The economic impact of air taxes in Europe
Sweden

October 2017

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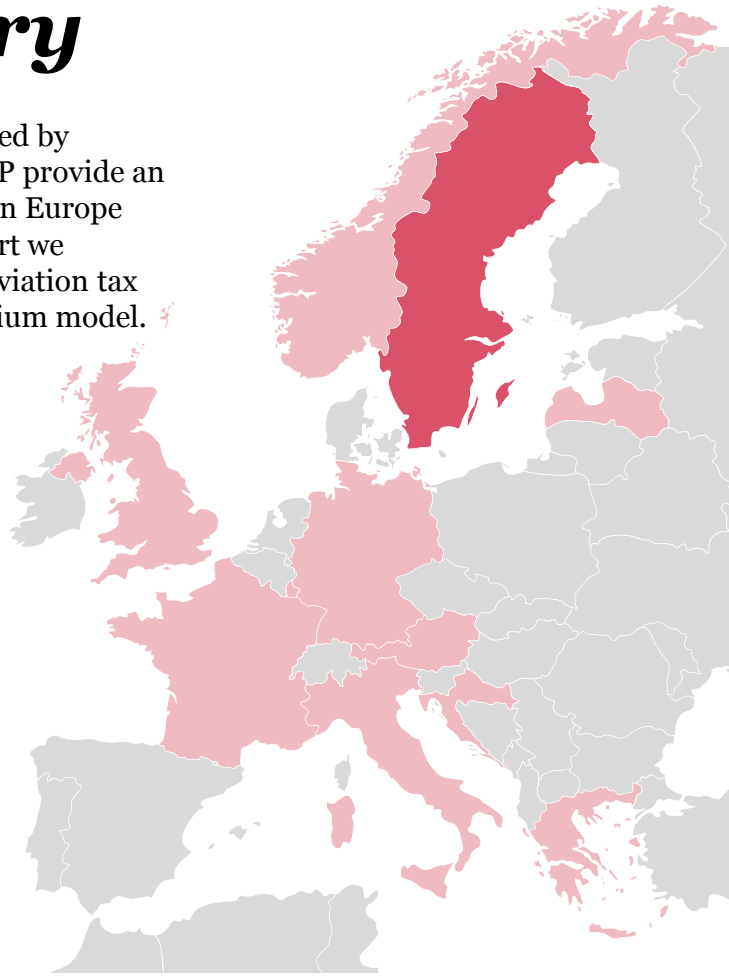
Executive Summary

This report is part of a broader set of reports commissioned by Airlines for Europe in which PricewaterhouseCoopers LLP provide an independent overview of the current air passenger taxes in Europe and an assessment of their economic impact. In this report we simulate the effect of implementing Sweden's proposed aviation tax from January 2018 using a Computable General Equilibrium model.



1.5 million
fewer arrivals by 2020

630,000
fewer inbound tourist arrivals by 2020

€120 million
lower tourism expenditure by 2020

€680 million
lower GDP in Sweden per year in 2030, increasing from €347 million per year in 2020.

€1.3 billion
lower GDP across the EEA per year by 2030, increasing from €430 million per year in 2020.

€185 million
Smaller air sector in Sweden per year in 2030, increasing from €150 million per year in 2020.

2,400
jobs lost across the Swedish economy in 2030, increasing from 1,265 in 2020.

89% of direct tax income will be lost

We expect the aviation tax to raise €143m in its first year. However, due to economic losses caused by the tax, the net effect of the tax will be to increase government revenue by just €16m. Due to the distortive nature of passenger tax, this revenue gain is much smaller than would be expected from the introduction of many other taxes.

Background to the study

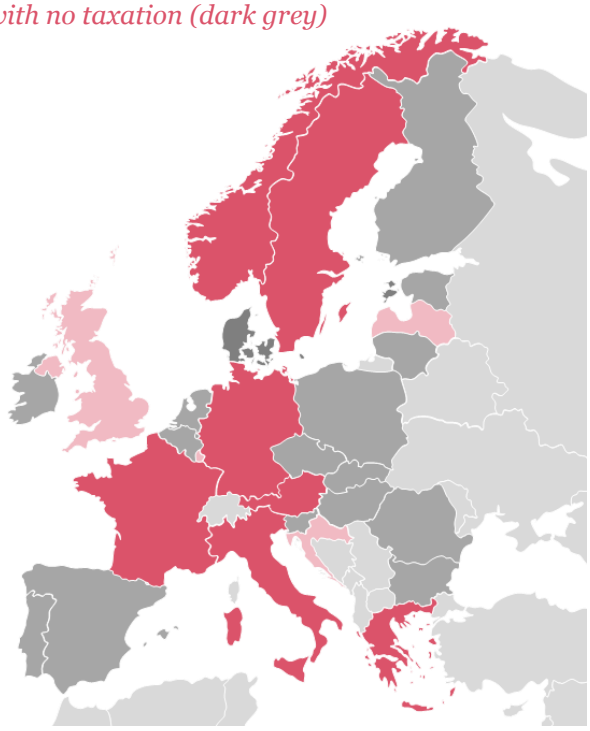
Background

PwC have been commissioned by Airlines for Europe, the representative body of various European airlines, to provide an overview of the current aviation taxes in Europe and an assessment of their economic impact. Whilst the consortium commissioned and financed the work, and commented on draft reports, the final reports represent the independent analysis of PwC.

We are producing 7 country reports which summarise the economic impact of a change in the level of air passenger tax, as projected by our multi-regional CGE model. This includes reports on the effect of reducing passenger tax in 6 countries (Austria, France, Germany, Greece, Italy and Norway) and a report on the effect of introducing passenger tax in Sweden in line with the proposal due to be implemented in 2018.

In addition to this we are producing an EEA report, for which we model a universal and multilateral abolition of air passenger taxes across the EEA (which amounts to abolishing passenger taxes in 10 EEA countries). This forward-looking analysis is complemented by 3 case studies (Ireland, Netherlands and Italy) in which we analyse the effects of historic changes in passenger tax.

Figure 2 Location of the 7 country reports (dark pink), countries with air passenger taxes but not under analysis (light pink), and EEA countries with no taxation (dark grey)



This analysis builds upon analysis undertaken by PwC in 2013 to assess the economic impact of Air Passenger Duty (APD) on the UK.[1] This analysis considered the potential positive impact of abolition of APD in order to aid an evidence-based assessment of the policy, and its contribution to UK public finances. This report found that abolishing APD would lead to a net positive gain to public finances through the economic activity it would stimulate, and accordingly concluded that such a tax cut would pay for itself.

Air passenger taxes in the European Economic Area

Air passenger taxation varies across Europe, in both the level and method of application. For the purpose of this study we have defined a passenger tax as one which is paid to federal government for revenue-raising purposes, as opposed to offsetting the cost of a service provided, and is aligned to the IATA List of Ticket and Airport Taxes and Fees. Air passenger taxes are not universally implemented, and the 10 countries in the EU/EEA with some form of passenger tax are as follows:[2]

- Austria – Air Transport Levy
- Croatia – Civil Aviation Authority Tax

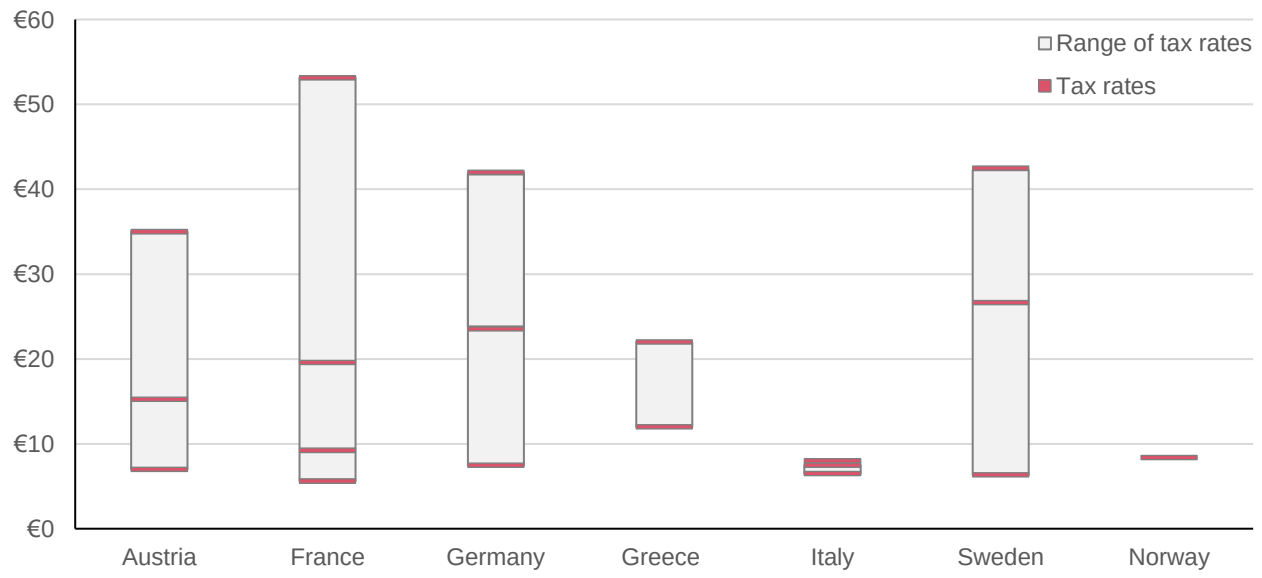
[1] PwC 2013, *The Economic Impact of Air Passenger Duty*

[2] Latvia, Luxembourg, Croatia and the United Kingdom are included in our model but will not have country-level reports.

- France – Civil Aviation Tax, Solidarity Tax, Fiscal Tax (Corsica)
- Germany – Air Transport Tax
- Greece – Air Development Charge
- Italy – Council City Tax
- Latvia – Passenger Service Charge
- Luxembourg – Passenger Service Charge
- Norway – Air Passenger Tax
- UK – Air Passenger Duty

The taxes are not easily compared between countries, as some taxes vary by destination country, others vary by airport, and some include transfers as well as departures. Nevertheless, Figure 3 benchmarks the rates across the countries under analysis against each other by including all different rates, regardless of how the taxes are banded. The pink dashes pick out the tax rates payable in each country, while the grey bars show the range. The full breakdown of taxes in each country can be found in Appendix 2. It is important to note that many countries charge no taxes, however, and so do not feature in the diagram.

Figure 3: Benchmarking analysis of air passenger tax rates in the 7 countries under analysis



Source: IATA, PwC analysis

This report covers the taxation system in Sweden. Sweden currently does not apply a passenger tax, however the Swedish Government commissioned an Inquiry Committee to analyse and propose how to design an air travel tax regime, submitting its paper in November 2016. The inquiry proposed that a tax should be implemented from the 1st of January 2018. The proposed tax rates vary according to whether a flight is domestic/within the EU or international. The rates were originally proposed to be SEK 80, SEK 280 and SEK 430, depending on the destination. However in August the proposed rates were revised downwards.[3] The new rates per adult are as follows:

[3] Bloomberg 2017, *Swedish Government Pulls Tax Increase Plans to Avert Crisis*

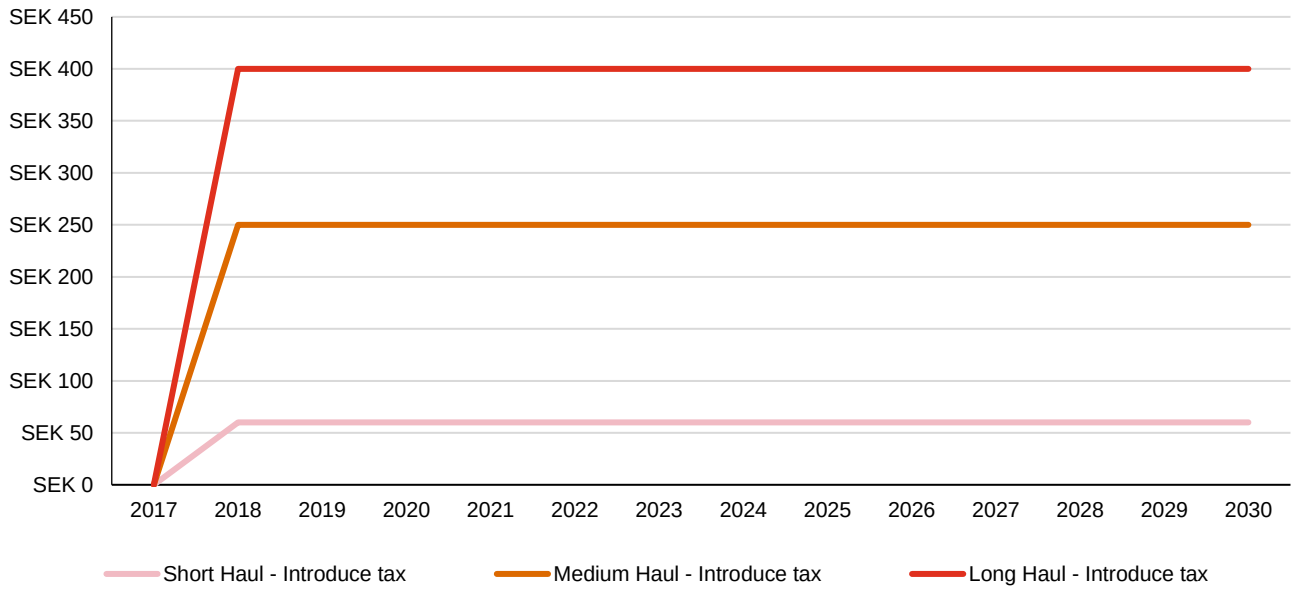
Table 1: Levels of proposed Air Passenger Tax in Sweden

Tax Level	Final Destination	Tax Rate
1	Entirely within Europe	SEK 60 *(Approximately €6)*
2	Entirely or partially located in another continent than Europe, with a distance of no more than 6000 km from the Airport Stockholm / Arlanda.	SEK 250 *(Approximately €26)*
3	Entirely located in another continent than Europe, with a distance of more than 6000 km from the Airport Stockholm / Arlanda.	SEK 400 *(Approximately €42)*

Source: Bloomberg

In this report we will simulate the macroeconomic and fiscal effects of implementing this tax, comparing this to the conditions if no tax was introduced. Our simulations start in January 2017 and run through to 2030, with the tax taking effect in January 2018.[4] Figure 4 shows the rates of Air Passenger Tax that would be introduced.

Figure 4: Proposed rates of Swedish air passenger tax that we model

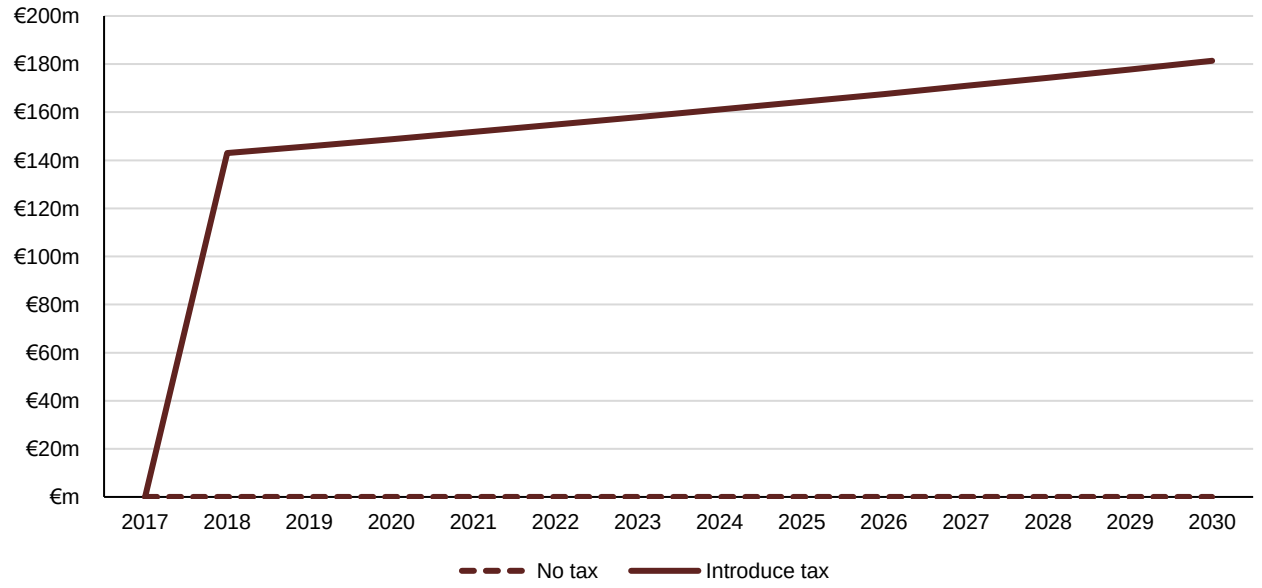


Source: Bloomberg

The implied revenue under the scenario that a tax is introduced is shown below in Figure 5. The committee that proposed the tax in 2016 originally estimated that it would raise SEK 1.75 billion (€192 million) in 2018. We have not been able to find any official estimate since the proposed rates were revised down and have therefore estimated the revenue by matching the above rates against passenger route data from 2016. In this way we estimate that the tax will raise SEK 1.3 billion (€143 million)

[4] Note, the actual date of implementation may be moved back to April 2018.

Figure 5: Forecast revenue from the proposed air passenger tax



Source: PwC analysis

While there is likely to be a positive impact on public finances as a result of introducing a tax, there are a number of other impacts on both the national and international economy, as captured through our model. These economic impacts drive changes in a wide array of macroeconomic variables, and indirectly contribute to the government's income through other means, such as labour and profit taxes.

Additional taxes and charges

It is important to note that air passenger taxes are not the only fees that airlines in Europe are subject to. Other costs, such as service charges levied by airports, have not been included in the analysis in this report. However, it is important to recognise that these charges nonetheless represent a cost burden to airlines operating in Sweden, and reflects the degree to which the aviation industry already contributes towards national infrastructure and assets. As described in the introduction to this report, the air passenger taxes modelled are purely those which are revenue raising, and are distinct from, and additional to, charges which are used to pay for a service.

For example, Sweden levies the Passenger Charge against all passengers, the amount of which varies depending upon whether the flight is domestic or international, and the airport from which the flight departs. It is important to acknowledge that in the presence of this charge, abolishing air taxes would not prevent the maintenance and upgrade of airport infrastructure. The table below outlines the rates and how they vary for different classes of passengers and at different airports.

Table 2: Outline of main taxes/charges and the rates

Main Tax/Charge	Flight Category	Rates at Busiest Airports by number of passengers	
Passenger Charge	Domestic	1. Stockholm- Arlanda SEK 115 (Approximately €12)	2. Gothenburg- Landvetter SEK 108 (Approximately €11)
Passenger Charge	International	1. Stockholm- Arlanda SEK 156 (Approximately €16)	2. Gothenburg- Landvetter SEK 136 (Approximately €14)

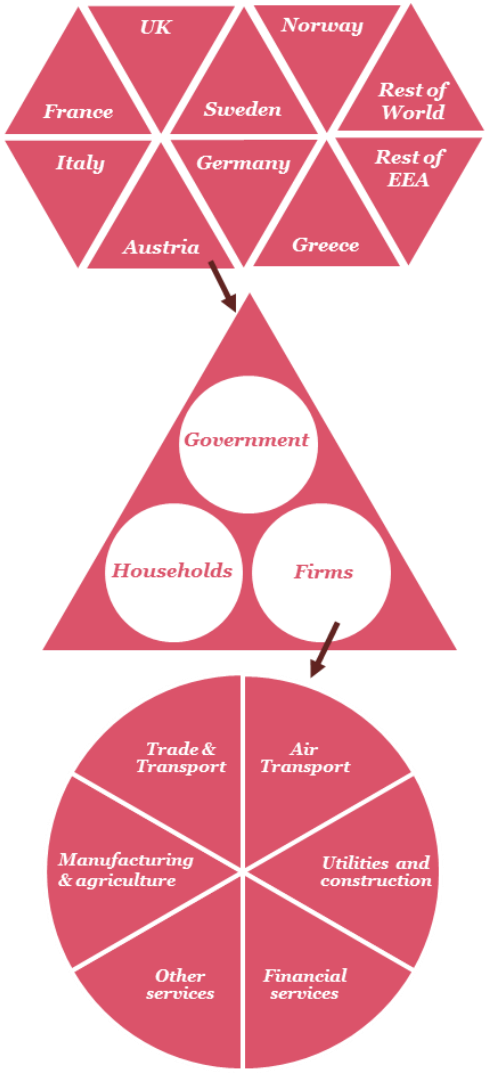
Source: IATA List of Taxes and Fees

Modelling Approach

To assess the economic impact of passenger taxes in Europe, we have built a multi-regional Computable General Equilibrium (CGE) model which captures the net economic impact of policy changes. This net analysis accounts for changes and displacements in the economy as it moves to a new equilibrium following the policy intervention.

CGE models are used by institutions such as the IMF, World Bank, OECD and several national governments to quantify the economic impact of policy changes. In essence, a CGE model captures the economic behaviours and interactions of all agents (consumers, producers, government, investors, etc.) in the economy. After a policy change (such as the abolition of air passenger taxes), these economic agents adjust to price changes until equilibrium is restored. A CGE model can be used to compare the differences between the baseline and policy shock scenarios to evaluate the economic impact.

Figure 6: High level structure of our multi-regional CGE model



Global level

We have developed a multi-regional, dynamic CGE model for Europe. Each country of interest is captured individually within the model, with all other countries combined into "Rest of EEA" and "Rest of World" regions.

Country level

Within each country there is a government sector, a household sector, and an industry sector. In CGE models, government, households and businesses engage in repeated local microeconomic interactions. These in turn give rise to macroeconomic relationships affecting variables such as employment, investment and GDP growth.

Industry level

In order to apply a tax change to the aviation specifically, we have separated this sector from the general Trade & Transport sector. The sectors we have chosen to model for these preliminary results are shown on the diagram. Underlying each sector is GTAP data regarding the extent to which each sector in each country trades with each other sector.

The model allows us to capture different types of impact. As the CGE model captures all changes in the economy simultaneously, these impact types cannot be broken out individually. We refer to economic impacts through changes in the level of Gross Value Added (GVA) at both a sectoral and national level. GVA is a measure of the value of goods and services produced which, at a national level, is broadly comparable to GDP. The model has been calibrated with Eurostat data to create a baseline view of the European economy.

Table 3: Types of impact captured by the CGE model

Impact type	Description
Direct	GVA and employment directly attributable to changes in output in the aviation sector
Indirect	GVA and employment contribution attributable to any upstream business activities directly associated with the aviation sector
Induced	GVA generated through consumer spending by those directly or indirectly employed by the aviation sector and connected businesses.
Catalytic	The broader economic contribution of the aviation sector through stimulating changes in tourism expenditure and international connectivity

Results

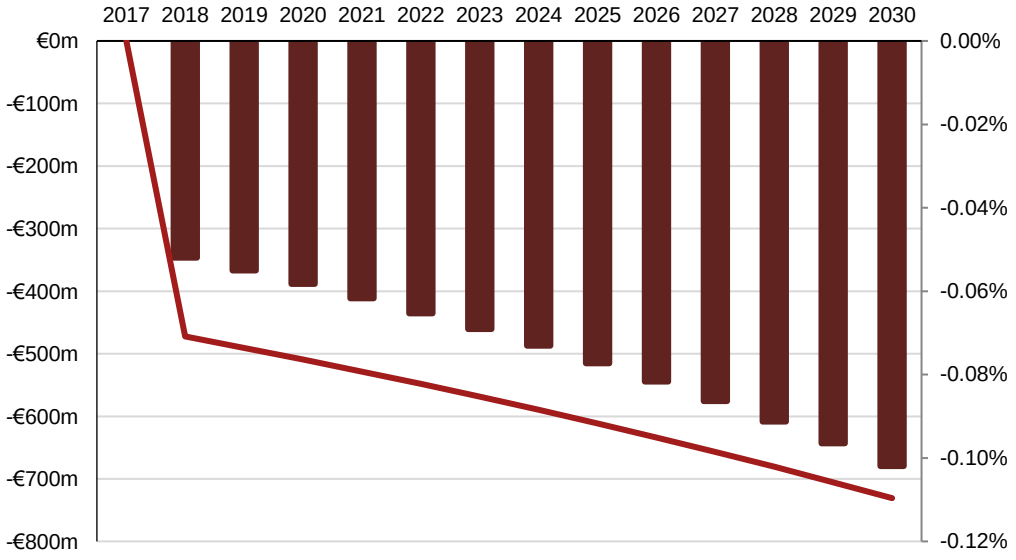
We have modelled the impact of the introduction scenario on key macroeconomic indicators, both nationally and internationally, the results of which are outlined in this section. This section is intended to provide an overview of the key results from our analysis. For a deeper look into the mechanisms driving the results we refer the reader to PwC's UK APD study.[5]

Our results are underpinned by a number of assumptions, and rely upon the assumption of a long run growth rate in the European Economic Area of 2%. A growth rate lower than this could lead to different results in absolute terms, but we would not expect the overall conclusions of the study to be materially affected.

Impact on national real GDP

By introducing an air passenger tax, real GDP in Sweden would be lower than the baseline scenario throughout the period under analysis. The percentage and absolute reduction below the baseline is expected to increase each year, with GDP around 0.1% (equivalent to €680 million per year) smaller than if no tax was to be introduced.

Figure 7: Impact on real GDP compared to base level from the introduction of air taxes in Sweden (percent change from the base case on right-hand axis, and impact in € on left-hand axis)



GDP will shrink by

€680m

per year in 2030 as a result of introducing the aviation tax

This loss in GDP is reflected across all sectors within the Swedish economy, with all expecting a negative impact. The aviation sector experiences the most pronounced decrease in output, of around 0.96% or €184 million per year lower than our forecast baseline by 2030. Other sectors also experience declines related to interaction effects with the aviation sector.

While all sectors experience a negative impact in 2030, there is some variation in the magnitude of this positive effect. For example, decreases in output range from €10 million in the utilities and construction sector to €110 million in the transport sector. Typically, the sectors which lose the most from the tax cut, beyond those directly affected, will be those which are the biggest consumers of air transport as a share of their total purchases. Following the tax introduction, one would typically expect the market price of air

[5] PwC 2013, *The Economic Impact of Air Passenger Duty*

transport to increase, and hence those businesses for whom air transport makes up a substantial share of their spending will stand to lose most materially.

Table 4: Impact on real GDP by sector compared to base level from the introduction of air taxes in Sweden (change from the base case)

Full	**2030**
Agriculture & manufacturing	-€68m
Utilities & construction	-€10m
Transport	-€110m
Aviation	-€184m
Financial Services	-€16m
Other services	-€190m
Total	*-€680m*

Tourism does not fit neatly alongside the other sectors in our model as it is a category of passenger rather than a sector. If a tourist purchases a bus ticket this would contribute to the Transport sector, if a tourist paid a fee on money exchange this would contribute to Financial Services. However, Tourist Satellite Account data suggests that approximately 80% of tourist expenditure would fall into Other Services, in the form of accommodation, cultural and leisure activities, cafes and restaurants etc. The remaining 20% is mostly split between various modes of travel, including aeroplanes. Across these sectors, our analysis suggests that the introduction of an air passenger tax in Sweden would lead to a total net reduction in tourist expenditure of €57m per year in 2030.

Net tourism expenditure decreases

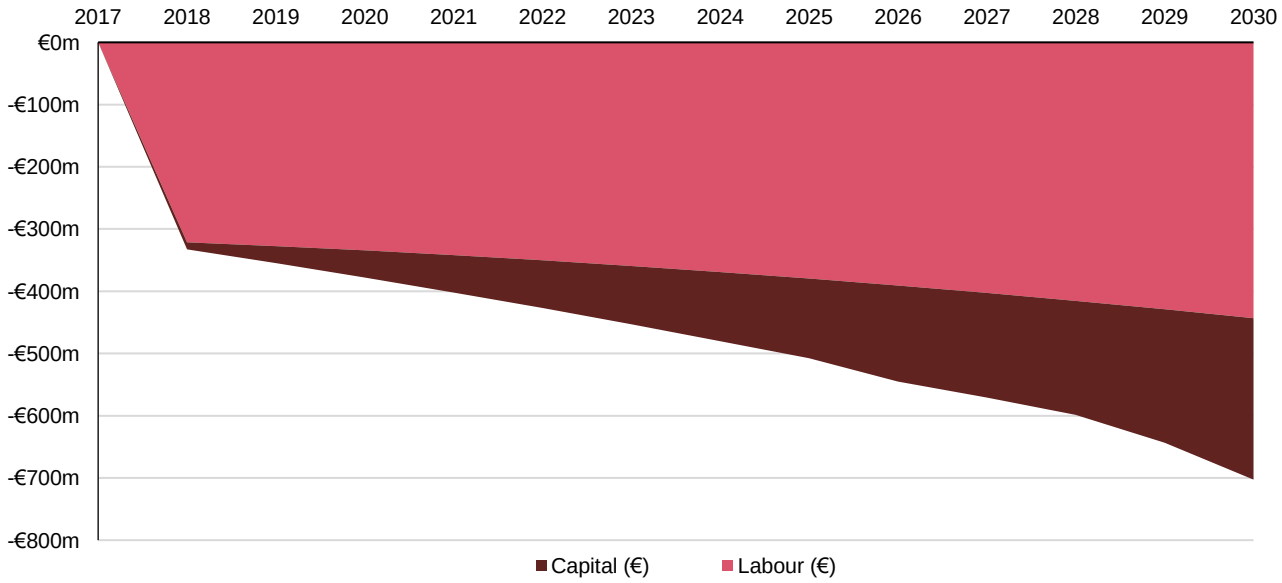
€57m

per year in 2030

This decrease in tourism expenditure, along with a weakened economy, contributes to lower consumption. In 2020 we estimate that consumption will fall by €142 million per year, rising to €243 million in 2030.

The change in GDP presented above and the commensurate decrease in consumption is driven by changes in income from both capital and households (i.e. increased profits and wages). Household income decreases more than capital over the period until 2030, though capital's share of the change grows over time. Household income decreases by over €320 million in the first year, while capital income declines by a little over €11 million.

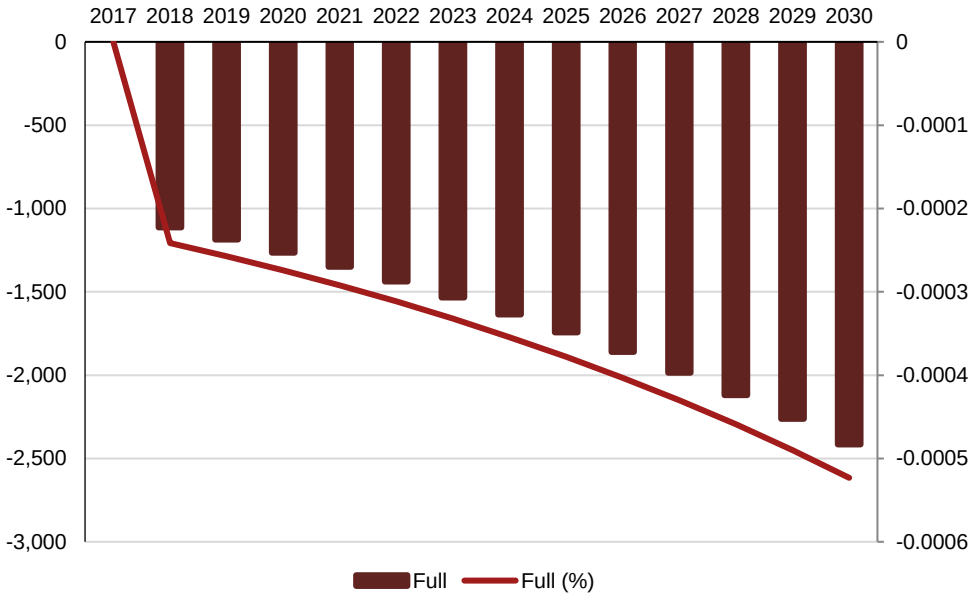
Figure 8: Impact on capital and household income compared to base level from the introduction of air taxes in Sweden (absolute change from the base case)



Impact on national employment

The immediate effect of introducing the tax on unemployment would be the loss of over 1,000 jobs. This figure would rise to a total of nearly 2,500 by 2030.

Figure 9: Impact on total national employment compared to base level from the introduction of air taxes in Sweden (percent change from the base case on right-hand axis, and impact in absolute terms on left-hand axis)



Over

1,100

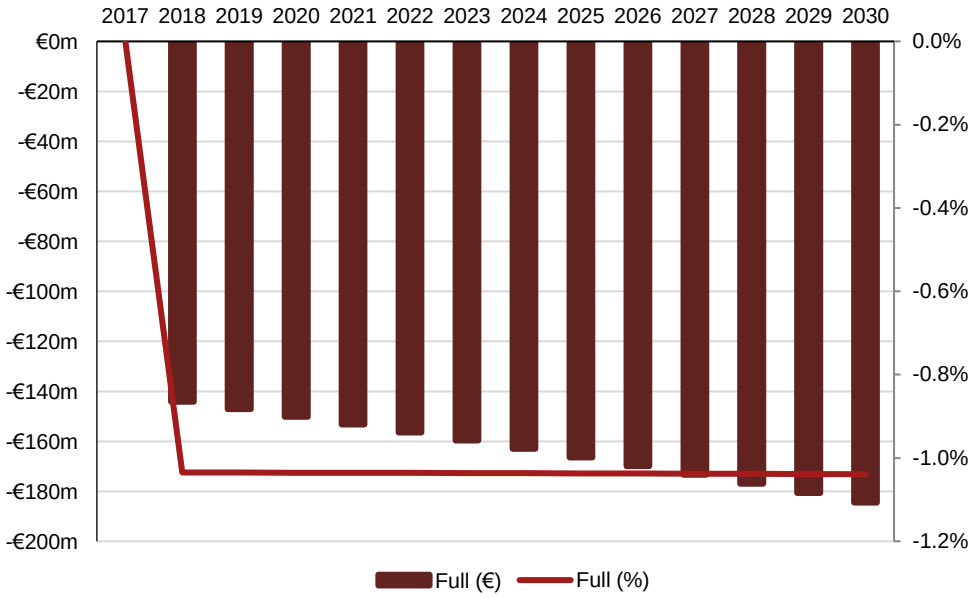
jobs would be lost in following the introduction of the aviation tax

Impact on national aviation sector GVA

The value of goods and services produced in Sweden's aviation industry would be over 1% smaller in 2018 if a tax was introduced, equal to a €145 million decline in the sector in 2018. A similar relative margin from the

baseline is maintained throughout the period until 2030, with the absolute difference growing to €185 million per year.[6]

Figure 10: Impact on aviation GVA compared to base level from the introduction of air taxes in Sweden (percent change from the base case on right-hand axis, and impact in € on left-hand axis)



The aviation sector would lose

€150m

of its value per year two years after the introduction of the aviation tax

Impacts on passengers and tourism

The CGE modelling approach captures the wider macroeconomic effects of the changes in tax rate. It is not able to provide a route-level analysis of the aviation sector, and accordingly it captures demand and capacity constraints only at an industry-wide level. However, if it is assumed that a decrease in economic output of the aviation sector manifests itself in a decrease in passenger numbers, then the introduction of an air passenger tax could reduce arrivals by 550,00 in 2020 from a baseline of 16.5 million (a decrease of 3.3%). This would mean 1.5 million fewer arrivals over the three years following the abolition (i.e. by 2020).

1.5m

fewer arrivals between 2018 and 2020 following the introduction of the proposed tax

By extrapolating trends, it is possible to break this number down. According to our analysis, 225,000 fewer overseas tourists would visit Sweden in 2020. Inbound tourism is recorded as an export as money from other countries flows into the Swedish economy, and so introducing a tax may restrict growth. However, it is important to recognise that introducing the aviation tax will impact both inbound and outbound tourism. Outbound tourism (which is treated as an import) is also likely to decrease as, among other factors, some Swedish citizens will be priced out of taking overseas trips and substitute overseas travel with domestic travel, offsetting the reduction in inbound tourism to some extent. As such, we forecast that the net decrease to tourism expenditure (increase in exports minus the increase in imports) will be around €120 million in the three year period to 2020.

630,000

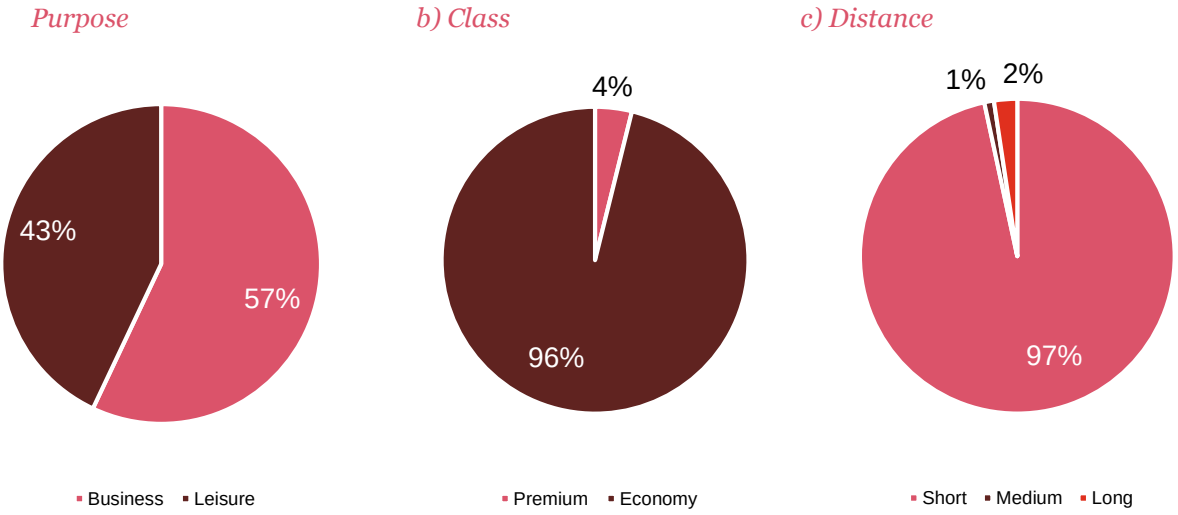
fewer tourists between 2018 and 2020 following the introduction of the proposed tax

We can extend this analysis, as shown in Figure 11 to give a breakdown of additional passenger numbers by class, distance and purpose. The chart reveals that the majority of passengers travel economy class on short haul flights. Approximately

[6] Note, we are using GTAP's definition of the aviation sector, which may be broader than other definitions.

57% of the additional passengers would come to Sweden for leisure purposes versus 43% for business purposes, with the level and type of expenditure differing between these two groups.

Figure 11: Additional passengers (arrivals) that would result from the tax introduction, broken down by class, distance and purpose. Each segment is a proportion of the total increase in arrivals

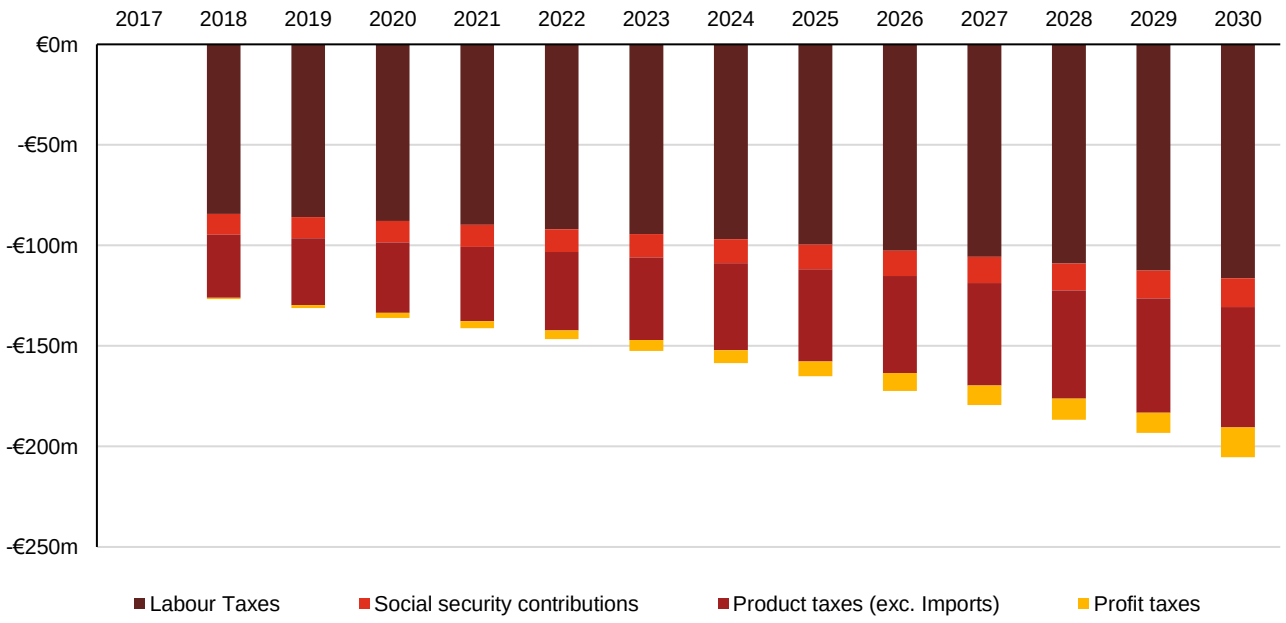


Impact on national tax income

Whilst introducing an aviation tax will lead to a direct increase in tax revenue, it will also likely cause a decline in government income from other taxes, such as labour taxes, social security contributions, product taxes, and profit taxes. This is a result of wider indicators of macroeconomic performance weakening, including employment, productivity, wages, and consumption.

We estimate that the proposed tax will raise €143 million in passenger tax. However, it is important to consider the impact of wider economic effects on the government's tax revenue as well. Figure 12 shows the effect the introduction of the proposed tax would have on other tax revenue streams, categorised as labour taxes, social security contributions, product taxes, and profit taxes. The graph reveals that, whilst we expect the aviation tax to raise €143m, this will come at the cost of €127m in lost tax revenue elsewhere. In other words, for every €1 that is raised in aviation tax revenue, €0.89 will be lost from the revenue of other taxes. We therefore expect that the net effect of introducing the tax will be to increase tax revenue by only €16m. Due to the distortive nature of passenger tax, this revenue gain is much smaller than would be expected from the introduction of many other taxes.

Figure 12: Impact on tax income compared to base level from the introduction of air taxes in Sweden (percent change from the base case on right-hand axis, and impact in € on left-hand axis)



89% of the passenger tax revenue will be lost through other tax revenue streams

Impact of introducing the Swedish passenger tax on other countries

As shown in Table 5, all of the countries we have analysed suffer a cut to GDP over the period if an aviation tax is introduced in Sweden, with Great Britain subject to the biggest decline over the next decade. A number of countries experience a small rise in GDP against the baseline for the first couple of years after the tax would be introduced, however GDP is lower in every country by 2021, which continues throughout the period of analysis. The loss in GDP to all other countries (except Sweden) is approximately the same as the economic loss to Sweden.

The deterioration in the economic position of other countries is due to the increased cost of flying causing, among other things, knowledge transfers between countries to become more restricted and Swedish residents to spend less of their money on goods and services in other countries. In addition, residents and businesses in countries outside of Sweden will suffer an increase in the cost of flying to Sweden, reducing tourism to the country.

Table 5: Impact on real GDP by country compared to base level from the full abolition of air taxes in Sweden (change from the base case)

Full	**2030**
Austria	-€5m
France	-€71m
Germany	-€61m
Italy	-€66m
Sweden	-€680m
Great Britain	-€110m
Rest of EEA	-€292m
Rest of World	-€173m
Total	*-€1,458m*

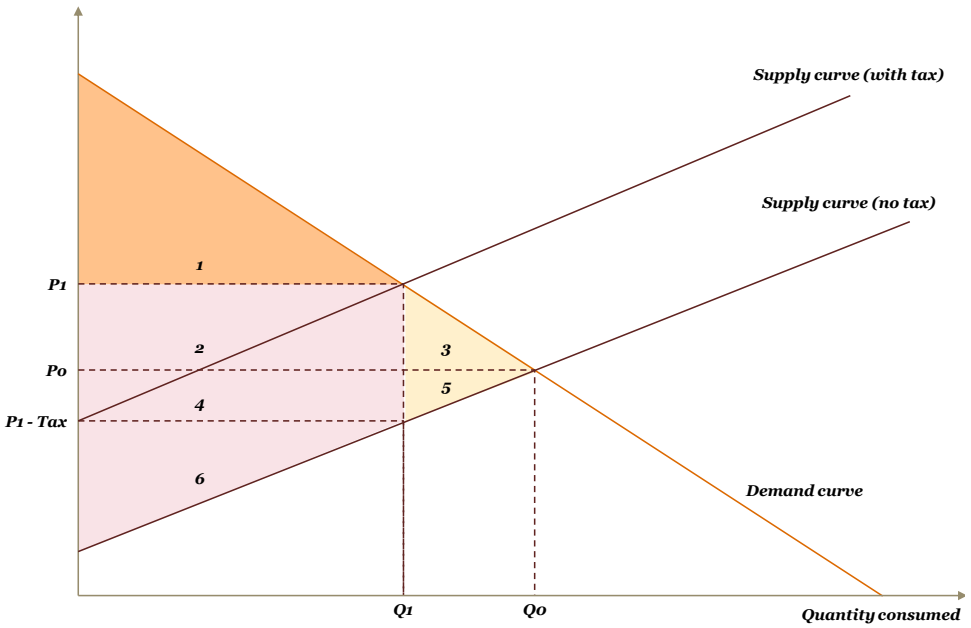
Appendix 1: Economic theory of indirect taxes

The tax system plays a crucial role in influencing the rate of short and long-term economic growth in the economy. In aggregate, the amount of tax raised, the type of tax raised, and its interaction with public spending will affect the long-term growth rate of the economy. However, individual tax policy measures are less likely to augment the rate of economic growth for any sustained period as they are smaller in scale, but they can affect the level of GDP.

Indirect taxes, such as air passenger taxes, create distortions in the market by increasing the price of the good or service to which the tax is charged (in this case, an international or domestic flight), leading businesses and households to adjust their behaviour to avoid paying the tax, resulting in a lower quantity sold. By reducing the amount purchased, consumers are worse off – the extent to which they are worse off is defined as a deadweight loss of taxation[7]. We explain this concept with use of a supply and demand curve framework (see Figure 13 below).

The equilibrium price and quantity that prevails in the market for the product or service in question (i.e. a flight ticket) is determined by the intersection of the market demand and supply curves. Before the application of the indirect tax (i.e. the respective air passenger tax), the quantity consumed in the market is represented by point Q0 in Figure 13. Once the tax is applied, the market supply curve shifts upwards by the amount of the tax. The equilibrium price for consumers is now higher (P1), so they demand less of the product. As a result, consumer surplus (a measure of consumer welfare) falls from Areas 1, 2 and 3 to Area 1. At the same time, the price received from the producer falls to P1-tax and therefore, producer surplus (a measure of producer welfare) falls from Areas 4, 5 and 6 to Area 6. The Government captures a portion of the consumer and producer surplus through tax receipts (Areas 2 and 3). However, some of the original surplus in the market is lost forever – represented by Areas 3 and 5.

Figure 13 Illustrative deadweight loss caused through application of indirect tax



[7] 'Intermediate Microeconomics: A Modern Approach', 8th Edition, Hal. R. Varian (2010).

A common measure of the deadweight loss is the amount of GDP forgone per unit of revenue raised. A deadweight loss of 0.5 should be interpreted as 50 pence of GDP lost per 1 of tax revenue raised. Governments set tax policy to balance the need to minimize the deadweight loss to society with the imperative to use the proceeds of taxation to provide goods that would otherwise be underprovided by a free market and to correct other market failures.

The size of this deadweight loss is determined by both static and dynamics factors. In terms of static determinants, the absolute level of the tax imposed and the steepness of the supply and demand curves. In the case of the former, the higher the tax rate the further the supply curve shifts up in response and the associated deadweight loss becomes larger. For the latter, a steeper demand or supply curve reflects more inelastic supply and demand conditions in the market, and means that supply or demand is relatively insensitive to changes in price. Dynamic determinants include the extent to which air passenger tax acts as a tax on business inputs and the extent to which improving business air usage has a positive impact on GDP by boosting productivity.

Appendix 2: Aviation tax rates in the European Economic Area

Country	Tax	Rate		Notes for Figure 3
Austria	Air Transport Levy	Short haul	€ 7	
		Medium haul	€ 15	
		Long haul	€ 35	
France	Civil Aviation Tax	EU	€4.48	Pink dashes within Figure 3 are shown as the sum of the Civil Aviation Tax and Solidarity Tax. Fiscal Tax (Corsica) is excluded from Figure 3.
		Non-EU	€8.06	
	Solidarity Tax	EU	Economy: €1.13	
			Business: €11.27	
		Non - EU	Economy: €4.51	
			Business: €45.07	
	Fiscal Tax (Corsica)	€ 4.57		
Germany	German Air Transport Tax	EU and EFTA	€7.47	
		Countries not included in the EU and with a distance of not more than 6,000km	€23.32	
		Other countries	€41.99	
Greece	Airport Development Charge	€ 12 to Hellenic Civil Aviation Authority		
Italy	Council City Tax	Rome airport	€ 7.50	
		Other airports	€ 6.50	
Norway	Air Passenger Tax	NOK 82		
Sweden	N/A	Proposal for 1st of January 2018)		Figure 3 shows the proposed rates from January 2018.
		Within EU	SEK 60	
		Less than 6000km	SEK 250	
		More than 6000km	SEK 400	

Glossary

Computable General Equilibrium model	A model used by governments and international organisations to simulate the effect of changes in policy or other external factors.
Gross Value Added	The total value of goods and services produced in a specific sector or area of the economy
Deadweight Loss	The loss in the level of welfare/efficiency in the economy when the equilibrium for a good or service is not achieved.
Passenger tax	We have defined a passenger tax, as opposed to a charge, as being raised by a government body for the purpose of raising revenue, rather than covering a specific cost
Passenger charge	A charge is a fee levied by a private body and charged on a per passenger basis
Producer Surplus	The difference in the price between the amount a producer is willing to receive for a unit (e.g. a seat on a plane) and the amount the producer does in fact receive
Consumer Surplus	The difference between a consumer's willingness to pay and the amount the consumer actually paid