	21% Ⓢ (6% Ⓡ)[72]	21% Ⓢ	21% Ⓢ (6% Ⓡ)[72]	0% Ⓓ	0% Ⓓ	6% Ⓡ: see footnote 72
Poland	8% Ⓡ	8% Ⓡ	8% Ⓡ	0% Ⓓ	0% Ⓓ	
Portugal	6% Ⓡ	6% Ⓡ	6% Ⓡ	0% Ⓓ	0% Ⓓ	
Romania	24% Ⓢ	24% Ⓢ	24% Ⓢ	0% Ⓓ	0% Ⓓ	
Slovakia	20% Ⓢ	20% Ⓢ	20% Ⓢ	0% Ⓓ	0% Ⓓ	
Slovenia	9.5% Ⓡ	9.5% Ⓡ	9.5% Ⓡ	0% Ⓓ	0% Ⓓ	
Spain	10% Ⓡ	10% Ⓡ	10% Ⓡ	0% Ⓓ	0% Ⓓ	
Sweden	6% Ⓡ	6% Ⓡ	6% Ⓡ	0% Ⓓ	0% Ⓓ	
United Kingdom	0% Ⓓ 20% Ⓢ	0% Ⓓ	0% Ⓓ 20% Ⓢ	0% Ⓓ	0% Ⓓ	0% Ⓓ: ≥ 10 seats scheduled or by a universal postal service provider 20% Ⓢ: otherwise

Source: National VAT legislation, European Commission (2014), Van Essen et al. (2012), IBFD (2012) and other sources; Adaptation and Demonstration: IHS, 2014.

As is evident, all extra-EU and intra-EU air passenger transport is zero-rated in the European Union.[73] With respect to domestic services, 2 Member States apply predominantly the zero-rate (Malta and the UK), 15 Member States predominantly the reduced rate (2 only for scheduled services), and 9 Member States predominantly the standard rate. Denmark and Ireland exempt domestic air passenger transport. The highest rates are in place in Hungary (where currently no scheduled domestic flights are offered) with 27%, Croatia (25%), and Romania (24%). However, especially in the smaller Member States domestic air passenger transport is of minor relevance, especially with respect to scheduled services.[74]

[71] The compilations of VAT rates usually state a rate of 0% for domestic air passenger transport, the VAT Act on the other hand doesn't seem to contain an explicit exemption.

[72] Medical passenger transport services by air and domestic passenger transport with balloons.

[73] In Germany this is restricted to a list of countries published by the Ministry of Finance, which however includes practically all important destinations.

[74] E.g. in Hungary, Latvia and Lithuania currently no scheduled domestic air passenger transport services are operated.

B. Other Transport Taxes and User Charges

VAT is only one of several user charges and taxes that passengers must pay in addition to the price of the ticket determined by transport operators. Nearly all of these charges and taxes are predicated on the need to generate revenue to pay for particular costs and not to contribute to general public revenue. A recent study on the internalization of the costs of transport externalities[75] provided a comprehensive description and quantification of these charges and taxes as shown in Table 3.14.

Table 3.14 – Internalization Charges by Mode and Level of Administration

Transport Mode	EU	National	Regional	Local

Road Transport		• Fuel taxes (including reduced levels and exemptions) Infrastructure charges:
		  ○ Time-based user charges (vignettes)
		  ○ Distance-based user charges
		• Insurance taxes
		• Vehicle purchase and/or registration taxes
		• Vehicle ownership and/or circulation taxes Company car taxation
		• VAT reductions/exemptions
			• Tolls on specific parts of the regional network (e.g. bridges and tunnels)	• Urban road pricing schemes

Rail Transport	ETS	• Fuel taxes • Electricity taxes • Infrastructure charges (including fees for delays) • VAT reductions or exemptions	out of scope	out of scope
Inland Navigation		• Fuel taxes • Fairway dues • Charges related to prevention of water pollution • VAT reductions or exemptions	• Fairway dues	• Port charges for selected ports of the TEN-T Core Network, as defined in COM (2011) 650 final • Not included in the analysis are dues for locks and bridges (for maritime shipping and inland navigation), as far as they are not related to one of the TEN-T core network ports

[75] European Commission (2012a)

Maritime Shipping		• Fuel Taxes • Charges related to prevention of water pollution • VAT reductions or exemptions		
Aviation	ETS	• Fuel taxes • Ticket taxes • VAT reductions or exemptions		• Airport charges for selected airports of the TEN-T Core Network (as defined in COM (2011) 650 final), in particular: Landing and Take-Off (LTO) charge

Some of these additional charges are more akin to taxes than to user charges as their incidence is not proportional to the use of a specific facility and the revenue they generate is not earmarked for the funding of a specific type of infrastructure facility or service. The following subsection reviews, in detail, such taxes and charges, limited to those that are directly added to the ticket price of the final consumer. We therefore exclude taxes charged to the carrier and possibly passed on via the ticket price later (e.g. noise charges or emission charges) as well as fees directly added to the ticket price, but charged for certain services (e.g. passenger service charges and security charges at airports, air transport supervision charges, and infrastructure charges).

These taxes are currently in place in Austria, France, Germany, Italy, and the UK. All of them are attributable to air passenger transport; the French *Tax on public air and sea transport to Corsica* is additionally applied to maritime navigation.

The oldest tax is the UK's *Air Passenger Duty* (APD), an excise duty introduced in 1994 and charged on the carriage of passengers flying from a UK airport on an aircraft that has an authorized take-off weight of more than ten tons or more than twenty seats for passengers (which is different from the thresholds for VAT liability). The rate applied depends both on the distance and class of travel and ranges from GBP 13 per passenger (i.e. a short distance in the lowest class available on the flight) to GBP 388 per passenger (i.e. a higher rate[76] for flights exceeding 6,000 miles). Distance is measured as the distance between London and the capital city of the country of final destination. Recently, rates have slightly increased, taking effect on 1 April 2014; in 2015, it is planned to abolish bands C and D, which would considerably reduce APD on long-distance flights. Exceptions of APD are direct long-haul flights originating from airports in Northern Ireland, since the North Ireland Assembly set the relevant rate to GBP 0 as of 1 January 2013. The APD accounts for distance; however, critics of the APD point out that its rates are not proportional to the environmental damage caused by the aviation emissions that it claims to address.

A similar *Air Travel Tax* in Ireland was abolished this year, effective 1 April 2014.

France introduced the *Civil Aviation Tax* in 1999. The rates are currently EUR 4.36 per passenger for journeys to destinations within the European Economic Area and French overseas territories and EUR 7.85

[76] For details on the application of the higher rate see footnote 82.

per passenger for journeys to other destinations. An annual adjustment of the rates is made based on the consumer price index. Unlike APD, the Civil Aviation Tax is also applied to freight and mail transport by air. The *Solidarity Tax* on aircraft tickets was established in 2006 as an additional surcharge on the ticket price. The rates of the Solidarity Tax are grouped by distance and travel class. Destinations in France and the European Economic Area are taxed at lower rates than other destinations. Additionally, higher rates are in place for passengers traveling in first or business class. Finally, a third tax is charged to passengers embarking to or disembarking from ships and aircraft in Corsican territory, the so-called *Tax on public air and sea transport to Corsica*. This tax is set by the Corsican Assembly, which also receives the revenue. The basic conditions, however, are governed by the central government. Currently, a rate of EUR 4.57 per passenger embarking or disembarking is applied. A lower rate is in place for certain short-haul connections to and from Sardinia (EUR 1.52). Inland transport in Corsica is exempt.

Italy has implemented two different taxes on air passenger transport. The so-called *City Council Tax* was introduced in 2004 to generate additional revenues for the state budget as well as for municipalities where airports are situated, and for general security measures at airports and in major train stations. The tax is frequently increased and currently amounts EUR 7.50 per passenger boarding in the Roman airports of Fiumicino and Ciampino and EUR 6.50 per passenger boarding in other Italian airports. Currently, the distribution of a large portion of the revenues is managed by the National Institute of Social Security. Despite its name, only a relatively small fraction seems to go to the municipalities. Italy's *Air Taxi Tax* was adopted in 2012. The tax is collected from passengers of air taxi flights (i.e. passenger flights where the entire capacity of the aircraft is chartered by a single contract) and the air carrier is liable for payment of the tax. The tax must be paid for each section separately and rates range from EUR 100 per passenger and leg (less than 1,500 km) to EUR 200 per passenger and leg (great than 1,500 km). According to Agenzia Entrate, the Air Taxi Tax is not only due upon embarking in Italy, but also on disembarking.[77]

Germany's *Air Passenger Tax* (Luftverkehrssteuer) was introduced in 2011 as an additional fee on the departure of passengers from German airports. There are three different rates, for short, medium, and long-haul flights, ranging from EUR 7.50 per passenger to EUR 42.18 per passenger. The annexes to the Air Transport Tax Act define the applicable rates; however, broadly speaking, short-haul corresponds to distances less than 2,500 km and long-haul to more than 6,000 km from Frankfurt Airport. Unlike France and the UK, Germany does not distinguish between different classes of travel. The tax rate is tied to and limited by the costs of EU emissions trading, which lead to a slight decrease in the rates from previous years.

Austria also implemented an *Air Transport Levy* in 2011, which is very similar to the German Air Passenger Tax. However, the Austrian rates are slightly lower at EUR 7 to EUR 35 per passenger. Additionally, and in contrast to Germany, VAT for domestic flights is already included in the Air Transport Levy, which, in practice, results in a rate of EUR 6.36 for domestic flights.

A number of Member States applied similar charges in the past, but have since abolished them. This holds for Malta, the Netherlands (2008-2009, 2010), Ireland (2009-2014), and Denmark (1991-2006).

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[77] http://www.agenziaentrate.gov.it/wps/wcm/connect/10b64e804bc82b0285a9fd067ba7a5f6/97718-+Provvedimento+imposta+aeromobili+-++27+giugno.pdf?MOD=AJPERES&CACHEID=10b64e804bc82b0285a9fd067ba7a5f6, p.2.

Table 3.8 provides an overview of the respective taxes in place as of April 2014. Further details and sources used can be found in the country fiches.

Table 3.8 – Other Indirect Taxes Levied on Passenger Transport Services

Country	Mode	Tax Base	Entity Liable	Tax Rate
Austria: ***Air Transport Levy (Flugabgabe)***	Air	The number of passengers departing from an Austrian airport using a motorized aircraft	The aircraft owner performing the departure who adds it to the ticket price	• Short-haul: EUR 7 per passenger (incl. VAT for domestic journeys) • Medium-haul: EUR 15 per passenger • Long-haul: EUR 35 per passenger
France: ***Civil Aviation Tax (Taxe de l'aviation civile)***	Air	The number of passengers and tons of mail and freight embarked from French territory on commercial flights	The air transport company who adds it to the ticket price	As of 1 April 2014, the following rates apply: • EUR 4.36 per passenger to destinations within France (including overseas departments and collectivities), other EU Member States, Iceland, Liechtenstein, Norway and Switzerland • EUR 7.85 per passenger to other destinations • EUR 1.30 per tons of freight or mail to any destination As of 2011, the rates are revalued annually based on the consumer price index.
France: ***Solidarity Tax (Taxe de solidarité sur les billets d'avion)***	Air	The number of passengers embarked on the French territory	The air transport company who adds it to the ticket price	**Normal rate** / **Increased rate**[78] Final destination in France or the EEA: EUR 1.13 per passenger / EUR 11.27 per passenger Other destinations: EUR 4.51 per passenger / EUR 45.07 per passenger
France: ***Tax on maritime passengers embarking to nature reserves***	Maritime nav.	The number of passengers embarking in maritime transport to nature reserves and certain other protected sites	The shipping companies, which in turn add it to the ticket price.	• 7 % of the transport fee, with a maximum of EUR 1.63 per passenger • Reduced rate, if several such destinations are visited on the same day

[78] The increased rate is applied to passengers traveling first class, business class, and similar; the normal rate otherwise.

France (Corsica): ***Tax on public air and sea transport to Corsica***	Maritime nav. and air	The number of passengers embarking on or disembarking from ships and aircraft in Corsican territory in the course of commercial flights or on regular shipping lines	Paid to the authorities by airlines and sea carriers, which, in turn, directly add it to the ticket price	• EUR 1.52 per passenger for distances of less than 20 km (includes some connections from Sardinia) • EUR 4.57 per passenger otherwise
Germany: ***Air Passenger Tax (Luftverkehrssteuer)***	Air	The number of passengers departing from a German airport	The air carrier performing the departure who adds it to the ticket price	• Short-haul: EUR 7.50 per passenger (excluding VAT for domestic flights) • Medium-haul: EUR 23.43 per passenger • Long-haul (great than 6,000 km): EUR 42.18 per passenger
Italy: ***City Council Tax (addizionale comunale sui diritti d'imbarco)***	Air	The number of passengers boarding an aircraft in Italy	The air carrier collects the tax from the passengers and passes it to the airport, which, in turn, forwards it to the competent authorities	• Roma Fiumicino and Roma Ciampino Airports: EUR 7.50 per passenger • Other Italian airports: EUR 6.50 per passenger
Italy: ***Air Taxi Tax***	Air	The number of passengers transported on air taxi flights[79]	The air carrier collects the tax from the passengers and forwards it to the financial authorities	• Less than 100 km: EUR 10 per passenger and leg • Between 100-1,500 km: EUR 100 per passenger and leg • Greater than 1,500 km: EUR 200 per passenger and leg
UK: ***Air Passenger Duty (APD)***	Air	The number of passengers departing from a UK airport	The operator of the aircraft who adds it to the ticket price	**Band (miles)** / **Reduced**[80] / **Standard**[81] / **Higher**[82]

[79] Air taxi flights are described as flights by planes or helicopters operated for passenger transport under charter contracts for the entire capacity of the aircraft.

[80] Applies to passengers in the lowest class of travel available on the plane (for details see the UK country fiche).

[81] Applies to passengers in travel classes other than the lowest class available on the flight.

[82] Applies to passengers on aircraft with an authorized take-off weight of 20 tons or more, which are equipped to carry fewer than 19 passengers.

				Band A (0 - 2,000)	GBP 13	GBP 26	GBP 52
				Band B (2,001-4,000)	GBP 69	GBP 138	GBP 276
				Band C (4,001-6,000)	GBP 85	GBP 170	GBP 340
				Band D (> 6,000)	GBP 97	GBP 194	GBP 388

Source: see respective country sections in Volume 2

Chapter 4. Analysis of Competitive Distortions

Having discussed the structure of the EU passenger transport market in Chapter 2, and the rules and regulations concerning the existing VAT regime in Chapter 3, we now turn to the issue of the distortions generated (both realized and potential) by the features and the implementation of the current VAT system.

We adopt the following definition of distortion:

> *A distortion is defined as the unequal treatment of passengers and/or operators with respect to any of the parameters composing the VAT regime in force in Member States in the passenger transport sector, and which leads to economic, social, and/or environmental changes in behaviour.*

Based on a review of existing legislation, as well as feedback from operators, we have identified 15 possible distortions, categorized into 4 groups:

- **Group 1 – distortions due to different VAT rates:** Six possible distortions (1a – 1f) derived from differences in VAT rates between transport modes and markets.
- **Group 2 – distortions due to the scope of passenger transport services and associated supplies:** Two distortions (2a and 2b) derived from the definition of passenger transport services and associated supplies; namely, consumption on board ships, aircraft, and trains.
- **Group 3 – distortions due to the treatment of inputs in the passenger transport sector:** Three distortions (3a, 3b, and 3c) related to input VAT.
- **Group 4 – distortions with regard to the place of supply:** Four distortions (4a – 4d) related to the current place of supply rules and differing administrative compliance requirements among Member States.

This categorization of distortions is based on their source in a characteristic of the current VAT regime. An alternative way of categorizing them is by their impacts. In this, a distortion is considered as having an impact when the VAT regime leads to differences in the relationship between price and marginal cost between different products and services. Such distortions may occur between passenger transport and other goods, or between modes within the passenger transport market, and less possibly, between transport markets. Since different modes of transport are closer competitors than passenger transport and other goods and services, the distortions between modes would be given more attention in this assessment.

In practice, assessment of distortions by the two methods is very similar as they are both based on considerations of market impacts of differences in VAT rates, whether on outputs or inputs.

Certain distortions were more amenable to quantifiable assessment, while others were less so and, hence, are best described qualitatively. Initial impact assessments indicated that certain distortions have a much smaller overall impact than others, although the impact on particular groups of users or operators is still large. Models were developed to evaluate the distortions that were assessed quantitatively (models are described in detail in Appendix C).

This Chapter provides an evaluation of the distortion impacts based on the VAT country fiches included in Volume 2 of this report.

Assessment of Distortions

There are some common features of all passenger transport markets within the European Union that impact on the competitiveness of both their demand and supply. First, markets within transport modes tend to be concentrated, with oligopolistic interactions between operators interfering even where the markets appear to be competitive (airline and inter-urban bus alliances reflect this tendency). Competitive market equilibria tend to be unstable and quickly decline into some form of oligopoly. Many of the transport policies and regulations of the EU are designed to address these tendencies, with increasing success in most cases (such as railways) but slower progress in others (such as ferries).

Second, demand is much more heterogeneous than supply. Each passenger has an individual set of attributes (income, family circumstances, value of time, etc.) that weigh differently for each trip for which a service is sought. In contrast, the range of service attributes available for each trip is much smaller.

Third, providing transport services is a capital intensive activity. For the network based modes (such as rail and metro) the costs of fixed infrastructure are higher than for the other modes that use non-mode specific infrastructure (such as roads, seas and airspace). Investments in buses, railway coaches, rolling stock, road vehicles or aircraft in one way or another (debt or equity) make up between 15% and 25% of operating costs. These costs are borne directly by the operators and need to be recovered from fare revenue, except where the service is provided for social rather than commercial reasons and can attract a subsidy, now usually in the form of payment of a public service obligation. With large long-term fixed costs in long-lived infrastructure and average-term large investments in vehicles, operators face a wide gap between average and marginal costs and therefore need to have sophisticated tariff schemes if they are operating in competitive markets.

In part because of the high fixed costs of transport operations, providers of transport services face significant economies of scale and network benefits. Both of these characteristics give competitive advantages to larger compared to smaller operators and create significant barriers to the entry of new competitors. The response of smaller operators is often to operate a form of joint marketing that may or may not include other forms of cooperation.

Even where there appear to be multiple operators (such as on many inter-urban bus routes in Central Europe), some of them are likely to be members of a marketing group that in one way or another reduces competition; where there appears to be competition between modes, in practice the competing services might be operated by the same company. The various forms of market integration make it difficult to assess the level of competition in many passenger transport markets. Less competition is not necessarily a wholly negative outcome of service integration. Passengers benefit from operators being able to offer a more extensive range of routes and services, and from the ability to book travel to destinations that are not served directly by one operator or mode from their home city. The more choices offered in terms of routes, schedules, modes of transport and tariffs, the more competitive are its offerings.

The distortions assessed in this Chapter impact on competition between operators within a mode and between modes. The impacts are assessed separately at the national level and for the four main transport markets.

The first task in the impact assessment of each distortion was to confirm the distortion is a real (and not only a theoretical) distortion. Unequal tax treatment is a potential distortion; it then becomes a real distortion when changes in behaviour are observed, either by passengers or operators. The second task was

to determine which of the real distortions are so insignificant that their further assessment is not a priority, and the third task was a quantitative assessment, where possible and appropriate.

This assessment involved three stages:

- To assess how many Member States have VAT regimes that include features which could result in the distortion;
- To assess which proportion of passengers or transport operators in each market are likely to be impacted by the distortion. These assessments are made at both the Member State and EU-28 levels. While the main assessment is at the EU-28 level, it is also important to know the significance of the distortions at the Member State level, as some distortions that are not significant for the EU-28 as a whole can be of great significance for an individual Member State, and;
- To estimate the scale of impacts on passengers affected by the distortion.

For the quantifiable distortions (1c and 1d), an assessment of magnitude is conducted using the modelling methods discussed in Appendix C.[83]

For the non-quantifiable distortions, we have used, in addition to published information from a variety of sources, three important sets of data: questionnaires sent to and interviews with agencies representing transport operators; submissions to the Commission on the Future of VAT (of the 1,726 submissions, less than 5% were from transport operators, their representatives, or representatives of groups of passengers); and position papers and other published documents of agencies representing transport operators. An overall assessment is provided in Table 4.17, with the metric small/medium/large.[84]

Group 1: Distortions Due to Different VAT Rates

The Commission is obliged to ensure the proper functioning of the internal market. Any potential distortion existing only in domestic markets falls within the responsibility of each Member State. Such distortions have not been fully quantified; however, these distortions have been described as possible changes to the current rules (e.g. abolishing zero and reduced rates) and may have an impact on domestic passenger transport services, which should be analysed for each scenario.

1a) Different VAT Rates within One Mode at the Domestic Level

Issue: There are two main reasons why Member States apply different VAT rates within a particular transport mode. The first reason is that urban transport might be considered to have different economic and

[83] In particular, the effect of unequal rates as discussed in 1c and 1d below are assessed by (i) taking as reference a hypothetical transport market with no VAT imposed, and (ii) imposing on the affected operators or modes a VAT rate equal to the distortion under consideration.

[84] Categorization of distortions into three groups is inevitably subjective.

For those subject to quantification, the categorization depends on the markets that are impacted. For each market or combination of markets, those distortions that have an impact of generating or discouraging less than 0.1% of the total market passenger kms are categorized as small, those impacting between 0.1% and 0.5% are considered medium and those impacting more 0.5% are categorized as large. Where impacts are on a group of Member States rather than on the total, the impacts are expressed in the same percentages, but applied only to the passengers originating in or departing from the relevant Member States.

So far as is possible with subjective assessments, the categorization of the non-quantified distortions is based on their probable impacts within the same three ranges.

social impacts than inter-urban travel, for example, because of the number of trips made per person per year. For some Member States where this is considered important, a lower VAT rate is applied to a particular transport mode in urban transport than to the same transport mode when used for other domestic transport. The second reason is that some passenger trips may be considered more necessary and less discretionary than others, and so may qualify for a lower VAT rate. The application of this reason is used in certain Member States that have a lower VAT rate for regular (and hence more essential) passenger travel than for unscheduled (and so more discretionary) travel.

Description: There are 12 Member States where we identified some form of this distortion (e.g. relating to urban transport or scheduled or unscheduled service); however, these distortions often occur in very limited situations.

Urban Transport

This distortion occurs in the three Member States that have differences in VAT rates between urban and other domestic transport within bus and train modes (trams and metros have the same lower VAT rates as other urban transport modes, but they have no other domestic transport equivalent). These differences can be found in Germany, Italy, and Cyprus. In Germany, passenger transport within municipalities or for trips with distances of less than 50 kilometres are VAT rated at 7%, whereas longer distance trips are subject to the standard rate of 19%. The criteria in Italy are similar, but urban services by taxi or vessel are exempt (without credit) and non-urban and long-distance services are taxed at the reduced rate of 10%. In Cyprus, urban and rural bus transport is VAT rated at 5%, whereas tour buses and other domestic road passenger transport are rated at 9%. Furthermore, there is a special flat-rate scheme for urban taxis, which does not apply to other domestic taxi services.

Scheduled and Unscheduled Services

A distinction between scheduled and occasional services is made in the Czech Republic, Latvia, and Lithuania, and to a lesser extent in Cyprus, Denmark, Germany, and Malta.

Type of Vehicle and Other Criteria

In the UK, the main criterion for determining whether a passenger transport service will qualify to be zero-rated for VAT is, for all transport modes, the size of the vehicle (zero-rated if the vehicle has 10 seats or more), although a few other factors can also be relevant.

Related effects could also be based on special regimes, which are, for example, applied in Cyprus (lump-sum tax for urban taxis) and Poland (flat-rate scheme for taxi services). Furthermore, many Member States provide general exemptions or simplified schemes for small taxable persons (not listed below).

Table 4.1 – Summary of Different VAT Rates within One Mode (Domestic)[85]

Member State	Mode	Distortion	Gap (ppts)
Cyprus	Road	Road passenger transport services are taxed at different tax rates: • Urban taxis: flat-rate scheme	4/10/14/lump-sum

[85] This table does not take into account general VAT rules like exemptions for small enterprises applied in many Member States.

		• Urban and rural buses: 5% • Urban, intercity, and rural taxis, tour buses, and suburban buses: 9% • Others: 19%	
Czech Republic	All	Scheduled services (15%) are taxed at a lower rate than non-scheduled services (21%)	6
Denmark	Road	Tourist bus services are taxed at 25% whereas regular bus services and other domestic road transport are exempt	25% vs. exempt
Germany	All	Most short- and medium-distance transport[86] is taxed at 7%, other connections at 19%.	12
Italy	Road, inland waterways, maritime shipping	Urban passenger transport services by taxi or by any means of transport on inland waterways or the sea, is exempt; otherwise, the reduced rate of 10% is applicable.	Exempt vs. 10%
Latvia	All	Scheduled services are taxed at the reduced rate of 12% whereas other services are subject to the standard rate of 21%.	9
Lithuania	All	Approved domestic public passenger transport services going on regular routes are taxed at a lower rate (9%) than other services (21%). Transport services connected with social services are furthermore exempt (without credit) subject to certain conditions.	12
Malta	Mainly road	Scheduled bus services and special regular services[87] are zero-rated whereas other services are taxed at 18%.	18
Netherlands	Air	Domestic air passenger transport is taxed at 21%, except for transport with balloons and aircraft especially equipped for the transport of sick or injured persons (6%).	15
	Inland waterways	Providers of ferry services can opt to apply an exemption (without credit) instead of the reduced rate of 6%.	Exempt vs. 6%
Poland	Road	There is an optional flat-rate scheme for taxi services: providers can choose to pay a reduced rate of 4% VAT and in turn waive the right for any additional refunds of input VAT.	Special scheme vs. 8%
UK	All	Zero-rating depends on certain criteria: most important are the size of the vehicle (10 seats or more), the provider (providers of universal postal services), and, in the case of air passenger transport, the type of transport (scheduled flights).	20

Extent of Distortions[88]

While the differences in VAT rates apply to specific modes, the distortions that result apply to all competing modes. The proportion of EU-28 urban passenger transport that occurs in Member States that have a different VAT rate for all urban transport is around 20%, while the share of bus travel in countries

[86] The transport of passengers by rail, with motor vehicles in approved regular services, taxis, trolleybuses, cableways and similar facilities as well as on ships (in approved regular services) and ferries, if the transport takes place within a municipality or the distance is not more than 50 kilometres.

[87] E.g. the carriage of students or workers to and from educational facilities or place of work, respectively.

[88] All references to the extent of distortions are expressed as shares of passenger km.

that differentiate between scheduled and non-scheduled bus services is about 5%. The following are country details.

Cyprus

There are three types of passenger service in Cyprus and, in each, there is strong competition between buses and taxis. The latter offer shared rides on a frequent and regular schedule between most towns and cities. In cities, the minimum taxi fare is more than double (2.3 times higher) the flat-rate bus fare. The differences in VAT rates adds EUR 0.07 to the bus fare but EUR 0.31 to the taxi fare. If taxis were subject to the same VAT rate as buses, their minimum fare would reduce to only 2.1 times the bus fare. This could have a marginal impact on competition between the modes, but that competition is perhaps more influenced by the difference in type of service offered.

Czech Republic, Denmark, Latvia, and Lithuania

These Member States all have lower VAT rates for scheduled than for tourist or non-scheduled services. Some non-scheduled services, such as those provided by employers to employees, have many of the characteristics of public transport (i.e. operating on fixed routes and fixed schedules). There is no published data on the scale of these types of services, so the extent of the competition they provide to scheduled buses cannot be determined. The fact they are able to reclaim VAT on inputs significantly reduces the impact of their operators being subject to VAT.

Netherlands

Historically, the only domestic air passenger services in the Netherlands were from Amsterdam to Eindhoven and Maastricht, and these exhibited zero passenger kilometres (PKM) in the TREMOVE model. However, both services have been closed for several years and there are currently no domestic flights in the Netherlands.

Germany

The distortion for Germany is different than that of other Member States, as it applies to all short distance passenger trips. That is, most trips take place in urban areas. To estimate the impact of this distortion, we have compared the current PKM for urban areas in Germany and the current VAT rates (from the TREMOVE model, Table 4.1.1) with those that would result from applying the same VAT rate of 19%, which is used for other passenger transport. The difference between the resulting PKM is taken as a measure of the extent of the distortion. The overall effect of the distortion is an increase in the number of urban transport PKM by about 3.3%, slightly more for rail (4.2%), and rather less for metro (2.7%) and bus (2.4%). The increase in PKM comes at the price of a loss of VAT revenue, which would be about 79% overall for urban transport passengers. Given the large difference in the VAT rates, the gain in PKM might be expected to be larger. However, the relatively low elasticity of demand results in a small overall reduction in urban PKM, and the application of the distortion to all urban transport modes makes its impact on modal shares very small.

Table 4.1.1 – Effects of Reduced Rates in Germany

	Metro	Bus	Rail	Total

Current PKM (million)	17,186	27,254	38,779	83,219
PKM with VAT at 19% (million)	16,717	26,611	37,157	80,485
Reduction in PKM (million)	512	702	1,834	3,048
% Change	2.7%	2.4%	4.2%	3.3%
Current VAT Revenue (EUR million)	1,203	1,908	2,714	5,825
Revenue with VAT at 19% (EUR million)	5,056	7,060	15,292	27,408
Loss of VAT revenue (EUR million)	2,154	3,436	4,914	10,504
% Loss	76.2%	73.0%	82.2%	78.7%

Italy

The distortion from the exemption of urban taxis from VAT in Italy is almost the reverse of that of the UK, where taxis are the only mode that is not zero-rated for VAT. By making taxi services exempt rather than rating them at zero takes away some of the advantage they would otherwise receive from being able to reclaim the VAT on their inputs. A recent survey of world taxi prices ranked Rome as 23rd highest, with a minimum fare per kilometre of about EUR 2.24, which was slightly less than Brussels and Paris. If the same VAT rate of 10% that applies to other urban transport modes was applied to taxis, the minimum fare in Rome would increase to about EUR 2.50 per kilometre, which is slightly higher than Brussels and Paris, and 20th highest in the ranking. A three-kilometre taxi ride at the current rate would cost about EUR 6.70, or more than four times the bus fare for unlimited travel of 100 minutes. Taxis are not competing for the same share of the market as buses, so exempting taxis from VAT does little to distort the competition between the two.

The other impact of the exemption in Italy relates to exempting domestic maritime services from VAT without a right to recovery of VAT, whereas intra-EU and extra-EU maritime services are zero-rated. Therefore, the distortion arises as input VAT can be recovered in two markets but not in the other.

There were about 33 million non-cruise passengers using Italy's ports in 2012, nearly all of them passengers on the many services to Sicily, but also to Sardinia, Elba, Capri, and several smaller islands. There are also ferry services on several of the lakes. These services are VAT exempt without the right to reclaim input VAT, whereas international ferry services, such as the many across the Adriatic, are zero-rated (as international maritime services) and, therefore, are able to reclaim VAT on their inputs. This difference in treatment of input VAT does not affect the competition between domestic and international maritime services as they serve different markets. It also does not affect competition between the international services provided by Italian operators and their competitors based in other countries or with air services as all have the same zero-rated VAT treatment. The inability to reclaim input VAT on domestic ferry services does somewhat reduce the advantage that comes from the exempted rate they benefit from compared to other transport modes, which are VAT rated at 10%.

The VAT on inputs for a ferry operator that has a fare of EUR 100 is about EUR 8 to EUR 10 of a base ferry fare of EUR 70 (typical of Naples to Palermo). However, on most routes, ferry transport already has

lower fares but longer travel times than air transport. There is a limited market in which air and ferry transport compete, and in these markets, an additional 8% to 10% of total operating costs could change the competitive balance. The markets where the two modes compete could be for business passengers on trips of several days (for which the extra travel time is less important) or non-business passengers also on trips of several days, so that inclusion of the hotel cost in the total trip cost can make the impact of the higher airfare less important.

On lake ferries, the market for most passengers is very different, being more for the travel itself than to arrive at a specific destination. In this market, there is no close competition, so the impact of the cost of non-recoverable VAT only affects the total demand and not the competition with other modes.

Poland

The optional flat-rate VAT scheme for taxi operators in Poland is similar in effect to the schemes in other Member States that have special provisions for small companies. These schemes usually require a maximum turnover to access the special provisions, thus the Polish scheme has a wider impact in that it applies to taxi companies, whose turnover would be above the thresholds for the schemes in other Member States. With lower taxi fares in Poland than in Italy (the minimum fare in Krakow is only EUR 1.50 per kilometre and ranks 38th highest), a taxi operator would need at least two vehicles to reach the threshold turnover of EUR 100,000. The loss of the right to reclaim VAT on inputs reduces the financial benefit to taxi operators; however, the administrative simplification could be enough to make the flat-rate scheme seem attractive to operators of one or two taxis.

UK

The impact of the UK distortion, which applies a zero VAT rate to all public transport vehicles with 10 or more seats, is addressed under Distortion 2a.

The remaining distortions have an even more limited impact than those described.

Overall, this distortion has a small impact on demand or inter-modal competition. However, in a few specific instances, it could have some impact on demand and mode shares in urban transport.

The UK vehicle size criterion applies to all modes; however, there are a few air and rail passenger service vehicles that are excluded by this criterion. This distortion primarily affects urban transport where it excludes taxis and certain mini-buses from qualifying for a zero VAT rate. UK urban transport accounts for about a 13% share of all EU-28 urban passenger transport.

With the exception of that of Germany, distortions of this type have little impact on competition in urban public transport markets, as they mostly offer a small cost advantage to the taxi mode, which does not usually compete on price, but rather on convenience, speed, and comfort. Where the distortion applies to type of bus service (scheduled or other), there could be some competitive impact on those competing unscheduled services that operate in the same market.

Even the distortion in Germany, which applies to urban transport as a whole, compared to domestic transport, rather than to one mode compared to the others within urban transport, does not have a large competitive effect. This is because it applies to all competing modes and they have similar tariffs.

1b) VAT Rates between Modes at the Domestic Level

Issue: The application of different VAT rates to domestic transport modes is aimed at influencing the modal share of specific modes.

Description: The application of different VAT rates to the various modes of domestic transport within a Member State is not very common. Unambiguous examples include the Netherlands, where domestic air travel is taxed at the standard rate of 21%, whereas all other modes benefit from a reduced rate (6%); Belgium, where only maritime shipping is zero-rated and other modes are taxed at 6%; and Cyprus, where the standard rate (19%) is applied to transport by air and inland waterways, and maritime shipping is taxed at the reduced rate of 9%. Road transport in Cyprus is subject to 3 different rates (19%, 9%, and 5%).

Table 4.2 – VAT Rates between Modes (Domestic)

Member State	Road	Rail	Inland Waterways	Maritime Shipping	Air	Gap (ppts)
Belgium	6%	6%	6%	0%	6%	6
Cyprus	5/9/19% flat-rate	n.a.	19%	9%	19%	14
Netherlands	6%	6%	6% (ex.)	6%	21% (6%)	15

It is more common that the VAT rate depends on particular provisions, which are, in theory, applicable to all modes of transport; however, some modes will benefit more than others. An example is Germany, where domestic high-speed rail (HSR) and other inter-city rail travel is subject to the standard rate, in most cases, because of a distance exceeding 50 kilometres, whereas taxi transport will usually benefit from the reduced rate as a mainly local service (less than 50 kilometres). Similar situations can also be found in the UK, where the application of the zero rate usually depends on the size of the vehicle. Consequently, long-distance taxi services and minibuses are nearly always taxed at 20%, whereas passenger transport by train is mostly zero-rated. Finally, Member States that tax certain scheduled services at a lower rate (e.g. the Czech Republic, Malta, and Lithuania) belong to this category, since rail transport is almost exclusively scheduled, whereas bus transport is not. For details on such cases, see 1a above.

Extent: The extent and impact of this type of distortion are both very limited, as they are confined to Cyprus, where domestic passengers only account for 2% of total air passengers and services are only available on one route.[89]

The extent of the distortion of different VAT rates on scheduled and unscheduled services and of the UK vehicle size distortion are described and estimated under distortion 2a. The other distortions in this group have a minimal impact on competition between transport modes, as the modes with different VAT rates do not compete strongly with each other (e.g. with very few exceptions, taxi and HSR travel in Germany). Finally, there are also cases where lower rates, special schemes, or exemptions are only available for certain modes, or the modes profit in different degrees (e.g. an exemption for ferries in the Netherlands; a reduced rate for most bus transport in Germany restricted to approved regular services, in addition to the distance

[89] Economics of Air Transport in Cyprus, Oxford Economics, 2011

criterion, but not for rail and air; an exemption for urban transport in Italy only available for taxi in water transport and the like (for details see 1a)). Most of these have a limited impact.

1c) Different VAT Rates within One Mode of Transport between Domestic, Intra-EU, and Extra-EU Transport

Issue: For all Members State, there are policy reasons to encourage transport in one market over another. This objective can be supported through different VAT rates in different markets for the same transport mode.

Description: This distortion is one of the most widespread and particular gaps between domestic and intra-EU VAT rates are quite high, to the extent that a few Member States have devised schemes to eliminate the differences in certain situations.

All 28 Member States apply higher VAT rates to domestic passenger transport than to intra-EU and extra-EU transport, at least for some modes or in some situations (UK).

Table 4.3 – Gap between Rates for Domestic and International Transport by Mode

Member State	Road	Rail	Inland Navigation	Maritime Navigation	Air	# Modes / Gap
Austria	0	0	10(0)	n.a.	10	2 of 5
Belgium	0	0	0	0	6	1 of 5
Bulgaria	20	20	20	20	20	5 of 5
Croatia	0	0	25	25	25	3 of 5
Cyprus	5/9/19	n.a.	n.a.	9	19	3 of 3
Czech Republic	15/21	15	15/21	n.a.	15/21	4 of 4
Denmark	Inp. (25)	Inp.	Inp.	Inp.	Inp.	5 of 5
Estonia	20	20	20	20	20	5 of 5
Finland	10	10	10	10	10	5 of 5
France	0 (10)	10 (0)	0	10	10	3(4) of 5
Germany	0	0	0	7/19	19 (7)	2 of 5
Greece	0	0	0	13	13	2 of 5
Hungary	27	27	27	n.a.	27	4 of 4
Ireland	Inp.	Inp.	Inp.	Inp.	Inp.	5 of 5
Italy	10 (Inp.)	10	10 (Inp.)	10 (Inp.)	10	5 of 5
Latvia	12/21	12	12/21	12/21	12/21	5 of 5
Lithuania	9/21	9	9/21	9/21	9/21	5 of 5
Luxembourg	3	3	3	n.a.	3	4 of 4

Malta	n.a.	n.a.	n.a.	0/18	18	1/2 of 2
Netherlands	0	0	0	6	21 (6)	2 of 5
Poland	0	8	0	8	8	3 of 5
Portugal	6	6	6	6	6	5 of 5
Romania	24	24	24	24	24	5 of 5
Slovakia	20	20	20	n.a.	20	4 of 4
Slovenia	0	9.5	9.5	9.5	9.5	4 of 5
Spain	0	0	0	10	10	2 of 5
Sweden	6	6	6	6	6	5 of 5
UK	0(20)	0	0 (20)	0 (20)	0 (20)	1[90] of 5
Number of Member States[91]	**16**	**18**	**18**	**21**	**27**	
Note: inp. = right to deduct inputs						

There are 14 Member States that zero-rate all international services irrespective of mode of transport while at the same time apply a positive VAT rate to all modes of domestic transport:[92]

- In five countries, this is the standard rate (Bulgaria (20%), Estonia (20%), Hungary (27%), Romania (24%), and the Slovak Republic (20%));
- In three countries, all domestic transport is subject to the reduced rate (Finland (10%), Portugal (6%), and Sweden (6%)). In Luxembourg, domestic transport is subject to a super-reduced rate of 3%; and,
- In five countries, domestic transport is taxed at different rates (Cyprus (5/9/19%), the Czech Republic (15/21%), Italy (10%/exempt),[93] Latvia (12/21%), and Lithuania (9/21%)).

Special cases are Denmark and Ireland, where both domestic[94] and international transport are exempt, but input VAT may only be deducted with respect to international transport.

Of the remaining Member States, rate gaps between domestic and international transport occur for the following modes:

- All modes except for road: Slovenia (9.5%),
- Inland waterways, maritime shipping, and air: Croatia (25%),
- Rail, maritime shipping, and air: France (10%)[95] and Poland (8%),

[90] Only in certain situations, since most domestic road passenger transport is zero-rated as well.
[91] Not including MS, where this gap applies only in certain situations.
[92] The relevant tax rate is indicated in parentheses.
[93] Domestic urban transport by taxi or ship is exempt, but input VAT may not be deducted.
[94] In the case of Denmark, with the exception of tourist bus services.
[95] Additionally, road up to a certain extent (zero-rating of occasional bus transport of foreigners).

- Inland waterways and air: Austria (10%),
- Maritime shipping and air: the Netherlands (6%/21%), Germany (7%/19%), Spain (10%), and Greece (13%), and
- Air: Belgium (6%)

In Malta, domestic travel is subject to higher VAT in the case of air transport (18%). With respect to road and maritime transport, this is mostly restricted to non-scheduled services like sightseeing tours. In the UK, domestic transport is taxed at higher rates in certain limited situations.

Related effects could also be based on special regimes, which are, for example, applied in Germany (i.e. journey specific VAT assessment for foreign buses entering Germany at a third-country border) and Greece (i.e. possible lump sum tax for foreign buses).

Extent: The impacts of this type of distortion are difficult to estimate quantitatively, as they are potentially widespread and complex. Unlike distortions related just to one market, where potential impact can be estimated from market size, distortions of this type may have an impact on demand between markets. The markets that may be impacted are domestic, intra-EU, and, to a lesser extent, extra-EU. Since all Member States have some form of VAT discrimination between markets and within modes, the potential extent of this distortion covers all Member State and transport modes.

However, the practical impact of the distortion is less than its potential one, as there is only limited competition between the markets that could be influenced by transport fares. Passenger travel choices are conventionally considered as a three-stage process: first, a choice of destination, followed by a choice of mode, and then finally by a choice of route. Although, increasingly, the latter choices are simultaneous. Choice of destination and, accordingly, of travel market is, to some extent, influenced by transport fares (and so by VAT rates) for some non-business travel, but choice of destination for business travel is usually determined by factors other than fare.

To estimate the extent of this distortion, we have compared the current VAT regime with a comparator in which the VAT rate is same for each mode in the three markets to which the distortion applies (intra-EU, extra-EU, and domestic), but not necessarily the same rate for each mode. The metro mode is only relevant in the urban transport market, so has not been considered to be relevant to this distortion. Bus transport is currently VAT rated at a wide range of rates between markets and countries, the most frequent being the national reduced rates used in 17 Member States that account for just over 40% of bus PKM in the three relevant markets. Therefore, we used the reduced VAT for each country as the comparator (so bus passenger transport was rated at the reduced national rate in all markets). For rail, we have used the same comparator: the national reduced rate for all markets. However, for air passenger transport we have used the zero-rate in all three markets, as is this rate already applies to all Member States for extra-EU and intra-EU passengers and to all but two for domestic passengers.

This is only one of many different sets of comparator VAT rates that could have been used. The results for others can be found in the assessment of Scenarios in Chapter 6. For example, setting the comparator VAT rate to the standard rate for all modes can be found in the assessment of Scenario 1, while that of setting to the reduced rate for all modes can be found in that for Scenario 2.

Table 4.4 – Loss in PKM from Distortion 1c[96]

Mode	Market	Change in PKM (million)	% Change
Air	Intra-EU	0	0.0%
	Extra-EU	0	0.0%
	Domestic	1,452	3.1%
Bus	Intra-EU	-10	-0.1%
	Extra-EU	0	0.0%
	Domestic	1,017	0.3%
Rail	Intra-EU	-147	-0.7%
	Extra-EU	0	0.0%
	Domestic	-468	-0.2%
Total	Intra-EU	-157	-0.1%
	Extra-EU	0	0.0%
	Domestic	2,001	0.3%
Sum of positive distortions (increase in PKM		2,469	0.4%
Sum of negative distortions (reduction in PKM)		-625	-0.1%
	Total	1,844	0.3%

The impact of this distortion on PKM is small, as it reduces PKM by about 1.8 billion, or 0.3% of the total. The largest impact in absolute and percentage is for domestic air passengers, where the zero VAT rate in the comparison is lower than the standard and reduced rates were currently applied (where the current rate is zero, there is no distortion). The loss in PKM is about 1.5 billion, or 3.1%. The next highest impact of the distortion is for buses in the domestic market, where the distortion results in a loss of about 1.0 billion PKM, or about 0.3% of the total.

There are very few practical examples of where passengers might be able to take advantage of the difference between domestic and intra-EU VAT rates. One situation is where, instead of traveling directly from an origin to a domestic destination ('true' destination), passengers might travel on an intra-EU trip (therefore incurring a lower VAT rate) to a destination just over the border ('false' destination) from their true destination, and then take another intra-EU trip back to the true destination. For this to be advantageous, the additional cost of traveling the extra distance to the false destination then back to the true destination would have to more than the VAT saved on what would have been the domestic trip to the true destination. For this to be possible, the origin and true destination must be a long distance apart to generate enough VAT saving to cover the cost of the extra distance, and the true and false destination must be close enough together to keep the additional transport cost as low as possible.

[96] A negative entry in the table indicate that the PKM with the current VAT rates are higher than they could have been with the comparator rates

After examining more than 20 possible instances[97], we found only two where it might be feasible; in all others the fare from the origin to the 'false' destination would be more than the cost to the true destination. In the first instance, a passenger from Paris with a true destination of Menton would incur a train fare of EUR 154,[98] whereas going to a 'false' destination of Ventimiglia (Italy) would incur a fare of EUR 152. However, the return fare to Menton would be EUR 5 making this trip more expensive than the direct one, but if private transport were available, the objective would be achieved.

In the second instance, a passenger traveling from Paris to Strasburg has two options for the 'false destination: Offenburg and Kehl (both in Germany and neither with a direct train service from Paris, a change must be made at Strasburg). Among the many possible fare options is a reduced fare from Paris to Offenburg for EUR 70, but this is the same as the least cost direct fare EUR 70 and so offers no advantage. However, from Paris to Kehl there is a EUR 58 fare available, which together with a Kehl to Strasburg fare of EUR 4, is a total fare of EUR 62, which is EUR 8 less than the direct fare. Therefore, with these fares, a passenger would be able to take advantage of the distortion with a savings in fare of about 10%. However, using only regular price tickets, there is no advantage as Paris to Strasbourg is EUR 80 and Paris to Offenbach or Kehl is EUR 82. Subsequently, the opportunity of the lower fare is more a result of incentive fares more than differences in VAT rates.

1d) Different VAT Rates between Different Modes of Transport for Intra-EU and Extra-EU Travel

Issue: There has been a long-term international community reluctance to tax international trade, of which international passenger transport is an integral part. The current VAT rules of Member States are a mixture of some zero-rating only air and maritime transport and some extending the zero rate to one or more other modes of transport.

Description: Whereas all Member States zero-rate intra-EU and extra-EU air and maritime passenger transport, 10 Member States apply positive tax rates to extra-EU road passenger transport, 7 to rail transport, and 6 to inland navigation. The gap between the rates applied to the different modes of intra-EU and extra-EU passenger transport within the same Member State ranges from 6 to 25 percentage points.

Table 4.5 – Gap between VAT Rates Applied to Transport Modes in Intra-EU and Extra-EU Passenger Transport

Member State	Road	Rail	Inland Navigation	Maritime Navigation	Air	Gap (ppts, highest to lowest)

[97] These instances were selected based on satisfying a criterion that the VAT on the cost of the domestic trip be less than the sum of the travel cost to an intermediate intra-EU destination and the return trip to the true domestic destination. Most instances that satisfy this criterion require that the distance between the origin and true destination be of the order of 1,000km, so the distortion is unlikely to occur for small Member States. As an example, with a distance of 1,000km between the origin and true domestic destination, a fare of €0.20 per km and a domestic VAT rate of 10%, the travel cost would be the same as travel to an intermediate destination that is 50km further than the domestic destination, the same per km fare but without any VAT. Any shorter domestic distance would make the alternative more expensive.

[98] All fares are based on a one week advance purchase, for one way travel on a Wednesday in October 2014

Austria	10%	10%	0% (10%)	n.a.	0%	10
Belgium	6%	6%	6%	0%	0%	6
Bulgaria	0%	0%	0%	0%	0%	0
Croatia	25%	25%	0%	0%	0%	25
Cyprus	0%	n.a.	n.a.	0%	0%	0
Czech Republic	0%	0%	0%	n.a.	0%	0
Denmark	0%	0%	0%	0%	0%	0
Estonia	0%	0%	0%	0%	0%	0
Finland	0%	0%	0%	0%	0%	0
France	10%	0%	10%	0%	0%	10
Germany	19%/7%	19%/7%	19%/7%	0%	0%	19/7
Greece	13%	13%	13%	0%	0%	13
Hungary	0%	0%	0%	n.a.	0%	0
Ireland	0%	0%	0%	0%	0%	0
Italy	0%	0%	0%	0%	0%	0
Latvia	0%	0%	0%	0%	0%	0
Lithuania	0%	0%	0%	0%	0%	0
Luxembourg	0%	0%	0%	n.a.	0%	0
Malta	n.a.	n.a.	n.a.	0%	0%	0
Netherlands	6%	6%	6%	0%	0%	6
Poland	8%	0%	0%	0%	0%	8
Portugal	0%	0%	0%	0%	0%	0
Romania	0%	0%	0%	0%	0%	0
Slovakia	0%	0%	0%	n.a.	0%	0
Slovenia	9.5%	0%	0%	0%	0%	9.5
Spain	10%	10%	10%	0%	0%	10
Sweden	0%	0%	0%	0%	0%	0
United Kingdom	0%	0%	0%	0%	0%	0

If we take the gap between international air transport and HSR transport, which are likely competitors in some markets, as an example, the numbers are:

- 19 Member States apply the same rate to both modes of transport;
- For 4 Member States, the gap is 10% or lower (6% for Belgium and the Netherlands, 10% for Austria and Spain);
- For another 2 Member States, the gap is between 10% and 20% (13% for Greece and 19% for Germany); and,
- For Croatia, the gap is 25%.

However, especially in the cases of Greece and Croatia, the substitutability between international air and rail transport is currently very limited. Cyprus and Malta currently do not operate a rail system; therefore, this comparison would not make sense for them.

Another example of different modes of transport potentially competing is that of bus and rail services. Here, three Member States apply lower rates to international rail transport than to road transport: Slovenia (0% vs. 9.5%), Poland (0% vs. 8%), and France (0% vs. 10%[99]).

Table 4.6 – Comparison between Modes in Intra-EU and Extra-EU Transport

Intercommunity and extra-EU passenger transport by ...1	… is taxed at a higher rate than … (# of Member States)				
	Road	**Rail**	**Inland Navigation**	**Maritime Navigation**	**Air**
Road	-	3	3	10	10
Rail	0	-	2	7	7
Inland Navigation	0	2	-	7	6
Maritime Navigation	0	0	0	-	0
Air	0	0	0	0	-

Remark: The table reads: "The rate applied to international passenger transport by road is higher than the rate for rail in 3 Member States, higher than the rate for inland navigation in 4 Member States, and higher than the rate for maritime navigation and air in 10 Member States.

Extent: This distortion applies to the difference of VAT rates between modes in intra-EU and extra-EU markets. To estimate of the extent of the distortion, we have compared the current VAT rates with a situation in which all modes would be zero-rated, this being the rate that is used in 80% of the country and mode combinations in these two markets.

The impact of the distortion is insignificant overall in terms of bus and rail passenger kms, resulting in a loss of some 0.5 billion PKM, less than 1% the total, but more significant in terms of revenues for affected operators reducing them by 2% - 3%. The situation is evolving as HSR services expand (these still do not

[99] Some bus services for foreign travellers are however exempt.

serve large parts of the intra-EU market, even at the average trip length of almost 700 kilometres in the intra-EU market), and therefore the distortion could increase over time.

Table 4.7 – Loss of PKM from Distortion 1d

Market	Mode	Increase in PKM	% Increase
Intra-EU	Air	0	0.0%
	Bus	156	1.2%
	Rail	147	0.5%
Extra-EU	Air	0	0.0%
	Bus	82	3.4%
	Rail	78	2.7%
Intra-EU	Total	303	0.1%
Extra-EU	Total	160	0.0%
Total	Total	463	0.0%

Box 4.1 – A Special Case of Intermodal Competition - Night trains

Night trains have been part of the European passenger transport scene since the middle of the 19th century. Now they compete with low cost airlines, daytime HSR trains and inter-city express buses. There are still more than 20 advertised night train services operating within and between Member States, but this number has significantly declined in the last few years. Examples include:

- Paris to Barcelona and Madrid (which used variable gauge coaches to avoid passengers having to transfer) was discontinued in December, 2013;
- Paris to Rome, a France-Italy joint venture direct sleeper service discontinued at the same time;
- Brussels to Copenhagen ceased from 1 November, 2014;
- Paris to Berlin and Hamburg and Munich services will end in December 2014;
- Amsterdam to Prague and Warsaw services will be cut back to run only from Cologne at the same time;
- Berlin to Warsaw and Kiev was withdrawn in 2010, and the weekly Sibirjak service to Siberia at the end of 2013.

Rail operators have cited several reasons for the reduction in services, all related to a reduced demand, as much as 25% over the last five years on some routes. The most frequent cited causes are the rise of low-cost airlines, more daytime HSR services that allow return trips to be made avoiding overnight stays (one of the advantages of sleeper trains, and expanded inter-city bus services.

The Caledonian Sleeper between London and three destinations in Scotland, is one of two remaining night train services in the UK. It operates under a separate concession (recently re-awarded for 15 years) to other train services between England and Scotland. The concession agreement includes a capital subsidy of about €120m (for new coaches and station upgrading). The other UK sleeper service between London and South West England is operated as part of a broader passenger service concession. Although it once had an operating subsidy (PSO) of about €8m per year, this is no longer available but the number of passengers was reported as increasing in 2010.

Deutsche Bahn has cited the need for passengers to pay VAT on rail but not on rail services as a contributing factor. The UK is one of the few Member States that has the same VAT rate for all domestic passenger transport modes, but even without this distortion only one sleeper train is financially viable. One report cited the costs of estimating and paying track access charges and VAT to different administrations as a possible additional contributing factor.

Of the Member States that have cancelled night train services, Germany (19%), Spain (10%) Netherlands (%) and Belgium (%) charge VAT on intra-EU rail services but not on air services.

In practice, competitive distortions only affect the limited country and market combinations where there is potential competition between modes in the absence of VAT considerations. Depending on the distance between the origin and destination cities, there could be two or three competing modes. Up to distances of about 350km, rail and bus are the competitive modes, with air services only competing at the upper limits of the range. But the range of distances at which bus is competing with low-coat airlines is expanding as to some extent they are operating in the same market, that for passengers looking for a low-cost service and who are not very sensitive to time considerations.

Table 4.7.1 Bus and rail competitive city pairs

City A		City B		Rail distance (km)
Strasbourg	FR	Stuttgart	DE	162
Constanta	RO	Varna	BG	251
Turin	IT	Grenoble	FR	270
Lisbon	PT	Badajoz	ES	277
Bialystok	PL	Kaunas	LT	286
Paris	FR	Brussels	BE	332
Gothenburg	SE	Oslo	NO	365
London	UK	Brussels	BE	377

From about 350km to 800km rail and air[100] are competitive, with bus services being competitive only in non-time sensitive segments of the market. Typical of cities close to the upper limit of this range are:

Table 4.7.2 Rail and air competitive city pairs

City A		City B		Rail distance (km)
Warsaw	PL	Vilnius	LT	595
Berlin	DE	Warsaw	PL	602
Sofia	BG	Istanbul	TR	621
Copenhagen	DK	Stockholm	SE	648
Warsaw	PL	Prague	CZ	653
Madrid	ES	Lisbon	PT	665
Paris	FR	Turin	IT	780
Berlin	DE	Brussels	BE	794

Taking the last two these two of these city pairs, Paris to Turin and Berlin to Brussels as examples, where there is a direct HSR service (Paris to Turin) the rail service is competitive on time with air although its

[100] Rail and bus distances between cities can be much longer than air distances. Since rail is competitive over a large range of distances we have used rail distances in Tables 4.7.1 and 4.7.2

fare more than 50% higher. Bus has the lowest fare but is not competitive for most passengers on a basis of time. Where there is only a connecting HSR service (Berlin to Brussels requires a change of train in Cologne) the time is less competitive and does not permit a return trip within one day. The rail fare is even less competitive than for Paris to Turin. Part of the reason for this is that the rail fare is liable to VAT both for its part in Germany (at 19%) and its part in Belgium (at 6%), giving an average VAT rate of 14%. Without the VAT the rail far would be about € 127, still more than double the lowest air fare[101].The Paris to Turin rail fare is not subject to VAT in France or Italy.

Table 4.7.3 Comparison modes for typical city pairs

	Paris to Turin		Berlin to Brussels	
Mode	Fare in €	Time in hours	Fare in €	Time in hours
Bus	50+	12+	70+	11+
Rail	110+	5.6+	145+	7+
Air	70+	5.5	60+	4+

Based on the data in the CPM, about 25% of intra-EU city pairs are less than 350 rail kilometres apart, 50% are between 250 and 750 kilometres apart, and the remaining 25% are more than 750 kilometres apart. Therefore, bus and rail are competitive in about 25% of the city pairs, bus and air in approximately 50%, and in the remaining 25%, air transport does not have significant competition. There are few Member States that have different VAT rates for Intra-EU passengers on bus and rail (France and Poland) so few city pairs at distances of less than 350 kms where this distortion could impact on competition between these modes.

These percentages are approximate and are changing as more direct long distance city-to-city bus services become available (e.g. increasing the 350 kilometre limit in which bus and rail are competitive, as more HSR services are introduced and hence, increasing the proportion of cities in the 350 kilometre to 750 kilometre range in which rail and air are competitive), and as more low cost air passenger services are available (bringing an extended passenger market into the same distance range).

1e) Different Delimitation between Domestic, Intra-EU, and Extra-EU (Two-Sector Trips)

Issue: This distortion results from Member States having different interpretations of how to define the three transport markets (domestic, intra-EU, and extra-EU), and this impacts those passenger trips that could be considered as taking place partially in two or more markets. There could also be an issue of Member States applying different definitions of the markets to maximize VAT revenue rather than to maximize the overall economic benefit of passenger transport.

Description: A few Member States consider the domestic sections of international trips to be part of the international trip, if the connection indicated on the ticket is international (Finland, Lithuania, and

[101] Al the fares are city center to city center so the air fares include bus or rail transport to/from the airports to the city center, in most Member States subject to domestic VAT rates.

Poland). In Croatia, the ticket specification is also decisive, but this is restricted to air and sea transport; Luxembourg and Italy also refer to a single contract.

Extent: This distortion usually applies to intra-EU and extra-EU passenger trips that have a stopover or interchange at an intermediate airport or terminal (possibly rail terminal) that is within the Member State in which the trip originated. This distortion arises because of the different VAT rates that some Member States apply to domestic and international air passengers.

However, the Member States that currently apply this distortion (i.e. they apply domestic VAT to the domestic section of international trips) account for approximately 14% (or approximately 30 billion) of the PKM which could be impacted by this distortion (e.g. those who are making a connecting international trip from a domestic trip through an airport located in the Member State in which their trip originates).

Airlines that provide interconnecting domestic and international flights tend to have lower yields for a connecting service than they would from ticketing the two sections of the trip separately. This suggests that they prefer to ticket two direct journeys rather than sell a through ticket for the domestic and connecting trip.[102] The use of a through ticket from the origin to final destination makes it easier for a Member State that applies VAT for the domestic section of such trips to identify the domestic part as being a section of what is really an international trip. If the passenger travels on two separate tickets, it is very difficult for the domestic ticket to be identified as relating to an international trip. Through ticketing is common for international air travel and for Intra-EU rail travel, particularly for HSR services. It is less common for international bus travel, making the domestic sections of international bus trips more difficult to identify and therefore to apply domestic VAT to them.

There is no data available for the number of domestic-international connecting rail passengers, but the number is much smaller than for air passengers as there are fewer domestic-international rail connections available for rail. Even if the number of interconnecting rail and bus passengers in the Member States impacted by this distortion were as many as the number of air passengers (approximately 90 billion PKM), this would still represent only about 16% of all international PKM (720 million PKM).

Where the domestic section of the international trip can be identified, and for those Member States that apply VAT to these sections, the addition of the national VAT is the fare will have only a small impact on competitiveness. For the intra-EU city pairs included in the CPM database, the domestic section is an average of just over 300 kms. If the average domestic fare is EUR 0.15 per kilometre and the average VAT rate on domestic passenger travel is 12%, adding VAT to the domestic portion of the trip would add EUR 5.40 to a total fare of EUR 225, an increase of about 2.4%. From the elasticities in the TREMOVE and CPM models, a change in fares of this order would reduce the number of trips by 0.8%, a small magnitude.

1f) Lower VAT Rates Applied in Certain Regions

Issue: Some Member States have economic and social policies aimed at stimulating the economies of specific territorial regions by attracting additional tourists, and part of the implementation of these policies can be to apply a lower VAT rate for passenger travel to and from these regions than for other domestic

[102] Connecting Passengers at UK Airports, Civil Aviation Authority, 2008

transport. Part of the objective of these VAT incentives is to attract potential tourists from competing Member States and other countries.

Description: We found two Member States that apply lower VAT rates with respect to passenger transport in certain regions:

- Portugal: Madeira (5% instead of 6%) and the Azores (4% instead of 6%). Some passenger transport between the mainland and the Autonomous Regions of the Azores or Madeira as well as between those Regions and between the islands within these regions is zero-rated.
- France: Corsica (within the island, 2.1% instead of 10%). In addition, passenger transport between continental France and Corsica is zero-rated, except for the section in continental France.

Furthermore, passenger transport services to some regions are treated as international because they are not part of the national (and European) VAT area (e.g. the Canary Islands, Ceuta and Melilla (Spain), Helgoland (Germany), the French overseas departments and territories, the Åland Islands (Finland), and the Channel Islands (UK)). These are not considered as VAT distortions but simply are the result of the application of VAT territoriality rules.

Extent: The regions that benefit from these distortions account for a small share of the total population of the Member State of which they are a part. The Azores and Madeira, together, comprise 5% of the population of Portugal, while Corsica comprises only 0.5% of the population of France.

The different VAT rates applied are only a few percentage points different from those applied to other domestic passenger transport, and with the exception of fares to Corsica, make a small impact on passenger fares to these regions. The difference in VAT rates is aimed at attracting non-business passengers, as business passengers can reclaim the VAT charged on their fares.

For many non-business passengers, the air or ferry fare to and from their destination is less than half the total cost of their trip.[103] With a low cost five-day package holiday from Lisbon to Funchal, costing about EUR 250 per person, the airfare component of EUR 50 would be only 20% of the total cost. The VAT share of the airfare would be approximately EUR 2.50 and only EUR 0.5 less than it would have been with the full domestic air VAT applied. This distortion would only have increased the cost of the total trip by 0.2%. The increase in total cost for comparable trips to Corsica (e.g. from Marseille) would have been more, but still less than 1%.

From Marseille to Ajaccio, the airfare is more than double than the ferry fare. The difference in the VAT savings between air and ferry transport with regional VAT rates is nearly EUR 6.00, which, with an overall travel cost of EUR 250, would represent a difference of about 2.5% and may affect competition between the modes (although it would make the more expensive mode slightly more expensive, but would not change its ranking).

Table 4.8 – Estimated Impact of VAT Distortion 1f

Origin	Lisbon	Lisbon	Marseille	Marseille
Destination	Funchal	Terceira	Ajaccio	Ajaccio
Mode	Air	Air	Air	Ferry

[103] http://www.telegraph.co.uk/travel/destinations/europe

Current Fare	46	70	88	30
Current VAT pass rate	0%	0%	0%	0%
Domestic VAT pass rate	6%	6%	10%	10%
Fare using Domestic VAT	48.8	74.2	96.8	33.0

Source: Air and Ferry fares from Rome2Rio; VAT rates from Chapter 3

For all combinations of itinerary and transport mode considered, the lower regional VAT rate has little impact on total fare and even less of an impact on the total cost of travel. The proportion of national tourists to each of the two destinations is about one-third for Madeira[104] and about two-thirds for Corsica.[105]

This is, therefore, considered a small distortion.

Group 2: Distortions Due to the Scope of Passenger Transport Services and Associated Supplies

2a) Definition of Passenger Transport and Related Incidental Services

Issue: Most Member States have a clear directive in their legislation regarding which passenger services are subject to VAT. However, in practice, some Member States are prone to making practical implementations that are potentially inconsistent with legislation.

Description: Although only a few Member States provide detailed definitions for the scope of passenger transport, there are some differences with respect to the exact delimitation of passenger transport. The renting of vehicles including a driver is normally considered passenger transport, whereas the rental of a means of transport without a driver or crew is not. Incidental services like the transport of accompanying luggage, seat reservations, or the provision of sleeping compartments are usually subject to the same rules as the underlying passenger transport service, though some countries seem to restrict that to services that are not separately billed (e.g. Poland). The transport of accompanying motor vehicles is usually also covered if it is incidental to passenger transport, with certain exceptions.

A variation of this deviation can apply to domestic passengers on services that also transport intra-EU passengers. Since both types of passengers use the same service, and many board and disembark from the transport vehicle at the same place, certain Member States treat domestic passengers as though they were intra-EU passengers for VAT purposes. This variation does not apply to domestic and extra-EU passengers, as they need to be segregated for immigration and security purposes.

Extent: The extent of this distortion is small, but not insignificant, as the majority of passenger travel falls clearly within or outside Member State VAT regulations.

One instance of this distortion is the limit on public transport vehicle size that qualifies VAT to be zero-rated on their revenue. One Member States that has the most widespread distortion of this type is the UK,

[104] Anuario Estadistico da Regiao Autonoma de Madeira, 2012

[105] Ministère des Transports de Equipment du Tourisme et de la Mer, Ministère délègue au Tourisme, France

where a vehicle size of 10 seats is the limit for zero rating of VAT. This limit excludes taxis, hire cars, and mini-buses that are licensed to carry passengers from being zero-rated as are other public transport modes.

In the UK in 2012, there were 230,000 of these vehicles. With a fare of EUR 4.00 per kilometre[106] and the standard UK VAT rate of 20%, there is an additional VAT revenue of about EUR 400 million that would not have been charged had these vehicles had the same VAT zero-rate as other public transport in the UK.

Table 4.9 - Estimated VAT Revenue from Small Public Transport Vehicles in the UK

Small Licensed Public Transport Vehicles	200,000
Population	64,000,000
Passenger Occupancy Rate	0.5
Average km Year per Vehicle	50,000
Annual PKM	5,000
Average Fare	4
VAT Rate	20%
VAT Revenue (EUR)	400,000,000

Thus, even for a Member State that has an example of this distortion with a wide application, its impact is small, at only about 0.3% of UK VAT revenue.

2b) Consumption On Board Ships, Aircraft, or Trains

We have not addressed this distortion, since it is covered in detail in the "Expert study on the issues arising from taxing the supply of goods and the supply of services, including restaurant and catering services, for consumption on board means of transport" by PWC[107] and was not included in the terms of reference.

Group 3: Distortions Due to the Treatment of Inputs in the Passenger Transport Sector

Issue: There are three distortions identified in this group. The first is the zero-rating of inputs to air and maritime passenger transport. The second is where Member States have their own regulations on how to specify when a vehicle is used predominantly for passenger services (and, hence, subject to VAT rates for

[106] http://www.priceoftravel.com/555/world-taxi-prices-what-a-3-kilometre-ride-costs-in-72-big-cities/

[107] For further information, see EC Report COM (2012) 605 final available on: http://ec.europa.eu/taxation_customs/resources/documents/taxation/vat/key_documents/reports_published/com_2012_605_en.pdf and the "Expert study on the issues arising from taxing the supply of goods and the supply of services, including restaurant and catering services, for consumption on board means of transport" by PWC available on: https://circabc.europa.eu/w/browse/59941dff-4fd3-47bb-8ee9-c502cab5b7b6. The report does not cover the distinction between the supply of goods and services and does not clarify if the supply of services might be covered by the derogation listed under Annex X, Part B, Point 9 of the VAT Directive.

passenger transport) and when it is used for private use (and, hence, subject to standard VAT rates).The third is the possible effects of the preferential treatment of certain energy inputs.

3a) Exemptions Following Article 148 VAT Directive

Description: Article 148 of the VAT Directive provides the framework for the zero-rating of certain supplies to maritime and international aviation. It covers the supply of vessels and aircraft fulfilling certain requirements, as well as their equipment, services related to such qualifying vessels and aircraft, their equipment or cargo, and the provisioning and fuelling of such vessels and aircraft. However, it is for the national legislation to provide specific details. Furthermore, a number of Member States apply derogations from the provisions of Article 148. Article 148 applies not only to aircraft and vessels meeting the above requirements, but also to qualified aircraft or vessels that are used for exempt activities and where there would normally be no right to deduct, e.g. public sector, education and financial services.

The functioning of the exemption for maritime services is rather different than that for air passenger services, in that it applies to "navigation on the high seas," whereas for air passenger services, it refers to "operations for reward chiefly on international routes." These differences have been the subject of differences of opinion, two of which were submitted to the Court of Justice of the European Union (CJEU) for clarification[108].

With respect to qualifying vessels, certain Member States require additional conditions to be met, such as minimum size (e.g. Finland and Sweden) or tonnage (e.g. UK and Ireland), to qualify for zero-rating. Others extend the scope to other types of vessels (e.g. Italy and Greece extend the scope to certain military vessels or to vessels used by state institutions; Finland extends the scope to all vessels of a certain size except those intended for recreation or sports purposes).

Aircraft generally qualify for zero-rating if they are used by airlines "operating for reward chiefly on international routes." We have found such a definition of this term for 19 Member States. The most common criterion used is a preponderance of turnover realized on extra-EU or intra-EU routes (e.g. Austria, Estonia, Germany, Greece, Italy, Lithuania, and Portugal); however, certain Member States also apply other criteria. More restrictive provisions are found in Denmark (55% or more of both turnover and number of kilometres), France (80% or more of the services performed on international routes), Bulgaria (60% of the total income in a period of five years), Latvia (80% or more of turnover and routes), and Poland (60% or more of revenues, number of flights, and number of passengers or amount of goods). The rules applied in the UK (e.g. any assessment method, as long as it produces fair and reasonable results and is consistently applied) and Ireland (50% or more of revenue, passengers, miles flown, or routes), on the other hand, are more flexible. The Swedish rule is that the airline's domestic operations must be less comprehensive than its international ones, taking into account all proper metrics including sales. In Belgium, airlines operating scheduled international air transport services are covered automatically, while other Belgian airlines must

[108] The VAT Committee discussed in its 98th meeting the implications of the ruling of the Court of Justice of the European Union (CJEU) in case C-33/11 A Oy regarding the exemptions in Article 148(e) and (f) of the VAT Directive. Following that discussion, guidelines were approved agreeing that the exemption provided for in Article 148(f) should be granted, not only when an aircraft was acquired by an airline operating chiefly on international routes, but also when that aircraft was acquired by a taxable person which was not itself an airline but it was bought with a view of allowing its exclusive use to companies that qualify as airlines operating chiefly on international routes.

achieve at least 80% of their turnover on international routes and foreign airlines must present a respective attestation by their competent national authorities. Finish administrative practice is that at least 50% of flights must be oriented outside Finland. In Spain, the share of the distance in the route of international flights is decisive (50% or more).

A comparison of how other supplies to maritime shipping and international aviation (e.g. provisioning and services for the direct needs of qualifying vessels or aircraft and their cargoes) are addressed is particularly difficult, because national implementations are often structured very differently than what is indicated in the VAT Directive. Certain Member States, for example, provide lists of services covered, while others adopt the general wording of the VAT Directive.

Extent: There are two rather different but related impacts of this distortion. The first is the VAT revenue effects of the exemptions themselves, and the second relates to the recovery of the VAT paid that is the object of the exemptions.

The impact of these exemptions for maritime and air services result in a difference in operating costs between these two modes others that compete with them (e.g. rail and bus). The extent of the difference in operating costs is not as great as might at first appear. While these two modes do not have to pay VAT on their qualifying inputs, the competing modes of rail and bus transport can reclaim the VAT they pay on inputs. The additional operating costs to rail and bus operators derive only from the financing costs of VAT for the period between when the payments are made and reimbursements received.

The differences between the two sets of modes (maritime and air vs. rail and bus) apply to all intra-EU and extra-EU passenger travel. Tables 2.2 through 2.5 presented earlier in this report show that all Member States have VAT rates for intra-EU and extra-EU passengers, even though in many the rate is zero.[109] Even where the rate is zero, VAT on inputs is deductible.

Table 4.10 - Liability to Pay VAT on Inputs

Mode	Intra-EU	Extra-EU
Maritime	Not liable	Not liable
Air	Not liable	Not liable
Rail	Liable with right to deduct	Liable with right to deduct
Bus	Liable with right to deduct	Liable with right to deduct

Table 4.11 shows combinations of input and output VAT for a typical transport operator providing intra and extra EU passenger services, with non-labour inputs making up about 80% of pre-VAT fares[110].

[109] Since neither Malta nor Cyprus have intra-EU or extra-EU rail or bus passengers they do not have corresponding VAT rates.

[110] To maintain consistency, a VAT rate of 10% has been assumed for input and output VAT for all four columns

Table 4.11 Example of impact of Article 148 exemption

	i	ii	Iii	iv
Modes	Rail and Bus	Rail and Bus	Air and Maritime	All
Member States	9 for bus, 7 for rail	17 for bus, 19 for rail	All	
VAT charged on inputs	Yes	Yes	No	No
VAT on fare	Yes	No	No	Yes
Labor input	17.0	17.0	17.0	17.0
Non labour input	80.0	80.0	80.0	80.0
VAT on non-labour input	2.1	2.1	0.0	0.0
Total input cost inc. VAT on inputs	99.1	99.1	97.0	97.0
Profit margin on cost (excl. VAT on inputs)	3.0	3.0	3.0	3.0
Pre-VAT fare	102.1	102.1	100.0	100.0
VAT on fare	10.2	0.0	0.0	10.0
Fare to passenger	112.3	102.1	100.0	110.0
% change from exemption with no VAT on fare	12.3%	2.1%	0.0%	10.0%

Column (i) shows the effect of a combination of charging VAT on inputs that is deductible, with VAT also being charged on outputs, used by *many* Member States for their Intra-EU and Extra-EU passenger services by rail and bus. Column (ii) shows the combination used by *most* Member States, charging VAT in inputs but having fares zero rated. For Intra-EU and Extra-EU passenger services by air and maritime transport, all Member States apply a combination of exemption of VAT on inputs and zero-rating VAT on outputs (Column (iii). The UK is different in that it applies the third of these combinations to all passenger transport modes for Intra-EU and Extra-EU passenger transport[111].

If the Article 148 exemption were to be removed, air and maritime transport would move from column (iii) to column (i) or Column (ii) depending on whether VAT would be charged on outputs. If the exemption were to be extended to all transport modes, rail and bus transport would move from column (i) to column (iii) or to column (iv) which is combination of exemption of VAT on inputs but VAT being charged on outputs (this combination is not currently applied by any Member State).

[111] Demark exempts domestic passenger services from VAT without the right to deduct VAT on inputs. Ireland exempts domestic passenger services without right to deduct input VAT whereas the UK zero rates air, rail, bus and maritime passenger transport with the right to deduct input VAT.

The combination with the highest passenger fare is that where VAT is charged on both inputs and outputs, which is about 12% higher than the lowest where VAT is not charged on inputs or outputs.

Supporters of retaining the terms of the Article occasionally cite the principle of not taxing international trade, of which passenger transport can be considered an important component.

The overall impact of the exemption on operators has been measured as the total avoided cost of financing the VAT liability that maritime and air passenger operators would have incurred if Article 148 were not operational.

The value of the goods and services that are subject to the exemptions granted under this Article is large. There are no consistent and readily available estimates of the value of inputs to maritime and aviation services, and less so for those that are the subject of this Article. To gauge the magnitude of the value of the goods and services, we have made estimates based on available data sources from the industry.

The air transport services referred to in the Article are those for "aircraft used by airlines operating for reward chiefly on international routes." Domestic air passenger services are not covered by the exemption, and no distortion is introduced by its application to extra-EU passenger services as those provided by other modes of transport (e.g. trains and buses) are also excluded from VAT considerations.

Extent: The overall cost reduction of the distortions resulting from the implementation of Article 148 is small, although the impact on any particular operator might be quite large if its operations are in a highly competitive market and where the competitors are not included in the terms of the Article, such as cruise lines competing with non-European operators. The overall cost reduction of €121 million (Table 4.12) is less than 0.1% of the total operating costs of the affected operators. The impact of eliminating the distortion also would be small and unlikely to affect the competitiveness of most operators.

An example of the impact of the exemption might be an airline purchasing a fleet of ten new aircraft for exclusive use on intra-EU and extra-EU routes, or a ferry company purchasing a new vessel for an intra-EU route. If the total investment cost of either of these were of the order of €500m, and a VAT rate of 10% were to be applied, the additional cost to the operator would initially be €50m. But this VAT would be recoverable as an input cost, so the real cost to the operator would be the cost of financing the €50m between when it was paid and the reimbursement was received. If this period were to be as long a year (the average period is about 3 months) and if real interest rates are about 3.5% per year, the cost to the operator would be €1.75m. Over the average period of three months it would be €0.44m

The combination of the ability of operators to recover VAT on inputs when the outputs are positively rated, the relatively short periods within which input VAT is now reimbursed by most Member States, and the current low interest rates that would apply to funding the VAT during this period, result in a small overall cost impact of this distortion (€121 million).

Table 4.12 - Estimation of Operating Cost Impact of Abolition of Article 148[112]

		Passenger Mode			
	Unit	**Air**	**Cruise**	**Ferry**	**Total**
Passengers	million	430,341		63.8	
PKM	million	660,361			
Unit Operating Cost	EUR per PKM	0.11		100	
Total Operating Cost	EUR billion	73.9626	6.366	6.386	86.7039
Labor Share of Cost	%	20%	20%	20%	20%
Non-Labor Cost	EUR billion	59.2	5.2	5.2	69.6
VAT Rate	%	20%	20%	20%	20%
VAT Liability	EUR billion	11.8	1.0	1.0	13.86
Financing Period	months	3	3	3	3
Interest Rate	%	3.5%	3.5%	3.5%	3.5%
Distortion Impact	EUR million	103.5	8.95	8.95	121.4

Therefore, while these provisions provide certain operators a cash-flow advantage through not having to carry the burden of VAT payments before refunds are issued, this advantage does not lead to significant discrimination among operators, as generally all inputs into the business process are deductible (with few restrictions and exceptions). The different time to process VAT reimbursements might increase the distortion in certain Member States (see distortion 4a).

In practice, providers of transport inputs, particularly capital, have taken advantage of the lack of precision in the wording of Article 148, and the different interpretations by Member States, to minimize their VAT liabilities by purchasing assets in one Member State for use in another that has different interpretations of the Article. In some cases, these efforts have come close to the line between what is legal and what is not, and have resulted in action being taken by the European Court. These have related to both shipping (e.g. when a leased private yacht can be considered as being used for passenger or commercial activities)[113] and aviation (e.g. what is an airline and what should "chiefly on international routes" be defined as).[114]

If Article 148 were to be rescinded, air and maritime transport operators would need to determine in which Member States their inputs had been purchased and take the appropriate actions with the tax

[112] The estimates of total passenger kms for air travel, numbers of ferry passengers and operating costs for all the modes are derived from an analysis of data from several sources. Air passenger kms were derived from the TREMOVE model and the number of ferry passengers derived from Eurostat statistics (Maritime ports freight and passenger statistics). Airline operating costs were derived from reports published by CAPA (Center for Aviation) including European Airline Labor Productivity (2013) and European Airlines Financial Results (2012). Cruise line operating costs were derived from Contribution of Cruise Tourism to the Economies of Europe, (2012), European Cruise Council.

[113] Bacino Charer Co. SA

[114] http://curia.europa.eu/juris/document/document.jsf?text=&docid=125223&pageIndex=0&doclang=EN&mode=lst&dir=&occ=first&part=1&cid=77695

authorities of those Member States to receive their re-imbursements (as to operators in other transport modes that provide Intra-EU and Extra-EU passenger services. If the rescinding of Article 138 were to be associated with charging of VAT on Intra-EU and Extra-EU air and maritime passenger services, operators would encounter the additional issues associated with determining in which Member State the services had been provided (see distortion 4d).

3b) Specification of Vehicle Use for Passenger Transport for Purposes of Input VAT

Description: All Member States allow for the deduction of input VAT on vehicles used for the provision of commercial passenger transport services (except for cases where passenger transport services are exempt). A few Member States apply restrictions, though, mainly in connection with passenger cars.[115] In various Member States, passenger cars must be used exclusively (Belgium and Romania) or predominantly (Hungary (greater than 90% use for taxi services) and the UK (mainly for taxi services)) for commercial passenger transport services to allow a full deduction, and others refer to the core activity of the business (Bulgaria, Italy, and Portugal). France, in general, restricts the deduction of input VAT on vehicles designed for the transport of persons[116] as well as related costs, but excludes such used by public transport enterprises solely for the transportation of persons from that rule. Poland restricts the deduction of input VAT on road vehicles to 50%, except for vehicles used entirely for business purposes and for vehicles designed for the carriage of at least 10 persons.

The deductibility of related costs (e.g. for spare parts, maintenance, and fuel) is mostly bound to the deductibility of the respective vehicle. Further restrictions are in place in France (no deduction for VAT on petrol, and a full deduction for VAT on LPG and natural gas, with respect to other fuels depending on the deductibility of the vehicle[117]), Hungary (motor fuels are not deductible, purchases in connection with the operation and maintenance of passenger cars are deductible only up to 50% (except for car rental businesses)), Ireland (VAT on petrol is not deductible, even if used for international passenger transport), Poland (VAT on fuel for cars and other motor vehicles less than 3.5 tons, which are not used entirely for business purposes, is currently not deductible and will be 50% deductible starting from 1 July 2015), and Portugal (fuel used by motor vehicles is, in general, not deductible, except with respect to diesel, LPG, and natural gas (50%, in general, and 100% if the vehicle is a large passenger vehicle or is licensed for public transport)).

Extent: The effect of these restrictions is most likely not relevant for competition, as they address the possibility of abuse of deductions. We evaluate it as not relevant for purposes of this study.

3c) Tax Incentives for Fuel and Electricity

Issue: To encourage the use of public transport in general and, in select transport modes and in certain Member States, to have lower VAT rates and reduced tax and duty rates for other inputs. While possibly helping to achieve this objective, these lower rates can introduce distortions.

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[115] In some Member States also with respect to vessels used for sports or pleasure purposes, aircraft, and motorcycles. For details, see the country sheets in Vol. 2 of this report.

[116] If they are treated as fixed business assets and not destined for sale as a new asset.

[117] Full deduction, if the vehicle was deductible, if this is not the case: no deduction with respect to aviation fuel, limited to 50% for kerosene, and 80% for diesel and E85 fuel.

Description: The general distortion of VAT on inputs is already assessed as distortion 3a. The descriptive assessment of this distortion is therefore limited to identifying potential distortions within one mode of transport (either bus or train) among different Member States.

Multiple Member States grant providers of passenger transport services tax incentives with respect to fuel. However, in most cases this is put into effect by a reduction in excise duties. Regarding gasoil, only Portugal and Ireland apply the reduced VAT rate when supplied to railways, whereas eight Member States apply reduced excise duties to railways and five Member States exempt gasoil used by railways. With respect to buses and road transport, reduced excise duties are in place in Italy and France. Luxembourg and Cyprus generally apply reduced VAT rates to LPG. With respect to electricity, Greece, Ireland, and Luxembourg apply reduced VAT rates, but six Member States exempt railways from excise duties on electricity (five of which also exempt other public transport) and one provides a reduced excise rate. Therefore, the majority of tax benefits granted on fuel and electricity seem to be based on excise duties.

In Germany, train operators do not pay any supplements on electricity except VAT.

The assessment of distortion 3b recognizes that the main differences among Member States are in relation to excise duties on fuel.

Extent: Although most Member States (19) apply their standard VAT rate to the energy used in passenger train services, only two do so while applying a reduced rate to bus passenger services (Belgium and Portugal).[118] Two Member States have exemptions for gasoil used in rail transport and four apply their reduced rate (these are the same four that apply their reduced rate to gasoil used in bus passenger transport). Only one Member State has an exemption for VAT on electricity used in rail services, and the same four Member States apply their reduced rate.

Air passenger services are only liable for VAT in the domestic market. Fifteen Member States apply their standard rate, nine apply their reduced rate, one applies a zero rate, and two provide exemptions. The two exemptions are the same as the energy exemption for bus and rail transport.

Energy is the smallest component of passenger train operating costs (at 10% to 12%), is rather higher for bus operations (up to 20%), and is significantly higher (about 30%) for air passenger operations. However, all VAT expenditures on fuel used as an input to passenger transport operations can be reclaimed (other than in the Member States where services are exempt from VAT without the right to reclaim).

As for VAT on other inputs to passenger transport operations, those for energy are refundable, thus the only cost distortion is that of financing the difference in energy cost from those operators who do not benefit from the distortion. Even when the refund period is long, the financial cost is a small percentage of total operator cost.

The overall impact of this distortion is very small.

Group 4: Distortion With Regard to Place of Supply

There are four distortions in this group. The first results in burdens for operators and also influences total revenue and its distribution among Member States; the second results in the imposition of additional costs on transport operators; the third derives from the part of domestic trips that takes place outside of the

[118] An Inventory of measures for internalizing external costs of transport, Final Report, November 2012

national territory; and the fourth distortion is a potential distortion that could arise in the case of the taxation of international air and maritime passenger transport, and is linked to distortion 1d above.

4a) Place of VAT Liability: Complexity of Calculating Place of Supply (Distance) of Extra-EU and Intra-EU Rail and Road Transport

Issue: The place of VAT liability has attracted much attention for the administrative costs that it is believed to impose on transport operators for its collection and distribution to the various Member States through which passenger trips pass. The implementation of this rule is not itself a distortion, but does impose higher costs on transport operators than might be incurred with alternative (and simpler) specifications of the place of liability for passenger transport VAT for intra-EU travel.

Extent: This distortion is relevant for rail and bus and for countries that charge VAT on international travel (both intra- and extra-EU), namely nine Member States for bus and seven Member States for rail. It is important to note that operators from countries that do not impose such charges, but where sections of passenger travel occur, also incur such administrative costs.

Measuring VAT according to distance obliges companies in the bus and railway passenger transport sector to determine VAT for each trip separately. Whereas the use of informatics tools allow for such calculations, they do involve start-up and maintenance costs. These costs are largely independent of the size of an operator, although more complex route patterns do require more complex software with higher costs. Such costs are deemed higher for coach operators, in particular, with regard to journeys involving several stopovers. The costs may even be considered as a handicap for small operators that cannot make use of professional software tools.

The correct calculation of distances passengers travel in each country is particularly important for small Member States whose passenger travel VAT revenue is largely earned from transit passengers. This proportion is higher for Member States located closer to the geographic centre of the EU territory. As an indication of the potential importance of this revenue, from the cities included in the City Pairs Model (see Chapter 6), about 62% of the total PKM within Belgium is from transit trips between other Member States, as compared to 87% from the more centrally located Austria.

These high percentages are indicative of the importance to small Member States to bear the additional administrative cost to ensure all transport operators comply with the supply-based allocation of VAT passenger transport revenues. This cost of ensuring compliance by the national VAT administrations is possibly higher than that of the operating companies in calculating the distance allocations and amounts, as the latter is a more mechanical exercise.

4b) Additional Compliance Costs

Supplying passenger transport services in certain Member States necessitates higher administrative costs than in others because, for example, rules with respect to registration and returns differ. Furthermore, the occasions where output VAT must be paid and when input VAT can be refunded vary considerably between Member States.

In some aspects, detailed rules from the legislation are not always clear and can depend on administrative practice. An example is the obligation to register for non-established providers of exclusively international passenger transport, which is zero-rated (or exempt with credit respectively) in many Member States (in all Member States with respect to maritime shipping and aviation). Based on the information we received from national VAT authorities, providers of such zero-rated international passenger transport services are obliged

to register in Bulgaria, Germany, Greece, Latvia, Luxembourg, Poland, Portugal, and Spain. In Italy and the UK, such providers, in principle, are required to register for VAT as well, but they can apply for an exemption with the tax authorities. In Austria, Belgium, Cyprus, the Czech Republic, Denmark, Estonia, Finland, France, Ireland, Slovenia, and Sweden, on the other hand, providers of zero-rated international passenger transport services are not per se obliged to register. In some of these countries, registration is, however, required in order to get a refund for input VAT (e.g. Austria, Denmark, and Finland). However, in others this can be done via the procedures of the Council Directives 2008/9/EC (providers established in Member States) and 86/560/EEC (providers established in third countries, for example, in Ireland, Lithuania, and Sweden). Nevertheless, even if there is the obligation to register for foreign providers, it might be not equally enforced among Member States.

With respect to small taxable persons, most Member States provide some kind of simplification. In most cases, an optional VAT exemption is available, with thresholds ranging from approximately EUR 5,000 to EUR 100,000 within one year. The detailed requirements of these exemptions, however, differ between Member States, for example, with respect to the items included in the calculation of the relevant turnover, the reference period (e.g. the calendar year or any 12 subsequent months), and the commencement of VAT obligations in case the threshold is exceeded (e.g. a retrospective application to the complete tax year or to start even after the month of the transgression). However, the thresholds are so low that only small taxi businesses could be concerned. Other simplifications for small businesses include the additional deduction of a part of output VAT paid (e.g. Finland and the Netherlands), extended taxable periods, cash-based accounting, flat-rate schemes (e.g. the UK or for taxis in Poland), or lump-sum schemes (e.g. urban taxis in Cyprus).

Taxable periods, in general, last between one and three months, and for smaller businesses, can last up to one year. Returns and VAT payments are usually due between 10 days and 2 months after the end of the relevant tax period and, in the case of annual returns, sometimes later. The period between a taxable supply and the relevant VAT payment can, therefore, vary considerably, ranging from less than two weeks to five months. This, of course, is not unique to the passenger transport sector. In certain Member States, an annual summary return must also be submitted. Closely related to and especially relevant for operators supplying occasional services in many different Member States is the obligation to submit nil-returns for tax periods in which no taxable turnover was generated. In the majority of cases, such nil-returns are obligatory. Exceptions to this rule are found in Austria and, with respect to non-established providers, in Italy and Slovakia.

An issue frequently mentioned in the statements in the Green Paper on the Future of VAT as a possible distortion, which is especially relevant for international passenger transport, is the difference regarding the deduction of input VAT. In most Member States, input VAT can be recovered in the period the tax point occurs or when the invoice is issued. The invoice must, however, be available when applying for the deduction. Some Member States, however, also refer to the period the invoice is received.

Distortions may also arise from the treatment of excess amounts of input VAT deducted. A few Member States automatically refund such excesses (e.g. Sweden and the UK). In the majority of cases, a corresponding application is necessary. Some Member States, however, restrict the right to receive refunds, for example, to certain dates (e.g. in France, Latvia, Luxembourg, and Spain refunds are usually dealt with only via the last return of the year) until excess amounts have been carried forward for a certain period (e.g. Bulgaria, Portugal, and Slovakia), minimum amounts are reached (e.g. Hungary and Romania), or certain

other conditions are fulfilled (e.g. Italy). In many Member States, there are additionally exceptions from the general procedures for certain taxable persons or in certain cases.[119] Also, the duration of the refund procedure varies significantly between Member States, ranging from about 10 days up to a couple of months.

The rules for foreign providers usually match those applied to domestic enterprises with certain exceptions: the exemptions for small enterprises, for example, cannot be applied by operators without a fixed establishment in the relevant Member State, and a few Member States apply the reverse charge rule to B2B suppliers of passenger transport services. Certain Member States provide administrative simplifications for foreign providers (e.g. a waiver for nil-returns or simplified tax procedures). Special schemes can be available especially for foreign providers of occasional international bus transport (e.g. Germany and Poland).

Only four Member State allow VAT returns in three or more languages, but the effects of this distortion are declining as more Member States allow the electronic submission of VAT claims from companies registered in other Member States. Since there is a high compatibility in the structure of electronic VAT forms between Member States and, so, between different languages, it is easier make electronic submissions. Still, certain Member States require 100% compliance in the completion of forms (i.e. if differences show up in electronic checks, the forms are rejected).

Extent: There are two distinct cost impacts of VAT rules and regulations and the distortions that arise when they are more complex. One impact is on the public administration for implementing the rules and regulations and the other is on the businesses for complying with them. In the assessment of this distortion, we consider only the latter.[120] Most studies of compliance costs emphasize their variation, some of which is found between countries and the other of which is found between different types of company (usually distinguished by their size). Most of these studies are macro-economic based and thus focus on the overall economic and social cost of compliance, while a few of the more micro-economic focused studies make some attempt to estimate the costs on individual companies. A study recently undertaken for TAXUD provided a summary of the previous studies.[121] The two studies[122] we used that provided monetary estimates of the costs of compliance were completed several years ago, so their results, as presented here, have been indexed to end-2012.

VAT Compliance Costs in the Netherlands, Denmark, Norway, and Sweden

One study undertaken in 2005 reported the cost per business of VAT compliance to be between EUR 180 and EUR 1,510 (EUR 210 to EUR 1,795 in 2012 prices), depending on the country and the number of VAT rates to manage (Table 4.13).

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[119] E.g. for refundable amounts originating from the acquisition of fixed assets, if a high percentage of the business' supplies are zero-rated or if the refundable amount exceeds certain thresholds.

[120] There is some confusion in the literature about how to name these different costs. Some studies refer to the compliance costs on companies as the administrative burden on them, but this excludes the indirect costs imposed on other companies.

[121] The Costs of VAT: A review of the literature.

[122] International comparison of measurements of the administrative burdens related to VAT in the Netherlands, Denmark, Norway, and Sweden, SCM Network, 2005 and Administrative Burdens, HMRC Measurement Project, HMRC, 2006.

Table 4.13 – VAT Administrative Burden

Country	# VAT Rates	Cost per Business per Year (EUR of 2005; indexed to 2012)
Denmark	1	210
Netherlands	1	940
Netherlands	2	1,013
Norway	1	908
Norway	2 to 3	501
Sweden	1	587
Sweden	2	987
Sweden	3	1,758

Source: International comparison of measurements of the administrative burdens related to VAT in the Netherlands, Denmark, Norway, and Sweden, SCM Network, 2005, updated to 2012

VAT Compliance Costs in the UK

Another study from the following year[123] estimated the total compliance cost of VAT in the UK to be about GBP 1.02 million, which when converted to a cost per company, adjusted for inflation, and converted to EUR, is about EUR 862. This figure is between the costs for Norwegian and Swedish VAT companies that have to deal with three VAT rates, which is about the same as UK transport companies dealing with VAT due on inputs to intra-EU and extra-EU passenger transport.

If size of the business is also taken into account and is proportional to the number of employees, the compliance cost per company for small employers (i.e. less than 50 employees) is highest, for the smaller medium-size companies (i.e. 50 to 250 employees) is lowest, and for the larger companies (i.e. more than 1,000 employees) is second highest.

Order of Magnitude Estimate of the Distortion

Airlines, cruise and ferry, and rail companies are all likely to be in the category of large employers, while bus companies are a mixture of all sizes. While this data does not specifically relate to transport companies, their VAT compliance costs probably follows the same pattern. Hence, the compliance burden for complex distance-based VAT rates across several Member States will fall disproportionally on small operators.

There are nearly 250[124] transport companies operating in the EU that could provide intra-EU or extra-EU services that could be affected by this distortion. Company ownership is difficult to distinguish and changes rapidly; accordingly, knowing exactly how many companies are affected is difficult to determine. However, even if all 250 companies benefited from the distortion, and each company had more than 1,000

[123] Administrative Burdens – HMRC Measurement Project, HMRC, 2006

[124] About 150 airlines, 20 railway passenger operators, and 60 bus companies. It is not clear from their websites that all of these operators are actually providing intra-EU/extra-EU services.

employees, if they were to eliminate all VAT compliance costs, the total cost savings would be less than EUR 1 million.

Table 4.14 – VAT Compliance Costs, UK

	Units	Company size by number of employees				
No. of employees	Number	0-50	50-250	250-1000	1000+	TOTAL
Number of companies	Number	305,108	865,132	380,836	95,209	1,551,076
Admin cost per company (2005 £)	£/company	2,193	109	202	1,882	608
Total VAT administrative cost	£m	669	94	76.8	179.2	1019
Administrative costs (2012 €)	€/company	3,361	167	309	2,885	931
Total administrative cost (2012 €m)	€m	1,025.6	144.1	117.7	274.7	1,287
2012 costs in € based on 2005 prices in £, adjusted by UK inflation and 2012 exchange rate						

Source: Administrative Burdens – HMRC Measurement Project, HMRC, 2006 and UK Government Employment database

Estimated compliance cost is based on evidence from four Member States. However, the first study noted does provide an indication of how the costs might be higher in Member States that have more complex VAT systems and regulations that transport operators have to comply with. The evidence from Sweden suggests that compliance costs can be three times higher when a company has to deal with more than one VAT rate. If compliance costs were to be directly proportional to the number of VAT rates that a company has to deal with, the costs for transport operators in several Member States could be up to ten times higher than used in the estimates.

There is no direct evidence on the VAT compliance costs of having to deal with documents in several different languages. With transport operators other than small bus operators, this is unlikely to impose a significant burden. However, few small bus operators offer services in multiple Member States, as we found only 60 bus companies providing these services.

To take account of these possible higher costs in an order of magnitude estimate of compliance costs, we considered a situation in which the cost per company was 10 times greater than that of UK large companies and the number of transport operating companies is four times greater than we have found. Even on these assumptions, total VAT compliance cost would still be less than EUR 30 million per year. This is, therefore, considered to be a small distortion.[125]

[125] It is highly improbable that eliminating this distortion would reduce VAT compliance costs of the intra-EU and extra-EU operating companies to zero, so in this respect the estimate of the compliance cost is possibly a maximum.

4c) Different Treatment of Sections in or Above International Areas outside EU

Issue: Member States have their own regulations for determining the VAT liability for passenger transport that takes place in international water or airspace when it forms part of a domestic trip. Resulting distortions are due to the fact that Member States may have difficulties in measuring the distance of journeys that are not entirely domestic and they are, therefore, a result of the current rules to define the place of supply as the place where the transport effectively takes place.

Description: Sections of international waters are treated differently among Member States when they are crossed in the course of otherwise domestic journeys. According to information we received from national VAT authorities, such trips are commonly considered domestic passenger transport (with the exceptions of Estonia, where such journeys are regarded as international transport, and Germany, where VAT treatment depends on the distance covered in and outside German territorial waters), unless there is stopover in foreign territory. Even between those Member States that consider such trips domestic, there are differences with respect to the distance that is subject to national VAT. In certain Member States, the distance travelled through national territorial waters is taxed at the rate for domestic transport, whereas the section through international waters is regarded as outside the scope of national VAT and is, therefore, zero-rated (e.g. in France (see e.g. ECJ Case C-30/89), the Netherlands, Poland, and Spain). Italy (see ECJ Case C-283/84), on the other hand, also taxes sections of international waters between the Italian peninsula and Sardinia (at the rate for domestic transport). The same holds for Sweden (travel to Gotland). The UK considers sections through international waters, and even sections through foreign territorial waters, domestic, although in most cases the tax rate will be zero.

Another possible source of distortion closely related to this is the differentiation between domestic and international transport. Many Member States define international transport as transport where the place of departure, the place of arrival, or both (often as indicated on the ticket) are outside the territory of the relevant Member State (e.g. Austria, Belgium, Bulgaria, and Romania). Journeys starting and ending within the Member State, therefore, seem to be considered domestic, even if the territory of another country is crossed. Sweden, on the other hand, treats a transport service as international if only a short section takes place in the territory or the territorial waters of another country (sections through international waters, however, do not constitute international transport).

Finally, certain Member States also apply derogations to the normal place of supply rules. The most prominent example is Germany, which treats short sections in foreign countries as domestic and short domestic sections as foreign, subject to certain conditions.

Extent: The extent of this distortion is believed to be very limited as few domestic trips pass through international airspace or waters. However, the distortion appears to raise important issues for some Member States.

Many of the instances of domestic travel that pass outside of the national territory for some part of its distance are addressed under Distortion 1f. This assessment illustrated the limited impact of these instances of the distortion.

A land-based variation of this distortion is where domestic passengers might extend their trip a short distance to an international destination and then make a return international trip to their real destination. With two international trips that are zero-rated replacing one domestic trip that is positively rated, the passenger could incur a lower overall cost. In the City Pairs Model, we have examined 12 possible instances

of this distortion and found that it does not apply to any of them.[126] Invariably, travel on an international train is at a higher cost per kilometre than on a domestic train, making this potential distortion not cost effective. Even where the trains have the same fare, there are few instances of a station in the second country that is close enough to the border to avoid incurring high distance costs. For these instances, we found that the domestic distance that would have to be travelled to make the trip cost effective would be about 1,500 kilometres (depending on the VAT rate of the Member State). This, again, dramatically reduces the possible instances of this distortion.

4d) Difficulty in Determining Place of Supply (Distance) of Extra-EU and Intra-EU Air and Sea Transport

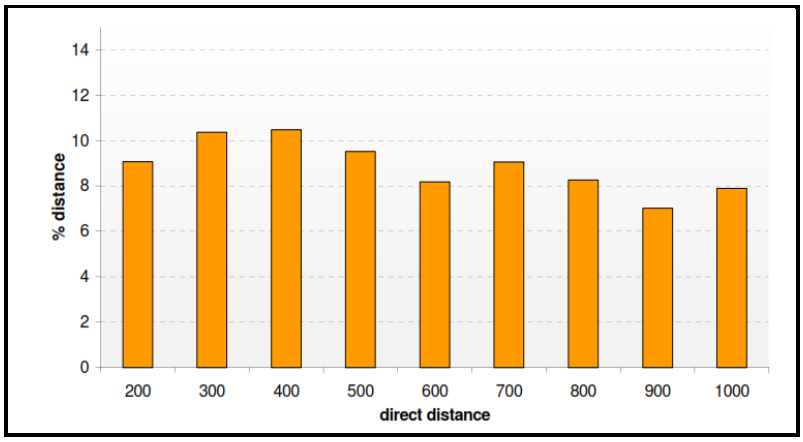
Issue: If extra-EU and intra-EU sea and air travel were to be positively rated for VAT, it would be difficult to determine what distance had been travelled in the territorial water or air space of the transited Member States.

Description: Sea and air transport of passengers for extra-EU and intra-EU travel is zero-rated for VAT purposes. Although the generally accepted explanation of the different treatment of these modes of transport to those for land transport refers to historical taxation habits (see description of distortion 1d), it would be virtually impossible to create equal treatment between different modes of transport under the current rules if Member States intended to tax extra-EU and intra-EU passenger transport. As a result, those Member States that tax extra-EU and intra-EU passenger transport only tax road, railway, and inland navigation transport services.

Extent: Rail and, to a lesser extent, road transport is constrained in its distances and routes by the fixed infrastructure that it uses, which subsequently limits the complexity of calculating the distances travelled in each Member State for the liability to account for VAT. Sea and air transport are less constrained in this sense. Passenger vessels have a wider scope in their use of shipping lanes and passenger aircraft are constrained by available flight paths. These can be indirect because of military air space and other constraints and the actual flight paths might be different to those planned because of congestion and other reasons. Given that the distances actually travelled by air and sea are in many cases much greater than for rail or road transport, the distortion would be greater than for those modes if sea or air travel were to be positively rated for VAT. In the broader sense, this potential distortion represents the ultimate cause of distortion 1d, because it complicates the taxation of air and sea travel. The extent to be quantified would thus represent a strict subset of distortion 1d (i.e. the amount of VAT collected by companies providing extra-EU and intra-EU road and railway passenger transport services).

[126] See City Pairs Model for the examples

Figure 4.1 – Extra Air Distance Flown Related to Direct Distance



Source: ATM Flight Efficiency and its Impact on the Environment, EEC/ENV/2003/001

On average, air flight distances in Europe are about 8% longer than they would be using great circle routes. Part of this is attributable to the pattern of available flight paths, which do not necessarily follow the shortest distance routes.[127] Other differences are attributable to constraints imposed by military air space (many of these are permanent, but some are imposed at short notice and for relatively short periods). While still others are attributable to climatic circumstances (e.g. a dramatic incidence of this occurred in 2010 with the eruption of Eyjafjallajökull volcano in Iceland.)

A third major category of additional flight distances is that attributable to congestion and the elongated flight paths or holding patterns that are imposed to compensate for the congestion.

The estimate of the size of this potential distortion is measured by the extra airline costs incurred for the less than minimum distances travelled and the extra-VAT incurred if it were to be applied to these modes of travel for intra-EU and extra-EU travel.

Several estimates have been made on the cost of additional flight distances, one of which was conducted by Eurocontrol as a measure of its own effectiveness and of the environmental impacts of the additional aviation fuel burned. An estimate made in 2002 found the additional airline operating cost was roughly EUR 1.6 billion to EUR 2.1 billion per year, which, taking account of increases in airline operating costs, is equivalent to about EUR 2.1 billion and EUR 2.8 billion per year. These costs were for all commercial passenger flights.

Since airline costs are usually measured in costs per hour, this was the basis of the Eurocontrol estimate. However, to estimate the potential VAT impact of the additional distances and the potential estimation errors, we have converted the in-flight component of these hours to kilometres. We have further assumed

[127] *ATM Flight Efficiency and its Impact on the Environment, EEC/ENV/2003/001*

an average airfare of EUR 0.10 per kilometre, an average aircraft occupancy of 100 passengers, and a potential VAT rate of 10%.

Table 4.15 – Estimate of VAT Revenue from Additional Flight Distances

Extra Hours Flown	Hours	510,923
Average Speed	Kilometres Per Hour	700
Average Passengers Per Aircraft	Passengers	100
Additional PKM	PKM (million)	35,765
Average Fare	EUR per PKM	0.10
VAT Rate	%	0.1
Extra VAT Revenue	EUR (million)	367.6

The indicated order of magnitude of the additional PKM travelled would be about 36 billion and the VAT revenue generated resulting from air space restrictions would be about EUR 368 million.

The additional maritime distances that have to be sailed are mostly for climatic reasons, while only occasionally to avoid restricted maritime space or for congestion on maritime routes.[128] There is no data on the additional distances that cruise ships and ferries have to travel to compensate for these restrictions. The total number of ferry passengers using European ports was about 213 million in 2012, but only about one-third, or approximately 70 million, of these passengers were on intra-EU or extra-EU trips, which taken together with the 6 million cruise passengers, is only 36% of intra-EU and extra-EU air passengers.

There is no data on the average distance maritime passenger travel, or on the extra distances travelled for each diversion or for the frequency of diversions. If we assume the parameter values indicated in Table 2.5 presented earlier in our report, the risk of an unaccounted diversion in the maritime sector is the same order of magnitude as for the air passenger sector.

Table 4.16 - Estimate of VAT Revenue from Additional Maritime Distances

		Ferry	**Cruise**
Average Extra km per Sailing	km	50	100
Sailings Diverted	%	1%	1%
Number Of Sailings	per	1,800	1,980
Average Passengers per Sailing	passengers	100	1,300
Average Fare	EUR per trip	50	1,500

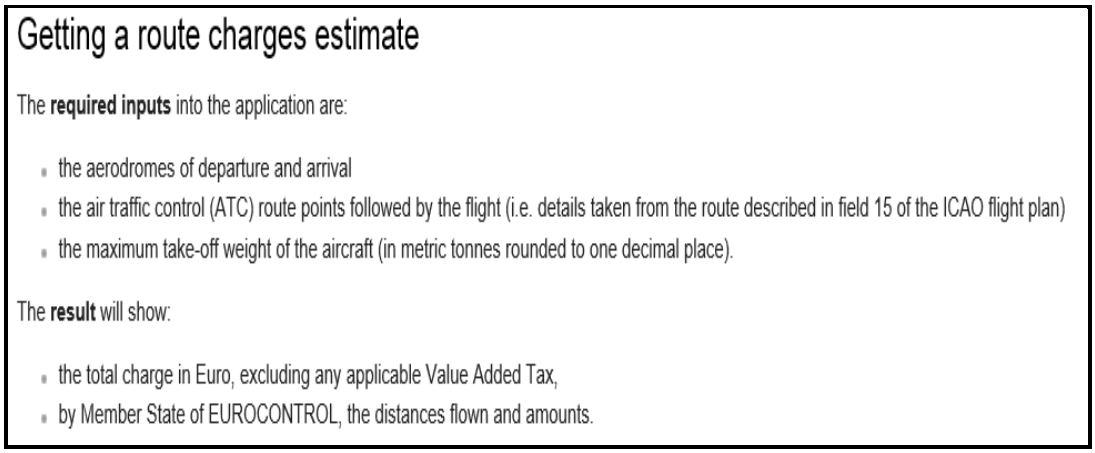
[128] Exceptions are some ferry routes where congestion can result in longer distances, but more frequently only in longer voyage times.

VAT Rate	%	0.1	0.1
Extra VAT Revenue	EUR million	0.45	386.1

Compliance Cost

Software is available that allows airlines to calculate the en-route navigation charges to Eurocontrol based on the flight distances travelled. This software would be easily adaptable to calculate the VAT charges due for overflights of intra-EU and extra-EU passenger flights. With the availability of the software, the probability of airlines having difficulty in estimating the actual distances that their flights travel is very low. If this is the case, the cost of avoiding this potential distortion is very low. Airlines already have the capacity to calculate flight and passenger distances as part of their yield management activities, and these estimates could be used to calculate the VAT liability when the passenger ticket is purchased (as it is for those Member States that have a positive VAT rate on domestic air passengers). These estimates would need to be reconciled with actual distances travelled. While potentially a high administrative cost, the availability of appropriate software would make it manageable at a low cost.

Figure 4.2- Eurocontrol Software to Estimate Flight Distances



For cruise lines, which already have sophisticated software that allows optimization of their revenue yield and operating costs, it is highly probable that they also have software that would allow them to estimate the actual distances that their vessels travel. If they do not, it is also highly probable that software companies will make it available should it be needed. For ferry operators, the probability that they already have such software is less than for cruise lines as some of them are relatively small operators with few vessels operating in less competitive markets. Nevertheless, even if the full costs are incurred, they will be relatively small since, over the short distances of most ferry routes, voyages between a specific origin port and destination port have little opportunity for variation.

Overall Impact

The assessment of this distortion is that its impact on potential distances travelled, compared with least cost routes, would be moderate for air and cruise line travel and small for ferry routes, and the administrative costs in estimating those distances for all three modes would be small.

We assess the potential impact of this distortion as large in respect to airline operating costs, medium in terms of potential VAT differences due from passenger flights, and small in terms of estimating flight and voyage distances.

Overall Assessment of Distortions

Table 4.17 provides a summary of the assessment of distortions.

Table 4.17 - Summary of Distortions and Their Assessment

Distortion	Description	Impact on PKM or Operating Costs	Comment	Assessment
1 - Different VAT Rates				
1a	Different VAT rates within one mode at the domestic level		Little impact on competition, except Germany	Very small
1b	Different VAT rates between modes at the domestic level		Only applies to three MS	Very small
1c	Different VAT rates within one mode between domestic, extra-EU, and intra-EU	-1.8 billion	Reduced PKM from distortion	Medium
1d	Different VAT rates between modes for domestic, extra-EU, and intra-EU	-0.5 billion	Reduced PKM from distortion	Medium
1e	Different delimitation between domestic, extra-EU, and intra-EU (two-sector trips)	limited		Small
1f	Lower VAT rates applied in certain regions at the domestic level			Small
2 - Scope of Passenger Transport Services and Associated Supplies				
2a	Definition of passenger transport and related incidental services	400 million*	Excess VAT collected on taxis etc. in UK	Small
2b	Consumption on board ships, aircraft, or trains	n.a.	Not addressed in this study	
3 - Treatment of Inputs in the Passenger Transport Sector				
3a	Exemptions following Article 148 of VAT Directive / Delay in processing VAT refunds	121 million	Estimate of possible added financial cost to operators	Not large
3b	Specification of vehicle use for passenger transport for purposes of input VAT deductibility		Aimed at avoiding abuse of deductions	Not relevant for competitive purposes
3c	Tax incentives on fuel and electricity between Member States			Very small
4 - Place of Supply				

4a	Complexity of calculating the place of supply (distance) of extra-EU and intra-EU rail and road transport			Small
4b	Additional compliance costs (proportion of distance, multiple registration)[129]	2 million		Small
4c	Different treatment of sections in/above international areas outside EU			Small
4d	Difficulty in determining the place of supply (distance) of extra-EU/intra-EU air and sea transport			Medium

[129] e.g. different registration and documentation requirements, invoicing rules, VAT returns, languages

Chapter 5 - Policy Options to Address Distortions

Chapter 5 presents the alternative VAT reform scenarios that we are using to assess how to address the distortions described in Chapter 4. Specifically, we identify 11 policy scenarios, which are discussed in the remainder of this Chapter and then evaluated in Chapter 6.

VAT Reform Scenarios

VAT Scenario 1

Output VAT on all modes of passenger transport in the urban, other domestic, and intra-EU markets will be set at national standard rates while the current input VAT rates will be retained to approximate the principle of VAT without output exemptions in the application of national rates. Scenario 1 would have a large impact on inter-modal competition between air and rail in the intra-EU markets, where air is currently the dominant mode and is zero-rated for VAT. It would also have a large impact on total demand for urban and other domestic passengers in the Member States where these services are currently rated lower than the standard rates, especially in the UK, where most passenger travel is zero-rated, and in Ireland, where it is exempted from VAT.

Scenario 1 is aimed at reducing distortions within and between modes (Distortions 1a-d, Table 4.16, presented earlier in our report). It would not address distortions arising from Member States applying different VAT rates to each other. This scenario would involve ending the temporary derogations that allow the use of VAT rates for passenger transport that are lower than the national standard rates, some of which have continued for decades rather than the originally-intended five years.

VAT Scenario 2

Scenario 2 is similar to Scenario 1; however, the output VAT rates are set to the reduced national rates. The objective of this scenario is similar to that of Scenario 1, but it is intended to have a smaller negative impact on the demand for urban and other domestic transport, as many Member States currently apply less than the standard rate.[130] This scenario would also have a smaller impact on competition between air and sea transport in the intra-EU market, as the VAT increase in these modes would be less than that in Scenario 1.

VAT Scenario 3

Scenario 3 is based on Scenario 1, except Scenario 3 changes the place of taxation from the Member State in which the transport service is provided to the Member State of passenger departure. The objective of this scenario would be to reduce the distortions that arise from the requirement of passenger services operators to calculate, charge, and distribute VAT based on the distance the passenger travels in each Member State through which he or she passes. We choose the option of "departure point" and do not separately consider the option of "arrival point," as we assume that most intra-EU trips are round-trip and,

[130] See Chapter 3 for the details of which Member States apply standard, reduced, super-reduced, and zero/exempt VAT rates to passenger transport outputs.

hence, the considerations applying to each option are similar.[131] A justification for this assumption is provided in the "Note on Multi-Sector Trips and Definition of Place of Departure" presented later in this Chapter.

VAT Scenario 4

Scenario 4 is the same as Scenario 2, except with a change in place of taxation as per Scenario 3.

VAT Scenario 5

Scenario 5 utilizes current VAT rates, but with the place of taxation as per Scenario 3.

VAT Scenario 6

Scenario 6 utilizes current output VAT rates and abolishes Article 148 of the VAT Directive exempting VAT on selected passenger transport inputs. It, therefore, extends VAT to the inputs used to provide sea and air passenger services. Under Article 148, aircraft must operate "chiefly for hire or reward on international routes" while ships must navigate "on the high seas." Since "the high seas" are, for legal purposes, maritime areas outside of territorial waters, there is some (but not exact) comparability between the conditions for ships and aircraft to qualify for the exemption. Since there is no land equivalent of the high seas, we will use a similar condition for trains and buses to that for aircraft to allow them to qualify for the exemption. As for aircraft, international routes for trains and buses will include both intra-EU and extra-EU routes. The objective of this scenario is to remove one distortion of competition between transport modes in the intra-EU market (however evaluated in Chapter 4 as being of a small magnitude).

VAT Scenario 7

The objective of Scenario 7 is the same as that of Scenario 5; however, instead of removing the exemptions of Article 148, it extends its provisions to inputs for bus and passenger rail services. Since there is no land equivalent of "the high seas," this scenario requires use of a similar condition for trains and buses as that for aircraft to qualify for the exemption. As for aircraft, international routes for trains and buses will include both intra-EU and extra-EU routes.

VAT Scenario 8

Scenario 8 is similar to VAT Scenario 4, which utilizes the Member State of passenger departure as where VAT liability is incurred, and extends that liability to the domestic part of an extra-EU passenger trip.

VAT Scenario 9

Scenario 9 is similar to VAT Scenario 8; however, the VAT liability for VAT on extra-EU passengers is based on the fare before user charges or taxes are added, with specific ticket taxes eliminated as they are replaced by VAT. This is consistent with VAT based on value-added and the taxes and user charges not reflecting any benefit. User charges that are to recover the costs of using transport infrastructure would

[131] Exceptions are trips that involve permanent relocation outside the Member State of departure and trips for which one way might entail a different mode than the return. These two factors are assumed to be of a second order of magnitude.

remain included in the basis for VAT. This variation is intended to reduce the negative impact of imposing VAT on extra-EU passengers on total demand.

VAT Scenario 10

This scenario implements the one-stop-shop provision for VAT transactions and addresses distortions 4a and 4b.

VAT Scenario 11

Finally, Scenario 11 utilizes current domestic rates, but harmonizes the rates on non-domestic transport to zero (or exemption with right to deduct).

Table 5.1 – Summary of Alternative VAT Scenarios

Scenario	Description of VAT Scenario	Distortions Addressed	Method of Assessment
1	The national standard rates will apply to outputs of all modes of urban, other domestic, and intra-EU passenger transport.	**1**	**Q**
2	The national reduced rates will apply to all modes of urban, other domestic, and intra-EU passenger transport. If no reduced rate exists, the standard rate will apply.	**1**	**Q**
3	Similar to Scenario 1, but with the place of taxation changed to the Member State of departure.	**1, 4a, 4d**	**Q**
4	Similar to Scenario 2, but with the place of taxation changed to the Member State of departure.	**1, 4a, 4d**	**Q**
5	Current VAT rates, but the place of taxation changed to the Member State of departure.	**4a, 4d**	**Q**
6	Exemptions according to Article 148 of the VAT Directive abolished.	**3a**	**O**
7	Exemptions according to Article 148 of the VAT Directive extended to buses and trains.	**3a**	**O**
8	Similar to Scenario 4, but with the obligation to extend VAT to extra-EU passengers departing from a Member State.	**1, 4a, 4c, 4d**	**Q**
9	Similar to Scenario 8, but with VAT applied to pre-tax fares as for the Air Passenger Duty.	**1, 4a, 4c, 4d**	**O**
10	Implementation of one-stop-shop for all VAT transactions.	**4a, 4b**	**D**
11	Current rates apply on all domestic transport. Intra-EU and extra-EU rates set to zero for all operators.	**1d, 4b**	**Q**
Q = Quantitative; O = Order of Magnitude; D = Description.			

Possible Additional Administrative Distortions from the Implementation of Scenarios

For operators in transport modes that are currently VAT zero-rated, there would be additional administrative costs (distortions) in all scenarios except for Scenario 6. The impact of Scenario 10 would be to reduce additional costs; however, they would, nevertheless, continue from the other scenarios.

For operators in transport modes that are currently positively VAT rated, there would be administrative cost reductions with Scenarios 3, 4, 7, and 10. There would be no administrative cost reductions from Scenarios 1, 2, and 6: they would still have to manage different VAT rates in each Member State as well as VAT charged on inputs. There would be an administrative cost increase with Scenarios 8 and 9, as they would be responsible for collecting VAT due on extra-EU travel, but this and other administrative costs would be less with Scenario 10.

Passenger Trips Excluded from the Quantitative Assessments

Cruise passengers and tourist coach passengers are not included in the ETISplus database and, therefore, cannot be included in the same quantification of outcomes as other passengers. There is data on the current number of cruise line passengers for nine Member States, which accounts for 97% of European cruise passengers, and three markets (but not the same market definitions as used in this Study). This will be estimated using projected growth rates for cruise trade and used in an order of magnitude estimate of the impacts of each VAT scenario on this category of passenger. There is no equivalent estimate of tourist coach passengers; rather, there is only an estimate of the total coach market size for 12 Member States and estimates of the coach share of the bus and coach market of the EU-27. There are no projections of demand available for coach passengers, so with the limited data on the current market size, we will make a descriptive assessment of the VAT scenarios for coach passengers.

Note on Multi-Sector Trips and Definition of Place of Departure

Two Sector and Multi-Sector Trips

The database we will use for the modelling method of quantifiable assessment (see Chapter 6) includes one-way single sector trips. The assumption in compiling the database is that all passenger trips are of two sectors, one origin to destination, and the other using that destination as the origin of a return trip. There are no records of more complex trips, such as those with multiple destinations, which could be included in the database. Even if such data were available, its introduction into the database would increase its complexity because of the vast number of different types of trips required to be included, with many different combinations of origins, intermediate, and final destinations. Even the specification of multi-sector trips would require a restructuring of the model to accommodate the concept of intermediate destinations.

As far as we are aware, there is no analysis of what proportion of total trips are multiple rather than two-sector trips. Recent changes in the structure of the airline industry and in airline fare policies have reduced the incentives for multi-sector tickets. The route structure of low-cost airlines is based on direct origin to destination travel and airlines offer few or no incentives to passengers to make multi-sector trips. Conventional airlines tend to lose revenue yield with multi-sector travel and, consequently, the practice is

discouraged through pricing strategies.[132] By combining recent IATA estimates of multi-sector and total international air passengers, it appears that the former represented less than 2% of the total in 2010.[133] There are no equivalent published estimates of the proportion of multi-destination trips for other transport modes.

Our database limits us to considering two sector travel; however, since multi-sector travel accounts for such a small percentage of air trips (less than 2%) and a declining share of total trips, we assume that all trips are two-sector trips and that this assumption will not introduce any significant errors into our analyses.

Additional Costs of Arrival Point of VAT Liability

There are few differences in the impacts of an arrival or departure option for the location of liability for VAT. In the only previous comprehensive assessment of these two alternatives, there was found to be some additional accounting cost compared to a departure option, as most scheduled airlines locate their hub in their home country. This is the place of departure rather than arrival for most of their passengers (passengers are more likely to use an airline based in their home country than one based in another country) as well as where the airline's main accounting facility is located. However, it was concluded: "under the arrival option, the additional cost of VAT accounting should not be particularly onerous."[134]

Notwithstanding the similarities between an arrival and a departure option, a departure option would require certain special considerations:

Special considerations for a place of departure option:

- ***Definition of place of departure:*** For many passengers, defining the place of departure would not be difficult. However, some issues would need to be addressed for multi-sector trips where there is an intermediate break between the places of departure and destination. These could be treated as a single trip or two separate trips. The former would be more practical where the first leg is a feeder to the second leg, while the latter would be more appropriate for a second case where the two parts of the trip are largely independent of each other. The departure point could be defined as the place where the passenger travel begins. In VAT regimes where "intra-EU legs" of extra-EU trips were to come within VAT coverage, the place of departure for inbound journeys could be defined as the external EU frontier. This would detract from one of the main advantages of a place of departure VAT liability as it would require the use of distances to determine VAT liability, whereas the VAT liability for all other passenger trips would depend only on the ticket price. Where operators issue "through" tickets (which involve the passenger traveling with a number of transport operators using a ticket issued by a single operator), the same issues and principles could apply.
- ***Intra-EU sector of extra-EU trips:*** A resolution would be needed for the situation of non-EU operators providing passenger services wholly or partly within the EU. A mechanism will need to be put into place to ensure that such operators include VAT in the first case and, in the second, for the regimes where VAT is applied to the intra-EU part of extra-EU trips.
- ***Return journeys*:** Another issue to be addressed is that of return journeys for which the passenger buys

[132] Flying Off-Course: Airline Economics and Marketing Fourth Edition, Rigas Doganis, Routledge, 2010

[133] http://www.iata.org/about/pages/history_2.aspx and http://www.iata.org/pressroom/pr/pages/2012-12-06-01.aspx

[134] KPMG, 1997

a single ticket for both the outbound and return leg of the trip. Such return travel could be considered as two separate trips, with the relevant departure VAT assessed separately for each, but the sum of the two included in the ticket price.

- ***Multi-sector trips:*** There are at least two VAT options for passengers making trips that require stops in at least one intermediate destination. The first option, to have one ticket with multiple sections, would be relatively easy to address, with each intermediate stop being the place of departure for the next leg of the trip. The second option would need to address tickets that cover a region or period without intermediate destinations defined. The simplest solution would be to charge the VAT rate of the first point of departure, but this might not reflect the VAT liability actually incurred with use of the ticket.
- ***Stopovers:*** Stopovers are similar to intermediate destinations of multi-sector trips when a passenger makes them voluntarily. However, stopovers require a different consideration when they are imposed by the operator and are not intermediate destinations from the passenger perspective. A mechanism would be required to distinguish between the two situations, allowing two places of departure for the first and only one for the second.
- ***Documentation issues:*** Whichever definition of place of departure is used, operator accounting and ticketing systems would have to identify the place of departure for each segment of the journey. For simple one-way trips, VAT liability will be more straightforward than with the current place of service VAT liability, as only one VAT rate will apply to the whole trip and there will be no need to use distances travelled in each Member State to calculate the VAT charge. Even for simple return trips, calculation and accounting will be simpler than under the current system. However, for multi-stop trips, the administration will not be very different. Each segment will have to be considered a separate trip. Otherwise, if a formula based on distance travelled in each Member State were to be used, there would be no difference to the current situation for this type of trip.

From a business passenger's perspective, reclaiming VAT on passenger travel would be simplified as there would be fewer Member States to deal with and the liability for each will be easier to calculate. Even for the multi-sector trips, accounting for the reclaim process will be simpler. The information provided on the passenger's ticket should be sufficient to enter the VAT deduction or refund claims with relative ease.

Note on the Pass-Through Coefficient

Not all changes in VAT rates will be fully passed through from the operators who are liable for the VAT to the passengers. Depending on the level of competition in the market in which the operators' service is being provided, the percentage of change in VAT passed through to passenger fares will be different. However, there is little empirical evidence on what percentage of previous changes in VAT have been passed through.

The previous study of the VAT regime and competition in the field of passenger transport noted: "the extent to which any tax costs will be passed on to consumers will depend on the operators' cost structure... and the degree of competition that they face." The study also noted: "...the flatter their (average) cost structures and the more competition that exists in the market, the less scope there will be for absorption of

tax costs by the operator and the higher will be the degree of pass-through."[135] Based on these premises, the study presented three scenarios:

- A perfectly competitive case where all costs arising from VAT charges are passed through;
- An imperfect competitive case where only 50% of these costs are passed through; and,
- A central scenario with 60% to 90% of costs passed through, with the exact amount determined by the extent of competition on the particular route.

Only in the third of these scenarios was there any distinction made between the extent of the pass-through and the level of competition on a particular route. The other two scenarios applied the same pass-through rate (100% or 50%) to all routes.

To better understand how the imposition of new VAT rates changes market equilibrium in transport markets, we have utilized a theoretical framework of an *n*-firm Cournot oligopoly market with ad valorem taxation. A Cournot model is an appropriate tool to analyse equilibrium in imperfectly competitive markets when firms face capacity constraints, as in transport markets. This tool is also general enough to allow the treatment of two extreme cases of perfect competition and pure monopoly. The imposition of VAT alters market equilibrium. In comparative statics, output distortion and the resulting consumer price adjustments can be observed. Our analysis in the above theoretical framework showed that the magnitude of equilibrium price adjustment is, in general, determined by three key factors: demand elasticity, technology, and the level of competition measured by number of firms in the market. More specifically, the impact of tax on consumer price is expected to be larger on:

- More demand-inelastic markets,
- More competitive markets, and
- When firms face higher marginal costs.

While our theoretical results support the assumptions adopted in previous studies of the VAT regime in the field of passenger transport, we acknowledge the fact that they all interact and might drive consumer prices in a complex way. For example, the modes that are more competitive are, at the same time, more demand-elastic, leading to opposing influences on the tax on pass-through. Therefore, assessing the magnitude of tax impact for different transport modes (including the possibility of overshifting) is purely an empirical issue and, if possible, should not be based on simple generalizations.

In our empirical analysis, we adopt a pass-through measure, which is defined as the portion of monetary tax liability resulting from an increased tax rate that is shifted to consumer price. We believe that this way of measuring the tax impact is convenient and informative for policy making. We performed calculations of pass-through coefficients for all country-mode pairs in a step procedure. First, we utilized regression techniques to estimate the size of the pass-through effect resulting from VAT rate changes in four passenger transport modes on an EU-28 level. We analysed a unique dataset with 112 cross sections (country-mode combinations) and 11 time series. In our estimation, we controlled for input prices, market structure, and demand shifters, which possibly determine consumer prices. Unlike some empirical studies that provide evidence of tax overshifting on various markets, we have obtained less than complete pass-through magnitudes for all four transport modes.

[135] KPMG, 1997, p 91

In the second step, we utilized data on market concentration to quantify the impact of competition on pass-through magnitudes. We obtained a result that is in line with the theoretical insights from the Cournot oligopoly analysis. On more concentrated markets, pass-through on consumers is smaller, and this difference between perfect competition (HHI=0) and monopoly (HHI=1) equates to an additional 20 cents. Using this figure, we were able to scale mode-specific values of tax pass-through with HHI levels in each of the EU-28 countries. Our major underlying assumption is that intra-mode demand elasticity and technology are fixed and that those pass-through effects follow ceteris paribus differentiation of competition intensity in particular countries. Linking theoretical insights with empirical analyses of historical passenger transport data, we obtained reliable estimates of the tax pass-through for utilization in the TREMOVE model (see Table 5.2). As discussed in Chapter 6, the simulations for the various policy scenarios will be presented with two sets of results, the first set assuming a full pass-through, and the second set incorporating the estimated coefficients in Table 5.2[136].For a more in-depth discussion of the model and methodology, see Appendix D.

Table 5.2 – Calculated Pass-Through Rates

	Rail		Road		Waterways		Air	
Country	**HHI**	**PASS-T**	**HHI**	**PASS-T**	**HHI**	**PASS-T**	**HHI**	**PASS-T**
AT	0.78	0.49	0.31	0.41			0.31	0.05
BE	0.93	0.46	0.24	0.42			0.10	0.09
BG	1.00	0.44	0.06	0.46	0.62	0.22	0.15	0.08
CY					0.13	0.32	0.06	0.10
CZ	0.98	0.45	0.10	0.45			0.16	0.08
DE	0.77	0.49	0.01	0.47	0.07	0.33	0.25	0.06
DK	0.77	0.49	0.16	0.44	0.42	0.26	0.19	0.07
EE	0.43	0.56	0.56	0.36	0.42	0.26	0.20	0.07
ES	0.88	0.47	0.04	0.46	0.13	0.32	0.12	0.08
FI	1.00	0.44	0.28	0.41	0.25	0.29	0.55	0.00
FR	0.74	0.50	0.22	0.42	0.11	0.32	0.25	0.06
GR	1.00	0.44	0.02	0.47	0.09	0.33	0.14	0.08
HU	0.51	0.54	0.01	0.47			0.10	0.09
HR	1.00	0.44	0.01	0.47	0.52	0.24		
IE	1.00	0.44	0.51	0.37	0.17	0.31	0.25	0.06
IT	0.83	0.48	0.01	0.47	0.09	0.33	0.13	0.08
LT	1.00	0.44	0.08	0.45	0.50	0.24	0.30	0.05
LU	1.00	0.44	0.10	0.45			0.43	0.02
LV	1.00	0.44	0.15	0.44	0.59	0.23	0.39	0.03
MT			0.11	0.45	0.29	0.29	0.26	0.06
NL	0.91	0.46	0.25	0.42	0.16	0.31	0.10	0.09

[136] The effect of different pass-through estimates in the various scenarios is not strictly linear, as the business exemption of VAT on travel introduce differences among countries and modes.

PL	0.26	0.59	0.01	0.47	0.34	0.28	0.27	0.05
PT	0.94	0.46	0.01	0.47	0.29	0.29	0.40	0.03
RO	0.93	0.46			1.00	0.14	0.28	0.05
SE	0.46	0.55	0.12	0.44	0.27	0.29	0.22	0.06
SI	1.00	0.44	0.06	0.46	0.35	0.27	0.43	0.02
SK	0.98	0.45	0.06	0.46			0.70	0.00
UK	0.06	0.63	0.13	0.44	0.18	0.31	0.12	0.08
Mode Average	0.67	0.51	0.09	0.45	0.19	0.31	0.19	0.07

Chapter 6. Simulation of Policy Scenarios

Introduction

In Chapter 5, we discussed the 11 policy scenarios that could be used to inform any eventual decision of how best to address the distortions reviewed and quantified in Chapter 4. In this Chapter, we report the results of the assessments of those scenarios. We start with a short comparison at the EU28 level of the major projected outcomes of the scenarios that have been capable of quantification. This is followed by a more thorough assessment the scenarios, offering a detailed breakdown at the Member State level and an indication of the possible outcomes for selected routes.

Both the EU28 and the detailed assessments of the quantifiable scenarios make use of two sets of simulations. The first, using TREMOVE and EDIP models, provides basic results at the EU28 and Member State level, and a separate model (CPM), provides specific results at the route (city pairs) level. All scenario assessments are made relative to the current VAT rates in force in the Member States (referred to as *business as usual* (BAU)) for each of the four markets (urban, other domestic, intra-EU, and extra-EU). To provide context for the scenario assessments, we provide an outline quantification of the BAU baseline. The quantification of the BAU and assessments of the quantified scenarios are provided for the years 2020 (as an indication of the short-term impacts) and 2030 (as an indication of the longer-term impacts). The assessments are based on projections of six main parameters (PKM, VAT revenue, operator revenue, change in Member State GDP, change in Member State employment, and CO2 emissions) and are supported by two supplementary parameters (GDP distribution and NOx emissions). The CPM provides fewer parameters (fare, number of passengers, and VAT revenues), but at a much greater level of detail. To simplify the presentation of results, only those for 2030 are presented here. Those for 2020 have a similar, but less pronounced pattern, as the short-term fare elasticities are lower than those for the long-term used for 2030.

We have not made our own projections of the economic and social parameters for the BAU that provide the framework for the models used (such as population and GDP), but instead use those incorporated in the 2010 Transport White Paper. We also assume that its proposals will be implemented according to the schedules indicated in the papers.

Throughout this assessment, a key parameter is the amount of taxable PKM; that is, the number of PKM in each Member State that are liable to VAT. At present, these are based on territoriality: when transport takes place on a Member State's infrastructure, it can charge VAT for each passenger based on the fare and the share of total PKM performed within its own borders (though it may choose not to). Business transport will generate revenue for transport operators, but not for Member States, through VAT, as this amount can be reclaimed.

The TREMOVE model contains estimates of ticket prices disaggregated by:

- Net fare: income for transport operators directly impacting their financial result;
- Taxes or subsidies: many public transport modes are subsidized to some extent; and
- VAT.

Assumptions on the levels of passenger fares (used in the TREMOVE model) are based on those in yet another model (SCENES[137]), which was last validated in 2010. Hence, all fares and other monetary values are expressed in EUR of the year 2010. The fares in SCENES are comprised of three components (operating costs, net subsidies, and VAT). Using this fare structure, we can calculate the revenue from the ticket sales of transport operators, along with the revenue for Member States from the VAT charged on these tickets.

The CPM uses the same source of numbers of trips (i.e. the NUTS3[138] database) and the same growth rates (at the county and mode level) as the TREMOVE model (from the NUTS3 base year to 2020 and 2030). It uses estimates of elasticities based on the results of the TREMOVE model for the BAU baseline and for Scenario 1 (by comparing their differences in county and mode fares and number of passengers). The fares used in the CPM are based on those available in July 2013.[139] The CPM includes data on 220 city pairs, but the results presented in this Chapter are for a sub-sample of 20 city pairs: 11 domestic, 6 intra-EU, and 3 extra-EU.

Pass-Through of VAT Changes and Quantified Scenarios

An essential input to the estimation of passenger fares and demand for each of the quantified scenarios is the amount of any change in VAT that will be passed onto passengers and the amount that will be absorbed by operators. The rationale for and results of our assessments of the pass-through rates is given in Chapter 5. The estimates of passenger demand and operator revenue are provided for the first two scenarios at two different levels of pass-through. The first is full pass-through, with which the impact on passengers would be maximized and that on operators minimized (operators would be affected only by the number of passengers and PKM). The second is with the less-than-full pass-through rates indicated in Chapter 5, which would reduce the impact on passenger demand by reducing fare changes (increased for most of the quantified scenarios), but increase the impact on operators (mostly negative) by requiring them to absorb some of the VAT change.

There is, however, an important side effect of this less-than-full pass-through, namely for business passengers in the Member States that allow expenditures on business travel to be taken into account as an input cost for VAT purposes.[140] In these Member States, transport operators would charge the same price to all transport users, but business travellers would be able to recover their VAT paid. Operators under less-than-full pass-through would absorb some of the VAT increase; thus, in effect, reducing fares as a result. Business users *de facto* would perceive this as a net reduction in fare, and, consequently, (paradoxically) pushing demand up instead of down. Given that the estimated pass-through rates for some modes are very low, the increase in business demand could outweigh the decrease in non-business demand.

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[137] ME&P. (2000) SCENES European Transport Forecasting Model and Appended Module: Technical Description. SCENES Deliverable 4 to the European Commission.

[138] The Nomenclature of Territorial Units for Statistics (NUTS) has three levels of aggregation. This category refers to regions belonging to the third level (NUTS 3, also known as NUTS III), which is largely used by Eurostat and other European Union bodies.

[139] There is no single set of fares for any city pair. We have used the one-way fare for a single passenger booking a return ticket one week in advance for an outward trip on a Wednesday morning and a return one week later. Where such a fare was not available, we used the closest equivalent we could find.

[140] In the simulations, we have taken into account business exemptions for all Member States except France, Greece, Italy, and Portugal. Some Member States apply other ad-hoc restrictions that are small and cannot be quantified with our models.

Overview of Results

Table 6.1 presents an overview of the highlights of the results of the model simulations, which are discussed in detail in the rest of this chapter.

By design, and as discussed in Chapter 5, the various scenarios eliminate one or several of the distortions that have been identified and discussed or quantified in Chapter 4. Thus, to the extent that the elimination of these distortions could be a desirable policy objective, the objective would be accomplished. The simulations displayed in Table 6.1, therefore, have to be considered as a quantification (to the extent possible) of the effects of the elimination of such distortions. If the elimination of the distortion is a benefit, the simulations give us an indication of the potential costs associated with these benefits. Not all of the consequences, however, are in the form of costs. As discussed later, while different scenarios may be associated with reductions in transport volumes, employment, or even (modestly) GDP, there are also benefits accruing from the scenarios, for instance, in the form of reduced environmental emissions and increased VAT revenues (at least in some of the scenarios), which can then, in turn, be used for other purposes by national governments.

With this caveat, Table 6.1 shows that the scenario with the largest economic and environmental impact is Scenario 1, which is not surprising in view of the fact that it provides the largest shock to the existing system. Overall demand for transport declines by between 0.7% and 4.8% by 2030 (for the EU28, with wide variations across Member States). VAT revenue from passenger transport almost trebles as a result of the increase to national standard rates. However, transport operator revenue decreases by 3% (short term, full pass-through) to 10% (long term, limited pass-through) when compared to the BAU Scenario. Economy-wide effects on GDP are minor, also because of the hypothesis that compensatory tax reductions or transfer increases cushion households from a negative fiscal shock. Employment in the sector declines, sometimes substantially, according to the mode.

Scenario 2 has a much more moderate effect on all of the variables discussed, since the increases in rates are more limited and apply to fewer Member States and modes.

Scenarios 3, 4, 5, and 8 provide information on the consequences of a change in the place of taxation. The main message here is that if such change were to be desirable for policy purposes, its effects would be rather marginal and we presume easily handled with minor compensatory mechanisms.

Scenarios 6 and 7 explore the consequences of removing or extending the provisions of Article 148 to all operators. Our conclusion is that the consequences are trivial.

Scenario 9 shows that using VAT based on pre-tax fares and national reduced rates for all transport modes and on the Member State of departure would not have a significant impact (on fares, demand, and competitiveness between or within modes) as compared to VAT based on final ticket prices.

Scenario 10 argues that the introduction of a single window for passenger transport VAT issues might be desirable, but cannot be evaluated without a specific study. We argue that such a scheme could be offered on a voluntary basis and then assessed on the basis of accumulated experience.

Finally, Scenario 11, which is the closest to the principle of subsidiarity, in that it would only affect international travel, has minimal consequences on the relevant variables affecting the demand or supply of passenger transport.

Table 6.1 – Overview of Scenario Assessments

Scenario	Description of VAT Scenario	Distortions Addressed	Method of Assessment	Main Highlights
1	The national standard rates will apply to outputs of all modes of urban, other domestic and intra-EU passenger transport.	**1**	**Q**	Total transport demand declines by between 0.7% and 4.8% by 2030 (for the EU28, with wide variations across Member States). Business demand, however, increases due to deductibility of VAT for business passenger transport purposes. VAT revenue almost trebles as a result of the increase to national standard rates. However, revenue of transport operators decreases by 3% (short term, full pass-through) up to 10% (long term, limited pass-through) when compared to the BAU Scenario. Economy-wide effects on GDP minor. Employment in the sector declines, sometimes substantially according to the mode. Environmental effects are generally positive and proportional to the reduction in different forms of passenger transport modes.
2	The national reduced rates will apply to all modes of urban, other domestic and intra-EU passenger transport. If no reduced rate exists, the standard rate will apply.	**1**	**Q**	Total transport demand declines slightly or increases slightly (depending on the scenario). The increase in VAT revenues is more modest than in Scenario 1 (about 23% for full pass-through in 2030), and so is the decline in revenues of operators. In some Member States, VAT revenues decline. GDP effects are minimal; employment effects in the sector are also smaller than in Scenario 1.
3	As for Scenario 1, but with the place of taxation changed to the Member State of departure/arrival.	**1, 4a, 4d**	**Q**	This scenario extends Scenario 1. Results are identical except that a redistribution of revenues among Member States occurs, limited to revenues from international tariffs. Smaller Member States tend to see an increase in their revenues at the expense of the larger ones.

4	As for Scenario 2, but with the place of taxation changed to the Member State of departure/arrival.	**1, 4a, 4d**	**Q**	Same as in Scenario 3, with very few differences.
5	Current VAT rates, but the place of taxation changed to the Member State of departure/arrival.	**4a, 4d**	**Q**	Effects of scenario consist of re-distribution of international travel revenues among Member States. In practice, the resulting changes are small, and no Member State gains or loses more than 1% of its revenues.
6	Exemptions according to Article 148 of the VAT Directive abolished.	**3a**	**O**	Minimal effects on the air and sea transport industries, provided right of deduction is allowed.
7	Exemptions according to Article 148 of the VAT Directive extended to buses and trains.	**3a**	**O**	Would allow to recover more speedily capital costs for buses and trains. Magnitude of the effect hard to estimate, but likely of minor importance.
8	As for Scenario 4, but with obligation to VAT extended to extra-EU passengers departing from a Member State.	**1, 4a, 4c, 4d**	**Q**	Relatively small impacts given that the long-term fare elasticities of demand are quite low.
9	As for Scenario 8, but with VAT applied to pre-tax fares as for the Air Passenger Duty.	**1, 4a, 4c, 4d**	**O**	Relatively small impacts once all transport modes are liable for VAT at the same rates.
10	Implementation of One-Stop-Shop for all VAT transactions.	**4a, 4b**	**D**	The reform would be desirable, although estimating its quantitative impacts would require a separate study.
11	Current rates apply on all domestic transport, intra- and extra-EU rates set to zero for all operators.	**1d, 4b**	**Q**	Minimal impact on PKM and on VAT revenues from this scenario, given the low share of bus and rail in international travel.
Q = Quantitative; O = Order of Magnitude; D = Description.				

Scenario Assessments

In the following pages, these summary findings are reviewed in more detail. The review of each of the quantified scenarios follows the same pattern: as assessment of the impact of the VAT changes of the level of demand, measured in taxable PKM at the EU28 and Member State level, as indicated by the TREMOVE model; an indication of the same changes in VAT rates at the city pair level, as indicated by the CPM; and an indication of the probable macro-economic, social, and environmental impacts as indicated by the EDIP model (for the first two of these impacts) and the TREMOVE model (for the environmental impacts). The descriptions of the impacts of Scenario 1 are the most complete, as those of the other scenarios are, in many cases, similar but smaller in extent.

Business As Usual (BAU)

The *Business As Usual* (BAU) baseline assumes that no changes are made to the current VAT rates as described in Chapter 3. The demand projections for the BAU are, therefore, based only on projected changes in per capita incomes and populations and the various elasticities related to these parameters.

a. Member State Passenger Demand

The growth rates of passenger transport demand for BAU used for the periods to 2010, 2020, and 2030 are as described in the Second Interim Report of this Study (May 2014) and are based on those of the 2011 Transport White Paper.

Table 6.2 summarizes the BAU evolution of transport demand at EU28 level over this period.[141] Air transport is expected to grow the most (it has the highest elasticity with respect to per capita income), followed by rail, bus, and metro.

Table 6.2 – Summary of Business As Usual (EU28, PKM)

		2010	2020	2030	Growth 2010-2020	Growth 2010-2030
Intra-EU	Air	217,039	309,499	405,815	42.6%	87.0%
	Bus	10,123	12,713	13,588	25.6%	34.2%
	Rail	21,867	28,084	32,542	28.4%	48.8%
	Total Intra-EU	249,029	350,296	451,945	40.7%	81.5%
Extra-EU	Air	315,826	446,025	573,286	41.2%	81.5%
	Bus	2,052	2,392	2,551	16.6%	24.3%
	Rail	2,326	2,915	3,352	25.3%	44.1%
	Total Extra-EU	320,204	451,331	579,188	41.0%	80.9%
Urban	Metro	92,241	102,970	109,481	11.6%	18.7%
	Bus	145,336	162,433	173,684	11.8%	19.5%
	Rail	147,600	172,445	197,624	16.8%	33.9%
	Total Urban	385,177	437,847	480,789	13.7%	24.8%
Other Domestic	Air	46,374	54,332	69,396	17.2%	49.6%

[141] Detailed data by Member State is available in Annex 6A.

	Bus	389,695	427,695	456,235	9.8%	17.1%
	Rail	220,299	256,663	298,044	16.5%	35.3%
	Total Other	656,367	738,689	823,676	12.5%	25.5%
Total	Air	579,239	809,856	1,048,497	39.8%	81.0%
	Bus	547,207	605,233	646,058	10.6%	18.1%
	Rail	392,091	460,106	531,563	17.3%	35.6%
	Metro	92,241	102,970	109,481	11.6%	18.7%
Total of Totals	Total	1,610,778	1,978,164	2,335,599	22.8%	45.0%

For the baseline scenario, gross revenue from passenger transport operations and VAT are projected to evolve as in Table 6.3. The largest incomes are generated in France, where transport is relatively more expensive than in Germany or the UK. Italy is also near the top. For the EU28 as a whole, VAT revenues are projected to increase by 16% by the year 2020 and by 31% by 2030. VAT as a percentage of gross fares is projected to fall very modestly from about 3.1% to about 3.0%, as the share of air passengers (most of which are not subject to VAT) increases. Operator revenue increases at a somewhat faster rate (19% and 39%, respectively), due to faster growth in lower-taxed modes and markets (particularly air).

Table 6.3 – Business As Usual: VAT Revenues from Transport Sector (EUR m)

	2010		2020		2030	
	VAT	**Tickets**	**VAT**	**Tickets**	**VAT**	**Tickets**
AT	372.2	8,220.0	427.6	9,818.3	469.3	11,239.5
BE	155.9	9,701.1	181.2	11,490.5	192.4	12,447.6
BG	110.1	2,207.9	121.8	2,686.4	128.2	3,100.8
CY	2.4	917.0	2.7	1,275.9	3.0	1,679.3
CZ	281.8	4,848.5	308.3	5,851.9	328.3	6,859.4
DE	1,207.2	34,395.2	1,413.6	41,975.4	1,527.8	47,589.1
DK	0.0	4,231.9	0.0	5,070.1	0.0	5,962.7
EE	18.7	229.4	19.0	283.3	19.7	367.1
ES	755.4	22,817.9	897.9	28,842.4	1,030.2	35,480.6
FI	128.2	3,298.8	144.4	3,894.0	156.5	4,555.1
FR	2,754.8	52,767.0	3,233.5	61,603.7	3,787.4	72,078.2
GR	308.6	7,967.9	434.7	10,200.1	500.0	12,742.0
HR	57.4	714.0	68.0	896.5	78.0	1,130.4
HU	235.6	3,736.7	247.4	4,169.5	265.4	4,807.4
IE	0.0	2,511.6	0.0	3,261.0	0.0	3,997.4
IT	1,192.7	43,102.5	1,289.5	47,324.5	1,434.5	53,662.4
LT	11.9	332.2	13.4	438.7	13.9	579.1
LU	2.3	426.0	2.6	517.9	2.9	597.3
LV	13.3	322.1	14.9	440.5	16.8	605.5
MT	0.0	286.3	0.0	416.8	0.0	535.7
NL	186.4	6,803.6	217.0	8,325.0	239.2	9,604.8
PL	283.5	7,926.4	325.8	9,496.7	366.4	11,181.6
PT	73.0	3,478.5	91.1	4,281.7	105.0	5,371.8
RO	188.3	3,280.3	223.1	3,941.3	250.4	4,468.0
SE	152.0	5,967.8	184.6	7,307.7	206.1	8,700.6

SI	22.7	541.4	26.5	650.5	28.1	717.8
SK	80.9	948.2	85.5	1,097.4	88.8	1,273.9
UK	0.0	31,198.3	0.0	38,557.2	0.0	44,095.5
EU28	8,595.0	263,178.4	9,974.2	314,114.8	11,238.0	365,430.6
% Change w.r.t. 2010, EU28			16.0	19.4	30.7	38.8

b. Demand between City Pairs

The results and analysis of the CPM all relate to 2030; those for 2020 are similar but smaller and less pronounced. There is a slight redistribution of trips and VAT revenue for 2030 as compared to 2020, as the growth rates are slightly different for each Member State and mode combination. Since the BAU assumes no changes in fares, those used in the CPM are based on current fares. They are presented here, together with number of passengers and VAT revenue, as they are the basis from which changes in VAT in the scenarios are compared.

From the wide range of fares available for most of the city pair and mode combinations, those used are closer to those for non-business than business passengers; they assume a one-week advance purchase and a stay of seven days. These fares are at the lower end of those available.[142] For air passengers, these fares tend to be those of the low cost airlines, and these are more used by non-business than business passengers. The highest available fares (all for economy class or equivalent travel) are, on average, more than double the lowest, whereas the fares used in the estimates of demand and VAT revenue are, on average, only 25% higher than the lowest.

The baseline scenario fares, number of passengers, and VAT revenue for the BAU are shown in Table 6.4.

Table 6.4 – Business As Usual City Pairs Model: Fares, Passengers, and VAT Revenue

			Fares (EUR)			Trips (m)	VAT Revenue (EUR m)
	City A	**City B**	**Air**	**Rail**	**Bus**	**All**	**All**
1	Athens	Thessaloniki	64	40	40	3.13	19.8
2	Berlin	Hamburg	132	80	33	2.74	28.2
3	Budapest	Debrecen	0	20	13	0.99	4.3
4	Cluj	Iasi	194	17	25	0.52	2.9
5	Copenhagen	Aarhus	0	55	40	3.90	0.0
6	Dublin	Cork	102	20	18	1.95	0.0
7	Krakow	Wroclaw	107	15	13	0.16	0.2
8	Lisbon	Porto	64	35	26	1.69	3.7
9	London	Glasgow	111	110	70	2.22	0.0
10	Madrid	Barcelona	58	49	30	2.89	14.0
11	Paris	Toulouse	81	120	71	4.01	32.3
12	Berlin	Warsaw	49	127	45	0.12	0.4

[142] The source for most of the fares was Rome2Rio (http://www.rome2rio.com/), a website that provides fares for air, rail, and bus (as well as ferry where relevant) for city pairs selected by the user. We have used the city center to city center fares available from this source. Fares and services provided by some small bus operators are not available from this (or from any other) Internet accessible source.

13	Constanta	Varna	0	0	20	0.02	0.0
14	Copenhagen	Vilnius	140	143	116	0.20	0.0
15	London	Brussels	121	162	60	3.42	8.4
16	Ostrava	Katowice	0	64	8	0.16	0.0
17	Paris	Lisbon	115	180	50	0.99	0.0
18	Frankfurt	Oslo	139	213	247	0.04	0.5
19	Gothenburg	Oslo	122	39	35	0.12	0.0
20	Riga	Moscow	221	76	75	0.02	0.0

For some city pairs, where their distance apart is less than about 200 kilometres (e.g. pairs 3, 5, and 13), there are sometimes no air services; or, if there are, their fares are not competitive (e.g. pairs 2, 4, 6, and 7). For certain city pairs that are long distances apart (e.g. pair 18), the fares by bus and sometimes by rail are not competitive with air. For other city pairs, even if the bus fare is competitive, the travel time is not (e.g. pairs 11, 15, and 20). For certain city pairs where the VAT revenue shows zero, this is because the VAT rates for all modes are zero or exempt (e.g. city pairs 5, 6, and 9), while for others it is because there are few trips and the VAT revenue is close to zero (e.g. pairs 13 and 14). For some intra-EU city pairs, most passenger travel is by air, which VAT zero-rated and the VAT revenue from those traveling by rail and bus is too low to register (e.g. pair 17).

VAT Scenario 1: VAT Rates for Urban, Domestic, and Intra-EU International Transport Set to National Standard Rates

This scenario entails an increase in VAT rates for most Member States and modes. As a result, demand for all transport subject to the rate increase will decrease according to the price sensitivity of demand.

a. Impact on Member State Passenger Demand

The differences between the two pass-through assumptions is shown by the difference between the results shown in Table 6.5 (for full pass-through) and Table 6.6 (for less-than-full pass-through). For the full pass-through effects, air demand decreases for the Member States and mode combinations where the VAT rate would increase (i.e. a "normal" reaction). However, with less-than-full pass-through, overall demand for air transport in these Member State and mode combinations would increase. The low pass-through rate (7% on average) for air transport would result in a moderate decrease in non-business transport, while business transport, which comprises around 40% of the market (expressed in PKM), would expand significantly in the countries where VAT deductions on transport expenses are allowed.

Table 6.5 - Scenario 1 Full Pass-Through: Transport Demand (EU28, PKM)

		2020	2030	Difference with BAU 2020	Difference with BAU 2030
Intra-EU	Air	297,892	375,300	-3.8%	-7.5%
	Bus	12,384	12,888	-2.6%	-5.2%
	Rail	27,213	30,845	-3.1%	-5.2%
	Total	337,489	419,033	-3.7%	-7.3%

Extra-EU	Air	446,025	573,286	0.0%	0.0%
	Bus	2,392	2,551	0.0%	0.0%
	Rail	2,915	3,352	0.0%	0.0%
	Total	451,331	579,188	0.0%	0.0%
Urban	Metro	100,559	105,224	-2.3%	-3.9%
	Bus	158,020	164,240	-2.7%	-5.4%
	Rail	164,977	183,404	-4.3%	-7.2%
	Total	423,556	452,867	-3.3%	-5.8%
Other Domestic	Air	52,098	63,705	-4.1%	-8.2%
	Bus	411,896	422,448	-3.7%	-7.4%
	Rail	244,215	273,928	-4.8%	-8.1%
	Total	708,208	760,081	-4.1%	-7.7%
Total	Air	796,014	1,012,290	-1.7%	-3.5%
	Bus	584,692	602,126	-3.4%	-6.8%
	Rail	439,320	491,529	-4.5%	-7.5%
	Metro	100,559	105,224	-2.3%	-3.9%
	Total	1,920,585	2,211,169	-2.9%	-5.3%

Table 6.6 - Scenario 1 Less-Than-Full Pass-Through: Transport Demand (EU28, PKM)

		2020	**2030**	**Difference with BAU 2020**	**Difference with BAU 2030**
Intra-EU	Air	314,090	417,974	1.5%	3.0%
	Bus	12,451	13,030	-2.1%	-4.1%
	Rail	27,396	31,205	-2.4%	-4.1%
	Total	353,937	462,209	1.0%	2.3%
Extra-EU	Air	446,025	573,286	0.0%	0.0%
	Bus	2,392	2,551	0.0%	0.0%
	Rail	2,915	3,352	0.0%	0.0%
	Total	451,331	579,188	0.0%	0.0%
Urban	Metro	101,804	107,424	-1.1%	-1.9%
	Bus	160,601	169,762	-1.1%	-2.3%
	Rail	168,907	190,907	-2.1%	-3.4%
	Total	431,312	468,093	-1.5%	-2.6%
Other Domestic	Air	54,594	70,089	0.5%	1.0%
	Bus	420,747	441,373	-1.6%	-3.3%
	Rail	250,717	286,561	-2.3%	-3.9%
	Total	726,058	798,023	-1.7%	-3.1%
Total	Air	814,709	1,061,349	0.6%	1.2%
	Bus	596,192	626,716	-1.5%	-3.0%
	Rail	449,935	512,024	-2.2%	-3.7%
	Metro	101,804	107,424	-1.1%	-1.9%

	Total	1,962,639	2,307,513	-0.8%	-1.2%

These changes in demand would have remarkable effects on the revenue collected by transport operators (from net fares) and by the government (from VAT), as displayed in Table 6.7. As is to be expected, VAT revenue would almost treble as a result of the increases to national standard rates (this also occurs if we modify the rates in the base year 2010 without allowing for any demand effects to operate, as in the second column of Table 6.7). However, when compared to the BAU Scenario, the revenue of transport operators would decrease by 3% (in the short term with full pass-through) and up to 10% (in the long term with less-than-full pass-through). The sum of VAT revenue and ticket revenue would only increase for the short-term simulation with full pass-through; in all other cases, transport would generate fewer transport kilometres. The distribution of the increase in VAT and the decrease in operator revenue would differ between the modes and Member States[143] (see Excel Annex for detailed results).

Table 6.7 – Scenario 1: Changes in VAT and Operator Revenues

	2010	2020				2030			
	Mechanical 2010 Change in Rates	Full Pass-Through		Less-Than-Full Pass-Through		Full Pass-Through		Less-Than-Full Pass-Through	
	VAT	VAT	Tickets	VAT	Tickets	VAT	Tickets	VAT	Tickets
AT	107.9%	103.9%	-2.4%	97.1%	-6.6%	120.7%	9.8%	116.5%	6.1%
BE	276.5%	265.5%	-3.7%	255.4%	-9.3%	280.0%	1.3%	267.7%	-3.1%
BG	16.1%	24.7%	-0.7%	23.2%	-3.6%	36.8%	13.6%	36.3%	10.7%
CY	3033.6%	3533.5%	-2.5%	3223.5%	-13.0%	4381.7%	25.1%	4182.5%	15.6%
CZ	60.0%	63.7%	-1.9%	60.7%	-6.8%	78.2%	13.2%	76.1%	8.4%
DE	191.7%	183.9%	-3.3%	175.3%	-9.1%	201.9%	6.9%	195.7%	1.8%
DK	..	..	-5.8%	..	-15.3%	..	5.9%	..	-2.4%
EE	20.2%	31.0%	-0.9%	31.0%	-6.1%	50.5%	27.0%	49.2%	19.6%
ES	148.7%	144.1%	-2.2%	144.1%	-9.9%	174.5%	18.0%	168.6%	11.2%
FI	208.0%	210.3%	-3.1%	194.2%	-11.4%	236.4%	10.4%	225.0%	3.1%
FR	112.8%	107.1%	-3.0%	102.6%	-7.2%	136.6%	11.0%	132.0%	7.4%
GR	210.8%	243.5%	-3.8%	209.0%	-13.2%	313.3%	15.8%	286.1%	6.7%
HR	6.0%	5.3%	-0.3%	2.8%	-4.9%	23.8%	25.2%	23.8%	21.2%
HU	18.0%	21.8%	-1.4%	23.2%	-3.0%	33.5%	12.3%	34.7%	11.0%
IE	..	..	-3.9%	..	-14.5%	..	13.7%	..	4.7%
IT	146.2%	142.7%	-3.5%	135.5%	-8.2%	164.4%	6.3%	157.1%	2.7%
LT	211.0%	233.1%	-3.8%	217.8%	-10.5%	293.6%	22.5%	287.6%	16.3%
LU	573.3%	587.4%	-1.8%	596.9%	-8.4%	662.3%	11.5%	633.8%	4.9%
LV	149.2%	177.3%	-3.1%	177.0%	-10.2%	249.3%	29.6%	241.8%	22.0%
MT	..	..	-2.8%	..	-13.4%	..	21.6%	..	11.6%
NL	285.0%	277.0%	-3.1%	260.9%	-10.3%	308.7%	9.2%	294.1%	2.3%
PL	203.0%	193.0%	-4.7%	193.5%	-9.0%	221.6%	7.8%	217.9%	4.9%

[143] Member States with an initial VAT revenue of zero, such as the UK, Denmark, and Ireland indeed register "infinite" percentage increases.

PT	537.2%	560.0%	-4.4%	516.6%	-15.1%	665.0%	15.0%	630.0%	5.1%
RO	16.0%	18.5%	-0.7%	24.1%	-2.9%	31.8%	11.8%	31.4%	10.3%
SE	432.7%	424.7%	-4.3%	392.8%	-12.8%	486.2%	10.0%	461.7%	2.0%
SI	141.6%	131.9%	-3.1%	129.2%	-7.8%	138.4%	4.1%	134.1%	0.8%
SK	7.8%	9.7%	-4.0%	11.9%	-3.9%	17.3%	10.3%	17.4%	10.4%
UK	..	..	-4.2%	..	-12.2%	..	5.9%	..	-1.3%
EU28	194.4%	191.8%	-3.3%	182.8%	-9.2%	222.9%	9.6%	213.9%	4.4%

b. Impact on Demand between City Pairs

The city pairs results for Scenario 1 and how they differ to the BAU situation are shown in Table 6.8. For simplicity of presentation, only the results of the full pass-through are presented. In terms of passenger demand and VAT revenue, the impacts of the less-than-full pass-through would be similar but less pronounced.

The impacts of setting all domestic and intra-EU VAT rates to the national standard rates would be similar at the city pair to the national level. In all 20 of the city pairs included in Table 6.8, the fare either increases (where the current rates are lower than the national standard rates, for example in city pairs 6 through 12) or stays the same (where the current rates are the same as the standard rates, for example pairs 2, 3, and 4).

For intra-EU city pairs, the outcome would be a combination of the two effects, as sometimes there would be a large increase in one of the Member States (from a zero or reduced rate to a standard rate); while in the other (or others where the route crosses other Member States), the increase would be zero (where all involved Member States currently apply their standard rate).

Table 6.8 - Scenario 1 City Pairs Model, Full Pass-Through: Changes in Fares, Trips, and VAT Revenue (Comparison with BAU)

			Fares (% Change)			Trips (% Change)	VAT Revenue (EUR m)	VAT Revenue (% Change)
	City A	**City B**	**Air**	**Rail**	**Bus**	**All**		
1	Athens	Thessaloniki	9%	9%	9%	-5%	35.6	69%
2	Berlin	Hamburg	0%	0%	0%	0%	31.1	0%
3	Budapest	Debrecen	n.a.	0%	0%	0%	5.0	0%
4	Cluj	Iasi	0%	0%	0%	0%	3.3	n.a.
5	Copenhagen	Aarhus	n.a.	25%	25%	-10%	30.7	n.a.
6	Dublin	Cork	23%	23%	23%	-13%	7.6	n.a.
7	Krakow	Wroclaw	14%	14%	14%	-8%	0.6	164%
8	Lisbon	Porto	16%	16%	16%	-9%	13.5	251%
9	London	Glasgow	20%	20%	20%	-10%	43.8	n.a.
10	Madrid	Barcelona	10%	10%	10%	-6%	29.1	98%
11	Paris	Toulouse	13%	13%	13%	-8%	73.8	117%
12	Berlin	Warsaw	22%	11%	11%	-5%	1.3	235%
13	Constanta	Varna	n.a.	n.a.	0%	0%	0.0	n.a.
14	Copenhagen	Vilnius	16%	10%	9%	-5%	4.3	n.a.
15	London	Brussels	21%	16%	17%	-6%	72.0	n.a.
16	Ostrava	Katowice	n.a.	12%	12%	-5%	0.0	n.a.

17	Paris	Lisbon	22%	13%	13%	-7%	22.9	n.a.
18	Frankfurt	Oslo	0%	10%	10%	0%	0.9	71%
19	Gothenburg	Oslo	0%	11%	4%	0%	0.0	n.a.
20	Riga	Moscow	0%	3%	4%	-1%	0.0	n.a.

The change in trips would always be negative and less than the change in fares, as all the fare elasticities are less than one. Where we could not find a current fare (e.g. by air for some of the city pairs that are relatively close to each other), we assumed that there is not, and would not be, a service. The largest reductions in trips would be for Member States that currently have either a zero or exempt VAT rate.

Changes in VAT revenue would be either zero (or not applicable) or large. These impacts would be a combination of the change in VAT rates and the changes in numbers of passengers (and, therefore, the PKM on which the VAT is based). The size of the impact of the changes in VAT rates is greater than that of the numbers of passengers, as the latter is diminished by the elasticities (always less than one).

Pair 18 is the only extra-EU city pair that has a measurable change in VAT revenue even without the extra-EU VAT rates being changed. This is because it is the only one in the sample that has a high proportion of rail and bus trips, and these are the only modes where through tickets are not generally available; hence, making the domestic portion of the trip liable to VAT. Air trips are nearly always made on through tickets, so the domestic section is not generally liable to VAT, and these account for nearly all the trips for city pair 20.

c. Macro-Economic and Social Effects

In order to assess the economy-wide effects of Scenario 1 (as well as for the other quantified scenarios), we assumed that the VAT increases would be budget-neutral through a system of proportional transfers to households. This effect was taken into account using the EDIP model to estimate the effect on GDP and employment in the transport sector and on the purchasing power of different per capita income quintiles of the population.

Table 6.9 - Scenario 1: GDP Effects (Comparison with BAU)

	Full Pass-Through (% Change)	Less-Than-Full Pass-Through (% Change)
AT	-0.01	-0.07
BE	-0.01	-0.04
BG	-0.01	-0.01
CZ	-0.01	-0.06
DE	-0.01	-0.02
EE	0.00	-0.02
ES	-0.02	-0.05
FI	-0.02	-0.05
FR	-0.07	-0.03
GR	-0.04	-0.01
HU	0.00	-0.01
IE	-0.03	-0.10

IT	-0.11	-0.04
LT	-0.05	-0.08
LV	-0.02	-0.03
NL	-0.01	-0.05
PL	-0.04	-0.09
PT	-0.04	-0.01
RO	-0.01	0.00
SE	-0.02	-0.06
SI	-0.01	-0.04
SK	0.00	-0.02
UK	-0.02	-0.04

With this assumption, the effects of the VAT changes of Scenario 1 on GDP would be, in general, small and would result from several countervailing effects. Given the model assumption of revenue-neutral VAT changes, an increase in VAT would be countered by a decrease in other taxes or an increase in lump-sum transfers to households; thus, the main effect of the changes would be a shift in consumption patterns, with less transport and more of other goods and services being consumed. This shift in consumption patterns would lead to increased production and GDP for some economic sectors, and decreased production and GDP for others. Whether the sum of these effects would be positive or negative would depend on the profitability of the affected sectors and on the interrelations between the sectors: if the demand for sector A were to decrease, then sector A would require less input from sector B, which, in turn, would require less input from sector C, and so on. For sectors with large interdependences, the effects would be largest. The net effect for each Member State would, therefore, depend on the structure of its economy and the profitability of its different economic sectors. A common feature for all Member States is that the effect on GDP would be more marked when the transport sectors are highly subsidized, as illustrated in Figure 6.1.[144]

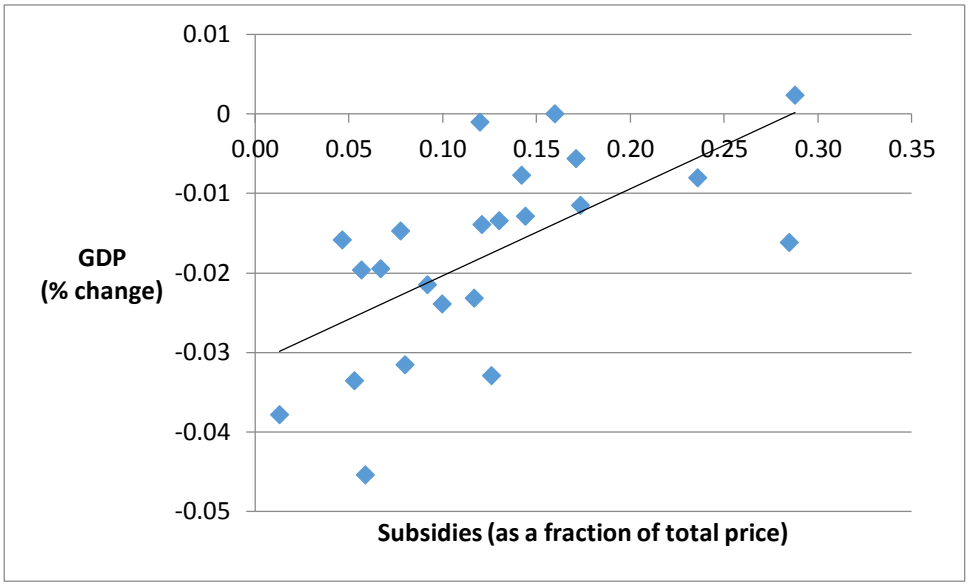
Figure 6.1 shows the relationship for each Member State of the change in GDP that would result from the VAT and Member States subsidies on rail transport.

The subsidies are expressed as a percentage of the fare, and are based on data in the supply tables of each of the Member States.[145] This relationship can be explained by the distortions resulting from high subsidies being partially balanced by VAT increases. If demand for transport were to decrease, the cost of subsidies would also decrease, making more of the budget available for the consumption of other goods. This impact would be higher in the Member State, market, and mode combinations where subsidies are high.

[144] The model used in these simulations does not take into account possible positive effects that could stem from shifting direct to indirect taxes and their impact on labour supply.

[145] (See http://epp.eurostat.ec.europa.eu/portal/page/portal/esa95_supply_use_input_tables/methodology/supply_and_use_tables)

Figure 6.1 - Subsidies and GDP Change



Overall, the effect of the VAT increases of Scenario 1 on GDP would be negative. The main explanation is that a decrease in the consumption budget of the households would result in a decrease in overall demand for consumption. A secondary explanation is that current investment in capital and materials are optimized for the current tax regime. If the VAT regime were to change, there would be over-capacity in transport sectors and under-capacity in other sectors, which would result in inefficient production. In the longer term, investments would shift to where they were most productive, reducing the inefficiency of resource misallocation and increasing GDP.

In almost all Member States, we would see a more negative effect on GDP when the VAT increase is only partially passed-through in fare changes. In those Member States were business travel is treated as a business input cost, business passenger transport would increase as a consequence of this deductibility of VAT. This, in turn, would increase the amount of subsidies paid by the government and require compensatory reductions in transfers to households (recall the balanced-budget constraint imposed on government in the general equilibrium model). In addition, the difference between full and partial pass-through would be an additional cost to transport operators and would decrease their consumption budget. Finally, as demand for business transport would increase, transport operators would readjust their fares upwards, further increasing the price of transport for non-business passengers. The combination of these three effects would result in consumption decreasing further, leading to a yet a further decrease in GDP.

Table 6.10 - Scenario 1: Employment Effects

	Full Pass-Through (% Difference)			Less-Than-Full Pass-Through (% Difference)		
	Train	**Bus**	**Plane**	**Train**	**Bus**	**Plane**
AT	**-3.29**	**-3.65**	**-2.15**	**0.31**	**-0.01**	**3.88**
BE	-6.55	-7.82	-0.90	-0.84	-2.36	6.14
BG	-0.41	-0.36	-6.11	-0.04	-0.02	-0.09
CZ	-3.49	-5.19	-0.60	1.39	-0.67	1.20
DE	-7.21	-7.84	-1.40	-2.24	-3.15	1.73

EE	-0.10	-0.09	-0.90	0.50	0.44	2.21
ES	-5.20	-6.36	-2.00	1.42	-0.11	3.40
FI	-6.30	-8.94	-1.75	1.77	-2.27	4.85
FR	-8.03	-7.01	-2.70	-4.29	-3.54	-0.12
GR	-6.60	-6.76	-3.57	-3.24	-3.37	-0.56
HU	-0.58	-0.65	-2.25	0.08	0.09	0.32
IE	-11.12	-15.65	-1.50	-0.99	-7.83	8.15
IT	-5.92	-9.06	-1.32	-2.95	-4.46	0.22
LT	-2.60	-2.62	-9.01	0.31	0.00	0.88
LV	-3.12	-3.20	-1.37	0.25	-0.15	-0.07
NL	-4.26	-4.58	-0.60	0.54	0.61	1.66
PL	-7.91	-8.31	-0.54	0.02	-1.13	1.68
PT	-11.19	-11.35	-4.09	-5.66	-5.63	-0.29
RO	-0.24	-0.29	-4.57	-0.01	0.01	0.44
SE	-13.36	-14.66	-2.02	-4.74	-7.05	6.81
SI	-5.44	-5.96	-3.18	0.63	-0.47	4.91
SK	-0.04	-0.02	-0.09	0.29	0.29	2.12
UK	-11.64	-12.68	-1.04	-6.64	-6.12	1.65

Employment in the Transport Sector

Employment in the transport sectors follows closely the demand for transport. In the case of full pass-through, demand would decrease for all three modes in all Member States. In the case of partial pass-through, this decrease would be small, and sometimes would even convert to an increase when the number of business trips would increase substantially. This would be particularly true for air transport, where the fare reductions would be largest.

Income Distribution

The change in purchasing power that would occur for different household types is shown in Table 6.11. It shows how much more or less each quintile of the population could buy of their own consumption bundle. In EDIP, there are five household types (quintiles) based on per capita income. The quintile with the lowest per capita income is designated as *household 1* (hh1) and the quintile with the highest per capita income as *household 5* (hh5). Each of the five per capita income quintiles has a different consumption pattern, employment, and per capita income. Households in the lower income quintiles typically spend a smaller overall share of their income on transport in general, but a higher share of their income on public transport.

Household purchasing power would be affected by VAT increases in two ways. *Ceteris paribus,* a price increase would decrease household purchasing power, but the increase of the VAT rate would also increase government revenues. We assume that these extra revenues would be used to decrease overall taxes on households, leading to an increase in household budgets.

Table 6.11 – Scenario 1: Distributional Effects

	Full Pass-Through					Less-Than-Full Pass-Through				
	hh1	**hh2**	**hh3**	**hh4**	**hh5**	**hh1**	**hh2**	**hh3**	**hh4**	**hh5**
AT	-0.22	-0.08	-0.09	-0.01	0.01	-0.16	-0.07	-0.06	-0.06	-0.23
BE	-0.04	-0.08	-0.03	-0.03	0.01	-0.11	-0.15	-0.10	-0.04	-0.07
BG	0.02	0.02	0.01	0.01	-0.05	-0.02	-0.03	-0.02	0.09	-0.04
CZ	-0.16	-0.15	0.00	-0.02	0.02	-0.14	-0.08	-0.03	-0.06	-0.19
DE	-0.11	-0.08	-0.04	0.00	0.01	-0.06	-0.08	-0.05	-0.02	-0.03
EE	0.00	0.00	0.00	0.00	0.00	0.00	-0.01	-0.02	-0.01	-0.06
ES	-0.14	-0.13	-0.07	-0.03	0.00	-0.14	-0.10	-0.06	-0.05	-0.13
FI	-0.10	-0.07	-0.02	0.02	-0.08	-0.06	-0.02	0.02	0.07	-0.26
FR	-0.09	-0.06	-0.04	-0.07	-0.16	-0.01	0.04	0.07	0.07	-0.17
GR	-0.27	-0.17	-0.08	-0.05	0.02	-0.01	-0.09	-0.03	0.00	0.00
HU	-0.01	0.00	0.00	0.00	0.01	0.01	-0.01	0.02	0.01	-0.04
IE	-0.24	-0.27	-0.20	-0.16	0.00	-0.49	-0.23	-0.21	-0.10	-0.31
IT	-0.16	-0.14	-0.08	-0.08	-0.11	-0.15	-0.07	0.01	0.03	-0.09
LT	-0.11	-0.44	-0.12	0.10	-0.07	0.01	-0.14	0.12	0.25	-0.26
LV	-0.13	-0.23	-0.04	0.03	-0.04	-0.05	-0.08	0.07	0.07	-0.12
NL	-0.16	-0.07	-0.05	-0.01	-0.02	-0.16	-0.10	-0.05	0.01	-0.21
PL	-0.22	-0.27	-0.11	-0.04	0.00	-0.07	-0.22	-0.06	-0.06	-0.18
PT	-0.20	-0.17	-0.06	-0.01	0.01	-0.10	-0.11	0.05	0.05	-0.01
RO	-0.01	0.00	0.00	0.00	-0.01	0.00	-0.01	0.04	0.04	-0.03
SE	-0.61	-0.80	-0.33	0.34	0.08	-0.31	-0.10	-0.04	0.01	-0.28
SI	-0.03	-0.09	-0.02	-0.02	-0.02	-0.04	-0.07	-0.06	-0.02	-0.13
SK	0.00	0.00	0.00	0.00	0.00	-0.04	-0.05	-0.02	-0.04	-0.04
UK	-0.31	-0.19	-0.03	0.01	-0.02	-0.20	-0.13	-0.06	0.03	-0.09

With full pass-through, the entire VAT increase would be passed on as an increase in transport fares. This would have a negative effect, especially on lower income households, since they spend a larger share of their income on public transport. For higher income households, the effect would be smaller, and sometimes even positive because of the tax cuts that would be made possible by the increased VAT revenues.

d. Environmental Impact

Any policy that affects transport demand has direct consequences for emissions of greenhouse gasses (e.g. CO2 and others) and of other pollutants with a more regional or local impact (e.g. particulates and NOx). Given the nature of the changes to VAT policy considered in the present study, which does not entail any explicit or implicit stimulus to improve the environmental qualities of vehicles, the assessment is as straightforward as applying the relative changes in demand to the projected emission levels per mode and per market. In other words, the emission factors (g/PKM)[146] are not expected to change from the baseline; the only driver for changes to emissions is the amount of PKM performed. Naturally,

[146] Source of emission factors is TREMOVE 3.5

different transport modes have different emission factors, so a modal shift from VAT policy can certainly impact overall emission levels in a manner that is not proportionate to demand changes. For example:

- Air has higher CO2 emissions than bus, which has higher CO2 emissions than rail, in general;
- NOx emissions are highest for bus; for air, the environmental effect of NOx differs for emissions at landings and take-offs and during cruise flight; and
- Particulates (PM) emission factors are only considered for bus transport. The impact of this pollutant would be local to the source of emissions, making it less relevant for rail and certainly for air.

While only demand effects on public passenger transport are considered, an increase in its end-user cost will also increase the demand for private transport, most notably personal car transport. This effect was not covered in this assessment.

As an illustration, Table 6.12 below shows the estimated effect of Scenario 1, which would create the most drastic changes, with overall CO2, PM, and NOx emissions down by 4.1%, 7.3%, and 7.3%, respectively, as compared to the BAU Scenario. The other scenarios show the same tendencies, but to a lesser extent. The absolute savings in terms of CO2 emissions for the transport modes considered amount to 6.2 million tons for 2030 (total EU CO2 emissions for 2011 were around 4.5 billion tons).[147]

Table 6.12 – Scenario 1: Environmental Effects

	2020 CO2	2030 CO2	2020 NOx	2030 NOx	2020 PM	2030 PM
AT	**-1.5%**	**-2.8%**	**-2.8%**	**-5.5%**	**-2.7%**	**-4.8%**
BE	-1.9%	-3.7%	-3.1%	-6.3%	-3.5%	-6.6%
BG	-1.3%	-2.7%	-0.5%	-1.1%	-0.5%	-0.9%
CY	-2.4%	-4.7%	-5.1%	-10.3%	-5.1%	-10.3%
CZ	-1.7%	-3.2%	-2.4%	-4.9%	-2.3%	-4.0%
DE	-2.0%	-3.7%	-3.6%	-7.2%	-4.0%	-6.9%
DK	-3.3%	-5.9%	-6.8%	-13.2%	-7.6%	-12.9%
EE	-1.1%	-2.4%	-0.5%	-0.9%	-0.5%	-0.8%
ES	-1.4%	-2.8%	-3.3%	-6.6%	-3.3%	-6.1%
FI	-2.5%	-4.8%	-4.1%	-8.2%	-3.8%	-7.1%
FR	-2.0%	-3.9%	-2.4%	-4.7%	-3.2%	-5.7%
GR	-2.1%	-4.0%	-4.1%	-8.2%	-3.8%	-6.8%
HR	-0.7%	-1.4%	-0.1%	-0.1%	0.0%	0.0%
HU	-1.4%	-2.9%	-0.6%	-1.2%	-1.2%	-2.3%
IE	-2.3%	-4.5%	-6.9%	-13.6%	-5.4%	-9.6%
IT	-2.1%	-4.1%	-3.1%	-6.2%	-3.2%	-6.1%
LT	-3.1%	-6.0%	-3.6%	-7.2%	-3.1%	-5.3%
LU	-1.0%	-1.9%	-1.9%	-3.8%	-1.8%	-3.4%
LV	-2.6%	-5.0%	-2.9%	-5.9%	-2.5%	-4.3%
MT	-2.5%	-5.0%	-4.6%	-9.3%	-4.6%	-9.3%
NL	-1.4%	-2.7%	-3.5%	-7.1%	-3.7%	-6.7%

[147] Source: EEA, http://www.eea.europa.eu/data-and-maps/data/data-viewers/greenhouse-gases-viewer

PL	-3.6%	-6.8%	-5.3%	-10.6%	-5.2%	-9.4%
PT	-1.4%	-2.7%	-5.0%	-10.0%	-4.9%	-9.1%
RO	-1.5%	-3.0%	-0.5%	-0.9%	-0.4%	-0.7%
SE	-2.9%	-5.7%	-4.9%	-9.9%	-5.1%	-9.8%
SI	-2.2%	-3.9%	-3.5%	-7.1%	-3.4%	-6.1%
SK	0.5%	1.1%	0.0%	-0.1%	-0.1%	-0.1%
UK	-2.1%	-3.8%	-5.2%	-10.4%	-6.0%	-10.5%
EU28	-2.1%	-4.1%	-3.6%	-7.3%	-4.1%	-7.3%

VAT Scenario 2: VAT Rates for Domestic and Intra-EU International Transport Set to National Reduced Rates

a. Impact of Member State Passenger Demand

For many Member States, this scenario would be a continuation of the current policy for domestic transport. For intra-EU transport, the effects would follow the same trend as Scenario 1, albeit at lower levels. The difference between the full pass-through and less-than-full pass-through for Member States that allow business travel as a VAT deduction would be the same for air transport as in Scenario 1: demand would increase due to the net reduction of the net fare (Tables 6.13 and 6.14).

Table 6.13 – Scenario 2 Full Pass-Through: Transport Demand (EU28, PKM)

		2020	2030	Difference with BAU 2020	Difference with BAU 2030
Intra-EU	Air	304,570	392,823	-1.6%	-3.2%
	Bus	12,700	13,564	-0.1%	-0.2%
	Rail	27,830	32,041	-0.9%	-1.5%
	Total	345,100	438,427	-1.5%	-3.0%
Extra-EU	Air	446,025	573,286	0.0%	0.0%
	Bus	2,392	2,551	0.0%	0.0%
	Rail	2,915	3,352	0.0%	0.0%
	Total	451,331	579,188	0.0%	0.0%
Urban	Metro	102,896	109,356	-0.1%	-0.1%
	Bus	162,248	173,280	-0.1%	-0.2%
	Rail	172,227	197,244	-0.1%	-0.2%
	Total	437,371	479,880	-0.1%	-0.2%
Other Domestic	Air	54,379	69,521	0.1%	0.2%
	Bus	428,798	458,517	0.3%	0.5%
	Rail	256,102	297,003	-0.2%	-0.3%
	Total	739,279	825,041	0.1%	0.2%
Total	Air	804,973	1,035,630	-0.6%	-1.2%
	Bus	606,138	647,911	0.1%	0.3%
	Rail	459,073	529,639	-0.2%	-0.4%
	Metro	102,896	109,356	-0.1%	-0.1%
	Total	1,973,080	2,322,536	-0.3%	-0.6%

Table 6.14 – Scenario 2 Less-Than-Full Pass-Through: Transport Demand (EU28, PKM)

		2020	2030	Difference with BAU 2020	Difference with BAU 2030
Intra-EU	Air	311,707	411,673	0.7%	1.4%
	Bus	12,661	13,478	-0.4%	-0.8%
	Rail	27,839	32,063	-0.9%	-1.5%
	Total	352,206	457,214	0.5%	1.2%
Extra-EU	Air	446,025	573,286	0.0%	0.0%
	Bus	2,392	2,551	0.0%	0.0%
	Rail	2,915	3,352	0.0%	0.0%
	Total	451,331	579,188	0.0%	0.0%
Urban	Metro	102,961	109,468	0.0%	0.0%
	Bus	162,434	173,681	0.0%	0.0%
	Rail	172,375	197,512	0.0%	-0.1%
	Total	437,769	480,661	0.0%	0.0%
Other Domestic	Air	54,237	69,151	-0.2%	-0.4%
	Bus	428,353	457,604	0.2%	0.3%
	Rail	256,472	297,711	-0.1%	-0.1%
	Total	739,062	824,466	0.1%	0.1%
Total	Air	811,969	1,054,110	0.3%	0.5%
	Bus	605,839	647,314	0.1%	0.2%
	Rail	459,600	530,637	-0.1%	-0.2%
	Metro	102,961	109,468	0.0%	0.0%
	Total	1,980,369	2,341,530	0.1%	0.3%

VAT revenues by 2030 would increase overall (EU28) by over 36% (full pass-through) to 22% (less-than-full pass-through). Unlike Scenario 1, however, a number of Member States would see a reduction in their VAT revenues (sometimes quite dramatic), as their BAU rates are higher than the reduced rates of Scenario 2 (e.g. Bulgaria, Croatia, Estonia, Hungary, Romania, and Slovakia, see Table 6.15).

Revenue for operators by 2030 would drop slightly compared to the BAU, by 0.5% with full pass-through and 2.0% with limited pass-through. For Member States where there would be reduced overall VAT revenues, the operators' revenues would tend to increase (e.g. Bulgaria, Croatia, Hungary, and Slovakia), whereas the opposite would be true for the Member States with higher relative increases (e.g. Denmark would have the highest decrease at -17%). The mechanical application of the scenario to the 2010 demand structure yields very similar results (See also table 6.40 for detailed estimates in Euros).

Table 6.15 – Scenario 2: Changes in VAT and Operator Revenues

	2010	2020				2030			
	Mechanical 2010 Change in Rates	**Full Pass-Through**		**Less-Than-Full Pass-Through**		**Full Pass-Through**		**Less-Than-Full Pass-Through**	
	VAT	**VAT**	**Tickets**	**VAT**	**Tickets**	**VAT**	**Tickets**	**VAT**	**Tickets**
AT	4.0%	2.9%	-0.1%	2.7%	-1.1%	2.0%	-0.2%	2.0%	-1.2%
BE	7.7%	6.3%	0.0%	5.0%	-0.5%	5.4%	-0.1%	5.2%	-0.6%
BG	-47.7%	-43.4%	2.4%	-43.6%	3.5%	-40.1%	4.0%	-39.9%	3.8%
CY	724.7%	886.3%	-0.6%	856.4%	-3.7%	1027.7%	-1.2%	1011.9%	-3.4%
CZ	14.3%	16.4%	-0.6%	13.9%	-3.3%	18.5%	-1.2%	18.2%	-3.8%
DE	7.5%	6.4%	-0.2%	4.5%	-1.7%	6.0%	-0.4%	5.5%	-1.9%
DK	..	..	-5.8%	..	-15.3%	..	-10.0%	..	-17.0%
EE	-45.9%	-39.1%	1.9%	-37.0%	1.6%	-30.3%	2.7%	-30.1%	0.6%
ES	18.4%	12.2%	-0.2%	6.5%	-3.6%	6.5%	-0.5%	5.2%	-3.2%
FI	28.4%	33.6%	-0.5%	32.0%	-3.2%	37.8%	-1.0%	36.4%	-3.5%
FR	6.4%	7.0%	-0.2%	7.6%	-1.3%	7.0%	-0.4%	6.4%	-1.4%
GR	75.8%	100.4%	-1.2%	88.8%	-6.8%	116.4%	-2.4%	105.9%	-7.5%
HR	-78.7%	-77.0%	3.3%	-75.7%	6.5%	-74.9%	5.7%	-74.0%	6.8%
HU	-78.1%	-75.9%	5.2%	-74.1%	11.2%	-73.8%	9.2%	-73.0%	12.6%
IE	..	..	-1.6%	..	-6.4%	..	-3.0%	..	-6.4%
IT	12.0%	14.4%	-0.2%	15.1%	-1.1%	15.7%	-0.4%	14.6%	-1.3%
LT	33.3%	38.7%	-0.6%	28.0%	-2.9%	57.4%	-1.6%	56.5%	-3.6%
LU	34.7%	33.6%	-0.1%	32.3%	-0.8%	30.9%	-0.2%	30.6%	-0.9%
LV	42.6%	56.2%	-0.9%	53.1%	-4.4%	74.0%	-1.9%	72.0%	-5.1%
MT	..	..	-0.8%	..	-4.2%	..	-1.6%	..	-4.1%
NL	10.1%	9.5%	-0.1%	7.1%	-1.3%	9.0%	-0.2%	8.6%	-1.5%
PL	5.4%	4.9%	-0.1%	6.7%	-0.7%	4.9%	-0.4%	4.9%	-0.9%
PT	66.4%	81.7%	-0.5%	82.7%	-3.4%	93.0%	-1.1%	89.9%	-3.7%
RO	-75.8%	-75.5%	4.6%	-74.7%	9.6%	-76.1%	8.6%	-75.7%	11.4%
SE	27.9%	32.1%	-0.3%	31.1%	-1.9%	38.1%	-0.6%	36.8%	-2.2%
SI	4.3%	-2.9%	-0.1%	-7.4%	-0.8%	-8.9%	-0.2%	-8.8%	-0.8%
SK	-46.0%	-45.3%	-1.3%	-44.4%	2.7%	-43.9%	-0.5%	-43.2%	2.5%
UK	..	..	-1.1%	..	-3.5%	..	-2.0%	..	-3.9%
EU28	23.3%	24.6%	-0.3%	22.8%	-1.9%	25.0%	-0.6%	23.6%	-2.1%

Note: Percentage change from BAU Scenario for VAT revenues and Operators' revenues
For DK, IE, MT and UK the percentage change in VAT is not meaningful, as there are no revenues under the BAU

b. Impact on Demand between City Pairs

The changes in fares, trips, and VAT revenue at the city pairs level for Scenario 2 would also similar to those in Scenario 1, but at lower percentages. City pairs in a Member State (or between Member States) that currently apply their standard VAT rate to all modes of transport (e.g. city pairs 2 and 4) would show no change in fares, trips, or VAT revenue for Scenario 1. For Scenario 2, the same city pairs would show a decrease in fares, an increase in trips, and a large reduction in VAT revenue. In

contrast, city pairs in Member States that currently apply their reduced rates and would show an increase in fares and a reduction in trips in Scenario 1 would show no change in Scenario 2.

Table 6.16 - Scenario 2 City Pairs Model Full Pass-Through: Changes in Fares, Trips, and VAT Revenue (Comparison with BAU)

		Fares (% Change)			Trips (% Change)	VAT Revenue (% Change)
City A	**City B**	**Air**	**Rail**	**Bus**	**Total**	**Total**
Athens	Thessaloniki	0%	0%	0%	0%	0%
Berlin	Hamburg	-10%	-10%	-10%	7%	-60%
Budapest	Debrecen	n.a.	-7%	-7%	5%	-30%
Cluj	Iasi	-12%	-12%	-12%	8%	-60%
Copenhagen	Aarhus	n.a.	25%	25%	-10%	n.a.
Dublin	Cork	13%	13%	13%	-8%	n.a.
Krakow	Wroclaw	0%	0%	0%	0%	0%
Lisbon	Porto	0%	0%	0%	0%	0%
London	Glasgow	5%	5%	5%	-3%	n.a.
Madrid	Barcelona	0%	0%	0%	0%	0%
Paris	Toulouse	3%	4%	3%	-2%	-2%
Berlin	Warsaw	8%	-2%	-2%	0%	23%
Constanta	Varna	n.a.	n.a.	-10%	0%	n.a.
Copenhagen	Vilnius	7%	0%	-2%	-3%	n.a.
London	Brussels	2%	3%	3%	-1%	n.a.
Ostrava	Katowice	n.a.	0%	0%	0%	52%
Paris	Lisbon	9%	1%	1%	-3%	n.a.
Frankfurt	Oslo	0%	1%	1%	0%	9%
Gothenburg	Oslo	0%	0%	0%	0%	n.a.
Riga	Moscow	0%	0%	0%	0%	n.a.

In comparing the VAT revenues for the BAU, Scenario 1, and Scenario 2, each city pair (with the exceptions of pairs 6, 9, and 15) would show the same results for two of the situations, a reflection that they are currently applying either their standard rate or their reduced VAT. For the three exceptions, the current rate is either exemption or zero; hence, the BAU has VAT revenue, Scenario 1 would show the highest VAT gain, and Scenario 2 would show a lesser VAT revenue. City pair 5 shows the same revenue for Scenarios 1 and 2, as the Member State (Denmark) does not have a reduced rate of VAT; subsequently, for Scenario 2, the same standard rate has been used as in Scenario 1.

In all three situations (BAU and Scenarios 1 and 2), city pair 11 (Paris/Toulouse) would generate the highest VAT revenue. In the BAU, city pair 2 (Berlin/Hamburg) would have the second highest VAT revenue, while for Scenario 1, it would be city pair 15 (London/Brussels) with the second highest VAT revenue gain and in Scenario 2, it would be city pair 5 (Copenhagen/Aarhus). This city pair would also show the largest percentage reduction in passengers in Scenario 2 and city pair 4 (Cluj/Iasi), the largest percentage gain in passengers.

Table 6.17 – BAU and Scenarios 1 and 2 City Pairs Model: Comparison of VAT Revenue

			VAT Revenue (EUR m)		
	City A	**City B**	**BAU**	**Scenario 1**	**Scenario 2**
1	Athens	Thessaloniki	21.1	35.6	21.1
2	Berlin	Hamburg	31.1	31.1	12.4
3	Budapest	Debrecen	5.0	5.0	3.5
4	Cluj	Iasi	3.3	3.3	1.3
5	Copenhagen	Aarhus	0.0	30.7	30.7
6	Dublin	Cork	0.0	7.6	4.7
7	Krakow	Wroclaw	0.2	0.6	0.2
8	Lisbon	Porto	3.8	13.5	3.8
9	London	Glasgow	0.0	43.8	11.8
10	Madrid	Barcelona	14.7	29.1	14.7
11	Paris	Toulouse	34.0	73.8	33.5
12	Berlin	Warsaw	0.4	1.3	0.5
13	Constanta	Varna	0.0	0.0	0.0
14	Copenhagen	Vilnius	0.0	4.3	1.9
15	London	Brussels	1.0	72.0	26.2
16	Ostrava	Katowice	0.0	0.0	0.0
17	Paris	Lisbon	0.0	22.9	9.8
18	Frankfurt	Oslo	0.5	0.9	0.6
19	Gothenburg	Oslo	0.0	0.0	0.0
20	Riga	Moscow	0.0	0.0	0.0

c. Macro-Economic and Social Effects

In this scenario, the effect on GDP would be much smaller for most Member States as compared to Scenario 1, because the change in VAT is much smaller (for many Member States, only the VAT on air transport would increase). For some Member States, the VAT would decrease for train and bus (e.g. Bulgaria, Estonia, Hungary, Romania, and Slovakia), and the effect on GDP would be positive as the decreased transport fares would increase disposable household budgets and increase consumption demand (Table 6.18).

For those Member States where the VAT would increase, GDP would decrease if the VAT increase were to be passed on only partially. This result would be similar to that obtained under Scenario 1. The opposite would be true for those Member States where VAT would decrease; GDP would increase further for these Member States. This outcome would result from a decrease in government subsidies to the bus and rail sectors: a VAT decrease for bus and rail transport would be passed-through only partially by raising the fares for these modes. The net effect for non-business trips would still be a fare decrease, but for business passengers, fares would increase. As a result, their demand for bus and rail transport will be reduced. This reduction in demand would result in reduced subsidies to these modes, and the extra available budget could be passed on to the households via tax reductions.

Table 6.18 – Scenario 2: GDP Effects (Comparison with BAU)

	Full Pass-Through (% Change)	Less-Than-Full Pass-Through (% Change)
AT	0.00	-0.02
BE	0.00	-0.01
BG	0.04	0.05
CZ	0.00	-0.02
DE	0.00	0.00
EE	0.02	0.02
ES	0.00	-0.01
FI	0.00	-0.01
FR	0.00	0.00
GR	-0.01	0.00
HU	0.02	0.03
IE	-0.01	-0.04
IT	0.00	0.00
LT	0.00	0.00
LV	0.00	0.00
NL	0.00	0.00
PL	0.00	-0.01
PT	0.00	0.00
RO	0.09	0.12
SE	0.00	0.00
SI	0.00	-0.01
SK	0.02	0.02
UK	0.00	-0.01

d. Employment in the Transport Sector

Employment in the transport sectors would again follow the pattern of the transport PKM for each mode. In Member States where the VAT rate would decrease (e.g. Bulgaria, Estonia, Hungary, Romania, and Slovakia), there would be a positive effect on employment. In Member States that already charge the reduced rate, the effect would be small; while in Member States with a current zero rate or exemption (e.g. Ireland and the UK), there would be a large negative effect on employment.

If there were to be a partial cost pass-through, business demand would increase due to the decrease in fares. This would lead to an increase in employment compared to what would happen with a full pass-through.

Table 6.19 – Scenario 2: Employment Effects

	Full Pass-Through (% Difference)			Less-Than-Full Pass-Through (% Difference)		
	Train	**Bus**	**Air**	**Train**	**Bus**	**Air**
AT	-0.04	-0.04	-0.91	0.12	0.11	1.57
BE	-0.02	-0.03	-0.22	0.12	0.07	1.50
BG	6.22	6.43	-2.43	0.84	1.49	0.38
CZ	-0.04	-0.15	-0.30	0.29	0.18	0.64
DE	0.00	0.00	-0.05	0.01	0.00	0.06
EE	3.67	4.19	-0.52	0.58	-0.12	0.73
ES	-0.05	-0.06	-0.65	0.24	0.23	0.95
FI	-0.03	-0.05	-0.49	0.26	0.09	1.23
FR	0.01	0.00	-0.23	0.00	0.00	-0.01
GR	0.03	-0.06	-1.97	-0.02	-0.02	-0.18
HU	8.75	9.82	0.75	2.35	2.77	0.58
IE	-4.86	-6.86	-0.61	-0.65	-3.26	2.97
IT	0.03	0.01	-0.29	0.00	0.00	-0.01
LT	-0.03	-0.03	-3.33	0.01	0.01	0.31
LV	-0.01	0.01	0.00	-0.01	0.01	0.00
NL	-0.01	-0.01	-0.12	0.05	0.05	0.34
PL	-0.02	-0.08	-0.15	0.25	0.23	0.40
PT	0.03	0.00	-0.94	-0.01	-0.01	-0.06
RO	5.42	5.73	1.57	-0.15	0.45	1.37
SE	-0.02	-0.02	-0.20	0.04	0.00	0.67
SI	-0.20	-0.20	-1.06	0.12	0.11	1.79
SK	2.87	3.34	-0.07	0.52	0.55	0.73
UK	-3.28	-3.57	-0.25	-1.82	-1.63	0.39

For Member States where the VAT would decrease for bus and rail transport (e.g. Bulgaria, Estonia, Hungary, Romania, and Slovakia), the purchasing power of lower-income households would increase as they could make more use of these modes. This increase would be larger with full pass-through as compared to partial pass-through because the decrease in consumer price would be larger in the former case. For the other Member States, the results would be similar to Scenario 1: with partial pass-through, the purchasing power would decrease mainly for the higher income households.

Table 6.20 – Scenario 2: Distributional Impact

	Full Pass-Through					Less-Than-Full Pass-Through				
	hh1	**hh2**	**hh3**	**hh4**	**hh5**	**hh1**	**hh2**	**hh3**	**hh4**	**hh5**
AT	-0.02	0.00	-0.01	0.00	0.00	-0.02	-0.01	-0.01	-0.02	-0.05
BE	0.00	0.00	0.00	0.00	0.00	-0.02	-0.02	-0.02	-0.01	-0.02

BG	n.a.[148]	n.a.	n.a.	n.a.	n.a.	0.08	0.15	0.12	-0.13	0.10
CZ	-0.01	0.00	0.00	0.00	0.00	-0.02	0.00	0.00	-0.02	-0.06
DE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
EE	0.11	0.21	0.06	0.00	0.01	0.00	0.05	0.00	-0.04	0.07
ES	-0.01	0.00	0.00	0.00	0.00	-0.02	-0.01	-0.01	-0.01	-0.03
FI	0.00	0.00	0.00	0.00	-0.01	-0.01	0.00	0.00	0.01	-0.04
FR	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
GR	0.00	0.00	0.00	-0.01	0.00	0.01	0.00	0.00	0.01	0.00
HU	0.14	0.19	0.05	-0.04	-0.01	0.03	0.11	-0.03	-0.03	0.08
IE	-0.09	-0.11	-0.08	-0.06	0.00	-0.19	-0.09	-0.08	-0.04	-0.11
IT	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
LT	0.00	0.00	0.00	0.01	-0.01	0.01	0.01	0.02	0.02	-0.02
LV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
NL	0.00	0.00	0.00	0.00	0.00	-0.01	-0.01	0.00	0.00	-0.01
PL	0.00	0.00	0.00	0.00	0.00	0.00	-0.01	-0.01	-0.01	-0.02
PT	-0.01	0.00	0.00	0.00	0.00	0.00	-0.01	0.01	0.01	0.00
RO	0.38	0.47	0.18	0.03	0.06	0.23	0.35	-0.09	-0.16	0.30
SE	-0.01	0.00	0.00	0.00	0.00	-0.01	-0.01	0.00	0.00	-0.02
SI	0.00	0.00	0.00	0.00	0.00	-0.01	-0.01	-0.01	-0.01	-0.02
SK	0.15	0.18	0.00	-0.02	0.00	0.09	0.11	-0.02	0.01	0.03
UK	-0.08	0.00	-0.06	0.02	0.00	-0.05	-0.03	-0.01	0.01	-0.02

VAT Scenario 3: VAT Rates for Domestic and Intra-EU International Transport Set to National Standard Rates, Place of Taxation Changed to Member State of Departure/Arrival

a. Impact on Member State Passenger Demand

This scenario is a variation of Scenario 1, but with a fundamental change in the way that VAT would be calculated and collected. We have argued earlier that there is a paucity of data on which it would be possible to project how intra-EU passengers might react to a change in the place of VAT liability. There is a multitude of possible current patterns of intra-EU trips, some of which appear to be designed to minimize VAT impacts. With an increase in the average level of VAT on passenger travel, it might be expected that the innovative ways of minimizing VAT on passenger travel might expand. However, evidence provided in the Second Interim Report indicated that the vast majority (e.g. more than 98% of air passengers) makes simple one-way or direct return trips.

Given the complexity of possible trip patterns between Member States, but considering that most intra-EU trips are of a round-trip nature, we have assumed that all trips are simple, two-leg out and return trips. Another complicating issue is that of the current zero rating of intra-EU air (and maritime) passenger travel. With zero rating, it has not been necessary to determine how passengers flying over transit Member States would be assessed for VAT. For possible future VAT regimes that retain the distance basis, one possibility would be that this part of the travel would not be taken into account in assessing liability for VAT; while at the other extreme, the transit travel would liable to VAT in the

[148] The model did not solve for Bulgaria in this scenario due to numerical errors.

same way that rail and bus are liable (for some Member States). This scenario avoids both of these options by making VAT liability based on country of departure or arrival.

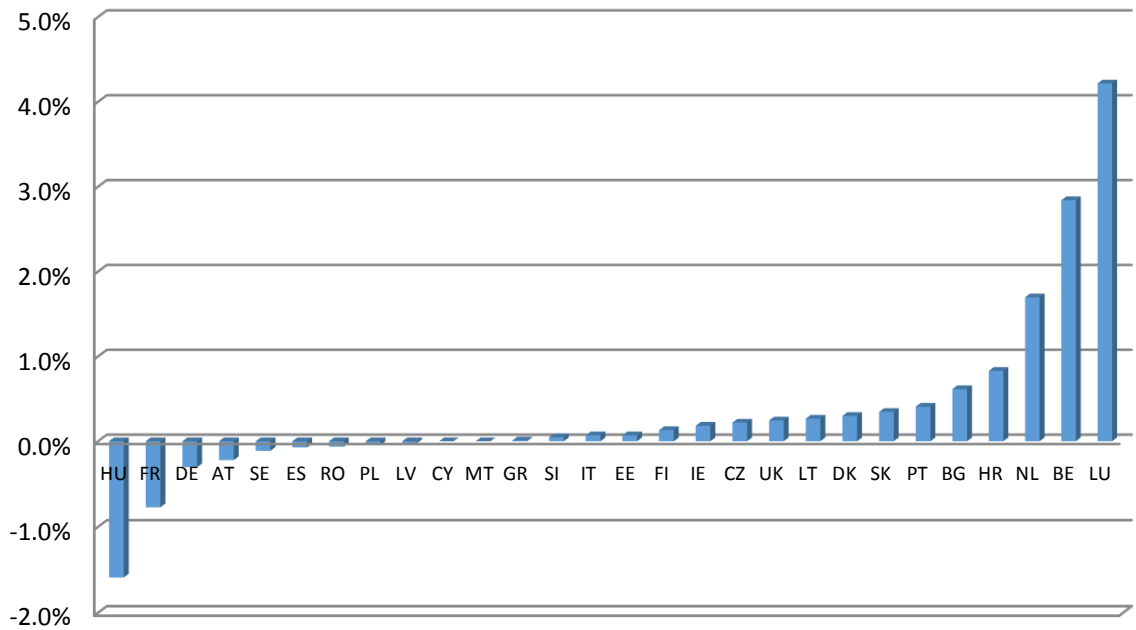
Most intra-EU travel passengers will not be affected by a change in the place of VAT liability. However, this does not imply that changing the place of taxation would have no impact at all: there will be a shift in VAT revenues between Member States.

The result of the shift in PKM subject to VAT because of the change in place of taxation would mainly affect the amount of taxable PKM for large, centrally located Member States (for transit), such as France and Germany. The smaller Member States located next to them would be the primary beneficiaries (Table 6.21 and Figure 6.2).

Table 6.21 – Scenario 3: Effects of Changes in Place of Taxation (Compared to Scenario 1)

	Scenario 1 PKM	Scenario 1 VAT	Scenario 3 PKM	Scenario 3 VAT	PKM (% Change)	VAT (% Change)
AT	44,075	943.7	43,942	941.6	-0.3%	-0.2%
BE	48,655	688.6	50,026	708.1	2.8%	2.8%
BG	27,729	166.5	27,925	167.6	0.7%	0.6%
CY	17,609	119.3	17,609	119.3	0.0%	0.0%
CZ	60,571	549.3	60,671	550.5	0.2%	0.2%
DE	304,375	4,267.8	303,631	4,254.7	-0.2%	-0.3%
DK	31,740	539.9	31,848	541.5	0.3%	0.3%
EE	5,707	28.6	5,711	28.6	0.1%	0.1%
ES	309,088	2,464.9	308,897	2,463.1	-0.1%	-0.1%
FI	28,761	485.9	28,790	486.6	0.1%	0.1%
FR	283,410	5,965.0	280,618	5,918.9	-1.0%	-0.8%
GR	93,551	1,167.0	93,556	1,167.1	0.0%	0.0%
HR	8,992	84.2	9,039	84.9	0.5%	0.8%
HU	41,651	330.2	40,875	324.9	-1.9%	-1.6%
IE	31,768	388.9	31,813	389.6	0.1%	0.2%
IT	250,500	3,070.5	250,656	3,072.7	0.1%	0.1%
LT	7,549	52.8	7,570	52.9	0.3%	0.3%
LU	2,620	20.2	2,702	21.0	3.1%	4.2%
LV	8,174	52.1	8,172	52.1	0.0%	0.0%
MT	5,632	52.4	5,632	52.4	0.0%	0.0%
NL	63,520	886.9	64,364	901.9	1.3%	1.7%
PL	81,297	1,047.8	81,248	1,047.4	-0.1%	0.0%
PT	52,043	392.6	52,148	394.2	0.2%	0.4%
RO	44,208	294.0	44,199	293.8	0.0%	-0.1%
SE	50,569	1,081.9	50,523	1,080.7	-0.1%	-0.1%
SI	5,676	63.2	5,666	63.2	-0.2%	0.0%
SK	16,932	100.2	16,962	100.6	0.2%	0.3%
UK	293,512	3,942.8	293,614	3,952.5	0.0%	0.2%
EU28	2,214,264	30,519.8	2,212,725	30,504.8	-0.1%	0.0%

Figure.6. 2 - Change in VAT Revenues



Given the very small impact on VAT revenue, the effects on GDP, employment, and purchasing power would vary only marginally from Scenario 1. For Member States where the new VAT regime would lead to a decrease in tax revenues, GDP, employment, and purchasing power would decrease, and vice versa for Member States where there would be a net increase in tax revenues.

The same argument holds for the assessment of Scenarios 4 and 5.

b. Impact on Demand between City Pairs

The impact of the changes of Scenario 3 from BAU would be in two parts: first, the change in VAT rates to the national standard rates and second, the change in the basis for VAT liability.

The impacts of the first type of change are described under the impacts of Scenario 1; consequently, here we focus on the differences between Scenarios 1 and 3, which is the difference between calculating VAT on a distance versus departure basis.

For domestic city pairs, a departure basis makes no difference, as the city of departure (or arrival) would always be in the same Member State as would be levying VAT under the current distance-based system.

With standard VAT rates and a departure basis for calculating VAT revenue, there would be a substantial difference in fares, numbers of trips, and VAT revenue for many intra-EU city pairs, whether the comparison is with the current VAT rates and a distance basis for VAT attribution or to Scenario 1.

As the standard rates apply equally to all three transport modes, the differences compared with Scenario 1 occur at all trip lengths and are not dependent on the modal shares (if they had been limited to air passengers, for example, the impacts would be concentrated on longer distance city pairs where the air mode predominates).

There are three principal criteria for a change to the departure basis to have a potential significant impact on VAT per trip and, hence, on the number of trips and on VAT revenue:

- The passengers' route between the city pair must transit at least one Member State. If this condition is not met, only the Member States of the origin and destination cities are involved (as with domestic passenger trips) and the VAT per trip will be the same as with a distance or departure basis for VAT attribution;[149]
- For those parts of any routes between city pairs that pass over non-EU territory, either sea outside of territorial waters (as are parts of the Mediterranean Sea) or airspace over non-EU countries (such as Switzerland or Serbia), the distance-based VAT will not incur VAT for this part of the travel. In contrast, a departure-based VAT will take into account the full fare, including that part for travel outside of the EU territory and, subsequently for these city pairs, will be higher than with the distance-based VAT. While not an essential condition, to have part of the route passing over non-EU Member State territory would create a difference in impact between a distance and a departure basis for VAT where it does occur; and
- Demand for travel between the city pairs needs to be at least about 0.1 million passengers per year, otherwise there are too few passenger trips for the difference in VAT rates to become evident in the changes in the numbers of passengers or in VAT revenue. The impact of the change in VAT basis on passenger fares is independent of the mode share.[150]

The twenty city pairs used to illustrate the impacts of standard VAT rates using the current distance basis (Scenarios 1 and 2) are not appropriate to illustrate Scenario 3. The domestic city pairs (numbers 1 through 11) would not show any difference with a departure basis and, of the intra-EU city pairs, only three pass through a transit Member State.

To assess the impact of changing to a departure basis, we have used seven different city pairs, all of which have a substantial part of their travel through one or more transit Member States or over non-EU Member State territory. They were chosen from the many more that satisfied the first two criteria described above, but introducing the third criterion reduced the potential sample size as many of the city pairs at longer distances from each other have few passengers. These seven city pairs, the distances between them, their current estimated fares, and the modal shares of demand were:

Table 6.22 – Scenario 3: Basic Parameters of Sample City Pairs

	City A	City B	Distance[151] (km)	Base Case Fares (EUR)			BAU Trips (m)	Mode Share (%)
				Air	Rail	Bus		Air
1	Athens	Prague	1,541	149	201	90	0.141	100%
2	Bucharest	Lisbon	2,492	164	n.a.	255	0.143	88%
3	Berlin	Rome	1,168	125	n.a.	135	0.180	93%
4	Brussels	Copenhagen	768	108	250	250	0.172	99%
5	Brussels	Warsaw	1,162	140	220	220	0.063	66%
6	London	Prague	919	149	255	80	0.247	88%
7	Paris	Stockholm	1,547	147	297	246	0.345	99%

[149] In the CPM, for calculating VAT on a distance basis, we have been able to use the actual distances of air, rail, and bus travel and have not had to make an assumption about the location of the cities, as is needed for the TREMOVE model.

[150] With 0.1 million passengers per year, an average fare of EUR 100 and an average VAT rate of 20%, the annual VAT revenue would be EUR 2 million.

[151] For simplification, we show only the air distance, although the actual distances for each mode have been used in the estimates of the impacts.

Of the city pairs in the sample, the share of rail distance in transit Member States averages about 52%, with a range of 7% to 74%. All city pairs in the reduced sample are more than about 700 kilometres apart and, of these, three have air modal shares close to 100% (city pairs 1, 4, and 7). The other city pairs (city pairs 2, 3, 5, and 6) have a higher proportion of non-business passengers who are less prepared than business passengers to pay the generally higher fares of air travel to save time and, accordingly, have rather lower air mode shares. Even for these city pairs, the air mode share is between 66% and 93%.

Table 6.23 – Scenario 3: Changes in Fares, Trips, and VAT Revenue (Comparison with BAU)

	City A	City B	Trips (m)	Fares (% Change)	Trips (% Change)	Change in VAT Revenue (EUR m)	Scenario 3 VAT Revenue (EUR m)	VAT Revenue (% Change)
1	Athens	Prague	0.134	-0.7%	1.5%	-0.35	2.79	36%
2	Bucharest	Lisbon	0.95	-5.7%	3.2%	-1.97	3.50	32%
3	Berlin	Rome	0.175	-10.0%	5.2%	-2.32	1.77	1%
4	Brussels	Copenhagen	0.153	-4.4%	3.2%	-0.84	2.74	11%
5	Brussels	Warsaw	0.059	3.0%	-0.5%	-0.93	0.70	10%
6	London	Prague	0.227	-8.3%	3.3%	-2.22	2.55	6%
7	Paris	Stockholm	0.314	-9.2%	-0.3%	-5.03	5.41	4%

Changing to a departure basis would not have a consistent impact on VAT and fares. Of the seven city pairs, all but one would see a reduction in fares of up to 10% compared to Scenario 1. However, all seven city pairs would generate more VAT revenue. This increase would be of more than 30% for the first two city pairs. For the first, a large part of the passenger travel between the cities is in countries that are not members of the European Union. With a distance based VAT this part of the travel would not generate any VAT revenue to Member States. With a departure based VAT, VAT liability would fall on the full ticket price, and so generate more VAT revenue. For city pair 2, the distance based VAT would lose revenue for the approximate one third of the air distance that would be over the Mediterranean Sea and not generate VAT revenue. With the departure based VAT, liability would be on the full fare and so generate more VAT revenue, as with city pair 1. The additional VAT revenues for the other city pair derive from the different VAT rates in the transit Member States compared to the Member State of departure.

VAT Scenario 4: VAT Rates for Domestic and Intra-EU International Transport Set to National Reduced Rates, Place of Taxation Changed to Member State of Departure/Arrival

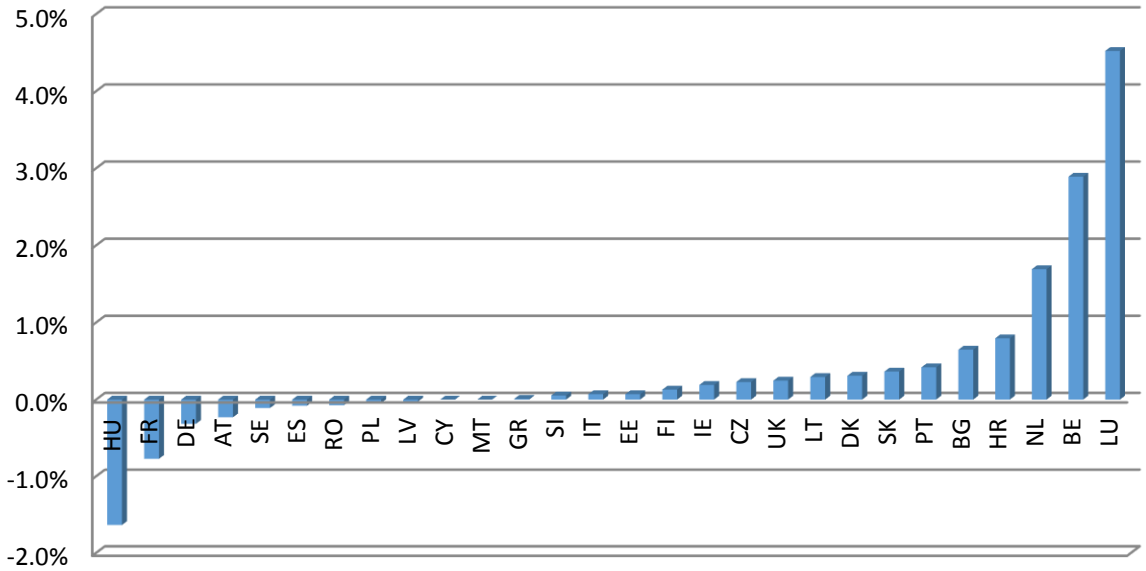
a. Impact on Member State Passenger Demand

As for Scenario 3, this scenario builds on the policy changes envisaged in Scenarios 2 and 3. The results are markedly similar to those in Scenario 3, as shown in Table 6.24 and Figure 6.3.

Table 6.24 – Scenario 4: Changes in PKM and VAT Revenue, 2030

	Scenario 2 PKM	Scenario 2 VAT	Scenario 4 PKM	Scenario 4 VAT	PKM (% Change)	VAT (% Change)
AT	45,583	478.7	45,444	477.6	-0.3%	-0.2%
BE	51,370	202.7	52,807	208.6	2.8%	2.9%
BG	29,140	76.8	29,352	77.3	0.7%	0.6%
CY	18,314	33.6	18,314	33.6	0.0%	0.0%
CZ	61,966	389.0	62,070	389.9	0.2%	0.2%
DE	320,086	1619.0	319,301	1613.9	-0.2%	-0.3%
DK	31,740	520.0	31,848	521.6	0.3%	0.3%
EE	5,956	13.7	5,960	13.7	0.1%	0.1%
ES	319,197	1097.7	319,000	1096.8	-0.1%	-0.1%
FI	30,074	215.7	30,105	216.0	0.1%	0.1%
FR	295,919	4052.0	293,021	4028.0	-1.0%	-0.6%
GR	96,670	693.0	96,676	693.1	0.0%	0.0%
HR	9,520	19.5	9,572	19.7	0.5%	0.8%
HU	46,180	69.4	45,274	68.3	-2.0%	-1.6%
IE	33,046	151.5	33,092	151.8	0.1%	0.2%
IT	262,837	1439.6	262,998	1440.6	0.1%	0.1%
LT	7,973	21.9	7,996	21.9	0.3%	0.3%
LU	2,685	3.8	2,769	4.0	3.1%	4.5%
LV	8,465	29.2	8,463	29.2	0.0%	0.0%
MT	5,855	15.4	5,855	15.4	0.0%	0.0%
NL	66,424	260.6	67,290	265.0	1.3%	1.7%
PL	88,408	384.5	88,354	384.3	-0.1%	0.0%
PT	54,325	105.8	54,436	106.3	0.2%	0.4%
RO	47,984	59.9	47,974	59.9	0.0%	-0.1%
SE	54,094	284.6	54,045	284.3	-0.1%	-0.1%
SI	6,014	25.6	6,003	25.6	-0.2%	0.1%
SK	17,658	49.8	17,689	50.0	0.2%	0.4%
UK	306,843	1028.7	306,957	1031.2	0.0%	0.2%
EU28	2,322,536	14047.1	2,320,841	14032.7	-0.1%	-0.1%

Figure 6.3 - Changes in VAT, Scenario 4



b. Impact on Demand between City Pairs

As with Scenario 3, the impacts of Scenario 4 are found in two parts: first, the change in VAT rates to national reduced rates and, second, the change from a distance basis to a departure basis. As with Scenario 3, for domestic city pairs, the change would make no difference, as the city of departure is always in the same Member State as would be levying VAT under the current distance-based system.

The same sub-set of seven intra-EU city pairs has been used as for the description of the impacts of Scenario 3, and the same three criteria for a change in basis of VAT application to make a noticeable difference apply here as for Scenario 3.

The seven city pairs register a reduction in passenger numbers (between 0.3% and 1.8%) compared to Scenario 2, as the reduced VAT rates applied on a departure basis result in higher VAT components of fares for city pairs that require transport through a transit Member State. However, these increases in fares and reductions in trips are both smaller than for Scenario 3.

VAT revenues increase substantially due to the generation of VAT revenue from air passengers (all zero rated with current rates). VAT revenue would also increase for several city pairs where rail and bus passengers would also incur VAT, which they did not before. All but one of the city pairs (Brussels to Warsaw) would generate VAT revenue of more than EUR 2 million, and one of them (Paris to Stockholm) would generate more than EUR 4 million. These revenue would accrue to the Member States of the named cities and none to the transit Member States.

The change to a departure basis would result in a small change (-1.1%) in the number of passenger trips for Bucharest/Lisbon. Current VAT rates are zero for air passengers, 5% for rail passengers, and 7% for bus passengers, all generated in transit Member States. With Scenario 4, these would all increase to 11% (based on Romania having a rate of 9% and Portugal of 13%) for all modes, and would accrue to the Member State of departure.

Table 6.25 – Scenario 4: Changes in Fares, Trips, and VAT Revenue (Comparison with Scenario 2)

	City A	City B	Trips (m)	Fares (% Change)	Trips (% Change)	Change in VAT Revenue (EUR m)	Scenario 4 VAT Revenue (EUR m)	VAT Revenue (% Change)
1	Athens	Prague	0.134	4.2%	-1.5%	0.34	2.23	15%
2	Bucharest	Lisbon	0.195	3.0%	-1.1%	0.29	2.80	10%
3	Berlin	Rome	0.174	-1.1%	-0.3%	0.24	2.24	11%
4	Brussels	Copenhagen	0.163	5.3%	-1.8%	0.46	2.20	21%
5	Brussels	Warsaw	0.063	-18.4%	-0.1%	-0.17	0.56	-31%
6	London	Prague	0.243	3.3%	-1.6%	0.15	2.04	7%
7	Paris	Stockholm	0.332	2.1%	-0.8%	0.07	4.32	2%

VAT Scenario 5: VAT Rates for Domestic and Intra-EU International Transport Are Equal to BAU, Place of Taxation Changed to Member State of Departure/Arrival

a. Impact on Member States Passenger Demand

The most important variable affected in this scenario would be the distribution of VAT revenues among Member States. As to be expected, the overall EU28 revenue from VAT and tickets would scarcely change.

The situation of this scenario differs from the previous ones in the application of current national VAT policies. The shifts in taxable PKM, as shown in Table 6.26, are only relevant to the extent that VAT would be charged on intra-EU trips. In Scenarios 3 and 4, all PKM would be subject to a positive VAT rate.

- Several Member States (Bulgaria, the Czech Republic, Denmark, Estonia, Finland, Hungary, Ireland, Italy, Lithuania, Latvia, Luxembourg, Portugal, Romania, Slovakia, Sweden, and the UK) have a zero rated VAT on intra-EU trips for any mode; subsequently, the VAT revenue shift will not happen in practice.
- Another group of Member States (France, Poland, and Slovenia) charge VAT on international road transport, but have a zero rate for rail. Only part of the shift would be realized there.

In practice, revenue shifts would be very modest. Belgium and the Netherlands would make small gains from the rail trips to France and Germany. No other Member State would win or lose more than 1% of its current transport VAT revenue.[152] The mechanical application of the scenario to the 2010 demand structure yields very similar results (See also table 6.40 for detailed estimates in Euros).

[152] Note that in this case, the assumption of the unchanged total demand is weaker, as differences between current rates can be higher than in Scenarios 3 and 4. However, the TREMOVE model does not have the level of precision required to do this.

Table 6.26 – Scenario 5: Changes in PKM and VAT Revenue, 2030

	BAU PKM	BAU VAT	Scenario 5 PKM	Scenario 5 VAT	PKM (% Change)	VAT (% Change)	VAT 2010 Mechanical (% Change)
AT	45,788	469.3	45,651	468.3	-0.3%	-0.2%	-0.2%
BE	51,489	192.4	52,910	198.1	2.8%	3.0%	2.4%
BG	28,250	127.4	28,476	127.4	0.8%	0.0%	0.0%
CY	18,546	3.0	18,546	3.0	0.0%	0.0%	0.0%
CZ	62,825	328.3	62,937	328.3	0.2%	0.0%	0.0%
DE	321,609	1523.1	320,838	1509.5	-0.2%	-0.9%	-0.8%
DK	34,665	0.0	34,775	0.0	0.3%	0.0%	..
EE	5,811	19.7	5,814	19.7	0.1%	0.0%	0.0%
ES	320,942	1029.4	320,751	1028.5	-0.1%	-0.1%	-0.1%
FI	30,467	149.2	30,499	149.2	0.1%	0.0%	0.0%
FR	297,841	2882.9	294,886	2875.3	-1.0%	-0.3%	-0.2%
GR	98,277	318.5	98,283	318.5	0.0%	0.0%	0.0%
HR	9,070	77.8	9,116	78.5	0.5%	0.9%	0.8%
HU	42,559	265.4	41,619	265.4	-2.2%	0.0%	0.0%
IE	33,966	0.0	34,014	0.0	0.1%	0.0%	..
IT	264,220	1304.6	264,386	1304.6	0.1%	0.0%	0.0%
LT	8,080	13.9	8,104	13.9	0.3%	0.0%	0.0%
LU	2,690	2.9	2,774	2.9	3.1%	0.0%	0.0%
LV	8,604	16.8	8,602	16.8	0.0%	0.0%	0.0%
MT	5,947	0.0	5,947	0.0	0.0%	0.0%	..
NL	66,584	239.2	67,432	243.5	1.3%	1.8%	1.4%
PL	88,857	365.7	88,802	365.6	-0.1%	0.0%	0.0%
PT	54,536	81.0	54,650	81.0	0.2%	0.0%	0.0%
RO	44,850	249.3	44,839	249.3	0.0%	0.0%	0.0%
SE	54,502	197.3	54,453	197.3	-0.1%	0.0%	0.0%
SI	6,029	28.1	6,018	28.0	-0.2%	-0.2%	-0.3%
SK	16,866	88.8	16,899	88.8	0.2%	0.0%	0.0%
UK	311,730	0.0	311,848	0.0	0.0%	0.0%	..
EU28	2,335,599	11238.0	2,333,832	11225.7	-0.1%	-0.1%	-0.1%

b. Impact on Demand between City Pairs

With current VAT rates, the departure basis for calculating VAT revenue would make very little difference to fares, numbers of trips, or VAT revenue for any of the selected city pairs.

As with Scenarios 3 and 4, for domestic city pairs, the departure basis would make no difference as the city of departure is always in the same Member State as would be levying VAT under the current distance-based system. For intra-EU city pairs, the departure basis would only make a difference for those city pairs that cross a transit Member State.

We present the results for the same city pairs as for the other scenarios that involve a departure basis for calculating VAT, as the criteria for this basis to make a difference are the same as for those scenarios.

Some Member States with significant numbers of transiting passengers currently apply positive VAT rates on intra-EU passengers (e.g. Austria, Belgium, Germany, and the Netherlands). Other Member States that apply positive VAT rates to intra-EU bus and rail passengers do not have important transiting services (e.g. Croatia, Poland, Slovenia, and Spain).

Given the current high air mode shares and the current zero rating of intra-EU air travel, the VAT currently generated is quite low and, in fact, zero for five of the city pairs. There would be very little change with a departure based VAT as the Member State and mode VAT rates themselves would not change, only how those rates would be used as the basis for VAT liability.

The increases in VAT would result in small changes in the numbers of passengers, between -1.4% and 3.3%, in the number of their passenger trips. For the other three city pairs, there would be very small changes in demand, between zero and -1%, as the corresponding VAT changes would also be very small. With small changes in VAT rates and in numbers of passengers, the VAT generated would remain small and almost unchanged.

No passengers departing from London or Prague would incur VAT with a departure basis, as both Member States (the UK and the Czech Republic) currently apply a zero VAT rate to all intra-EU passengers. With the distance based VAT, the non-air passengers incur VAT for the part of their trips that takes place in transit Member States (France, Belgium Netherlands, Germany or Austria depending on the route).

Table 6.27 – Scenario 5: Changes in Fares, Trips, and VAT Revenue (Comparison with BAU)

	City A	City B	Trips (m)	Fares (% Change)	Trips (% Change)	Change in VAT Revenue (EUR m)	Scenario 5 VAT Revenue (EUR m)	VAT Revenue (% Change)
1	Athens	Prague	0.144	-14.7%	2.5%	0.00	0.00	-3.7%
2	Bucharest	Lisbon	0.185	-15.1%	0.0%	0.00	0.00	-9.1%
3	Berlin	Rome	0.187	-17.8%	3.3%	0.00	0.03	-5.9%
4	Brussels	Copenhagen	0.174	-2.8%	1.1%	0.00	0.03	-6.2%
5	Brussels	Warsaw	0.062	-4.5%	+1.4%	-0.04	0.57	-6.2%
6	London	Prague	0.120	-5.5%	+0.5%	-0.01	0.12	-4.3%
7	Paris	Stockholm	0.345	-8.4%	0.2%	0.01	0.06	-3.0%

VAT Scenarios 6 and 7: Exemptions According to Article 148 of the VAT Directive Abolished (6) or Extended to Buses and Trains (7)

We have demonstrated in the assessment of distortions in Chapter 4 of this report that the terms of Article 148 of the VAT Directive have little, if any, practical impact on the costs of passenger travel or

on the relative competitiveness of different transport modes. For transport operators that are obliged to pay VAT on their inputs, the only financial cost to them is that of financing those payments between the time that they are made and the time that they are rebated. With current low interest charges, these costs are small.

We have, therefore, not even made an order of estimate of the impact of either of these two scenarios beyond that included in Chapter 4, which showed the impacts to be small or negligible.

Even for extra-EU city pairs, in which EU operating companies are in strong competition with operators based outside of the EU who might or might not pay VAT or sales tax on their inputs, the fact that these taxes are reimbursable for operators for most Member States minimizes any competitive disadvantage that EU operators might suffer.

Exemptions to these generalizations occur for Member States (e.g. Ireland and Denmark) that exempt some or all domestic passenger services from VAT without the right to recover VAT on inputs. Operators of domestic passenger services in these Member States do suffer some competitive disadvantage with those from other Member States and possibly with operators from outside the EU; however, if these operators are licensed to operate within these Member States, their services will be subject to the same VAT rules and regulations as national operators. It therefore appears that exempting domestic passenger services from VAT without the right to recover input VAT does not create any significant competitive distortions.

These two scenarios, each of which would eliminate any such distortion by either making all or no operators liable to pay VAT on inputs would not eliminate any significant distortions; however, Scenario 5, which would extend the input exemptions to all transport modes, would have an additional impact of reducing administrative costs.

VAT Scenario 8: All VAT Rates Including Extra-EU are Set to National Reduced Rates, Place of Taxation Changed to Member State of Departure/Arrival

Scenario 8 would extend the national reduced rates and the departure basis of Scenario 4 to extra-EU passengers departing from a Member State. It is conceptually rather different from Scenario 4 in that it would not (and probably practically could not) extend VAT to passengers departing from countries outside of the EU to Member States.

In analysing the impacts of this scenario, we have overlooked the practicality and impacts on passenger behaviour of extending VAT to non-EU destinations. As VAT would be applied to the whole price of the ticket and not just the share attributable to distance travelled within EU borders, these could include passengers making short distance trips to destinations close to the EU border (and hence incurring only a small amount of VAT) and then continuing travel on a separate ticket from that close-by false destination to the true destination to avoid paying VAT on that part of the travel. There is evidence that this behaviour exists for some air passengers departing from Member States that apply an Air Passenger Charge; consequently, it could be expected to occur to reduce liability to VAT.

In the analysis made here, we continue the assumption that there are an equal number of VAT-paying passengers traveling in each direction (i.e. half of the total passengers for each city pair are departing from a Member State).

a. Impact on Member States Passenger Demand

This scenario would build on Scenario 4, but include extra-EU transport in the pool of taxable PKM. In practice, the additional extra-EU transport market coming under VAT coverage is air transport only,

as it has a 98.5% market share. Only for some Member States close to the eastern border of the EU and neighbours of Switzerland is land based extra-EU transport of significance. The effects for intra- and extra-EU transport are very similar, as is to be expected; although, the share of business demand (and thus the increasing effect) is lower in extra-EU than in intra-EU transport. For urban and other domestic transport, the amount of PKM would be identical to that of Scenarios 2 and 4 (Table 6.28).

Table 6.28 – Scenario 8: Revenue Effects (Compared with Scenario 4)

	Full Pass-Through			Less-Than-Full Pass-Through		
	Scenario 4	Scenario 8	% Change	Scenario 4	Scenario 8	% Change
AT	477.6	534.8	12.0%	477.4	533.5	11.7%
BE	208.6	258.6	24.0%	208.1	257.3	23.6%
BG	77.3	90.9	17.6%	77.6	91.0	17.3%
CY	33.6	49.4	46.9%	33.1	48.6	46.8%
CZ	389.7	484.3	24.3%	388.8	479.8	23.4%
DE	1613.9	2239.3	38.8%	1607.0	2219.4	38.1%
DK	521.6	794.2	52.3%	493.8	738.1	49.5%
EE	13.7	19.7	43.7%	13.8	19.6	42.3%
ES	1096.8	1262.5	15.1%	1082.7	1242.7	14.8%
FI	216.0	276.2	27.9%	213.8	272.0	27.2%
FR	4018.8	4650.1	15.7%	3997.5	4610.7	15.3%
GR	1082.3	1387.8	28.2%	1029.4	1316.9	27.9%
HR	19.7	20.9	6.2%	20.4	21.6	5.9%
HU	68.3	76.2	11.6%	70.4	78.2	11.1%
IE	151.8	203.8	34.3%	149.0	199.2	33.7%
IT	1660.6	2088.8	25.8%	1645.7	2059.3	25.1%
LT	21.9	27.1	23.5%	21.8	26.9	23.3%
LU	4.0	6.0	50.1%	4.0	6.0	49.7%
LV	29.2	37.6	28.8%	28.9	37.0	28.2%
MT	15.4	19.2	25.0%	15.0	18.8	25.0%
NL	265.0	379.0	43.0%	264.0	374.9	42.0%
PL	384.3	422.6	10.0%	384.1	422.0	9.9%
PT	203.2	291.5	43.4%	200.0	286.3	43.1%
RO	59.9	64.8	8.2%	60.9	65.7	7.9%
SE	284.3	386.6	36.0%	281.7	381.5	35.4%
SI	25.6	26.2	2.5%	25.6	26.2	2.5%
SK	50.0	59.0	18.1%	50.6	59.9	18.4%
UK	1031.2	1519.6	47.4%	1019.6	1495.5	46.7%
EU28	14024.2	17676.9	26.0%	13864.6	17388.6	25.4%

The effects on VAT revenues would be substantial (Table 6.28). By 2030, overall VAT revenue would increase by 25-26% against Scenario 4 (limited or full pass-through). For some Member States with large international hubs for air travel, the increase would be even more substantial (e.g. the UK with an increase of 47% and the Netherlands with an increase of 43%) and, correspondingly, for Member States with limited direct flights to extra-EU destinations, the changes would be rather minimal (e.g. Slovenia and Hungary).

b. Impact on Demand between City Pairs

This scenario would apply specifically to extra-EU travel, so we present the results for all fourteen of the extra-EU city pairs included in the CPM.

Since VAT applies to the full ticket price, the impacts in absolute terms on total fares would be quite large; however, expressed as percentages, they would be the same as for the other city pairs with the national reduced VAT rates applied. We have seen from the assessment of Scenarios 2 and 4 that the effects would be modest. Ten Member States have reduced VAT rates that are less than 10% and all others, with two exceptions, are 15% or less.[153] With relatively low fare elasticities, these VAT rates would result in reductions in demand of 3% or less. VAT revenues are modest in comparison with the larger of the intra-EU city pairs; however, Helsinki/St. Petersburg would generate more than EUR 4 million and Brussels/Moscow and Warsaw/Kiev would each generate almost EUR 3 million.

Table 6.29 - Scenario 8 Extra-EU City Pairs Model: Fares, Passengers, and VAT Revenue

			Fares (% Change)			Passengers (% Change)	VAT Revenue (EUR m)
	City A	**City B**	**Air**	**Rail**	**Bus**	**All**	
1	Berlin	Kiev	5%	5%	5%	-1%	0.5
2	Bratislava	Kiev	4%	0%	6%	-2%	0.6
3	Brussels	Moscow	4%	2%	4%	-2%	2.8
4	Copenhagen	Reykjavik	15%	0%	0%	-2%	0.7
5	Frankfurt	Oslo	12%	0%	12%	-2%	0.9
6	Gothenburg	Oslo	4%	0%	4%	-3%	0.5
7	Helsinki	St. Petersburg	4%	0%	5%	-3%	4.2
8	Marseille	Algiers	1%	0%	0%	0%	0.5
9	Riga	Moscow	4%	0%	4%	-1%	0.0
10	Rome	Tunis	1%	0%	0%	0%	0.4
11	Sofia	Istanbul	5%	0%	5%	-2%	0.1
12	Stockholm	St. Petersburg	2%	0%	6%	-2%	1.8
13	Tallinn	St. Petersburg	5%	6%	7%	-2%	0.1
14	Warsaw	Kiev	2%	0%	3%	-2%	2.8

c. Macro-Economic and Social Effects

The results for GDP would be very similar to those of Scenario 2. The further increase in VAT for extra-EU transport would mainly affect the air sector. Especially in the case of partial pass-through, this would have a negative effect on GDP for reasons similar to those before.

[153] For Denmark, which does not have a reduced VAT rate, we have used the standard rate of 25%.

Table 6.30 – Scenario 8: GDP Effects (Comparison with BAU)

	Full Pass-Through (% Change)	Less-Than-Full Pass-Through (% Change)
AT	0.01	-0.09
BE	0.00	-0.06
BG	0.00	0.10
CZ	0.00	-0.05
DE	0.00	-0.03
EE	0.05	0.02
ES	-0.01	-0.02
FI	-0.01	-0.02
FR	-0.01	0.00
GR	-0.01	0.00
HU	0.01	0.02
IE	0.02	-0.08
IT	-0.01	0.00
LT	-0.04	0.00
LV	0.00	0.00
NL	0.00	-0.03
PL	0.01	-0.05
PT	-0.01	0.00
RO	0.24	0.18
SE	0.00	-0.03
SI	0.00	-0.02
SK	0.08	-0.04
UK	0.00	-0.03

Employment in the Transport Sector

The effect on employment is also similar to that of Scenario 2. The higher VAT rate causes less employment (as compared to Scenario 2) in the air sector in the case of full pass-through and higher employment in the case of partial pass-through, due to a further increase in business air demand. There are also some indirect effects on employment in the bus and rail sector. As price further increases for air transport, total travel budget decreases, and consumers will travel less by bus or train in the case of full cost pass-through. In the case of partial cost pass-through, there is a further increase in business bus and train demand, as they spend less on air travel.

Table 6.31 – Scenario 8: Employment Effects

	Full Pass-Through (% Difference)			Less-Than-Full Pass-Through (% Difference)		
	Train	Bus	Plane	Train	Bus	Plane
AT	-0.12	-0.13	-2.81	0.41	0.37	5.42

BE	-0.08	-0.09	-0.74	0.42	0.27	5.48
BG	6.15	6.30	-4.60	0.82	1.48	0.35
CZ	-0.09	-0.35	-0.65	0.70	0.44	1.57
DE	-0.09	-0.10	-1.69	0.24	0.13	2.10
EE	3.58	4.10	-1.26	1.00	0.24	2.72
ES	-0.12	-0.13	-1.38	0.53	0.51	2.14
FI	-0.09	-0.12	-1.25	0.71	0.23	3.36
FR	0.10	0.03	-4.04	-0.01	-0.01	-0.26
GR	0.05	-0.09	-3.21	-0.03	-0.04	-0.31
HU	8.57	9.63	0.16	2.36	2.79	0.66
IE	-4.91	-6.95	-1.21	0.15	-3.27	6.78
IT	0.27	0.13	-2.71	-0.01	-0.02	-0.10
LT	-0.05	-0.04	-4.93	0.02	0.02	0.48
LV	-0.01	0.01	0.00	-0.01	0.01	0.00
NL	-0.03	-0.04	-0.50	0.22	0.22	1.54
PL	-0.04	-0.16	-0.31	0.56	0.51	0.91
PT	0.06	0.01	-1.95	-0.02	-0.02	-0.12
RO	5.38	5.69	0.92	-0.15	0.45	1.42
SE	-0.07	-0.09	-0.73	0.14	-0.02	2.55
SI	-0.38	-0.36	-1.93	0.24	0.22	3.53
SK	2.81	3.31	-0.19	0.92	0.96	3.81
UK	-3.32	-3.69	-1.17	-1.71	-1.64	1.39

Income Distribution

Regarding purchasing power, again, the results are very similar to Scenario 2. The purchasing power of households would decrease further as compared to Scenario 2 for almost all household types and Member States.

Table 6.32 – Scenario 8: Distributional Impacts

	Full Pass-Through					**Less-Than-Full Pass-Through**				
	hh1	**hh2**	**hh3**	**hh4**	**hh5**	**hh1**	**hh2**	**hh3**	**hh4**	**hh5**
AT	-0.05	-0.01	-0.02	-0.01	-0.01	-0.07	-0.04	-0.04	-0.06	-0.18
BE	0.00	0.00	0.00	0.00	0.00	-0.07	-0.07	-0.06	-0.03	-0.06
BG	0.08	0.17	0.11	-0.01	0.01	0.08	0.14	0.11	-0.09	0.09
CZ	-0.02	-0.01	0.01	0.00	0.00	-0.05	-0.02	-0.04	-0.06	-0.15
DE	-0.03	-0.01	-0.01	0.00	0.00	-0.02	-0.03	-0.03	-0.02	-0.03
EE	0.11	0.21	0.06	0.00	0.01	0.00	0.04	-0.02	-0.05	0.01
ES	-0.01	-0.01	-0.01	-0.01	-0.01	-0.04	-0.02	-0.02	-0.02	-0.06
FI	-0.01	0.00	0.00	0.00	-0.02	-0.02	0.00	0.00	0.01	-0.10
FR	-0.01	0.00	0.00	-0.01	-0.03	0.01	0.01	0.02	0.02	-0.02
GR	0.00	0.00	0.00	-0.01	-0.01	0.02	-0.01	0.00	0.01	0.00

HU	0.16	0.20	0.08	0.01	-0.05	0.04	0.11	-0.03	-0.03	0.07
IE	-0.10	-0.11	-0.09	-0.08	0.00	-0.33	-0.14	-0.14	-0.07	-0.24
IT	-0.01	0.00	0.00	0.00	-0.02	-0.02	-0.00	0.01	0.02	-0.01
LT	0.00	-0.01	0.01	0.02	-0.01	0.01	0.02	0.03	0.03	-0.03
LV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
NL	-0.01	0.00	0.00	0.00	0.00	-0.03	-0.03	-0.02	0.00	-0.07
PL	0.00	0.00	0.00	0.00	0.00	-0.01	-0.03	-0.02	-0.02	-0.04
PT	-0.02	-0.01	0.00	0.00	-0.01	-0.01	-0.01	0.02	0.01	-0.01
RO	0.47	0.46	0.24	-0.09	0.08	0.23	0.35	-0.09	-0.16	0.29
SE	-0.03	0.00	0.00	0.00	0.00	-0.04	-0.02	-0.02	-0.01	-0.07
SI	0.00	0.00	0.00	0.00	0.00	-0.01	-0.01	-0.02	-0.01	-0.05
SK	0.15	0.17	0.00	-0.02	0.00	0.03	0.04	-0.05	-0.04	-0.03
UK	-0.07	-0.02	0.00	0.01	-0.01	-0.09	-0.06	-0.03	0.01	-0.05

VAT Scenario 9: All VAT Rates Including Extra-EU are Set to National Reduced Rates, Place of Taxation Changed to Member State of Departure/Arrival, With VAT Applied to Pre-Tax Fares

There are three types of charges that air passengers in Member States must pay and that are included in ticket prices: user charges to cover part or all of the cost of the infrastructure that passenger transport operators use for their services; charges that are intended to internalize some of the external costs of passenger transport that would not otherwise be taken into account in passengers' decision making; and indirect taxes aimed at raising revenues for local, regional, or national budgets.

Since the first of these charges is for a service that has provided added value to the output of passenger services, it is legitimately included in the part of the ticket price that is subject to VAT. This can include track access charges for passenger rail services, most airport charges for the use of runways and terminals, and Eurocontrol charges for en-route navigation services. In the maritime sector, this can include port charges for use of berths and other facilities and fairway charges imposed by some maritime authorities to cover the cost of keeping the freeways open and to a predetermined depth. In road passenger transport, it can include part of the cost of vehicle licenses as part of the charges for use of the road network, but the main user charge in this respect is the tax on transport fuels.

Taxes on transport fuel can have a variety of applications, of which the three most significant could be: to bring the retail price of transport fuel up to its opportunity cost (only applicable for fuel producing states where the cost of production and distribution could be less than the border price); to cover some of the costs of providing and maintaining road infrastructure; and to raise revenue for local, regional, and national budgets. Only the second of these applications is a user charge that should be included in the price of the ticket that is subject to VAT. The first could be considered a tax to make user decisions consider the economic costs of the resources they consume. Since the estimates of the amount of the fuel tax for this purpose do not usually take VAT into account, this amount of the fuel charge could be excluded from the ticket price that is subject to VAT. The third application is more clearly an indirect tax that should not attract VAT.

Charges that are aimed at internalizing the cost of transport externalities are more difficult to categorize for the application of VAT. They do not represent added value to passenger transport services, but could be considered as an unavoidable cost that is a direct consequence of providing passenger transport services and, so, is the same as any other cost that contributes to the added value

of the service provided.[154] As such, it would be legitimate to include these charges in the part of the ticket price that is liable to VAT.

There are few charges included in the price of passenger tickets that do not fall clearly into the category of a user charge or a charge for the internalization of an external cost. One of the most prominent of these is the Air Passenger Duty (APD) or Air Passenger Charge (APC). Some Member States refer to these as ecological charges aimed at internalizing the external cost of emissions from aircraft fuels that impact global warming. Evidence for this interpretation can be found in the distance travelled basis of some of the charges (others are fixed fees). However, there is little reliable analysis on the costs of global warning that are attributable to air passenger travel; although, there are estimates of the CO2 intensity of air travel compared to that of other modes.

Of the charges that are included in the price of a passenger ticket, the two that most clearly have some component of an indirect tax are fuel taxes and the APC. The impact of excluding the latter from the part of the ticket price that is liable to VAT is relatively straightforward, as the amount of the APC is clearly stated. While the amount of fuel taxes is also known, the fuel consumption (and, hence, the incidence of the fuel tax) is highly variable between modes, within modes, between different operators, and even between different services on the same route. Therefore, the part of the fuel tax that can be considered as a user charge is difficult to estimate.

In Scenario 9, we have first considered the impacts of not applying VAT to that part of the ticket price that is attributable to the APC. Second, to give an approximate indication of the possible impact of excluding the amount of fuel tax from the VAT basis, we have made assumptions about the general contribution of fuel to the cost of bus and rail passenger transport (international air and maritime services are exempt from fuel taxes).

Air Passenger Charges

At least six Member States have some form of APC: Austria, Croatia, France, Germany, Italy, and the UK. Since these do not, in general terms, represent any value added, it could be argued that they should not be included in that part of an air fare that is subject to a value added tax. At times, these charges have been described as environmental charges to represent some of the carbon emission consequences of air travel. However, as there is no indication that the revenue from the charges is used to alleviate the consequences of these emissions, they are usually perceived more as a tax than a user charge.

These charges are in the form of a fixed amount or a range of values related to the distance travelled. In a few instances, they have the form of a luxury tax, being related to the seat pitch of the part of the aircraft in which the passenger has purchased a seat.

- Austria has three rates of charge for short-haul, medium-haul, and long-haul flights. All destinations in Member States are in the short-haul rate category;
- Croatia has a two-level charge, one for domestic and the other for international passenger departures;

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154 Based on internalization measures and policies for the external cost of transport - Produced within the study Internalisation Measures and Policies for all external cost of Transport (IMPACT) – Deliverable 3, CE Delft/INFRAS/Fraunhofer-ISI/University of Gdansk, 2008 and quoted in *An inventory of measures for internalising external costs in transport,* European Commission Directorate-General for Mobility and Transport, November 2012.

- France levies four charges on departing air passengers, the revenues of only the first two being included in this assessment:
    - Civil Aviation Tax – the rate varies according to destination (domestic and European destinations are taxed at one rate and all other destinations at another) and class of travel (economy at one rate and all others at another);
    - Solidarity Charge – the revenue of which is earmarked to UNITAID, a World Health Organization fund aimed at providing low cost medicines for specific diseases (including AIDS and malaria) in developing countries. Eight other countries have similar charges, but France is the only one that is a Member State. This charge is included in the assessment;
    - Airport Tax – to cover the costs of the safety and security equipment and procedures. This is a user charge and not included in this assessment; and
    - Air Transport Noise Tax – the tax rate varies according to the type of airport and aircraft and is given to airport operators. The revenues from this charge are not included in the estimate as the specific tax rates are very complex. The average charge is about EUR 12 per departing passenger, a little more than the sum of the first two taxes;
- Germany's passenger departure tax has three rates of charge for short-haul, medium-haul, and long-haul flights. All destinations in Member States are in the short-haul rate category;
- Ireland had a passenger departure tax; however, it was abolished in 2013 and is therefore not considered further in this assessment;
- Italy's charge has the nature of a luxury tax and only applies to air-taxi services. It is not considered further in this assessment; and
- Until 2015, the UK has levied an Air Passenger Duty (APD) based on four distance bands; however, from April 2015, there will be only two: one for passengers departing on flights with a distance of 2,000 kilometres or less (and so including destinations in most Member States, as with the current four band system) and the other for longer distance flights. The luxury tax nature of the charge is represented by its being doubled for business and first class passengers and being up to six times higher for passengers on private aircraft.

The estimates of the revenues from Air Passenger Charges[155] for the Member States that still apply them are based on estimated numbers of departing passengers in 2013 for each of the three markets that include aviation (domestic, intra-EU, and extra-EU) and the 2013 tax rates.

If VAT had been applied in 2013 at the reduced national VAT rates on a departure basis, it would have generated revenue equivalent to almost 70% of that of the Air Passenger Charges. This comparison is greatly influenced by the UK, where VAT at the reduced national rate of 5% would generate only about 25% as much revenue as its high Air Passenger Duty.[156] In the other four Member States, the national reduced rate VAT would generate more revenue than their APCs.

[155] The revenues for France are for the sum of the Civil Aviation Tax and Solidarity Charge.

[156] The UK refers to its air passenger charge as a duty and not a tax.

Table 6.33 – Scenario 9: Air Passenger Charge Revenue and VAT on Air Passengers

	APC Revenue (EUR m)				VAT Revenue (EUR m)	VAT/APC %
	Domestic	Intra-EU	Extra-EU	Total	Total	
AT	1.4	35.2	42.2	78.8	224.3	285%
HR	0.1	0.8	0.3	1.1	8.7	765%
FR	59.8	68.3	185.0	313.0	1,334.0	426%
DE	61.9	376.0	457.1	895.0	988.6	110%
UK	100.4	916.9	2,591.9	3,609.2	891.1	25%
Total	223.5	1,397.2	3,276.4	4,897.2	3,446.8	70%

City Pairs Assessment

In the city pairs assessments, we have used approximate applications of the charges to the flight distance between the cities and, where appropriate, have applied the level of charge application to intra-EU passengers. For the UK in particular, the charges indicated in the table are weighted averages by purpose and class of travel. Although the definitions of short, medium, and long distance are different for each of the Member States, for most of them, domestic and intra-EU destinations are in the short distance category.

Table 6.34 – Scenario 9: Approximation of Air Passenger Charges Used in CPM

Member State	Charge per Passenger (EUR)		
	Short	Medium	Long
Austria	7.0	15.0	35.0
Croatia	0.7	1.4	1.4
France	6.0	6.0	20.0
Germany	7.5	23.4	42.2
UK	6.0	6.0	20.0

A comparison for the sample of twenty city pairs of the current VAT regime (the BAU Scenario) with reduced national VAT rates, applied on a departure basis by excluding the APC from the fare on which the VAT is based, is shown in Table 6.35.

Table 6.35 Scenario 9: Changes in Fares, Trips, and VAT Revenue (Comparison with BAU)

		Fares (% Change)			Trips (% Change)	VAT Revenue (Change)
City A	**City B**	**Air**	**Rail**	**Bus**	**All**	**EUR (m)**
Athens	**Thessaloniki**	6%	6%	6%	-3%	-0.6
Berlin	**Hamburg**	1%	3%	3%	-2%	-17.4
Budapest	**Debrecen**	n.a.	7%	7%	-5%	-1.4
Cluj	**Iasi**	9%	4%	4%	-2%	-1.6
Copenhagen	**Aarhus**	0%	0%	0%	0%	0.0

Dublin	**Cork**	0%	6%	6%	-4%	4.5
Krakow	**Wroclaw**	4%	4%	4%	-3%	0.0
Lisbon	**Porto**	3%	6%	6%	-3%	2.3
London	**Glasgow**	-23%	2%	2%	9%	2.9
Madrid	**Barcelona**	4%	5%	5%	-3%	-0.4
Paris	**Toulouse**	-10%	-5%	5%	5%	-32.3
Berlin	**Warsaw**	-2%	7%	6%	-2%	0.5
Constanta	**Varna**	n.a.	n.a.	10%	0%	0.0
Copenhagen	**Vilnius**	4%	4%	4%	-2%	2.4
London	**Brussels**	-7%	5%	5%	-2%	42.4
Ostrava	**Katowice**	n.a.	9%	9%	-4%	1.8
Paris	**Lisbon**	7%	9%	9%	-3%	22.2
Frankfurt	**Oslo**	-8%	3%	0%	2%	-0.5
Gothenburg	**Oslo**	0%	5%	0%	0%	0.0
Riga	**Moscow**	0%	5%	0%	-1%	0.1

Of the 220 city pairs included in the sample, the airfares of 74 (34%) are increased to a greater or lesser extent by the inclusion of an APC. Of the 20 city pairs in the reduced sample, 7 (35%) have fares that include an APC. The change in trips in Table 6.34 between Scenario 9 and the BAU has three components. First, changing current VAT rates to the national reduced rates; second, changing the basis of applying VAT to the departure rather than to distance; and finally, excluding the APC from the fare to which the VAT is applied. The impacts of these changes were not always in the same direction. Most, but not all, city pairs currently have VAT rates that are lower than the national reduced rates; hence, changing to a departure basis would only impact a few city pairs and, where it would, the effect is to increase the VAT for the whole trip, even though the same national reduced rates are used. For approximately one-third of city pairs that currently have an APC included in their fare, excluding the APC charge always results in a reduction in airfare from what it would be with the national reduced rates.

VAT Scenario 10: Implementation of a One-Stop VAT Shop for Passenger Transport

In earlier discussions on how to simplify compliance with VAT regulations for transport operators, serious consideration was given to the inclusion of passenger transport operations together with broadcasting, telecommunications, and electronic services in this first application of a one-stop-shop.

For B2C transactions (such as those of most transport operators) and B2B transactions (such as those of most suppliers to transport operators) subject to VAT in a Member State other than that in which the operator or supplier is established, complying with the particular rules of that Member State is not always easy. For transport operators and suppliers with services in multiple Member States, the difficulties are greater. There is evidence that businesses (but not passenger transport operators or their suppliers) avoid such transactions because of difficulties. In other cases, the rules are ignored and VAT is charged in the Member State where the supplier is established rather than where the supply actually takes place.

Intra-EU and extra-EU transport operators tend to operate in more Member States than those in most other industries. By its nature as a network service provider, an operator gains efficiency by providing

services in markets with different demands so that its assets can be allocated where and when needed. This tends to make the operators providing services in more Member States more efficient than those operating in less.

The Mini One-Stop-Shop (MOSS) that comes into force on 1 January 2015 addressed some of these concerns for specific sectors. It will allow companies supplying telecommunication services, television and radio broadcasting services, and electronically supplied services to non-taxable persons in Member States in which they do not have an establishment to account for the VAT due on those supplies via a web-portal in the Member State in which they are located (and formally registered).[157] This scheme is optional and follows changes to the VAT place of supply rules that now specify that the supply takes place in the Member State of the customer and not the Member State of the supplier, as previously.[158] The MOSS allows companies to avoid registering in each Member State in which their products are consumed.

The MOSS applies to two different types of supplier: those that have an establishment and registration in a Member State (the Union scheme) and those that do not (the non-Union scheme). Under the first, a supplier cannot use the MOSS for supplies made in any Member State in which it has an establishment (business establishment or fixed establishment). The second applies only to suppliers that do not have an established business (or even have a fixed establishment) in a Member State and are not registered or identified for VAT in the EU.

If the MOSS were to be extended to suppliers of transport operators and the operators themselves, these restrictions would severely limit its usefulness, as most do have an establishment (as defined) in the Member States in which they supply services. Most are also registered for VAT in at least one Member State.

As currently envisaged, the MOSS legislation would not apply to businesses trading below the VAT registration threshold. These small businesses would, therefore, be required to register for VAT in the Member State of each customer in which they provided transport services. While this could be expensive and impractical for small businesses in other industries, the thresholds in the transport industry are so low that a passenger transport operator with more than one vehicle (even the smallest intra-EU operator will need more than one vehicle) will be above the threshold and consequently qualify to register for the MOSS.

Given the analyses in Chapter 4 that showed only a small distortional impact of the administrative costs of compliance with VAT regulations, it is unlikely that an extension of the MOSS to the passenger transport sector would have a significant impact on competitiveness. Although, it would present a win-win situation by having few, if any, negative consequences and small but measurable cost savings once operational. Even the smallest intra-EU and extra-EU transport operators and their suppliers will be above the minimum thresholds and so will qualify for registration in the MOSS as currently planned, but the restrictions on registration or having a fixed establishment in the Member State of supply would bar almost all passenger transport operators and suppliers from participating. For the MOSS to be of practical use to most passenger operators, these restrictions would need to be substantially revised. If the passenger transport sector were to move in the direction of taxation in the place of destination, an equivalent of the MOSS would no doubt be more useful for a large number of operators.

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[157] Guide to the Mini One-Stop-Shop, DGTAXUD, September 2013.

[158] Transport services remain liable for VAT in the Member State in which they are consumed rather than supplied.

VAT Scenario 11: All Domestic VAT Rates as in BAU, All International (Intra- and Extra-EU) VAT Rates Set to Zero

This scenario would be that which fits best with the subsidiarity principle: it would leave the domestic market to national governments while regulating trade between Member States.

a. Impact on Member States Passenger Demand

This scenario, while equalizing the treatment of modes in the intra- and extra-EU markets, would have limited effects. First, domestic transport demand would not be affected by this scenario. Secondly, given the low share of bus and rail in intra- and extra-EU markets, the overall results would be minimal concerning PKM in international travel and VAT revenues.

Table 6.36 – Scenario 11 Full Pass-Through: Transport Demand (EU28, PKM)

		2020	2030	Difference with BAU 2020	Difference with BAU 2030
Intra-EU	Air	309,349	405,426	0.0%	-0.1%
	Bus	12,882	13,953	1.3%	2.7%
	Rail	28,247	32,853	0.6%	1.0%
	Total	350,478	452,232	0.1%	0.1%
Extra-EU	Air	445,710	572,490	-0.1%	-0.1%
	Bus	2,473	2,723	3.4%	6.8%
	Rail	3,012	3,539	3.3%	5.6%
	Total	451,194	578,752	0.0%	-0.1%
Urban	Metro	102,970	109,481	0.0%	0.0%
	Bus	162,433	173,684	0.0%	0.0%
	Rail	172,445	197,624	0.0%	0.0%
	Total	437,847	480,789	0.0%	0.0%
Other Domestic	Air	54,332	69,396	0.0%	0.0%
	Bus	427,695	456,235	0.0%	0.0%
	Rail	256,663	298,044	0.0%	0.0%
	Total	738,689	823,676	0.0%	0.0%
Total	Air	809,391	1,047,313	-0.1%	-0.1%
	Bus	605,482	646,595	0.0%	0.1%
	Rail	460,366	532,060	0.1%	0.1%
	Metro	102,970	109,481	0.0%	0.0%
	Total	1,978,209	2,335,448	0.0%	0.0%

Table 6.37 Scenario 11 Less-Than-Full Pass-Through: Transport Demand (EU28, PKM)

		2020	2030	Difference with BAU 2020	Difference with BAU 2030
Intra-EU	Air	309,438	405,657	0.0%	0.0%
	Bus	12,780	13,734	0.5%	1.1%
	Rail	28,120	32,609	0.1%	0.2%
	Total	350,338	451,999	0.0%	0.0%
Extra-EU	Air	445,885	572,935	0.0%	-0.1%
	Bus	2,426	2,623	1.4%	2.8%
	Rail	2,954	3,428	1.4%	2.3%
	Total	451,265	578,985	0.0%	0.0%
Urban	Metro	102,970	109,481	0.0%	0.0%
	Bus	162,433	173,684	0.0%	0.0%
	Rail	172,445	197,624	0.0%	0.0%
	Total	437,847	480,789	0.0%	0.0%
Other Domestic	Air	54,332	69,396	0.0%	0.0%
	Bus	427,695	456,235	0.0%	0.0%
	Rail	256,663	298,044	0.0%	0.0%
	Total	738,689	823,676	0.0%	0.0%
Total	Air	809,655	1,047,988	0.0%	0.0%
	Bus	605,333	646,275	0.0%	0.0%
	Rail	460,181	531,706	0.0%	0.0%
	Metro	102,970	109,481	0.0%	0.0%
	Total	1,978,140	2,335,450	0.0%	0.0%

Given the fact that intra-EU and extra-EU passenger transport is mostly by air and is already zero-rated, the impact on operator revenue would be small. VAT revenues would not change much at the EU28 level, with very few noticeable country variations (Table 6.38). The mechanical application of the scenario to the 2010 demand structure yields very similar results (See also table 6.40 for detailed estimates in Euros).

Table 6.38 – Scenario 11: Revenue Implications (Comparison with BAU)

	2010	2020				2030			
	Mechanical Change in Rates	Full Pass-Through		Less-Than-Full Pass-Through		Full Pass-Through		Less-Than-Full Pass-Through	
	VAT	VAT	Tickets	VAT	Tickets	VAT	Tickets	VAT	Tickets
AT	-2.4%	-2.8%	0.1%	-2.8%	0.2%	-2.9%	0.1%	-2.9%	0.2%
BE	-8.5%	-10.6%	0.1%	-10.6%	0.4%	-10.6%	0.2%	-10.6%	0.4%
BG	0.0%	0.0%	0.1%	-0.6%	0.4%	0.0%	0.1%	-0.8%	0.4%
CY	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
CZ	0.0%	0.0%	0.0%	0.0%	0.1%	0.0%	0.0%	0.0%	0.1%

DE	-4.6%	-5.4%	0.0%	-5.8%	0.1%	-5.4%	0.0%	-5.9%	0.1%
DK	..	..	0.0%	..	0.0%	..	0.0%	..	0.0%
EE	0.0%	0.0%	0.0%	0.0%	0.2%	0.0%	0.0%	0.0%	0.2%
ES	-0.5%	-0.5%	0.0%	-1.2%	0.0%	-0.5%	0.0%	-1.3%	0.0%
FI	0.0%	0.0%	0.0%	-0.5%	0.2%	0.0%	-0.1%	-0.6%	0.2%
FR	-0.4%	-0.5%	0.0%	-1.0%	0.1%	-0.5%	0.0%	-1.0%	0.1%
GR	-0.5%	-0.6%	0.0%	-4.2%	0.0%	-0.6%	0.0%	-4.9%	0.0%
HR	-2.7%	-2.4%	0.1%	-5.1%	0.3%	-2.7%	0.2%	-2.7%	0.4%
HU	0.0%	0.0%	0.0%	0.0%	1.3%	0.0%	0.0%	0.0%	1.4%
IE	..	..	0.0%	..	0.0%	..	0.0%	..	0.0%
IT	0.0%	0.0%	0.0%	-0.6%	0.1%	0.0%	0.0%	-0.7%	0.1%
LT	0.0%	0.0%	0.0%	0.0%	0.1%	0.0%	0.0%	0.0%	0.1%
LU	0.0%	0.0%	0.0%	0.0%	0.1%	0.0%	0.0%	0.0%	0.1%
LV	0.0%	0.0%	0.0%	0.0%	0.2%	0.0%	0.0%	0.0%	0.2%
MT	..	..	0.0%	..	0.0%	..	0.0%	..	0.0%
NL	-3.4%	-4.4%	0.0%	-4.3%	0.1%	-4.4%	0.1%	-4.4%	0.1%
PL	-0.7%	-0.6%	0.0%	-0.7%	0.0%	-0.6%	0.0%	-0.7%	0.0%
PT	0.0%	0.0%	0.0%	-1.0%	0.0%	0.0%	0.0%	-1.1%	0.0%
RO	0.0%	0.0%	0.1%	-0.7%	0.6%	0.0%	0.2%	-0.8%	0.6%
SE	0.0%	0.0%	0.0%	-0.4%	0.0%	0.0%	0.0%	-0.5%	0.0%
SI	-1.2%	-1.0%	0.0%	-1.0%	0.2%	-1.0%	0.0%	-1.0%	0.2%
SK	0.0%	0.0%	0.0%	0.0%	0.3%	0.0%	0.0%	0.0%	0.3%
UK	..	..	0.0%	..	0.0%	..	0.0%	..	0.0%
EU28	-1.2%	-1.4%	0.0%	-2.0%	0.1%	-1.4%	0.0%	-2.1%	0.1%

b. Impact on Demand between City Pairs

Scenario 11 in the CPM is presented only for comparison purposes and is not intended to provide an indication that it might be considered as a realistic proposal for changing the current VAT regime.

Its only purpose is to provide an alternative basis to the BAU on which the other strategies could be considered. From some perspectives, it provides the most rational basis for comparison between the other scenarios, as in some sense, its fares and demand estimates for intra-EU and extra-EU passenger trips are unbiased by any VAT content in their fares.

Table 6.39 – Scenario 11: Changes in Fares, Trips, and VAT Revenue (Comparison with BAU)

			Fares (% Change)			Trips (% Change)	VAT Revenue (% Change)
	City A	City B	Air	Rail	Bus	All	All
1	Athens	Thessaloniki	0%	0%	0%	0.0%	0.00%
2	Berlin	Hamburg	0%	0%	0%	0.0%	0.00%
3	Budapest	Debrecen	0%	0%	0%	0.0%	0.00%
4	Cluj	Iasi	0%	0%	0%	0.0%	0.00%
5	Copenhagen	Aarhus	0%	0%	0%	0.0%	0.00%
6	Dublin	Cork	0%	0%	0%	0.0%	0.00%

7	Krakow	Wroclaw	0%	0%	0%	0.0%	0.00%
8	Lisbon	Porto	0%	0%	0%	0.0%	0.00%
9	London	Glasgow	0%	0%	0%	0.0%	0.00%
10	Madrid	Barcelona	0%	0%	0%	0.0%	0.00%
11	Paris	Toulouse	0%	0%	0%	0.0%	0.00%
12	Berlin	Warsaw	0%	-7%	-8%	2.6%	-0.43%
13	Constanta	Varna	0%	0%	0%	0.0%	0.00%
14	Copenhagen	Vilnius	0%	-5%	-5%	0.0%	0.00%
15	London	Brussels	0%	-6%	-6%	2.3%	-8.36%
16	Ostrava	Katowice	0%	-12%	-12%	5.1%	-0.01%
17	Paris	Lisbon	0%	-12%	-12%	0.0%	-0.01%
18	Frankfurt	Oslo	0%	-4%	0%	0.0%	-0.48%
19	Gothenburg	Oslo	0%	-6%	0%	0.0%	0.00%
20	Riga	Moscow	0%	-6%	0%	0.0%	0.00%

For the 11 domestic city pairs, Scenario 11 is identical to BAU; so, for these city pairs, it would have no change in fares or demand of VAT revenue. For the six intra-EU and three extra-EU city pairs, there would be no change in airfare, which is already based on zero VAT rates. However, for these city pairs (other than Ostrava/Katowice), there would be a reduction in fares for the other modes, ranging from 4% to 12% (these current fares include some element of VAT, depending on which Member States are those of origin, transit, and destination). The VAT rates of these transit Member States would not be included in the Scenario 11 fares.

c. Macro-Economic and Social Effects

For most Member States, there is no change in the VAT regime; accordingly, there is no change at the GDP level. For those Member States where the VAT regime changes (i.e. Austria, Belgium, France, Germany, Greece, the Netherlands, Poland, Slovenia, and Spain), the effect on GDP is negligible. The effects on employment in the sector are equally negligible. The effect on purchasing power is negligible in all Member States, with no changes greater than 0.01%.

Final Note

The detailed results of the TREMOVE-based simulations for all countries are reported in Volume 3 of this report (Excel file).

Following (Table 6.40) is the summary table on the VAT revenue effects for Scenarions 1,2,5, and 11 of the mechanical application of the rates to the demand structure of the baseline in 2010.

Table 6.40 - Mechanical Application of Scenario Rates to 2010 Demand Structure
(EUR m)

	Baseline	Scenario 1	Scenario 2	Scenario 5	Scenario 11
AT	372.2	773.9	387.0	371.5	363.2
BE	155.9	586.8	167.9	159.6	142.6
BG	110.4	128.2	57.7	110.4	110.4
CY	2.4	73.7	19.4	2.4	2.4
CZ	281.8	451.0	322.2	281.8	281.8
DE	1210.0	3529.3	1300.7	1200.9	1154.7
DK	0.0	447.3	447.3	0.0	0.0
EE	18.7	22.4	10.1	18.7	18.7
ES	755.9	1879.8	895.3	755.4	752.4
FI	133.2	410.3	171.1	133.2	133.2
FR	2801.6	5961.9	2980.3	2796.8	2790.7
GR	391.9	1218.2	689.0	392.0	390.1
HR	59.1	62.7	12.6	59.6	57.5
HU	235.6	277.9	51.5	235.6	235.6
IE	0.0	305.2	119.5	0.0	0.0
IT	1205.6	2968.0	1349.9	1205.6	1205.6
LT	11.9	36.9	15.8	11.9	11.9
LU	2.3	15.7	3.1	2.3	2.3
LV	13.3	33.0	18.9	13.3	13.3
MT	0.0	29.6	8.2	0.0	0.0
NL	186.4	717.6	205.1	189.0	180.0
PL	283.7	859.8	299.0	283.7	281.7
PT	83.7	533.5	139.4	83.7	83.7
RO	189.0	219.3	45.8	189.0	189.0
SE	157.3	838.2	201.2	157.3	157.3
SI	22.7	54.8	23.7	22.6	22.4
SK	80.9	87.2	43.7	80.9	80.9
UK	0.0	3286.8	822.2	0.0	0.0
EU28	8765.6	25809.1	10807.6	8757.3	8661.4

Annexes

Annex 1 - Relevant EU VAT Legislation

This Annex (i) reproduces the section on EU Output VAT legislation from the Interim Report, and (ii) completes it with a review of laws and regulations concerning Input VAT.

Legal Framework

The basis of the EU VAT legislation is Council Directive 2006/112/EC of 28 November 2006 on the common system of value added tax (VAT Directive (VATD)). It replaced and consolidated Directive 77/388/EEC (Sixth Directive) as well as Directive 67/227/EWG, which was in force at that time.

Further relevant legislation includes Directive 2008/9/EC (VAT Refund-EU business), Directive 86/560/EEC (VAT Refund-non-EU business), Directive 2009/132/EC (VAT-free importation), Directive 2006/79/EC (private consignments), Directive 2007/74/EC (travellers' allowances), and Council Regulation No. 282/2011 (VAT Implementing Regulation). Further information is available on European Commission websites. [159]

Provisions Regarding Passenger Transport (Output VAT)

The transport of passengers is generally taxable as a service (Art. 24 VAT Directive). The taxable amount results from Art. 73 as the total consideration received in return for providing the transport service.[160] In most cases, the service provider, as the taxable person,[161] is obliged to pay the VAT due to the tax authorities. However, under certain conditions, this obligation can be passed to the recipient (reverse charge).

Place of Supply

The place of supply of passenger transport is defined in Art. 48 VAT Directive, which states: "The place of supply of passenger transport shall be the place where the transport takes place, proportionate to the distances covered."[162] In other words, passenger transport services are taxable where they are performed,

[159] http://ec.europa.eu/taxation_customs/taxation/vat/index_en.htm.

[160] "In respect of the supply of goods or services, other than as referred to in Articles 74 to 77, the taxable amount shall include everything which constitutes consideration obtained or to be obtained by the supplier, in return for the supply, from the customer or a third party, including subsidies directly linked to the price of the supply." (Art. 73 EC VAT Directive)

[161] Passenger transport services are also subject to VAT, if they are provided by government authorities or other bodies governed by public law (Art. 13 VAT Directive in conjunction with Annex I).

[162] The question, if the allocation in case of cross-border passenger transport services may also include other factors, e.g. the duration of the stays in the various countries, was raised in case C-36/99. The ECJ decided, that in case of the supply of cross-frontier passenger transport on an all-inclusive basis, the total consideration must be allocated on a pro rata basis based on the distances covered in each Member State, other factors must not be considered (ECJ, 6 November 1997, Case C-116/96, Reisebüro Binder GmbH vs. Finanzamt Stuttgart-Körperschaften, [1998], I-01889).

which is an application of the destination principle. Concerning the place of supply, the rule is the same for business-to-business and business-to-consumer services as well as for intra-EU and domestic services.[163]

Passenger transport services provided outside the borders of the EU are usually outside of the scope of the EC VAT Directive,[164] although the Member States may extend the scope of their tax legislation beyond their normal territorial borders (including territorial waters), if purely internal services are affected and no conflicts of jurisdiction regarding taxation arise with other States.[165]

Rates Applicable

Basic Rules (Title VIII, Chapter 2 VATD)

Supplies of goods and services are normally subject to a standard rate, which can be set individually by Member States. However, Art. 97 of the VAT Directive states that the standard rate may not be lower than 15%.

Member States are also allowed to apply a reduced rate to the "transport of passengers and their accompanying luggage" (Art. 98 VAT Directive in conjunction with Annex III, Item 5). This reduced rate must not be lower than 5% and there may only be two different reduced rates in each Member State (Art. 98 and 99 VAT Directive).

There is no obligation to apply the same VAT rate to different modes of transport. According to ECJ Case C-36/99 (European Court of Justice, Idéal Tourisme SA vs. Belgian State), diverging VAT rates on different modes of transport do not conflict with the Community's principle of equal treatment.[166]

A general exemption, without input VAT credit, as an activity in the public interest is stated by the VAT Directive for the "supply of transport services for sick or injured persons in vehicles specially designed for the purpose, by duly authorised bodies" (Art. 132, Item 1, Letter p, VATD).

In summary, according to the general rules, the transport of passengers may be taxed at either the standard rate or (one of) the reduced rate(s), unless it is a special medical service. Nevertheless, there are a number of derogations at present that allow Member States to apply other rules.

Special Provisions (Title VIII, Chapter 4 VATD)

Article 110 VATD lays down a transitional arrangement, which allows Member States to continue to apply the zero rate or reduced rates lower than permitted by Article 99 under certain conditions and until the adoption of definitive EU-wide arrangements (see Art. 109 and Art. 402). The conditions state that these measures must have been adopted "for clearly defined social reasons and for the benefit of the final consumer" (Art. 109 and Art. 402 VAT Directive) and they must have been in place on 1 January 1991.

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[163] This is in contrast to the place-of-supply rules for the transport of goods, where a distinction is made between B2B and B2C and between intra-EU and domestic transport (Lang, Melz & Kristoffersson (2009), p. 1097).

[164] See e.g. ECJ, 13 March 1990, Case C-30/89, Commission of the European Communities vs. French Republic, ECR 1990, Page I-00691.

[165] See ECJ, 23 January 1986, Trans Tirreno Express SpA vs. Ufficio provinciale IVA, ECR 1986, Page I-00231.

[166] See ECJ, 13 July 2000, Case C-36/99, Idéal Tourisme SA vs. Belgian State, [2000], I – 6060.

In addition, Art. 114 also allows Member States, "which, on 1 January 1993, were obliged to increase their standard rate in force at 1 January 1991 by more than 2%" (Art. 114 VATD), to apply a reduced rate lower than 5% to the goods and services listed in Annex III, which includes passenger transport (Item 5). However, in contrast to Art. 110, this article does not permit zero rating (Art. 114, Par. 2). Like Art. 110, these lower rates may be used until the adoption of a definitive EU-wide regime. Furthermore, Greece is allowed to apply lower rates, up to 30% lower than corresponding rates in the mainland, on certain Aegean Islands (Art. 120). In addition, Portugal may treat sea and air transport between the islands of the Azores and Madeira and between those islands and the mainland as international transport (Art. 149).

Derogations (Title XIII VATD)

Title XIII of the VAT Directive, which contains derogations for individual Member States, also includes rules that apply to passenger transport.

Article 371, in conjunction with Annex X (Part B, Item 10), allows Member States that joined the EC before 1978,[167] to continue to exempt the transport of passengers,[168] provided that this exemption was in place on 1 January 1978. This also holds true for the transport of accompanying goods (e.g. luggage or motor vehicles) and for the supply of services relating to passenger transport.

Similar rules are in place for a number of Member States that joined the Community later and have negotiated a respective derogation upon accession. These provisions can be found in Article 375ff (in conjunction with Annex X, Part B, Item 10). Specifically, passenger transport may be exempt based on such derogation in the following Member States, as far as in place at the time of accession, to the following extent:

Table A1.1 – Derogations in VAT Directive to Passenger Transport for Member States

Member State	Article	Exemption
Austria	378	International passenger transport carried out by air, sea or inland waterway, with the exception of passenger transport operations on Lake Constance;[169] input VAT deduction is possible
Bulgaria	390a	International passenger transport services as referred to in Annex 10, Part B, Item 10 as far as exempt at time of accession[170]

[167] I.e. Belgium, Italy, Luxembourg, France, Netherlands, Germany, Denmark, Ireland, and the United Kingdom.

[168] The exact coverage is "the transport of passengers and, in so far as the transport of the passengers is exempt, the transport of goods accompanying them, such as luggage or motor vehicles, or the supply of services relating to the transport of passengers."

[169] Linked to the restriction that this exemption is also in place in any of the Member States, which were members of the Community on 31 December 1994.

[170] Linked to the restriction that this exemption is also in place in any of the Member States, which were members of the Community on 31 December 2006.

Croatia	390c	The international transport of passengers, as referred to in Annex X, Part B, Item 10[171]
Cyprus	383	International passenger transport services as referred to in Annex 10, Part B, Item 10 as far as exempt at time of accession[172]
Czech Republic	381	International passenger transport services as referred to in Annex 10, Part B, Item 10 as far as exempt at time of accession[172]
Estonia	382	International passenger transport services as referred to in Annex 10, Part B, Item 10 as far as exempt at time of accession[172]
Finland	379	Passenger transport services, the transport of accompanying goods, and the supply of services relating to passenger transport[169]
Hungary	386	International passenger transport services as referred to in Annex 10, Part B, Item 10 as far as exempt at time of accession[172]
Latvia	384	International passenger transport services as referred to in Annex 10, Part B, Item 10 as far as exempt at time of accession[172]
Lithuania	385	International passenger transport services as referred to in Annex 10, Part B, Item 10 as far as exempt at time of accession[172]
Malta	387	Domestic and international passenger transport as well as domestic inter-island sea passenger transport services as referred to in Annex 10, Part B, Item 10 as far as exempt at time of accession[172]
Poland	388	International passenger transport services as referred to in Annex 10, Part B, Item 10 as far as exempt at time of accession[172]
Portugal	377	Passenger transport services, the transport of accompanying goods, and the supply of services relating to the passenger transport as far as exempt on 1 January 1989
Romania	390b	International passenger transport services as referred to in Annex 10, Part B, Item 10 as far as exempt at time of accession[170]
Slovakia	390	International passenger transport services as referred to in Annex 10, Part B, Item 10 as far as exempt at time of accession[172]
Slovenia	389	International passenger transport services as referred to in Annex 10, Part B, Item 10 as far as exempt at time of accession[172]

[171] Linked to the restriction "for as long as the same exemption is applied in any of the Member States which were members of the Union before the accession of Croatia."

[172] Linked to the restriction that this exemption is also in place in any of the Member States, which were members of the Community on 30 April 2004.

Sweden	380	Passenger transport services, the transport of accompanying goods, and the supply of services relating to the passenger transport as far as exempt at time of accession[169]

Source: Council Directive 2006/112/EC of 28 November 2006 on the common system of value added tax (VAT Directive); Adaptation and Demonstration: IHS, 2013.

It is unclear how far the exemptions of Art. 371-390c permit zero rating. Only the Austrian and the Maltese derogations (Art. 378 and Art. 387c) explicitly include the deduction of input VAT whereas the others, strictly speaking, only state a 'pure exemption.' KPMG[173] concludes that input VAT deduction is generally not allowed whereas one might also argue that input VAT deduction is still possible if in place at the time of accession ("as far as exempt at time of accession").[174]

Further derogations are based on special authorization by the Council of the European Union (see Art. 394-396 VATD). Examples include the treatment of short internal transport journeys as international transport, and vice versa, and the flat-rate calculation of the taxable amount for foreign providers of passenger transport services in Germany and special VAT treatment of journeys through the tunnels of Mont Blanc and Fréjus in Italy and France.[175]

However, this system of derogations is also seen as a transitional system. In a final regime, passenger transport shall be taxed in the country of departure for the whole intra-EU part of the journey (Art. 393).

Extra-EU Passenger Transport

In the case of international passenger transport services, only the domestic leg is taxed in each Member State. Foreign legs (i.e. passenger transport services provided outside the borders of the respective Member State) are taxable in the Member State or third country where the transport takes place (see chapter (a)). Since Art. 169, letter a, of the VAT Directive permits the deduction of input VAT incurred on foreign legs, passenger transport services outside the EU are effectively zero-rated as far as EU VAT is concerned. Since a majority of Member States also exempts domestic legs (some of them only for certain modes of transport though) under the derogations described above, international passenger transport is often completely zero-rated.

Supply of Goods and Services on board Ships, Aircraft, or Trains[176]

Articles 37 and 57 of the VATD provide particular rules for on-board supplies. The place of supply of goods and catering and restaurant services supplied on-board ships, aircraft, or trains "during the section of

[173] KPMG (1997), p. 67.

[174] This is the position of the British HM Revenue & Customs (see: http://www.hmrc.gov.uk/manuals /vtransmanual/VTRANS020200.htm).

[175] A list of relevant derogations currently in place can be found on http://ec.europa.eu/taxation_customs/resources/ documents/taxation/vat/key_documents/table_derogations/vat_index_derogations_en.pdf

[176] For further information see EC Report COM(2012) 605 final available on http://ec.europa.eu/ taxation_customs/resources/documents/taxation/vat/key_documents/reports_published/com_2012_605_en.pdf and the "Expert

a passenger transport operation effected within the Community" is deemed to be at the point of departure of the passenger transport operation (Art. 37 VATD). The section of a passenger transport operation effected within the Community (Community section) is defined as "the section of the operation effected, without a stopover,[177] outside the Community, between the point of departure and the point of arrival of the passenger transport operation" (Art. 37 VATD). The point of departure is the first scheduled stop within the Community, where passengers can board; the point of arrival is the last scheduled stop within the Community, where people, who embarked in the Community, can get out. In case of interim stopovers in a third country, the journey is split into two or more Community sections.

These rules apply to all goods and restaurant and catering services supplied on board ships, aircraft, and trains during the Community section. Consequently,

- For other services supplied during the Community section,
- For any goods and services supplied on board within the Community, but outside the Community section,[178] and
- For any goods and services supplied on board other means of transport (e.g. buses),

The standard rules of Art. 31 VATD for goods ("the place of supply shall be deemed to be the place where the goods are located at the time when the supply takes place"), Art. 55 VATD for restaurant and catering services ("the place of supply… shall be the place where the services are physically carried out"), and Art. 44 and 45 VATD for other services apply.

Regarding the relevant tax rate, Art. 37 (3) VATD states that Member States may exempt, with input VAT deduction, the supply of goods for consumption supplied on board ships, trains, and aircraft during the Community section. Goods supplied outside the Community section, supplied on board other means of transport like buses, or not intended for consumption on board are not covered by this exemption allowance.

Services relating to the transport of passengers (e.g. restaurant and catering services) might be exempt in a number of Member States, in so far as the transport of the passengers is exempt, according to Art. 371 in conjunction with Annex X, Part B (10) VAT Directive or Art. 375 to 390b VAT Directive. For other services supplied on board (e.g. hairdressing services during cruises), an exemption is not permitted.

However, a detailed analysis of the European VAT reform scenarios regarding supplies of goods and services on board means of transport is provided in EC Report COM (2012) 605[179] and therefore will not be further addressed in this report.

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study on the issues arising from taxing the supply of goods and the supply of services, including restaurant and catering services, for consumption on board means of transport" by PWC available on https://circabc.europa.eu/w/browse/59941dff-4fd3-47bb-8ee9-c502cab5b7b6.

[177] A stop, which doesn't have to be a scheduled point of passenger (dis)embarkation (cf. COM(2012) 605 final, p. 4 or European Court of Justice, Case C-58/04, Antje Köhler vs. Finanzamt Düsseldorf-Nord, I-8233).

[178] I.e. within the borders of the EC, but before the point of departure or after the point of arrival.

[179] See footnote 176.

Provisions with Respect to Input VAT

The VAT Directive also provides a number of rules especially relevant for inputs to passenger transport services. In the following, we look at the rules applicable to the acquisition of means of transport and related expenses (e.g. repair, modification, maintenance, and fuel).

Exemptions Related to International Transport

Article 148 of the VAT Directive provides specific exemptions for the supply of goods and services related to international transport by air and sea. It covers, broadly speaking, the supply of certain seagoing vessels and aircraft used by airlines operating chiefly on international routes, the supply of goods for their fuelling and provisioning, and a number of services directly connected thereto.

Figure A1.1 – Art. 148 of Council Directive 2006/112/EC

Council Directive 2006/112/EC Article 148:

"Member States shall exempt the following transactions:

(a) the supply of goods for the fuelling and provisioning of vessels used for navigation on the high seas and carrying passengers for reward or used for the purpose of commercial, industrial or fishing activities, or for rescue or assistance at sea, or for inshore fishing, with the exception, in the case of vessels used for inshore fishing, of ships' provisions;

(b) the supply of goods for the fuelling and provisioning of fighting ships, falling within the combined nomenclature (CN) code 8906 10 00 leaving their territory and bound for ports or anchorages outside the Member State concerned;

(c) the supply, modification, repair, maintenance, chartering and hiring of the vessels referred to in point (a), and the supply, hiring, repair and maintenance of equipment, including fishing equipment, incorporated or used therein;

(d) the supply of services other than those referred to in point (c), to meet the direct needs of the vessels referred to in point (a) or of their cargoes;

(e) the supply of goods for the fuelling and provisioning of aircraft used by airlines operating for reward chiefly on international routes;

(f) the supply, modification, repair, maintenance, chartering and hiring of the aircraft referred to in point (e), and the supply, hiring, repair and maintenance of equipment incorporated or used therein;

(g) the supply of services, other than those referred to in point (f), to meet the direct needs of the aircraft referred to in point (e) or of their cargoes."

Since Art. 169 (b) permits the deduction of input VAT with respect to the supply of those goods and services, they are effectively zero-rated. In detail, the provisions are as follows:

Maritime Shipping

The following supplies are zero-rated according to Art. 148 (a)-(d) of the VAT Directive:

Supply of Qualifying Vessels:	*Art. 148 (a) and (c)*
The supply of qualifying vessels is zero-rated. These are vessels: • Used for navigation on the high seas and carrying passengers for reward or used for the purpose of commercial, industrial, or fishing activities, • For rescue or assistance at sea, or • For inshore fishing. In the first case it is conditional that the vessel is actually used (or planned to be used) on the high seas, it is not sufficient that the vessel is designed in a way that is could potentially be used for ocean shipping.[180] Not covered are pleasure boats used (e.g. by the lessee) for leisure activities.[181]	
Services Relating to Qualifying Vessels:	*Art. 148 (c) and (d)*
Certain services relating to such qualifying vessels are also zero-rated, for example: • Chartering and hiring, • Modification, repair, and maintenance, and • The supply of other services[182] to meet the direct needs of such vessels or of their cargoes. Chartering in this respect comprises full charter as well as partial charter.[183]	
Supply of Equipment and Related Services:	*Art. 148 (c)*
The supply of equipment, including fishing equipment, incorporated or used in qualifying vessels, as well as the hiring, repair, and maintenance of such equipment is zero-rated according to Art. 148 (c).	
Fuelling and Provisioning:	*Art. 148 (a)*
Finally, the supply of goods for the fuelling and provisioning of qualifying vessels as above, with the exception of the ships' provisions for ships for inshore fishing, is zero-rated (Art. 148 (a)). According to C-185/89,[184] in order to profit from zero-rating, goods for the fuelling and provisioning must be supplied directly to the operator of the vessel, and supplies at previous stages are not covered, one of the reasons being that it would be too difficult for the Member States to verify the final use of the goods. However,	

[180] ECJ, 21 March 2013, Case C-197/12, Commission of the European Communities vs. French Republic.

[181] ECJ, 22 December 2010, Case C-116/10, État du Grand-Duché de Luxembourg and Administration de l'enregistrement et des domains vs. Pierre Feltgen (in his capacity as administrator in the bankruptcy of Bacino Charter Company SA) and Bacino Charter Company SA.

[182] Only if supplied directly to the shipowner (ECJ, 14 September 2006, Joined Cases C-181/04 to C-183/04, Elmeka NE vs. Ipourgos Ikonomikon, ECR 2006, Page I-8167).

[183] ECJ, 18 October 2007, C-97/06, Navicon SA vs. Administración del Estado.

[184] ECJ, 26 June 1990, C-185/89, Staatssecretaris van Financiën vs. Velker International Oil Company Ltd NV, ECR 1990, Page I-02561.

it is not conditional that the goods are loaded directly on board the vessel at the time of supply to the operator. The goods can also be stored ashore by the operator for later use.[185]

Most of these provisions are binding for Member States and only the supply of goods for fuelling and provisioning may be restricted by Member States until the adoption of definitive arrangements (Art. 150).

Extra-EU Aviation

Similar exemptions are in place for international aviation and are dealt with in Art. 148 (e)-(f). The following supplies are covered:

Supply of Qualifying Aircraft:	*Art. 148 (e) and (f)*
The supply of qualifying aircraft (i.e. aircraft used by airlines operating for reward chiefly on international routes), is zero-rated based on Art. 148 (e) and (f) of the VAT Directive. In contrast to the exemptions for vessels, which depend on the use of the individual vessels, here the properties of the airline, not the individual aircraft, are decisive. "Operating for reward" suggests that the planes must be used for some kind of commercial activities. "Chiefly on international routes" signifies that international services must outweigh domestic services. The VAT Directive does not give detailed information on how this assessment must be conducted, but C-382/02[186] states "all information which indicates the relative importance of the type of operations concerned, in particular turnover," may be taken into account. In practice, Member States apply different rules with respect to the assessment if international operations prevail. Although the term routes might suggest that the exemption only applies to regular flights on specified routes, the European Court of Justice confirmed that charter flights, even if they mainly serve the demands from undertakings and private persons, fulfil the requirements, if the predominance of international operations is given.[187] Finally, the supply of such qualifying aircraft must not necessarily be effected directly to the airline operating on international routes. The exemption is also applicable if a third party acquires the aircraft for the purposes of exclusive use by such an undertaking.[187]	
Services Relating to Qualifying Aircraft:	*Art. 148 (f) and (g)*
Art. 148 (f) and (g) zero-rate certain services relating to qualifying aircraft, for example: • Chartering and hiring, • Modification, repair, and maintenance, and	

[185] Art. 148 (b) furthermore zero-rates the provisioning of certain fighting ships. The supply of such fighting ships and related services is not covered by the exemption according to Art. 148, but it can be based on Art. 371ff and Annex X, Part B, Item 12, which is applied e.g. in Greece and Spain.

[186] ECJ, 16 September 2004, Case C-382/02, Cimber Air A/S vs. Skatteministeriet, ECR 1990, Page I-8395.

[187] ECJ, 19 July 2012, Case C-33/11, A Oy.

• The supply of other services to meet the direct needs of such aircraft or of their cargoes.
Supply of Equipment and Related Services: *Art. 148 (f)*
The supply of equipment incorporated or used in qualifying aircraft, as well as the hiring, repair, and maintenance of such equipment is also zero-rated.
Fuelling and provisioning: *Art. 148 (e)*
Art. 148 (e) zero-rates the supply of goods for the fuelling and provisioning of qualifying aircraft as above.

Related Provisions

Article 3 extends the scope of Art. 148 "supplies to intra-EU acquisitions." Services by intermediaries, acting in the name and on behalf of another person and taking part in transactions referred to in Art. 148, are also zero-rated (Art. 153).

Some Member States furthermore exempt the supply of aircraft used by state institutions and related supplies (e.g. Greece and Spain). However, this is not covered by Art. 148, but rather is a derogation based on Art. 371ff and Annex X, Part B, Item 11.

VAT on Means of Transport and Fuel

The acquisition of means of transport and fuel is taxed according to standard rules in most Member States and usually the standard rate is applicable. Some propellants can be taxed at a reduced rate, especially electricity (Art. 102) and LPG (Cyprus, Art. 104a).

Reduced levels of excise duties on fuel and electricity as applied in many Member States are mainly based on Council Directive 2003/96/EC of 27 October 2003 restructuring the Community framework for the taxation of energy products and electricity.

VAT incurred on inputs is generally deductible in so far as it is used for business purposes (Art. 168). Nevertheless, derogations from that principle can be found, especially with respect to passenger cars and related goods and services (e.g. Italy, Poland, and Latvia)[188] or capital goods used primarily for private purposes (e.g. Austria, Germany, and France). These derogations are mostly based on Art. 394/395 of the VAT Directive. Finally, we also encountered an instance where a derogation from the normal VAT rules is based on an accession act (i.e. the - compared to Art. 148 wider – zero-rating of the supply of vessels and related services in Finland).

[188] Vehicles used for commercial passenger transport are however frequently except from such restrictions.

Annex 2 – Methodological Note on Demand Data

As seen in Chapter 2, Section A, demand data has been obtained using TREMOVE and ETISplus databases. As ETISplus does not deliver PKM directly, an attempt was made to derive PKM data from the amount and distance of trips. However, the NUTS3 level at which trips were defined proved too coarse a measure for a correct estimate of trip distance. For rail transport, the PKM estimate from ETISplus underestimated actual demand from TREMOVE and EUROSTAT by a significant margin (overestimated on average by 36%), while the opposite was generally true for bus transport (underestimated on average by 37%).

Table A2.1 - Demand Data in TREMOVE and ETISplus

	TREMOVE Rail PKM	ETISplus Domestic Rail PKM Estimate	Factor	TREMOVE Bus PKM	ETISplus Domestic Bus PKM Estimate	Factor
AT	9,180.05	7,018.94	1.31	9,856.35	12,378.55	0.8
BE	9,868.01	4,666.76	2.11	18,921.51	9,944.68	1.9
BG	2,450.98	1,671.84	1.47	11,419.21	17,605.40	0.65
CY	0	0		1,339.77	2,162.87	0.62
CZ	6,404.71	5,266.42	1.22	16,257.84	48,308.59	0.34
DE	76,658.75	54,632.48	1.4	68,511.81	77,767.94	0.88
DK	6,171.17	5,740.82	1.07	7,403.22	10,726.05	0.69
EE	271.04	177.23	1.53	2,669.04	8,119.73	0.33
ES	21,125.31	24,954.19	0.85	59,691.35	113,447.31	0.53
FI	3,786.66	3,381.95	1.12	7,565.84	20,346.25	0.37
FR	79,968.83	64,129.16	1.25	47,524.18	114,023.71	0.42
GR	1,936.34	1,391.35	1.39	22,156.56	34,702.79	0.64
HR	1,112.70	1,249.53	0.89	2,170.51	7,175.87	0.3
HU	8,546.04	4,893.26	1.75	17,049.10	28,646.30	0.6
IE	1,881.60	1,504.16	1.25	7,167.75	11,699.86	0.61
IT	49,323.73	32,741.36	1.51	103,671.15	181,930.87	0.57
LT	407.44	357.81	1.14	3,598.17	19,962.53	0.18
LU	315.27	244.94	1.29	857.51	1,091.72	0.79
LV	900.7	600.87	1.5	2,546.21	8,166.13	0.31
MT	0	0		517.96	304.5	1.7

NL	16,129.55	11,581.47	1.39	12,364.83	16,645.83	0.74
PL	20,079.15	13,414.43	1.5	28,278.88	118,278.07	0.24
PT	3,938.15	2,812.07	1.4	10,839.15	17,709.15	0.61
RO	7,384.88	4,373.47	1.69	12,602.94	36,398.54	0.35
SE	10,197.13	9,340.58	1.09	8,578.11	46,743.50	0.18
SI	834.65	463.88	1.8	3,292.66	2,768.48	1.19
SK	2,160.08	2,058.19	1.05	8,757.96	30,053.57	0.29
UK	51,058.37	39,252.28	1.3	51,597.19	74,674.44	0.69
		Average	1.36		Average	0.63

There are a number of potential factors contributing to this:

- The ETISplus estimate covers only domestic trips, while the TREMOVE and EUROSTAT data cover both domestic trips and the part of the international trip on the country's territory.
- Rail transport often does not use the shortest distance between two zones due to the structure of the network.
- Only pure rail trips are counted. When rail is used as the first or last leg of an air trip, for example, it is counted as part of an air trip.
- For trips within a NUTS3 zone, no estimate of trip distance was available. The distance was, instead, estimated based on the surface area of the zone, which may have led to too low a value (the opposite could explain the overestimation for bus, which was generally used for short trips).
- Different data collection methods for EUROSTAT PKM and trips.

For this reason, it was decided to only use the TREMOVE and EUROSTAT estimates for PKM, and ETISplus for amount of trips. ETISplus PKM data will only be relied upon to estimate ratios for the share of international transport, which is not identified in TREMOVE.

Annex 3 – Background Assumptions and Analytical Tools for Evaluating VAT Reform Scenarios

This Annex describes the background assumptions and analytical tools used to provide inputs to and outputs from the quantified assessments of VAT scenarios.

Background Assumptions

The analyses of alternative VAT reform scenarios are based on the reference scenario in the 2011 Transport White Paper "Roadmap to a Single European Transport Area - Towards a competitive and resource efficient transport system."[189]

A comprehensive description of the White Paper reference scenario is given in the Impact Assessment document.[190] Key assumptions are:

- GDP projections follow the baseline scenario of the 2009 Ageing Report.[191] Furthermore, the reference scenario assumes a lasting effect of the economic crisis that started in 2008, leading to a permanent loss in GDP. The projected growth rate for the EU27 for 2010-2020 is around 2.2%, which is similar to the growth rates between 1990 and 2000. Beyond 2020, growth rates are projected to fall to 1.6%, mainly due to the ageing of the population.
- Oil prices are assumed to be relatively high and are based on the most recent projections (at that time) of the International Energy Agency (IEA). From US$59 per barrel in 2005, the oil price is expected to rise to US$106 per barrel in 2030.
- Total passenger transport activity is expected to grow by 34% between 2005 and 2030 in the reference scenario, which is equivalent to an average growth of 1.2% per year. However, growth is not distributed proportionally among transport modes, with air transport activity almost doubling by 2030. Weaker growth in passenger transport compared to GDP per capita (1.4% per year) is explained by the assumption that passenger car activity in select EU-15 Members States is close to saturation and by national and EU policies to reduce the transport intensity of the economy. Rail competes with both road and air, but the results of its performance differ considerably between the EU-15 and the EU-13. In the EU-15, given the expected saturation of passenger car demand, a large share of potential additional demand could be covered by (in most cases, high-speed) rail, at least in the Member States where investments in (high-speed) rail are foreseen. At the same time, high-speed rail attracts traffic from air transport. In the EU-13, the competitive situation of rail relative to air and road is expected to worsen, resulting in slower growth than the other main two modes.
- Policies whose effects are accounted for in the reference scenario include:
    - Minimum levels of biofuel content in fuels (Directives 2003/30/EC and 2009/28/EC)

[189] http://ec.europa.eu/transport/themes/strategies/2011_white_paper_en.htm

[190] http://ec.europa.eu/transport/themes/strategies/doc/2011_white_paper/white_paper_2011_ia_full_en.pdf, starting from p.130.

[191] European Commission, DG Economic and Financial Affairs: 2009 Ageing Report: Economic and budgetary projections for the EU-27 Member States (2008-2060). EUROPEAN ECONOMY 2|2009, http://ec.europa.eu/economy_finance/publications/publication14992_en.pdf

- Fuel quality directives (98/70/EC and 2009/30/EC)
- Eurovignette (amendment 2006/38/EC)
- Energy taxation directive (2003/93/EC)
- Improvement to the Trans-European Network (TEN)
- Euro V and Euro VI for heavy-duty vehicles (HDV), Euro 6 for light-duty vehicles (LDV)
- CO_2 targets for cars and vans (95 and 135 grams per kilometre, respectively, by 2025)
- Inclusion of aviation in EU Emissions Trading System (ETS)
- Single European Sky
- Third Railway Package

The Three Models

The quantitative analyses at the country level uses two models, TREMOVE and EDIP, that have a long history of use in transport policy research by DG MOVE, DG CLIMA, and DG ENV. The models are designed specifically to simulate the effects of transport policy at the national level and use a wide range of input parameters for which values have been collected and updated over the years. The two models have been designed to work together and complement each other.

The analyses at the most disaggregate levels use a City Pairs Model (CPM) and database that have been developed specifically for this study. The database that provides inputs to the CPM includes details of passenger travel between a sample of 220 city pairs, including some pairs where both cities are in one country, some where each city is in different Member State, and a smaller number where one city is within a Member State and the other city is outside.

For the analyses of the impact of different VAT reform scenarios on transport operators at the market level, we also used the TREMOVE and EDIP models. Although the basic outputs from these models are at the national level, their inputs from the ETISplus database are at the zone level. Therefore, by careful selection among the zones, it is possible to closely replicate outputs for the four identified markets (urban, domestic, intra-EU, and extra-EU).

Table 6.1 shows which outputs from which models will be used in the assessments of alternative VAT reform scenarios.

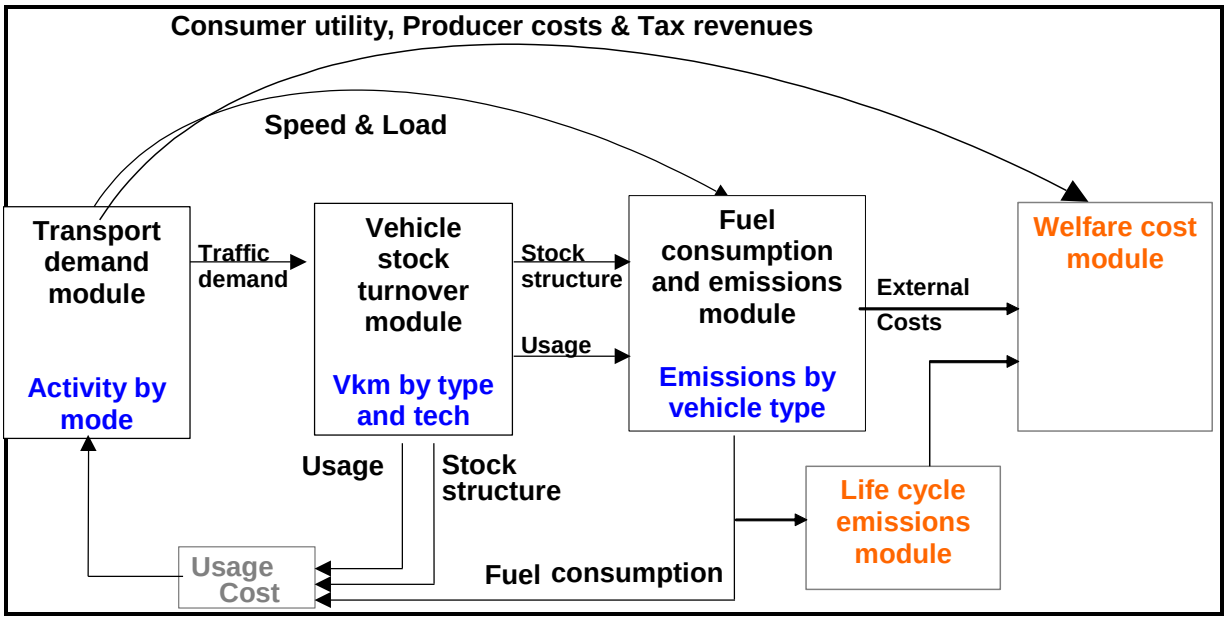
Models for the Quantified Assessment of Scenarios – Outputs, Strengths and Weaknesses

TREMOVE

The first model used in the assessment is TREMOVE. In this section, we briefly present the main mechanisms of the model and show the potential impact of the VAT reform scenarios described in the previous chapter using the model.

TREMOVE consists of several modules employed to assess different aspects of policies.

Figure A3.1 - Structure of TREMOVE



The most important effects of a change in VAT policy are processed in the transport demand module. This module will calculate changes in demand relative to a given baseline (i.e. the Transport White Paper reference scenario) as a result of a change in relative costs (i.e. "usage cost" in the figure) of different transport options (i.e. the tree structures included in the first interim report), using a methodology based on a nested CES (constant elasticities of substitution) tree.[192]

As the relative usage costs and prices of two options change because of VAT policy (e.g. a plane and a train ticket), their relative demand changes as well. The model calculates these relative changes throughout the user choice tree to come to an aggregated outcome. The model runs and generates output for the entire period 1995-2030. It can be run for the entire EU or for specific countries. One VAT scenario can be run at a time.

The effects of these changes in demand also work through in the other modules. If air transport demand decreases, so would the emissions of airplanes. Emissions of trains and buses, on the other hand, could increase, which may or may not create a positive balance. This could, for example, be impacted by the energy mix of a country (e.g. how much of the electricity used by trains comes from fossil fuels, nuclear power, or renewable energy) and the structure of the vehicle fleet (e.g. old vs. new buses). While these are secondary effects, it is important to note that there would also be an effect on the government budget (e.g. income from VAT or other taxes and expenses on subsidies) calculated in the welfare cost module.

The VAT rate is an integral part of the calculation of the usage costs and can be modified directly as a model parameter for simulations with TREMOVE. Any considerations on cost pass-through will be processed exogenously in the fare level, as it will also be done in reality. For example, if only 50% of the

[192] For an elaborate discussion of the mechanisms of CES, we refer to the paper of Ramskov, J. and Munksgaard, J.: "Elasticities – A Theoretical Introduction" http://balmorel.com/doc/b-elasttheory0201.pdf

VAT can be passed on to consumers, the fare will be decreased in the model simulation so that net fare plus VAT equals the final user price and the VAT rate follows the VAT scenario. These adaptations, all standard within the model's setup, allow us to model the first four VAT scenarios (BAU, VAT standardized at national normal rates, reduced rates, and zero rates). For the scenarios where the place of taxation changes to Member State of departure or arrival, a more extensive procedure was followed whereby the demand for international trips is redistributed over the countries, based on country of origin. We constructed a matrix of international trips, based on the ETISplus dataset, to assess the amount of taxable trips and VAT revenue that would shift between countries, with special attention for the transit countries most likely to feel negative consequences from such a policy change.

The output of the model is a standardized set of pivot tables with all main outputs. Relevant outputs will be changes in PKM, vehicle kilometres, vehicle stock, emissions, and VAT and fare revenue (in part). These outputs will be split by country, mode, trip distance class, and trip motive.

Strengths and Weaknesses of TREMOVE

The main strength of the TREMOVE model is that it calculates all these effects together. It takes into account almost all of the relevant choices and costs for transport users. Indeed, transport costs are calculated as generalized prices, meaning that not only the monetary cost of the trips (for the context of this study: the fare) is accounted for, but also the time cost. This allows for a differentiation in preferences depending, for example, on the travel motive, which has an effect on value of time.

However, the model is not without its weaknesses. Some of these are hardly relevant for this study, such as the lack of income effects (a given total transport budget is assumed). However, others are:

- The model is at the Member State level, which implies that it does not directly allow the identification of international trips. We have mitigated this by using supporting data from the ETISplus model, and have matched these with TREMOVE data to identify cross-border trips, both intra- and extra-EU.
- Another implication of the Member State level is that only aggregate results can be shown. For example, while a distinction can be made for long distance air trips, there is no direct identification of trips that would compete heavily with rail transport and of those where no real alternatives exist. These effects will be covered in the City Pairs Model.
- The elasticities are fixed, so called "point elasticities," which may only be applicable for limited changes in the costs parameters. While the range in which these "limited changes" are valid is not determined by economic theory, and could well vary between applications, results will not diverge too much from expected outcomes. The model projection would, in such a case, be a cautious estimate of the effect of a policy.
- The substitution elasticities at the lower levels of the tree are identical and set at 0.5. This assumption can be defended based on the previous point and on the fact that the model works with generalized costs, instead of just monetary costs, which provides a more equal playing field (i.e. it incorporates the extra time cost "paid" by users choosing a slow mode over a fast mode). Few sources from literature exist that have reviewed elasticities with regard to generalized cost. Past work with the model, however, gives confidence that the values used provide a good reflection of real user behaviour.

- The effects on government income only cover those aspects that are directly related to the decisions of transport users. For a more general assessment of the evolution of government income as a result of changes to VAT policy, the EDIP model will be used.

EDIP

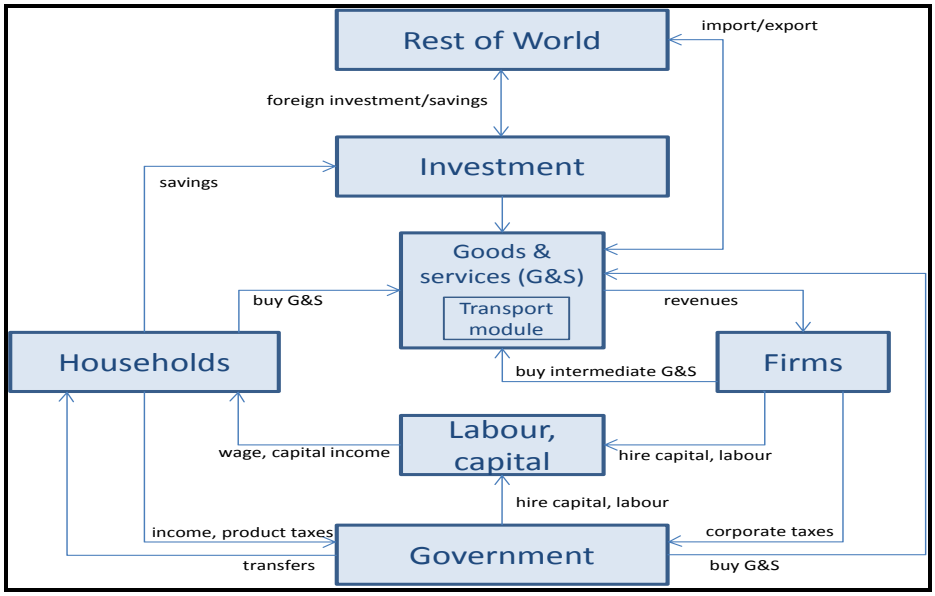
The second model used in the assessment is EDIP, a Computable General Equilibrium (CGE) model that describes the interactions between numerous economic agents (households, firms, government, and the rest of the world) on different markets (goods and services (G&S), capital, and labour). Households supply labour and capital to firms that organize production activities. In return, households receive payments for the use of labour and capital factors in the form of wages and capital income (e.g. interest or dividends). Furthermore, households spend income on G&S, which are delivered by firms. The government is involved in transfers to and from households and firms. The transfers may refer to taxes on G&S, production, subsidies, income taxes, social security contributions, and social benefits. There is also an interaction with the rest of the world.

The reference scenario is assumed to be in a state of equilibrium: for current prices there are stable flows of money and commodities between economic agents. Households have no incentive to change consumption patterns or supplied labour and firms have no incentive to alter production processes.

VAT taxes are part of product and corporate taxes (indicated in red in **Error! Reference source not found.**) and can be modified directly as a model parameter. A change in VAT policy will initiate a chain reaction of changes in monetary and commodity flows. First, as the relative prices between G&S change, the preferences of consumers change, resulting in different consumption patterns. As in TREMOVE, this is modelled by using a methodology based on a nested CES tree. Different transport options are represented in the transport module in the G&S market. Hence, a change of the VAT regime for one transport option will change the demand for the other transport options, as well as the demand for other G&S.

Different consumption patterns have an effect on the prices and quantity of G&S produced by firms. In turn, this has an effect on the amount of labour and capital required in production processes. This change in demand for capital and labour has an effect on the wages and return to capital, and leads to a change in income for households. Furthermore, a change in VAT rate will affect government revenues and, as a result, its expenditure. The government will adapt its own consumption, which will again affect the quantity of G&S produced by the firms. This process above repeats itself, and continues until all markets are back in equilibrium.

Figure A3.2 – EDIP Structure and Effect of VAT Policy



As with TREMOVE, one VAT scenario is run at a time for each Member State. The output of EDIP is a standardized set of reports in the form of pivot tables. Relevant outputs will be changes in price and expenditures for different transport options, emissions, VAT and fare revenue (in part), GDP, and social effects.

Strengths and Weaknesses of EDIP

The main strength of the EDIP model is the fact that all income and substitution effects and the interactions between economic agents are considered. An important element in the case of a change in the VAT regime is its effect on government expenditure. In many European countries, the government is an important customer in the service sector. A decrease in government expenditures leads to less work in this sector, and can effect on other sectors as well. The importance of such effects in the transport sector has been studied, for example, in the NEUJOBS project.[193]

However, EDIP also has a number of weaknesses:

- Even though a large number of different G&S have already been modelled (56 non-transport goods and 14 transport options), the number of transport options is not as disaggregated as in TREMOVE. For example, no distinction is made between national, intra-EU, and extra-EU air transport, and one average VAT rate is applied. Therefore, a differentiation of the VAT regime for these three options needs to be calculated externally from the model and is then used as input for EDIP. More specifically, a new average VAT rate should to be calculated outside of the model based on new VAT rates and the old relative importance of each option. The effect of this new average VAT rate

[193] www.neujobs.eu

can then be calculated using EDIP. However, possible changes in the relative importance of each option are not considered.

- EDIP works with expenditures. All (initial) prices are normalized to one. To convert the output to physical units (e.g. PKM, VKM), we use conversion factors based on TREMOVE.

Interaction between TREMOVE and EDIP

The EDIP model was built to support the analyses of TREMOVE by looking further into the effects of transport policy on the rest of the economy. The partial equilibrium model of TREMOVE simulates transport policies with variables and parameters that reflect the specific needs of transport policy makers. While the effects on wealth, public budgets, and society as whole are somewhat covered in the model's welfare module, the results are only indicative and far from exhaustive. EDIP, as a general equilibrium model, was designed to work with TREMOVE results, albeit in a less detailed way, and to add interactions with economic sectors other than transport. In addition, whereas TREMOVE works with transport volumes and how they are affected by changes in policies, and thus in transport costs, EDIP models economic interactions expressed in expenditures or monetary terms (i.e. euros).

The mechanisms linking both models have been tried and tested in several projects, but have not been automated, mainly because the EDIP model is constantly being updated and refined.

TREMOVE and EDIP were run simultaneously for each of the VAT scenarios. Given the more detailed setup of the transport markets in TREMOVE, its results will give a more detailed reflection of expected outcomes for the transport market. This TREMOVE output, mainly with regard to transport volumes (PKM and VKM) will then be compared with EDIP output. If differences are found, EDIP will be recalibrated and run again to provide a closer match to the transport volume approach of TREMOVE. With the transport module of EDIP matching TREMOVE's output, the effects on other sectors is more realistic than for an independent run.

City Pairs Model (CPM)

Uses of the CPM

The objective of the CPM is to provide practical illustrations of how alternative VAT reform scenarios will change the VAT rates that passengers will be faced with and to gain insight into how these changes might influence passenger behaviour. The CPM will also provide indications of how operator revenue will change with alternative VAT reform scenarios. So far, the model does not include an operator cost function; hence, it is not possible to assess changes in profitability.

The database that supports the model also includes data on the services provided between each city pair. This supports the other objective of the model, which is to provide a basis on which an assessment can be made about how competition between modes and between operators within modes might be influenced by alternative VAT reform scenarios. There are no directly applicable models of operator behaviour that can be applied to passenger transport and that would be sensitive to the relative changes in fares resulting from alternative VAT reform scenarios (remembering that the pass-through of VAT changes to fares is less than 100%). Hence, the assessment of alternative VAT reform scenarios on how operators will respond will be

more subjective than that of passenger responses, where the concepts of fare elasticity and cross elasticity indicate a simpler and more direct impact.

The CPM is a valuable resource to understand how VAT on passenger travel will change with alternative VAT rates on passenger fares (it is less useful for assessing the impact of changes on input VAT rules). By including the distance within each Member State for each city pair, and applying the particular VAT rates for intra-EU passengers of each Member State, it is possible to calculate VAT liability in fares for each mode.

While not one of its objectives, the CPM is also used to provide verification of the results of the TREMOVE model. Using the ratio of the populations of cities in the city pair model to the total population of Member States, it is possible to approximate changes in VAT revenue from city pairs to national totals.

Structure of the Model

The CPM consists of five parts, each with a specific set of data for the 220 city pairs (see below for a discussion on the choice of cities for the model).

The first part of the model provides basic travel data, such as the distances, travel times, and fares between each city pair for each feasible mode. Certain city pairs are too close to each other for air to be a viable transport mode; conversely, for others, the travel times by train and bus are too long to be viable transport modes other than for a small segment of non-business passengers. The feasible modes are defined as those for which there are identified trips between the relevant city pairs in the ETISplus data.

The second part of the model includes data on the quantity of services provided by each mode. This data is based on the number of services provided in a specific week in July 2013 and is derived from various websites that offer booking services. For rail, data is based on the print edition of Thomas Cook's European Railway Timetable using the same week in July 2013. This part of the model is used for a different purpose than the other parts (i.e. to estimate the inter-modal and intra-modal competition). For an estimate of intra-modal competition, we estimate the capacity of the service provided by operator in each mode. This data is proving difficult and time consuming to collect and may not be obtainable for bus operators for many city pairs where there are no published timetables or on-line booking services.

The third part of the model includes the distances travelled in each Member State between each city pair for each mode. It also includes the VAT rates for each travel market (domestic, intra-EU, and extra-EU) for each Member State. By multiplying the share of distance in each Member State by the appropriate VAT rate, it is possible to derive the VAT charged for each mode for each Member State, as well as the VAT-free fare for each city pair.

The fourth part of the model incorporates the number of passenger trips for business and non-business travel purposes for each transport mode. This data is extracted from the ETISplus database.

The fifth part of the model consolidates the data to provide intermediate and final outputs. First, the model multiplies fares (Part 1) by VAT rates (Part 3) to provide the actual VAT applicable to travel by each feasible transport mode between city pairs. These VAT components of fares are then multiplied by the number of trips between each city pair (Part 4) to provide a measure of VAT revenue. The revenue is then allocated to each of the countries based on its share of trip distance (Part 3). By summing the VAT revenue for each country from each city pair, we then have an index of VAT revenue. By comparing the number of trips from each city pair in each country with the total trips for that market indicated by ETIS data, we have

a multiplier between the VAT revenue from the city pairs model and the VAT revenue for that country and from that market. By applying the multiplier for each market type to the city pairs in that market, and then summing over all markets, we are able to estimate the total VAT from passenger transport attributable to each Member State.

Applications of the Model

The CPM is used to estimate the impact of each VAT scenario. Different VAT reform scenarios will result in different VAT rates for each combination of city pair and transport mode, different fares, different total numbers of passengers and distributions between modes, and finally, different total fares paid by passengers, VAT revenues to each Member State, and to transport operators.

The first stage of estimating these impacts is to assess the change in VAT for each mode and city pair combination, starting from the VAT-free fare for each mode (Part 3). The relevant new VAT rates for each mode and country and market combination are entered into the model (also Part 3). Initial estimates are made of the new VAT for each city pair and mode combination by applying the new inter-city VAT rate to the VAT-free fare, and then adding the two components together. The resulting initial estimate of the new fare is then compared with the current fare (from Part 1) and the "pass-through percentage" is applied to the difference. The resulting revised estimate of the VAT component of the fare is added back to the VAT-free fare (from the original Part 3) to give the final estimate of the new VAT inclusive fare for each city pair and mode combination under the particular VAT scenario.

These new fares can then be applied to the TREMOVE model (or simply the total and cross-mode elasticities are used for more approximate but more easily obtained results) and estimates are derived from the changes in demand for both trip purposes. The new data from TREMOVE (or the elasticity model) is entered into the CPM (Part 4). Part 5 of the model then uses the new combinations of outputs from Parts 3 and 4 of the model to provide estimates of the new outputs for each VAT scenario.

Strengths and Weaknesses of the CPM

The main strengths of the model are related to its ability to assess the impact of alternative VAT reform scenarios at a very disaggregate level. Although based on city-to-city data, the model may also be used to assess individual trips. It is relatively easy to add further city pairs or to change those already included in the model. The CPM provides a wide selection of outputs, both in relation to passenger demand and, with additional assumptions, on the supply of passenger services.

The model's main weaknesses are related to the difficulty of scaling up city pair data to the national level. The city pairs do not represent the same share of passenger trips in all markets or for all Member States; hence any scaling up should apply different scale factors for each market and Member State combination.

The model also relies on simple elasticities to estimate the impact of different VAT rates (adjusted for the relevant pass-through rate), whereas the TREMOVE model includes cross elasticities and can better estimate the impact on the modal share of trips. It would be possible to have a loop between the CPM and TREMOVE so that the VAT changes could feed into the demand module of TREMOVE and the resulting percentage shares of passengers between modes could feed back into the CPM model. While this would address this weakness of the CPM model, the time taken to implement the loop appears, at present, to be prohibitive.

As with the TREMOVE and EDIP model combination, the first application of the CPM will be to provide disaggregate assessments of the impacts of distortions 1c and 1d (Chapter 4).

Selection of City Pairs

The city pairs were divided into three groups: those where both cities are in the same Member State (to represent other domestic passengers), those where each city is in a different Member State (to represent intra-EU passengers), and those where only one city pair is in a Member State (to represent extra-EU passengers).

Other Domestic City Pairs[194]

We used three criteria to select our sample of domestic city pairs. First, we selected 15 of the 28 Member States based on total urban population. Second, for these countries, we selected the capital city and the three subsequent most populous cities (based on census data from 2010 to 2012). Third, from these four cities, we selected six city pairs that were at least 40 km apart, at least one city pair that included the capital city, and at least one north-south and one east-west route. For two Member States there were not six city pairs that met these criteria, so for these, a lesser number of city pairs were included in the sample.

Intra-EU City Pairs

The selection of city pairs for the analysis of intra-EU passengers was based on different principles than those for other domestic city pairs. With 104 cities within the EU with a population of more than 300,000, there are approximately 10,700 possible city pairs. The largest sample that could provide statistical significance for the results is 1% (i.e. approximately 100 city pairs). If we used a random selection of city pairs, we would have included too many for which there are few options of transport mode available, and we would not have covered a very high proportion of the population that make intra-EU trips. Instead of taking a random sample, we used the following selection criteria:

We started with the capital cities of the 15 Member States that had a city included in the sample of cities, providing a potential of 210 city pairs. From these, we used a stratified sample to include some city pairs:

- With four passenger transport modes (air, rail, bus, and ferry) available;
- That are north-south and east-west;
- That are of long, medium, and short distances;
- That includes large, medium, and small population cities; and
- That cross transit countries.

The routes between capital cities did not provide enough examples of small cities or of the four transport mode routes, so a further seven routes were added to cover these criteria.

Twelve extra city pairs were added where the second city was just across the border and there was another city in the same country as the first city that was also close to the border. The first city was at least 250 km from the border. These city pairs represent the situation where a passenger might cross the border to gain the advantage of a VAT free intra-EU trip and then travel back the real destination (the city in the first country that is close to the border). There was a belief that this could represent a significant distortion

[194] Other domestic is used to emphasize that there is another category of domestic passenger travel (urban) that is not included in the CPM

by giving passengers an incentive to convert a domestic trip into an intra-EU trip. In practice, however, we did not find any instances where this might occur (including the examples that were given as being city pairs where it did occur). However, the city pairs were retained in the database and model. The final sample included 119 intra-EU city pairs.

Extra-EU City Pairs

No attempt was made to produce a statistical sample of the many extra-EU city pairs. A sample of 12 was chosen based on satisfying the criteria including:

- At least one city in an island state
- At least one city in each country with a land border with the EU28
- At least three city pairs where the cities are not in bordering countries
- At least one city on another continent

The smallest sample we could find that satisfied all these criteria was 11 city pairs.

The final sample comprised 220 city pairs with the following distances (Table A3.1).

Table A3.1 City Pairs Distance Statistics

	Domestic	Intra-EU	Extra-EU	Total
Number of Member States in the sample	15	22	13	22
Number of city pairs	89	117	14	220
Average distance between cities (km)	379	1,493	1,005	1,020
Maximum distance between cities (km)	1,086	4,247	2,540	4,247
Minimum distance between cities (km)	30	24	134	24
Standard deviation of distance between cities (km)	211	222	718	973

The CPM produces some of the same outputs as the TREMOVE and EDIP models but at a much lower level of aggregation. However, scaling the disaggregate results to the Member State and market levels involves more approximations than the TREMOVE and EDIP model combination.

List of City Pairs

The following is a list of the 220 city pairs used in the City Pairs Model.

The city pairs are organized into three groups: other domestic city pairs, intra-EU city pairs, and extra-EU city pairs.

For each city pair, we provide:

- The number of the city pair in the full list,
- The type of city pair (A denotes Other Domestic, B denotes intra-EU, and C denotes extra-EU),
- The name of city A,
- The Member State of city A,
- The name of city B, and
- The Member State (or country for extra-EU city pairs) of city B.

Table A3.2 - Other Domestic City Pairs

Pair No.	Pair Type	City A	MS of A	City B	MS of B
203	A	Vienna	AT	Salzburg	AT
44	A	Brussels	BE	Antwerp*	BE
95	A	Lille	BE	Kortrijk	BE
182	A	Sofia	BG	Varna	BG
42	A	Brno	CZ	Liberec	CZ
43	A	Brno	CZ	Ostrava	CZ
143	A	Ostrava	CZ	Liberec	CZ
164	A	Prague	CZ	Brno	CZ
165	A	Prague	CZ	Liberec	CZ
166	A	Prague	CZ	Ostrava	CZ
25	A	Berlin	DE	Cologne	DE
27	A	Berlin	DE	Hamburg	DE
31	A	Berlin	DE	Munich	DE
84	A	Hamburg	DE	Cologne	DE
85	A	Hamburg	DE	Munich	DE
139	A	Munich	DE	Cologne	DE
1	A	Aarhus	DK	Aalborg	DK
2	A	Aarhus	DK	Odense	DK
66	A	Copenhagen	DK	Aalborg	DK
67	A	Copenhagen	DK	Aarhus	DK
70	A	Copenhagen	DK	Odense	DK
142	A	Odense	DK	Aalborg	DK
19	A	Barcelona	ES	Seville	ES
20	A	Barcelona	ES	Valencia	ES
119	A	Madrid	ES	Barcelona	ES
126	A	Madrid	ES	Seville	ES
128	A	Madrid	ES	Valencia	ES
201	A	Valencia	ES	Seville	ES
86	A	Helsinki	FI	Oulu	FI
117	A	Lyon	FR	Toulouse	FR
135	A	Marseille	FR	Lyon	FR
136	A	Marseille	FR	Toulouse	FR
150	A	Paris	FR	Lyon	FR
152	A	Paris	FR	Marseille	FR
157	A	Paris	FR	Toulouse	FR
11	A	Athens	GR	Heraklion	GR
12	A	Athens	GR	Rhodes	GR
14	A	Athens	GR	Thessaloniki*	GR
88	A	Heraklion	GR	Rhodes	GR
197	A	Thessaloniki	GR	Heraklion	GR
198	A	Thessaloniki	GR	Rhodes	GR
21	A	Békéscsaba	HU	Arad	HU
61	A	Budapest	HU	Debrecen	HU
77	A	Dublin	IE	Cork	IE
137	A	Milano	IT	Naples	IT
138	A	Milano	IT	Turin	IT

Other Domestic City Pairs

Pair No.	Pair Type	City A	MS of A	City B	MS of B
140	A	Naples	IT	Turin	IT
141	A	Nice	IT	Ventimiglia	IT
173	A	Rome	IT	Milano	IT
174	A	Rome	IT	Naples	IT
178	A	Rome	IT	Turin	IT
90	A	Kaunas	LT	Klaipeda	LT
91	A	Kaunas	LT	Siauliai	LT
92	A	Klaipeda	LT	Siauliai	LT
205	A	Vilnius	LT	Kaunas	LT
206	A	Vilnius	LT	Klaipeda	LT
209	A	Vilnius	LT	Siauliai	LT
4	A	Amsterdam	NL	Eindhoven	NL
5	A	Amsterdam	NL	Enschede	NL
6	A	Amsterdam	NL	Groningen	NL
93	A	Krakow	PL	Lodz	PL
94	A	Krakow	PL	Wroclaw	PL
212	A	Warsaw	PL	Krakow	PL
214	A	Warsaw	PL	Lodz	PL
217	A	Warsaw	PL	Wroclaw	PL
220	A	Wroclaw	PL	Lodz	PL
39	A	Braga	PT	Faro	PT
97	A	Lisbon	PT	Braga	PT
98	A	Lisbon	PT	Faro	PT
99	A	Lisbon	PT	Porto	PT
162	A	Porto	PT	Braga	PT
163	A	Porto	PT	Faro	PT
56	A	Bucharest	RO	Cluj	RO
57	A	Bucharest	RO	Iasi	RO
60	A	Bucharest	RO	Timisoara	RO
63	A	Cluj	RO	Iasi	RO
64	A	Cluj	RO	Timisoara	RO
199	A	Timisoara	RO	Iasi	RO
82	A	Gothenburg	SE	Linkoping	SE
83	A	Gothenburg	SE	Malmo	SE
131	A	Malmo	SE	Linkoping	SE
188	A	Stockholm	SE	Goteborg	SE
189	A	Stockholm	SE	Linköping	SE
190	A	Stockholm	SE	Malmo	SE
41	A	Bratislava	SK	Kosice	SK
80	A	Glasgow	UK	Leeds	UK
106	A	London	UK	Glasgow	UK
107	A	London	UK	Leeds	UK
110	A	London	UK	Manchester	UK
132	A	Manchester	UK	Glasgow	UK
133	A	Manchester	UK	Leeds	UK

Intra-EU City Pairs

Pair No.	Pair Type	City A	MS of A	City B	MS of B
219	B	Wien	AT	Brno	CZ
160	B	Parndorf	AT	Gyor	HU
218	B	Wien	AT	Bratislava	SK
51	B	Brussels	BE	Prague	CZ
47	B	Brussels	BE	Copenhagen	DK
49	B	Brussels	BE	Madrid	ES
45	B	Brussels	BE	Athens	GR
52	B	Brussels	BE	Rome	IT
54	B	Brussels	BE	Vilnius	LT
8	B	Antwerp	BE	Roosendaal	NL
55	B	Brussels	BE	Warsaw	PL
48	B	Brussels	BE	Lisbon	PT
46	B	Brussels	BE	Bucharest	RO
53	B	Brussels	BE	Stockholm	SE
144	B	Ostrava	CZ	Katowice	PL
23	B	Berlin	DE	Brussels	BE
33	B	Berlin	DE	Prague	CZ
76	B	Dresden	DE	Liberec	CZ
26	B	Berlin	DE	Copenhagen	DK
78	B	Flensburg	DE	Kolding	DK
30	B	Berlin	DE	Madrid	ES
32	B	Berlin	DE	Paris	FR
22	B	Berlin	DE	Athens	GR
34	B	Berlin	DE	Rome	IT
36	B	Berlin	DE	Vilnius	LT
7	B	Angermünde	DE	Szczecin	PL
37	B	Berlin	DE	Warsaw	PL
29	B	Berlin	DE	Lisbon	PT
24	B	Berlin	DE	Bucharest	RO
35	B	Berlin	DE	Stockholm	SE
71	B	Copenhagen	DK	Prague	CZ
74	B	Copenhagen	DK	Vilnius	LT
75	B	Copenhagen	DK	Warsaw	PL
69	B	Copenhagen	DK	Lisbon	PT
68	B	Copenhagen	DK	Bucharest	RO
73	B	Copenhagen	DK	Stockholm	SE
195	B	Tallinn	EE	Helsinki	FI
124	B	Madrid	ES	Prague	CZ
121	B	Madrid	ES	Copenhagen	DK
89	B	Irun	ES	Bayonne	FR
118	B	Madrid	ES	Athens	GR
122	B	Madrid	ES	Dublin	IE
125	B	Madrid	ES	Rome	IT
129	B	Madrid	ES	Vilnius	LT
130	B	Madrid	ES	Warsaw	PL
123	B	Madrid	ES	Lisbon	PT

Intra-EU City Pairs

Pair No.	Pair Type	City A	MS of A	City B	MS of B
120	B	Madrid	ES	Bucharest	RO
127	B	Madrid	ES	Stockholm	SE
146	B	Paris	FR	Brussels	BE
154	B	Paris	FR	Prague	CZ
193	B	Strasbourg	FR	Offenburg	DE
194	B	Strasbourg	FR	Stuttgart	DE
148	B	Paris	FR	Copenhagen	DK
151	B	Paris	FR	Madrid	ES
161	B	Perpignan	FR	Girona	ES
145	B	Paris	FR	Athens	GR
153	B	Paris	FR	Naples	IT
155	B	Paris	FR	Rome	IT
158	B	Paris	FR	Vilnius	LT
159	B	Paris	FR	Warsaw	PL
149	B	Paris	FR	Lisbon	PT
147	B	Paris	FR	Bucharest	RO
156	B	Paris	FR	Stockholm	SE
62	B	Calais	FR	Dover	UK
18	B	Athens	GR	Prague	CZ
10	B	Athens	GR	Copenhagen	DK
15	B	Athens	GR	Vilnius	LT
16	B	Athens	GR	Warsaw	PL
17	B	Athens	GR	Lisbon	PT
9	B	Athens	GR	Bucharest	RO
13	B	Athens	GR	Stockholm	SE
183	B	Sopron	HU	Wiener	AT
167	B	Püspökladany	HU	Oradea	RO
175	B	Rome	IT	Prague	CZ
171	B	Rome	IT	Copenhagen	DK
200	B	Turin	IT	Grenoble	FR
169	B	Rome	IT	Athens	GR
179	B	Rome	IT	Vilnius	LT
180	B	Rome	IT	Warsaw	PL
172	B	Rome	IT	Lisbon	PT
170	B	Rome	IT	Bucharest	RO
176	B	Rome	IT	Stockholm	SE
208	B	Vilnius	LT	Prague	CZ
207	B	Vilnius	LT	Lisbon	PT
204	B	Vilnius	LT	Bucharest	RO
202	B	Venlo	NL	Viersen	DE
3	B	Amsterdam	NL	Bratislava	SK
215	B	Warsaw	PL	Prague	CZ
38	B	Bialystok	PL	Kaunas	LT
216	B	Warsaw	PL	Vilnius	LT
213	B	Warsaw	PL	Lisbon	PT
210	B	Warsaw	PL	Bucharest	RO

Intra-EU City Pairs

Pair No.	Pair Type	City A	MS of A	City B	MS of B
100	B	Lisbon	PT	Prague	CZ
96	B	Lisbon	PT	Badajoz	ES
65	B	Constanta	RO	Varna	BG
59	B	Bucharest	RO	Prague	CZ
58	B	Bucharest	RO	Lisbon	PT
185	B	Stockholm	SE	Prague	CZ
191	B	Stockholm	SE	Vilnius	LT
192	B	Stockholm	SE	Warsaw	PL
184	B	Stockholm	SE	Lisbon	PT
187	B	Stockholm	SE	Bucharest	RO
103	B	London	UK	Brussels	BE
112	B	London	UK	Prague	CZ
102	B	London	UK	Berlin	DE
105	B	London	UK	Copenhagen	DK
109	B	London	UK	Madrid	ES
111	B	London	UK	Paris	FR
101	B	London	UK	Athens	GR
113	B	London	UK	Rome	IT
115	B	London	UK	Vilnius	LT
116	B	London	UK	Warsaw	PL
108	B	London	UK	Lisbon	PT
104	B	London	UK	Bucharest	RO
114	B	London	UK	Stockholm	SE

Extra-EU City Pairs

Pair No.	Pair Type	City A	MS of A	City B	Country of B
50	C	Brussels	BE	Moscow	RU
181	C	Sofia	BG	Istanbul	TR
28	C	Berlin	DE	Kiev	UA
79	C	Frankfurt	DE	Oslo	NO
72	C	Copenhagen	DK	Reykjavik	IS
196	C	Tallinn	EE	Kaliningrad	RU
87	C	Helsinki	FI	St.	RU
134	C	Marseille	FR	Algiers	DZ
177	C	Rome	IT	Tunis	TN
168	C	Riga	LV	Moscow	RU
211	C	Warsaw	PL	Kiev	UA
186	C	Stockholm	SE	St.	RU
81	C	Gothenburg	SE	Oslo	NO
40	C	Bratislava	SK	Kiev	UA

Annex 4 – A Model of Pass-Through Coefficients for VAT in Transport

Introduction

The standard economic theory of supply and demand argues that the imposition of taxes or subsidies usually introduces output distortion and changes equilibrium price as compared to the non-taxed market. Changes in market prices resulting from changes in tax rates, including VAT, will typically be split in different proportions between suppliers and consumers. According to textbook economics, this tax incidence is determined by the ratio of supply and demand elasticities (Varian 1992). Only in special cases, when either supply or demand is completely inelastic, the price change is absorbed, respectively, by suppliers and consumers. We refer to those two extreme cases as zero or full pass-through.

The above textbook insight is useful as a starting point in the study of economics of tax incidence in passenger transport, but misses important subtleties which are present in state-of-art research on the subject. The main reason why determination of pass-through on transport markets is a complex issue is their imperfectly competitive nature. Many theoretical and empirical contributions related to imperfectly competitive markets point to the fact that the impact of tax on consumer price, including also the possibility of tax overshifting, depends on numerous factors other than just demand and supply elasticities: such as market structure and type of competition, number of firms, cost and demand structures, and the time horizon in which the tax shifting is analysed (Fullerton and Metcalf 2002).

This appendix describes in two steps how we have approached the determination of VAT pass-through effect in passenger transport. Given the objectives of the report, we start from illustrating how demand elasticity and level of market competition affect tax pass-through. Building on theoretical literature, we show that increased competition, measured by number of firms or concentration index, leads to more pass-through on customers. This counter-intuitive result implies that profit maximizing transport carriers will strategically absorb a larger part of the tax in order to reduce output distortion induced by demand response. The second major result is, on the other hand, intuitive. It indicates that tax pass-through decreases with growing demand elasticity. Thus, the stronger the intra- and inter-mode substitutability possibilities for passengers, the more tax will be absorbed again by transport carriers.

Secondly, we calculate estimates of pass-through effect for four main transport modes (airline, railways, road, and waterways) in each of the EU-28 countries. We have utilized simple econometric modelling on a unique dataset collected specifically for the purpose. The set contains market level data on prices, output, levels of competition, and VAT rates for each country-mode pair in the years 2001-2011. This approach allowed us to obtain VAT pass-through estimates for different modes while controlling for changes in input prices, level of competition, and demand shocks, which all can shift consumer price. To obtain country-mode specific pass-through levels for each of the EU-28 member states, we utilized data on market concentration and performed a simple scaling procedure based on results from the model estimations.

In the second section, we review theoretical literature on tax incidence and illustrate the most important results with a simple analysis of Cournot oligopoly. The third section starts with review of selected empirical studies and then provides econometric evidence on the relation between level of competition and magnitude of tax pass-through. Finally, we present pass-through estimates for each country-mode pair.

Theoretical Foundations of tax pass-through

A comprehensive theoretical presentation of tax incidence is made in Fullerton and Metcalf (2002). They clearly separate the case of perfectly and imperfectly competitive markets and consider both ad valorem and specific output taxation for different models of oligopolies. A general conclusion that follows from their work is that the magnitude of pass-through is very sensitive to particular assumptions about costs and demand in specific oligopolistic settings. It can be easily seen even in the simplest case of perfect competition. Under the constant returns to scale assumption, Fullerton and Metcalf argue that any unit tax increase will be fully passed on consumers since producer prices cannot fall below constant marginal cost. The same logic derived from the principle of zero economic profits holds for homogeneous product Bertrand competition, where firms compete in prices. Thus, for the reasons given above, in a long-term equilibrium of perfectly competitive markets, typical full-shifting might be assumed under constant returns to scale. On the other hand, in the short run, under perfect competition with an upward sloping supply curve due to increasing marginal cost, any proportion of tax sharing between consumer and producers is possible, excluding full-shifting or overshifting. One must remember, however, that if a market of interest has an oligopolistic structure, as is the case of passenger transport, then analysing taxation on such a market by interpolating results from either perfect competition or monopoly might be very misleading (Katz and Rosen 1985).

Fullerton and Metcalf show that under many imperfectly competitive settings, tax overshifting might be possible or even sometimes guaranteed. Their interest in overshifting is motivated by the results of several empirical studies, which tend to confirm this phenomenon in various markets. However, on theoretical grounds, overshifting occurs only under specific model specifications regarding costs or demand. For example, in a monopoly case, overshifting cannot occur under linear demand and constant marginal cost; however, under constant elasticity demand, it will always be guaranteed. Moreover, Fullerton and Metcalf show that in a Cournot oligopoly, under free entry with positive fixed costs and constant marginal costs, overshifting is more likely because a tax increase has an additional indirect effect on consumer price via a changing industry structure. This result suggests that in the long run, the pass-through effect will typically be larger than under a fixed number of firms. We explore this intuition formally later on.

The introduction of product differentiation brings additional avenues over which taxes can affect prices. Typically, with differentiated products, firm responses to tax increases might partially have a non-price nature. Under horizontal differentiation, oligopolistic firms can react by reducing product variety. On the other hand, in vertically differentiated markets, firms may respond by lowering product quality. Under the latter scenario, consumer prices might even drop due to a decreased marginal cost marking negative pass-through. The general conclusion from differentiated product markets is that the pass-through will typically be lower as firms can respond to tax increases by reducing the degree of differentiation, which intensifies price competition.

In what follows, we illustrate the impact of changes in taxation on consumer prices in imperfectly competitive markets by utilizing a standard *n*-firm Cournot model. The primary objective of this analytical exercise is to gain insight into the most important elements that increase or decrease an ad valorem pass-through effect.[195] The choice of this particular analytical framework can be motivated by its suitability to

[195] We consider our exercise useful also because existing theoretical literature focuses mostly on unit tax pass-through.

the transport industry (Cole 2005). Moreover, empirical studies in the airline industry tend to confirm the consistency of market conduct with a Cournot outcome (Brander and Zhang 1990 and Fischer and Kamerschen 2003).

Determinants of Taxation Pass-Through Illustrated in a Cournot Oligopoly Framework

We start our illustration from the specification of model assumptions. Market demand is linear: $p(Q) = a - bQ$ where $Q = \sum_1^N q_i$. Firms use identical technologies with constant returns to scale so that the cost function of each firm writes: $C_i(q_i) = cq_i + f$. The cost of market entry is $f > 0$. We set $a > c$ and, initially, there is no tax imposed.

The Cournot-Nash equilibrium in this market in the long run is shown as:

$$\begin{cases} q_i^* = \dfrac{a-c}{(n+1)b} \\ p^* = \dfrac{A+nc}{n+1} \\ N^* = \dfrac{(a-c)^2}{\sqrt{bf}} - 1 \end{cases} \quad (1)$$

The number of firms in equilibrium is determined by zero profit conditions under free entry. According to the above equation, the number of firms in equilibrium increases with positive (and persistent) demand shocks (*a*) and decreases with marginal costs (*c*) and fixed costs (*f*).

In industrial economics, the notion of competition intensity is understood in terms of the market power that firms exercise over customers. Market power of firm (*i*) is usually measured by the relative mark-up known as the Lerner index $L = \dfrac{p-c}{p}$. The higher the market power the firm poses, the higher the price level set by the firm above marginal costs and, thus, the market is less competitive. In the above Cournot-Nash equilibrium, it can be shown that:

$$\begin{cases} L_i = \dfrac{p^* - c}{p^*} = \dfrac{s_i}{|\varepsilon|} \\ L^M = \sum_1^n s_i L_i = \dfrac{HHI}{|\varepsilon|} \\ HHI = \dfrac{1}{n} + n \cdot D^2(s) \end{cases} \quad (2)$$

In other words, the market power of an individual firm is proportional to its market share (s_i) and inversely proportional to the elasticity of market demand (ε). The average market power of the whole market, which is equal to the weighted sum of individual Lerner indices, can be expressed in terms of demand elasticity and a measure of market concentration (the Herfindahl-Hirschman Index (HHI)). The second equation in formula (2) establishes a link between the measurement of average market power in a

given industry and the level of market concentration. Due to low data requirements, HHI is often used as yet another, although imperfect, measure of market competitiveness.[196] The third equation indicates that market concentration increases when the number of firms drops or, for a given number of market players, increases with the variance of their market shares $D^2(s)$. Symmetric oligopolies will be more competitive than markets with dominant firms.

Now, we will show how the introduction of ad valorem tax changes the equilibrium in a Cournot market.

Ad Valorem Tax Pass-Through

With the introduction of a tax, a distinction must be made between producer and consumer price, the latter being tax inclusive: $p_P = (1-t)p_c$ where t is tax rate ($t < 1$). The imposition of a tax does not affect the demand curve of customers, but is reflected in the profit function of a particular firm via producer price p_P.[197]

With tax, the equilibrium consumer price given in formula (1) now changes to:

$$p_c^* = \frac{a(1-t)+nc}{(n+1)\cdot(1-t)} \qquad (3)$$

The impact of ad valorem tax on consumer price can be measured by a derivate of consumer price with respect to tax rate:

$$\frac{dp_c}{dt} = \frac{cn}{(n+1)(t-1)^2} \qquad (4)$$

It can be shown that this derivate increases with the number of firms in the market.[198] This result is robust to various model specifications and has a clear economic interpretation. With more firms, equilibrium price decreases, driving down price-cost margins. Hence, firms have less space to absorb any tax increase and shift a larger part of tax burden to consumers. On the other hand, when price-cost margins are high (indicating large market power), firms recognize that a large fall in demand would be harmful for their profits and tend to strategically absorb more tax to minimize output distortion. This strategy will be profitable especially when market demand is elastic.

To show the impact of demand elasticity (ϵ) on tax pass-through, we first utilize a general expression of price elasticity for the linear demand assumed in this exercise: $e = |\epsilon| = \frac{p}{a-p}$ to substitute parameter (a) in formula (3). After rearranging, we obtain a new expression for equilibrium price in the Cournot model, with an explicit account for the absolute value of demand elasticity (e):

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[196] HHI can serve as comparative measure of competitiveness in a relevant market provided that it is properly defined in terms of geographical outreach and product scope.

[197] The profit function of a single firm now writes: $\pi_i = (a - bQ)\cdot(1-t)q_i - cq_i - F$.

[198] Formally, the partial derivative of formula (4) $\frac{d}{dn}\frac{dp_c}{dt} = \frac{c}{(n+1)^2(t-1)^2}$ is always positive.

$$p_c^* = \frac{nce}{(en-1)\cdot(1-t)} \quad (5)$$

The impact of demand elasticity on the magnitude of pass-through can be assessed by evaluating the following double derivative:

$$\frac{d}{de}\frac{dp_c}{dt} = -\frac{cn}{(en-1)^2(t-1)^2} \quad (6)$$

This expression is always negative, which indicates that with the growing elasticity of demand (in absolute terms), the impact of tax on consumer prices decreases. This result is, again, robust to different model specifications and intuitive.

As the last element in this section, we illustrate how pass-through changes in the long run as compared to the short run. Note that with tax, the long-run equilibrium number of firms obtained from a zero-profit condition now writes:

$$N^* = \frac{[a(1-t)-c]^2}{\sqrt{bf(t-1)}} - 1 \quad (7)$$

It can be shown that N^* decreases with (t) indicating that an increase in tax rate will affect market structure in the long run and, hence, indirectly also consumer price.[199] This is an additional avenue over which tax passes-through to customers compared to the short-run equilibrium. To assess the long-term pass-through, we take, again, a price equation given by (5) and substitute parameter (n) with its long-run value provided in expression (7). Like before, the evaluation is done for the derivative of long-run consumer price with respect to tax rate. Unfortunately, $\frac{dp_c^{L-R}}{dt}$ has a complex algebraic form and we will evaluate it only for the special case of no entry costs:

$$\frac{dp_c^{L-R}}{dt}|_{f=0}| = \frac{c}{(t-1)^2} \quad (8)$$

A quick look at formulas (4) and (8), which show tax pass-through in the short and long run, brings about a conclusion that the latter is always larger. For a monopoly case, short-run pass-through is two times smaller than in the long run, while for a low-concentrated oligopoly, the difference diminishes and approaches zero in the limit for the case of perfect competition.

Overshifting of ad valorem tax in the Cournot model presented above requires that the percentage change in consumer price exceed 100%. This condition translates to:

[199] Formally, the derivative of formula (7) $\frac{dn}{dt} = -\frac{a(1-t)+c}{2\sqrt{bf(1-t)^{3/2}}}$ is always negative.

$$\frac{dp_c}{dt} / p_c^* = \frac{cn}{(1-t)\cdot(a(1-t)+cn)} > 1 \quad (9)$$

Inequality (9) has a non-empty space of solutions. In theory, overshifting is likely for combinations with sufficiently large values of parameters $t, n,$ and $c,$ and for a low value of parameter $a.$ Thus, our last conclusion says that there is no simple generalization regarding overshifting in our analytical framework, as the occurrence of such a result is sensitive to the values of several parameters.

Within this section, we have illustrated a few interesting results in the theory of tax incidence for imperfectly competitive markets. Theoretical insights from the Cournot model allow drawing a few conclusions regarding the likely pass-through differentiation in particular modes of transport industry (C1-C3). These are single factor conclusions, which assume ceteris paribus condition.

- C1: For a given mode, VAT tax pass-through is expected to be larger for more demand elastic markets;
- C1a: Markets with larger inter-modal demand substitutability and, hence, more elastic demand are likely to exhibit smaller pass-through;
- C2: For a given mode, VAT tax pass-through is expected to be larger for more competitive markets;
- C2a: Formerly vertically integrated markets, such as rail, which are now markets with dominant firms under third party access regulation, will be less competitive than other modes without a critical facility bottleneck. Thus, markets that are not fully liberalized will experience smaller pass-through ceteris paribus.
- C3: For a given mode, VAT tax pass-through is expected to be larger in the long run, provided that only economic barriers to entry exist.

The difficulty in formulating ex-ante pass-through comparisons for different modes lies in the multi-causal nature of the tax impact on prices as shown in the second section. For transport markets, it will rarely be the case that such between-mode conclusions might be posted reliably, because a ceteris paribus condition does not hold in observable data. For example, those modes that are more competitive are, at the same time, more demand-elastic, leading to opposing influences of tax on pass-through. Without knowing which of those two partial effects is stronger, one cannot be sure about the total effect.

Empirical Evidence on VAT Pass-Through in Passenger Transport

There is a huge body of empirical literature dealing with tax incidence. This literature focuses on several aspects related to tax pass-through, such as: impact of competition, impact of demand elasticity, impact of type of taxation, overshifting, and long-term versus short-term impact. In general, empirical studies confirm most of the theoretical findings presented in the second section. Below, we provide a short overview of several studies covering a wide range of markets such as tobacco, consumer electronics, clothing, personal care, and repair services.

Review of Previous Empirical Studies

A number of studies found less shifting in less competitive or more demand elastic markets. The most widely cited among them are Poterba (1996), Carbonnier (2007), and Alm, Sennoga, et al. (2009). In light of these two findings, Carbonnier (2007) formulates interesting policy recommendations. Firstly, higher

sales tax rates for low competition market goods may serve as a means to capture a greater portion of oligopoly rent. Secondly, the higher rates should be applied to goods whose demand elasticity is low and tax shifting on prices is low.

In theory, on imperfectly competitive markets, tax shifting to consumers is larger for specific tax than for ad valorem tax (Delipalla and Keen 1992). This result is particularly relevant for the study of VAT incidence and has been empirically confirmed by Delipalla and O'Donnell (1998), who compared consumer shares of specific and ad valorem sales taxes on the European cigarette market. Carbonnier (2007) points also to the interesting issue of scale of tax changes. He speculates that large changes in tax rates tend to be less shifted than small changes because of consumer perception bias.

While few studies obtained clear tax overshifting results such as Karp and Perloff (1989) and Alm, Sennoga, et al. (2009), others, especially multiproduct papers, obtained mixed evidence with this respect (Poterba 1996; Besley and Rosen 1998). There is a tendency that commodity markets close to perfect competition exhibit full shifting, while purely oligopolistic structures tend to exhibit under or overshifting. Both possibilities are theoretically plausible and there is consent in the literature that the question about overshifting has no a-priori answer and must be assessed case by case, because pass-through is determined by an interaction of several cost, demand, and competition parameters (Delipalla and O'Donnell 2001).

While market structure is important for assessing tax incidence, with a risk of obtaining biased estimates if ignored (Karp and Perloff 1989), the majority of studies account for it only indirectly. Most studies adopt a reduced form model on pricing data. Under this approach, accounting for industry structure is usually limited to some measure of market concentration and has not been a common practice. In addition, many studies failed to maintain proper control over all potential price shifters, such as costs of inputs or wholesale prices, which potentially leads to overestimation of pass-through effect. Some authors discuss this risk explicitly (Besley and Rosen 1998), while other studies are less careful in this respect (Harris 1987).

Modelling Framework for VAT Pass-Through in Different Transport Modes.

In order to estimate the impact of VAT rate changes on price levels, we utilized a reduced-form pricing model. This framework is most frequently adopted in empirical studies of tax incidence because it fits well to existing market data. We have estimated our equation using cross-sectional data for EU-27 countries in the period of 2001-2011. We have chosen those observations where the VAT rate for passenger transport was changed. As a result, our sample consisted of 75 observations. Usually, sample of this size is does not provide strong results in term of statistical significance. However, given that actual changes in VAT rates have been quite infrequent in passenger transport, we had no other choice than to base our modelling effort on this small sample. The general model was presented in the following form:

$$\{dP = f(dQ(L), dtax^{VAT}, m(i)dtax^{VAT}, U, dP^{L}, dY(L)\} \quad (10)$$

where:

- i ∈ (1) passenger transport by air (CP0733), (2) passenger transport by railway (CP0731), (3) passenger transport by road (CP0732), and (4) passenger transport by sea and inland waterway (CP0734);
- dP – annual rate of change in a harmonized index of consumer price (HICP) and lag of consumer price, data source: EUROSTAT;

- $\mathrm{dQ(L)}$ – lag of annual rate of change in the demand level, measured by the change of passengers (for air and water transport) and passenger-kilometres (for road and rail transport), data source: EUROSTAT and World Bank; and
- $\mathrm{dtax^{VAT}}$– the first difference in theoretical liability from changing VAT rates, data source: own estimations.

The $dtax^{VAT}$ was calculated in the following form:

$$dtax^{VAT} = \frac{VAT_t}{(1+VAT_t)} P_t - \frac{VAT_{t-1}}{(1+VAT_{t-1})} P_{t-1} \quad (11)$$

where $\mathrm{VAT_t}$ denotes the rate of VAT in the time *t* (after the change of rate) and $\mathrm{VAT_{t-1}}$ is the rate of VAT for the previous year (before the change of rate). $\mathrm{P_t}$ and $\mathrm{P_{t-1}}$ are the levels of corresponding consumer price indices (HICP).

- $\mathrm{m(i)dtax^{VAT}}$ are mode-specific changes in VAT liabilities, where $\mathrm{m(i)}$ are dummy variables for four modes multiplied by $\mathrm{dtax^{VAT}}$.

We included in our model a set of control variables that influence prices (shifters):

- dY – annual rate of GDP growth (grasps consumers' preferences), data source: EUROSTAT,
- $\mathrm{dP^L}$ – growth of unit labour costs (economy's cost side, mode-invariant), data source: own estimations based on World Bank Data, and
- U – rate of unemployment, data sources: EUROSTAT.

In order to avoid multicollinearity problems, we decided to estimate equation (10) for each mode separately. In this, way we obtained the mode-specific parameters for the relation between changes in VAT and price. We performed a number of tests to check the model properties and concluded that the general specifications of the models are correct.[200] The results of our estimations are presented in Tables A.D1-4 below.

Table A4.1 – Estimation Results: Air Passenger Transport

Variable	Coefficient	(Std.Err.)
$\boldsymbol{dQ(L)}$	-4.666	(6.986)
$\boldsymbol{dtax^{VAT}}$	0.450**	(0.128)
$\boldsymbol{m(1)dtax^{VAT}}$	-0.380**	(0.128)
$\boldsymbol{U}$	-0.216	(0.191)
$\boldsymbol{dP^L}$	24.816*	(12.398)
$\boldsymbol{dY}$	-45.397**	(14.713)
Intercept	3.557	(2.891)

[200] For all models, we performed a White test to check if our sample is heteroscedastic. For each mode, we failed to reject the null hypothesis that the sample is homoscedastic. According to a RESET test with a p-value greater than 10%, we failed to reject the null hypothesis that our models have omitted variables. In the last step, we check the multicollinearity using the variation inflation factor (VIF). The VIF for all variables in our models was lower than 2, which indicates that there was no problem of multicollinearity.

Table A4.2 – Estimation Results: Railway Passenger Transport

Variable	Coefficient	(Std. Err.)
$dQ(L)$	-8.948	(6.998)
$dtax^{VAT}$	0.233	(0.150)
$m(2)dtax^{VAT}$	0.277*	(0.112)
U	-0.184	(0.194)
dP^L	23.091†	(12.659)
dY	-40.986**	(14.849)
Intercept	3.385	(2.945)

Table A4.3 – Estimation Results: Road Passenger Transport

Variable	Coefficient	(Std. Err.)
$dQ(L)$	-8.157	(7.336)
$dtax^{VAT}$	0.404**	(0.141)
$m(3)dtax^{VAT}$	0.047	(0.124)
U	-0.208	(0.203)
dP^L	25.032†	(13.196)
dY	-39.417*	(15.484)
Intercept	2.426	(3.045)

Table A4.4 – Estimation Results: Waterways Passenger Transport

Variable	Coefficient	(Std. Err.)
$dQ(L)$	-9.035	(7.370)
$dtax^{VAT}$	0.413**	(0.136)
$m(4)dtax^{VAT}$	-0.106	(0.202)
U	-0.203	(0.202)
dP^L	23.875†	(13.456)
dY	-38.768*	(15.460)
Intercept	2.565	(3.061)

The pass-through effect is captured by the sum of $dtax^{VAT}$ and $m(i)dtax^{VAT}$. The latter one reflects mode-specific effect, which adds up to the sample average. Since actual changes in VAT rates have been quite infrequent, we face a problem of insufficient sample size, which implies that our results are, indeed, not strong in terms of statistical significance. The strongest evidence of pass-through effect has been observed for the air mode where both coefficients are statistically significant. The negative sign for $m(1)dtax^{VAT}$ is an indication of significantly lower than average pass-through in passenger air transport. For other modes, only one of the two pass-through coefficients is statistically significant. We think that these results can be attributed to the large structural and regulatory differences within rail, road, and water modes between EU-28 countries (in contrast to a largely congruent air mode), which we could not control for, but which affected the standard errors of $m(i)dtax^{VAT}$. This being said, we decided to ignore the problem of large standard errors and calculate the magnitude of VAT pass-through in different modes by taking the sum of $dtax^{VAT}$ and $m(i)dtax^{VAT}$. The results are summarized in Table A.D5.

Table A4.5 – HHI and Pass-Through for Each Transport Mode

Mode	Air	Rail	Road	Waterways
HHI (EU-28 Weighted Average)	0.19	0.67	0.09	0.19
Pass-Through	0.07	0.51	0.45	0.31

According to our results, the largest pass-through is observed for the rail mode. This indicates that EUR 1 of increase in VAT liability (as a result of a VAT rate increase) increases consumer price by EUR 51 cents. This result can be explained by low demand elasticity for passenger transport by railway. The second highest pass-through level has been observed in passenger transport by road, which is an expected result for highly competitive markets. The lowest pass-through magnitude has been obtained for the air mode, which is consistent with relatively high demand elasticity, especially on domestic routes where inter-modal competition with railway is particularly strong. An overshifting would occur if the sum of $dtax^{VAT}$ and $m(i)dtax^{VAT}$ is greater than 1. This is, however, not the case in our model. One reason for under-shifting could be that we have controlled for both input costs and demand shifters, which turned out to be important determinants of consumer price.

Country-Mode Pass-Through Levels

To obtain country-mode specific pass-through levels for each of the EU-28 Member States, we decided to utilize data on market concentration in each country-mode. This was the only way in which we could differentiate the mode-specific averages calculated in the previous section. To obtain an idea of the strength of competition impact on pass-through magnitude, we decided to estimate a subsidiary model given by a slight modification of equation (10):

$$\{dP = f(dQ(L), dtax^{VAT}, m(i), m(i)dtax^{VAT}, U, dP^{L}, dY(L), HHIdtax^{VAT})\} \quad (12)$$

The main variable of interest is HHIdtax^{VAT}. This is an interaction of HHI and dtax^{VAT}, which allows us to capture how market competition affects the VAT pass-through mechanism. This model has been estimated in a pooled regression with the baseline mode being waterways: m(4). The results of our estimations, including mode-specific changes in VAT liabilities, are presented in Table 6 below.

Table A4.6 – Estimation Results: Impact of HHI - All Modes

Variable	Coefficient	(Std. Err.)
$\boldsymbol{dQ(L)}$	-4.692	(7.458)
$\boldsymbol{dtax^{VAT}}$	0.671	(0.470)
$\boldsymbol{U}$	-0.156	(0.163)
$\boldsymbol{dP^{L}}$	22.623*	(9.880)
$\boldsymbol{dY}$	-48.876**	(15.890)
$\boldsymbol{m(1)}$	2,675	(5.654)
$\boldsymbol{m(2)}$	5,173	(4.988)
$\boldsymbol{m(3)}$	9,355†	(5.213)
$\boldsymbol{m(1)dtax^{VAT}}$	-0,451	(0.495)
$\boldsymbol{m(2)dtax^{VAT}}$	-0,048	(0.302)
$\boldsymbol{m(3)dtax^{VAT}}$	-0,549	(0.501)

$HHI\ dtax^{VAT}$	-0,202	(0.338)
Intercept	-1,363	(5.014)

Source: own estimation.

The results of our estimation provided us with a theoretically consistent, albeit statistically insignificant, result of the impact of HHI on VAT pass-through. The coefficient for the interaction variable $HHI\ dtax^{VAT}$ equals -0.202. Thus, on more concentrated markets, pass-through to consumers (at least historically), is smaller, and this difference between perfect competition (HHI=0) and monopoly (HHI=1) equates to an additional EUR 20 cents in our model. Following both the theoretical insights and empirical results from our model, we scaled mode-specific values of tax pass-through with HHI levels for different countries using a coefficient for interaction variable $HHI\ dtax^{VAT}$. As a result, less competitive country markets exhibit less pass-through on consumers.[201] Table A.D7 shows VAT pass-through estimates per individual country-modes, obtained from the scaling procedure.

Table A4.7 – Pass-Through Estimates for Country-Modes Pairs

	Rail		Road		Waterways		Air	
Country	HHI	PASS-T	HHI	PASS-T	HHI	PASS-T	HHI	PASS-T
AT	0.78	0.49	0.31	0.41			0.31	0.05
BE	0.93	0.46	0.24	0.42			0.10	0.09
BG	1.00	0.44	0.06	0.46	0.62	0.22	0.15	0.08
CY					0.13	0.32	0.06	0.10
CZ	0.98	0.45	0.10	0.45			0.16	0.08
DE	0.77	0.49	0.01	0.47	0.07	0.33	0.25	0.06
DK	0.77	0.49	0.16	0.44	0.42	0.26	0.19	0.07
EE	0.43	0.56	0.56	0.36	0.42	0.26	0.20	0.07
ES	0.88	0.47	0.04	0.46	0.13	0.32	0.12	0.08
FI	1.00	0.44	0.28	0.41	0.25	0.29	0.55	0.00
FR	0.74	0.50	0.22	0.42	0.11	0.32	0.25	0.06
GR	1.00	0.44	0.02	0.47	0.09	0.33	0.14	0.08
HU	0.51	0.54	0.01	0.47			0.10	0.09
HR	1.00	0.44	0.01	0.47	0.52	0.24		
IE	1.00	0.44	0.51	0.37	0.17	0.31	0.25	0.06
IT	0.83	0.48	0.01	0.47	0.09	0.33	0.13	0.08
LT	1.00	0.44	0.08	0.45	0.50	0.24	0.30	0.05
LU	1.00	0.44	0.10	0.45			0.43	0.02
LV	1.00	0.44	0.15	0.44	0.59	0.23	0.39	0.03
MT			0.11	0.45	0.29	0.29	0.26	0.06
NL	0.91	0.46	0.25	0.42	0.16	0.31	0.10	0.09

[201] The scaling procedure was very simple. First, we took the difference between country-specific and EU-28 average HHI scores and multiplied them by -0.202. Secondly, we added this result to the mode-specific pass-through average. Our implicit assumption here is that the relation of pass-through effect and HHI is linear and has the same magnitude for all modes.

PL	0.26	0.59	0.01	0.47	0.34	0.28	0.27	0.05
PT	0.94	0.46	0.01	0.47	0.29	0.29	0.40	0.03
RO	0.93	0.46			1.00	0.14	0.28	0.05
SE	0.46	0.55	0.12	0.44	0.27	0.29	0.22	0.06
SI	1.00	0.44	0.06	0.46	0.35	0.27	0.43	0.02
SK	0.98	0.45	0.06	0.46			0.70	0.00
UK	0.06	0.63	0.13	0.44	0.18	0.31	0.12	0.08
Mode Average	0.67	0.51	0.09	0.45	0.19	0.31	0.19	0.07

Note on the Use of the HHI

Some methodological concerns are often raised with regards to utilizing HHI as a measure of competition. When using country-level HHI for assessing competition in particular transport modes one must be careful, because country level markets might be either too broad or too narrow compared to the true relevant market scope. In particular, a country-level HHI might provide an upward-biased assessment of competition in fragmented markets such as for example bus transport, if different companies operate on different routes without overlaps. While this is indeed the case for some particular city pairs, we have found many instances of on-the-route competition in the city pair data. While we could not analyse all possible relevant city pairs markets in Europe it seems that the greater the number of companies that operate in particular country (as reflected by the country level HHI), the more likely it will be that overlaps on particular routes will exist. In other words, even though the HHI might not be the most accurate measure of competition intensity in all cases, we found indications of negative correlation between the degree of competition on different routes and the level of the HHI at a country level. We believe that this observation supports our approach.

There is an additional argument for introducing within mode pass-through differentiation by country with HHI scores. As seen in Table A4.7, HHI scores are rather similar in a given mode in different member states, which is not surprising as all countries are bounded by the same package of EU regulatory policies. HHI differentiation is indeed low as indicated by standard deviation ranging from 0.15 in air and bus modes to 0.25 for rail transport. This small differentiation combined with the low value of coefficient for HHIVAT interaction variable (-0.202) generates an order of magnitude smaller pass-through differences between countries with standard deviation ranging from 0.02 to 0.05. Thus, even if the HHI is in some way an inaccurate measure of actual competition intensity in particular modes and countries, we believe that the resulting bias is negligible.

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