

# Is energy taxation a source of long-term fiscal revenue?

A closer look at Swedish data

Clara Schultz


Clara.Schultz@gov.se



# The dual objectives of energy taxation

Environmental objective:  
change behaviour to  
eliminate inefficiency created  
by environmental damage  
(e.g. reduce carbon  
emissions)

Fiscal objective:  
raise public revenues,  
without affecting or distorting  
producer or consumer  
behaviour



Gradually eroding tax base and  
therefore limited revenue potential?



# An inverse relationship?

Fuel duty taxes face £170bn hit from electric cars

Think-tank calls for road tolls to plug gap in government revenues



© Miles Willis/Getty

Financial Times, 26 June 2017

- Electrification “threatening” fiscal tax revenues
- Can environmental progress be a fiscal problem?

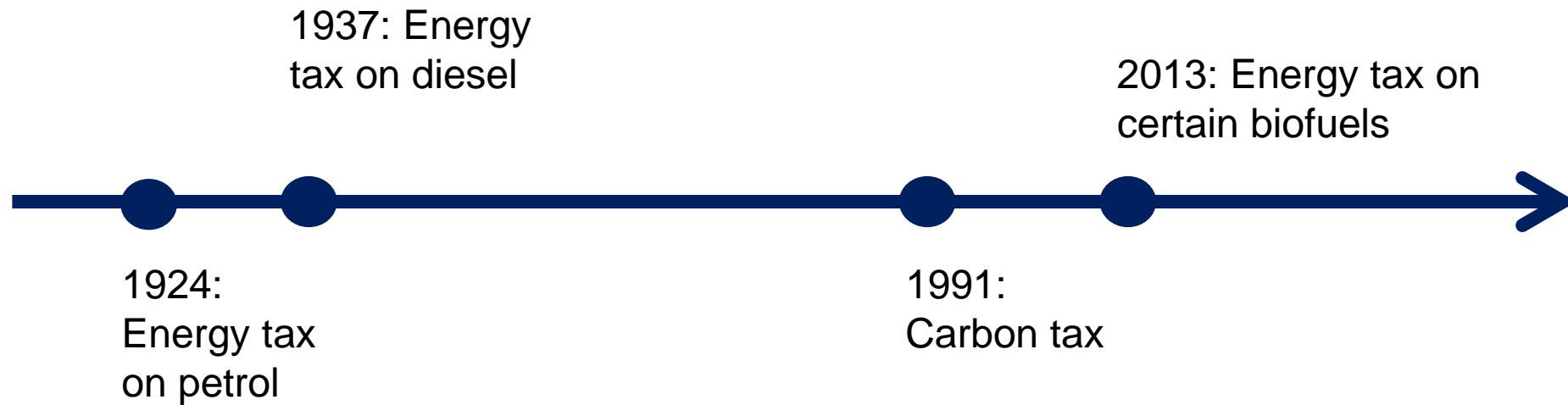


# Focus on motor fuel taxation

- Importance of motor fuels from environmental perspective
- “High-end” of the oil barrel and therefore difficult to replace
- Importance of motor fuel taxes as source of fiscal revenue
- Relatively broad and inelastic tax base



# Swedish motor fuel taxation



# Motor fuel tax rates in 2016

Table 1 Motor fuel tax rates, 2016

SEK (US\$) per litre

Fuel	Energy tax	Carbon tax	Total fuel tax
Petrol (MK1)	3.72 (0.44)	2,59 (0,30)	6,31 (0,74)
Diesel (MK1)	2.36 (0,28)	3,20 (0,37)	5,56 (0,65)
Low-blended ethanol	0.96 (0.11)	0	0.96 (0.11)
Low-blended FAME	2.12 (0.25)	0	2.12 (0.25)
High-blended FAME (B100)	1.15 (0.13)	0	1.15 (0.13)
High-blended ethanol (in E85)	0.99 (0.12)	0	0.99 (0.12)
HVO	0	0	0

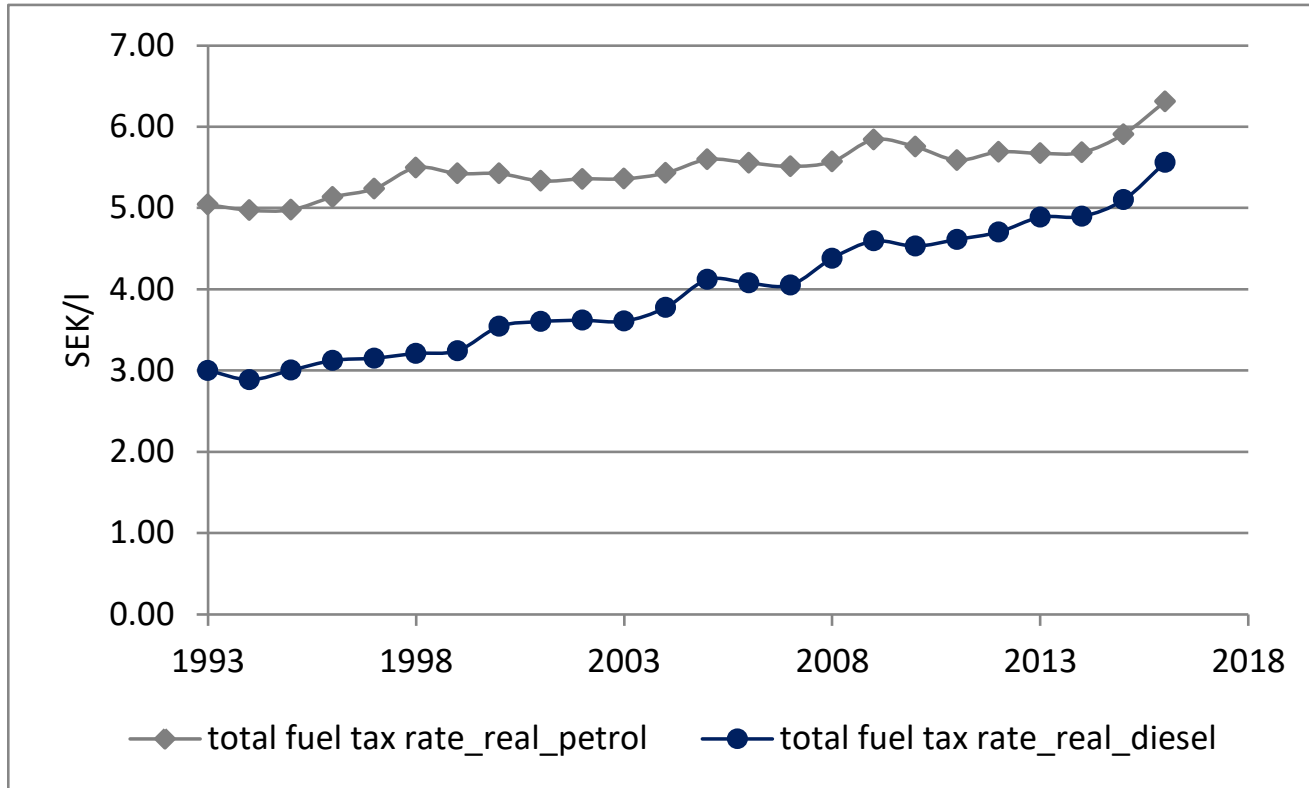
Note: Excluding VAT and according to tax rules in 2016. Tax rates on biofuel refer to biomass-based component. Fossil components in e.g. E85 are subject to taxation. Currency conversion based on exchange rate 3 October 2016, 8.54 SEK per USD. Diesel fuel used in forestry and agriculture is granted certain tax reductions. MK1 = Swedish Environmental Class 1. HVO = Hydrogenated Vegetable Oils, FAME = Fatty Acid Methyl Esters.

Source: Swedish Ministry of Finance and Statistics Sweden.



# Tax rates gradually increased 1993-2016

Figure 1. Total fuel tax rates (real) on petrol and diesel, 1993-2016



- Both energy and carbon tax rates have been increased gradually over time, both in nominal and real terms

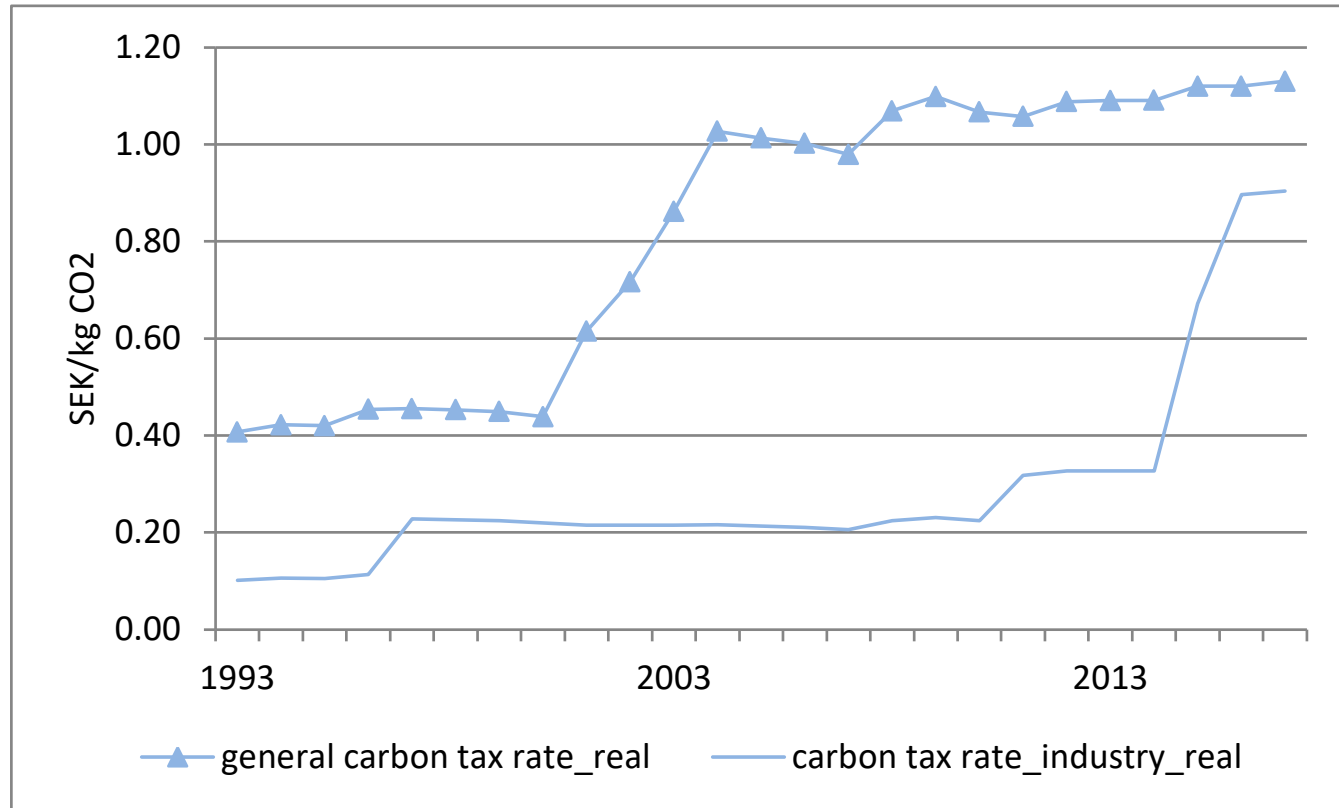
Note: Tax excluding VAT. Real prices in 2016.

Source: Swedish Ministry of Finance



# General carbon tax rate

Figure 1. General carbon tax rate (real) per kilogram carbon emissions, 1993-2017



Note: Tax excluding VAT.

Source: Swedish Ministry of Finance

- In 2016, general carbon tax rate of US\$132 per tonne fossil carbon
- Industry pays reduced rates (2018 full carbon tax)
- Since 2008 major industries part of EU Emissions Trading Scheme (EU ETS) exempt from carbon taxation to avoid double regulation





# Environmental objective to induce behavioural change

- Internalising negative externalities
- Increasing the price of fuel leads to reduced fuel consumption (to the extent that fuel is a normal good)
- Behavioural effects of increased fuel prices may differ depending on time horizon



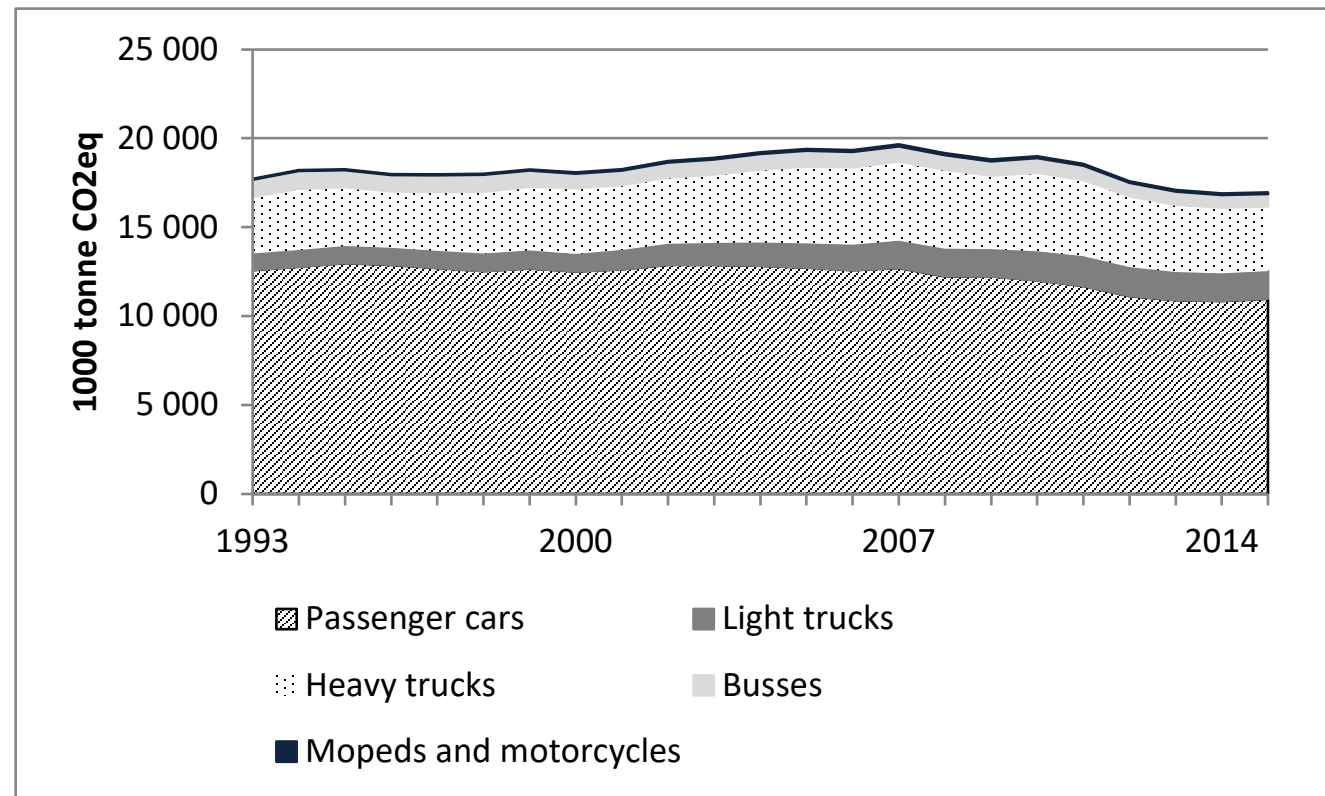
# Role of transport

- Roughly one third of green-house gas (GHG) emissions from transport sector
- Road transport responsible for around 98 percent



# Emissions mainly from passenger cars

Figure 1. GHG emissions from road transport by mode of transport, 1993-2015



- Passenger cars and heavy trucks responsible for main part of emissions.

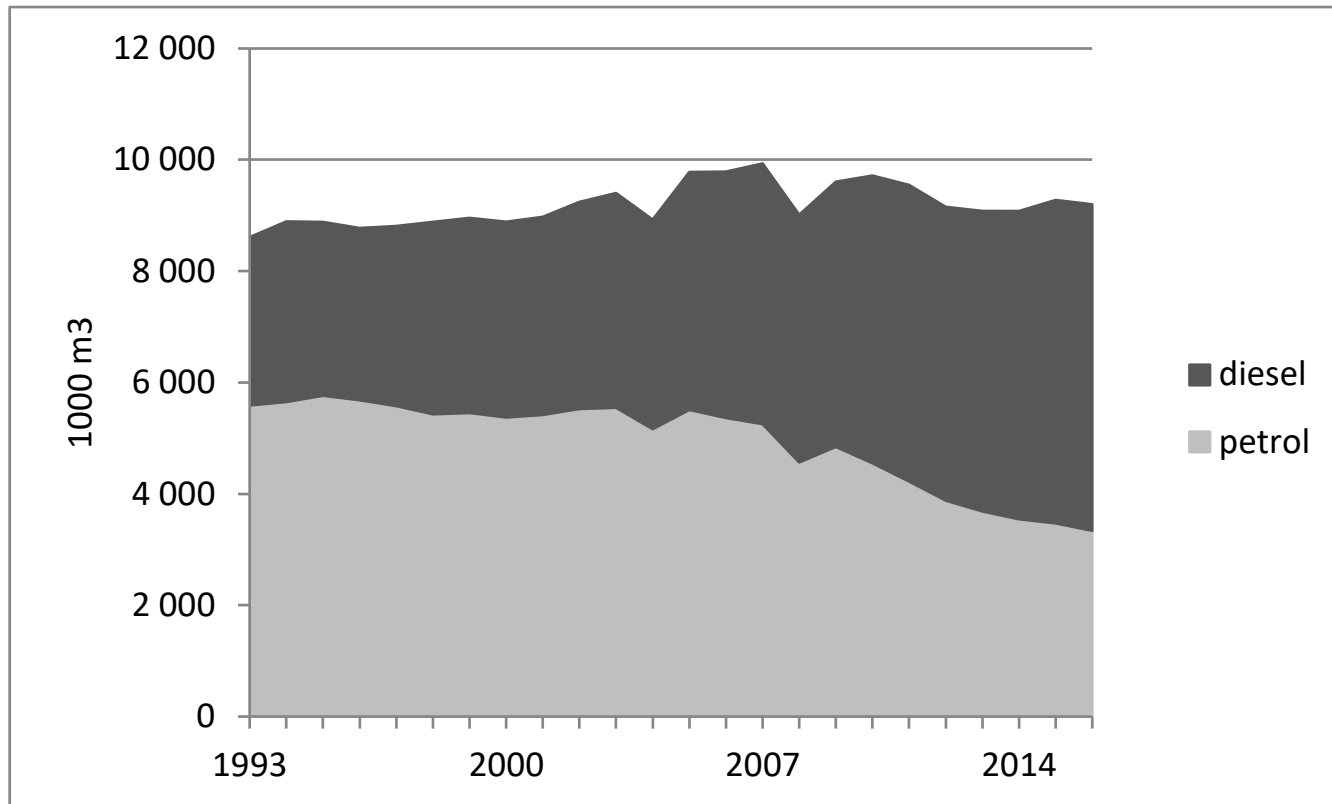
Note: Carbon dioxide equivalent (CO<sub>2</sub>eq) is a measure of GHG emissions based on global warming potential.

Source: Statistics Sweden



# From petrol to diesel to...

Figure 1. Volume petrol and diesel fuel, 1993-2016



- Clear shift towards increasing use of diesel
- Total volume of fossil motor fuel remains relatively constant, but a declining share of total fuel use

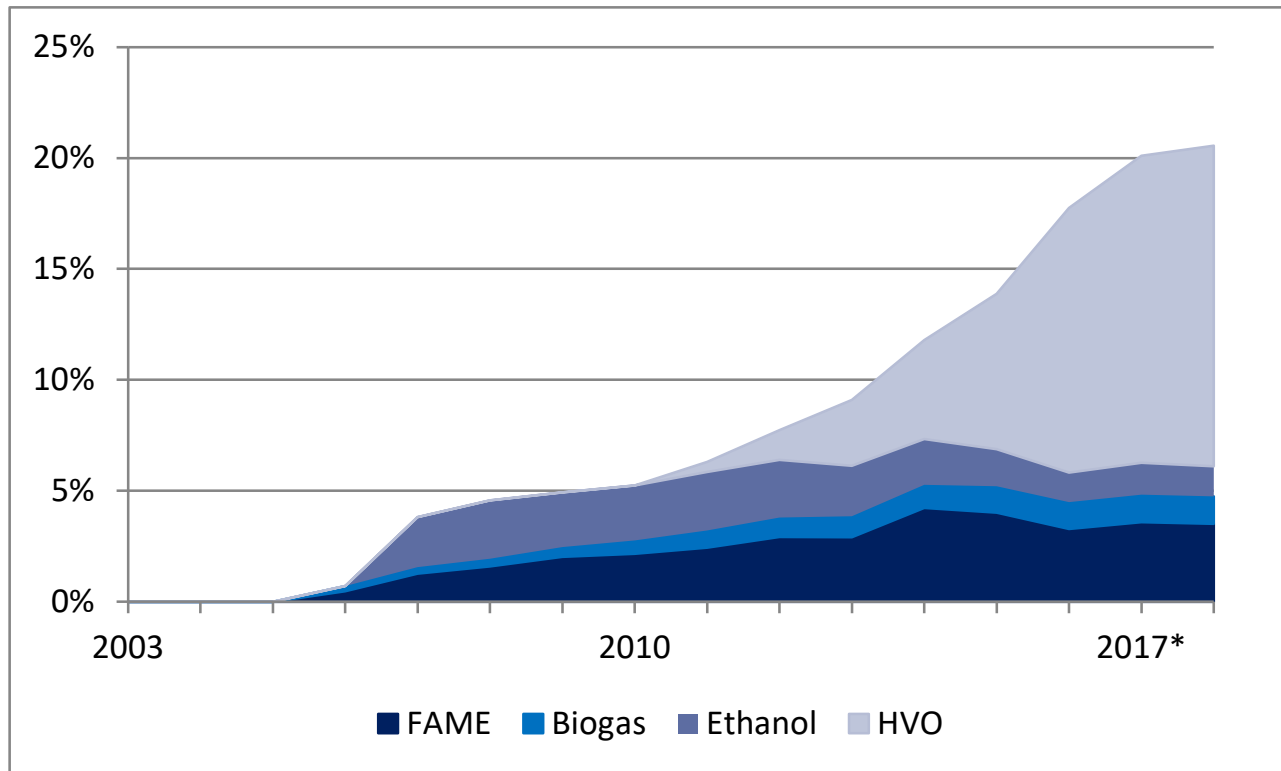
Note: Reported fuel volume made available for use.

Source: Swedish Petroleum and Biofuel Institute (SPBI)



# ...biofuels?

Figure 1. Share of biofuels in the transport sector, 2003-2018\*



Note: \*Forecast for 2017-2018, which only takes into account current policy. Share in terms of energy content. Including both high- and low-blended biofuels. HVO = Hydrogenated Vegetable Oils, FAME = Fatty Acid Methyl Esters.  
Source: Swedish Energy Agency (SEA) and own calculations.

- Share of biofuels in transport sector steadily increasing since around 2006
- Electrification still limited. In 2016, electric vehicles (incl. hybrids) accounted for around 1.7 percent of passenger cars in traffic (around 7 percent of new registrations)



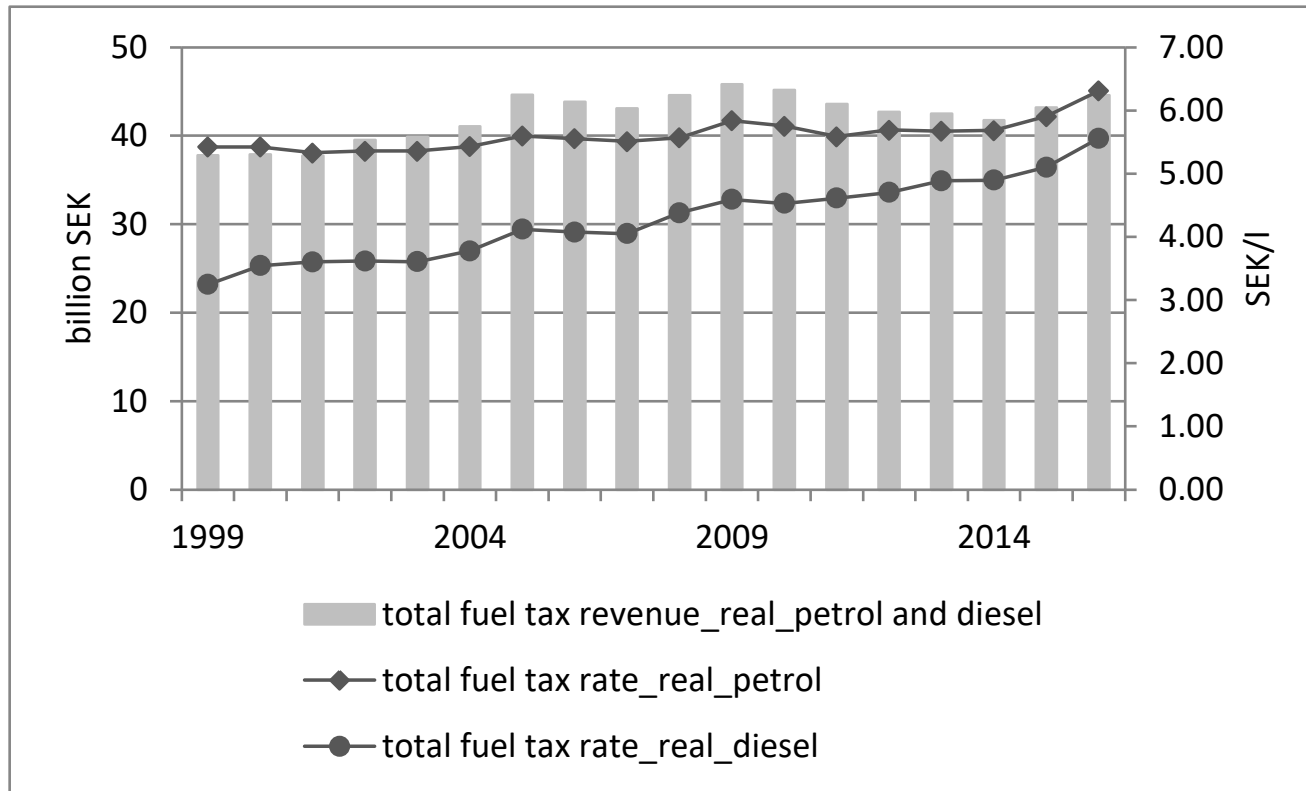
# Fiscal objective of stable tax revenue flows

- In 2016, around US\$ 5.6 billion from fuel taxes on petrol and diesel (roughly half of total environmental tax revenues and three percent of total tax revenues)
- At the same time, environmental objective to curb consumption of fossil fuels
- Stability and predictability of revenue flows?



# Stable total motor fuel tax revenue flows

Figure 1. Total fuel tax revenues and tax rates (real), 1999-2016

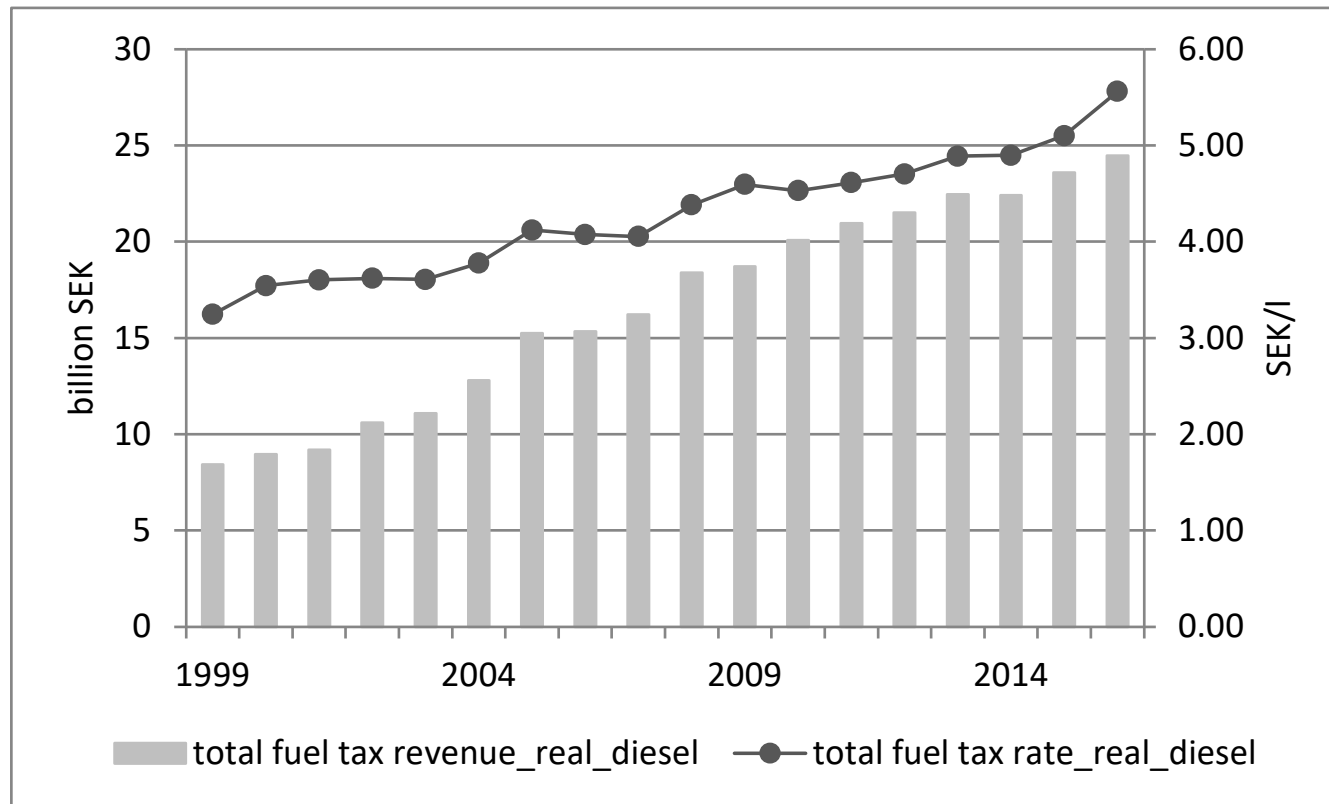


Note: Taxes excluding VAT. Real prices in 2016. Tax revenues have been calculated using fuel tax rates and energy use data.

Source: Swedish Ministry of Finance, SEA and own calculations

# Increasing fuel tax revenues from diesel

Figure 1. Total fuel tax revenues and tax rates (real) from diesel, 1999-2016



Note: Taxes excluding VAT. Real prices in 2016. Tax revenues have been calculated using fuel tax rates and energy use data.

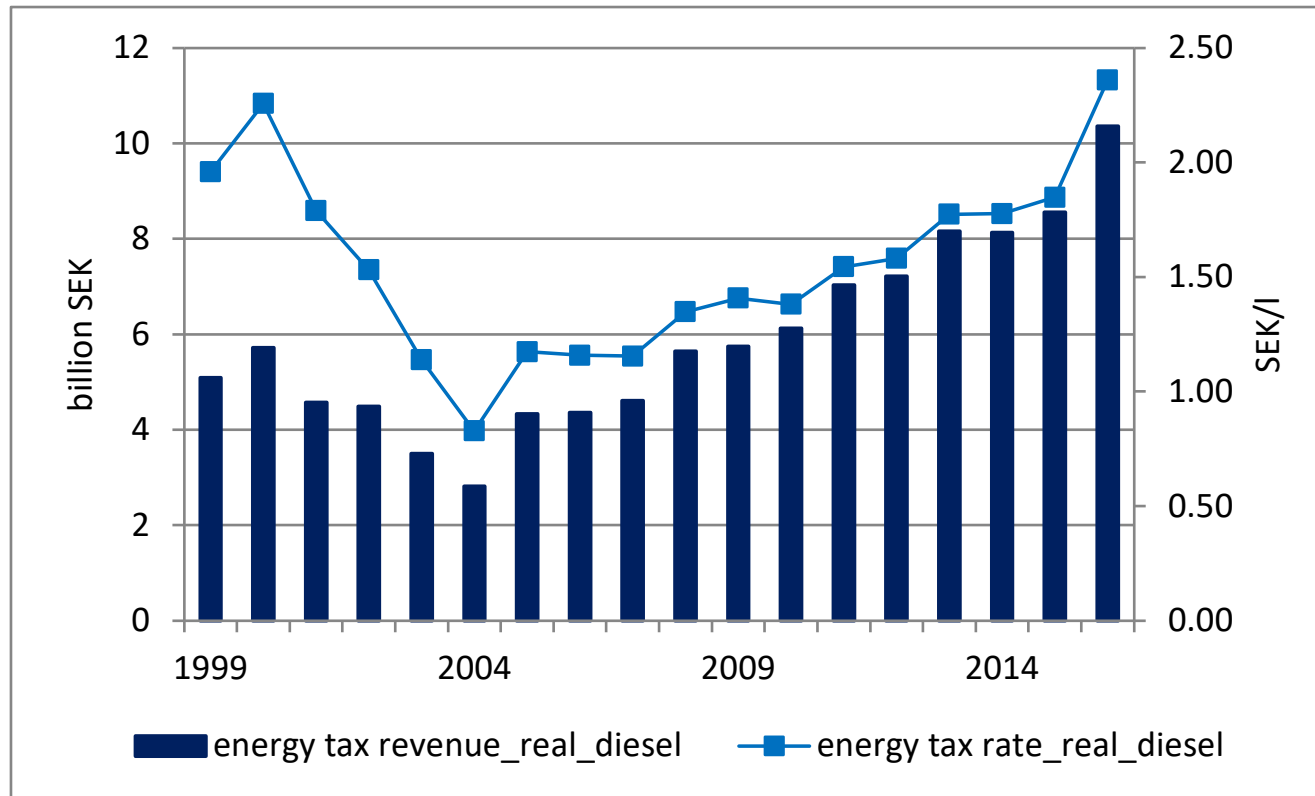
Source: Swedish Ministry of Finance, SEA and own calculations





# ...mainly driven by energy tax revenues

Figure 1. Energy tax revenues and tax rates (real) from diesel, 1999-2016

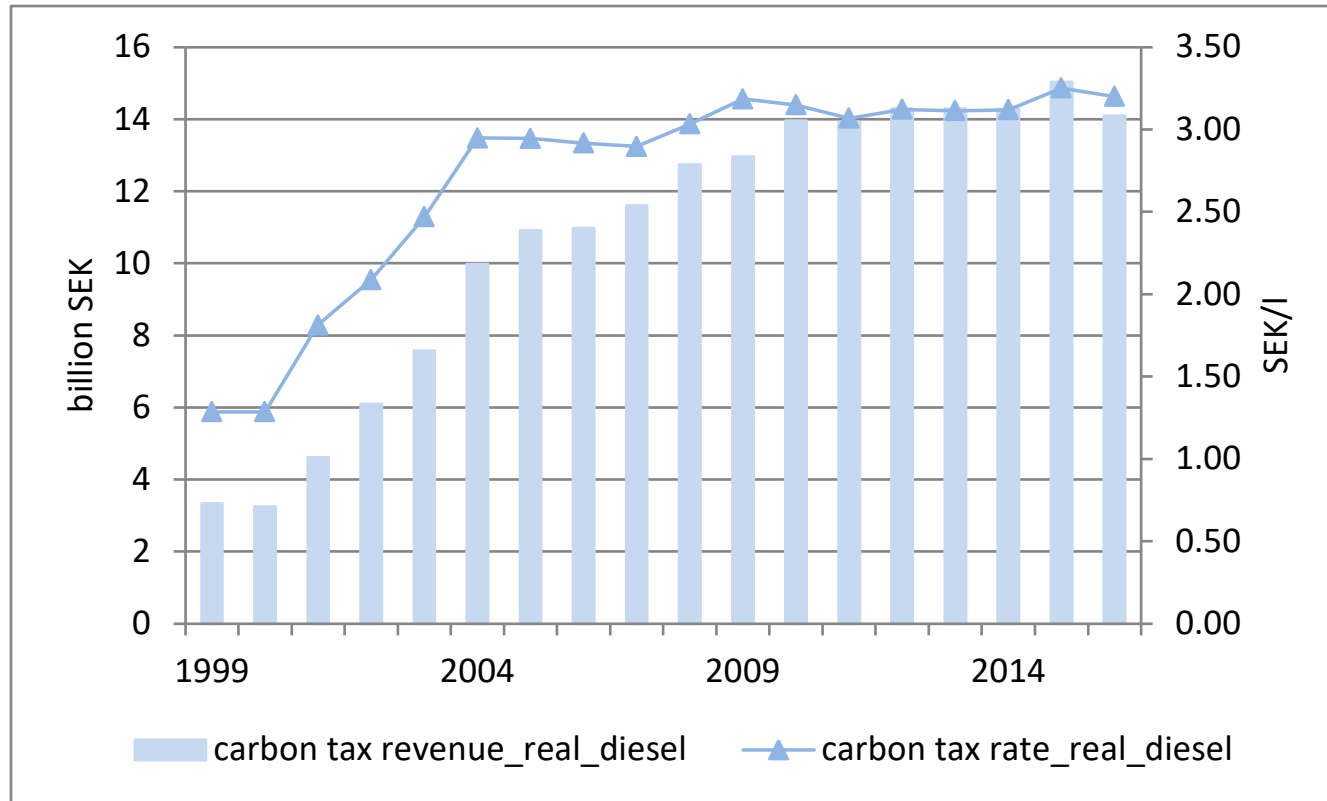


Note: Taxes excluding VAT. Real prices in 2016. Tax revenues have been calculated using fuel tax rates and energy use data.

Source: Swedish Ministry of Finance, SEA and own calculations

# ...less so by carbon tax revenues

Figure 1. Carbon tax revenues and tax rates (real) from diesel, 1999-2016

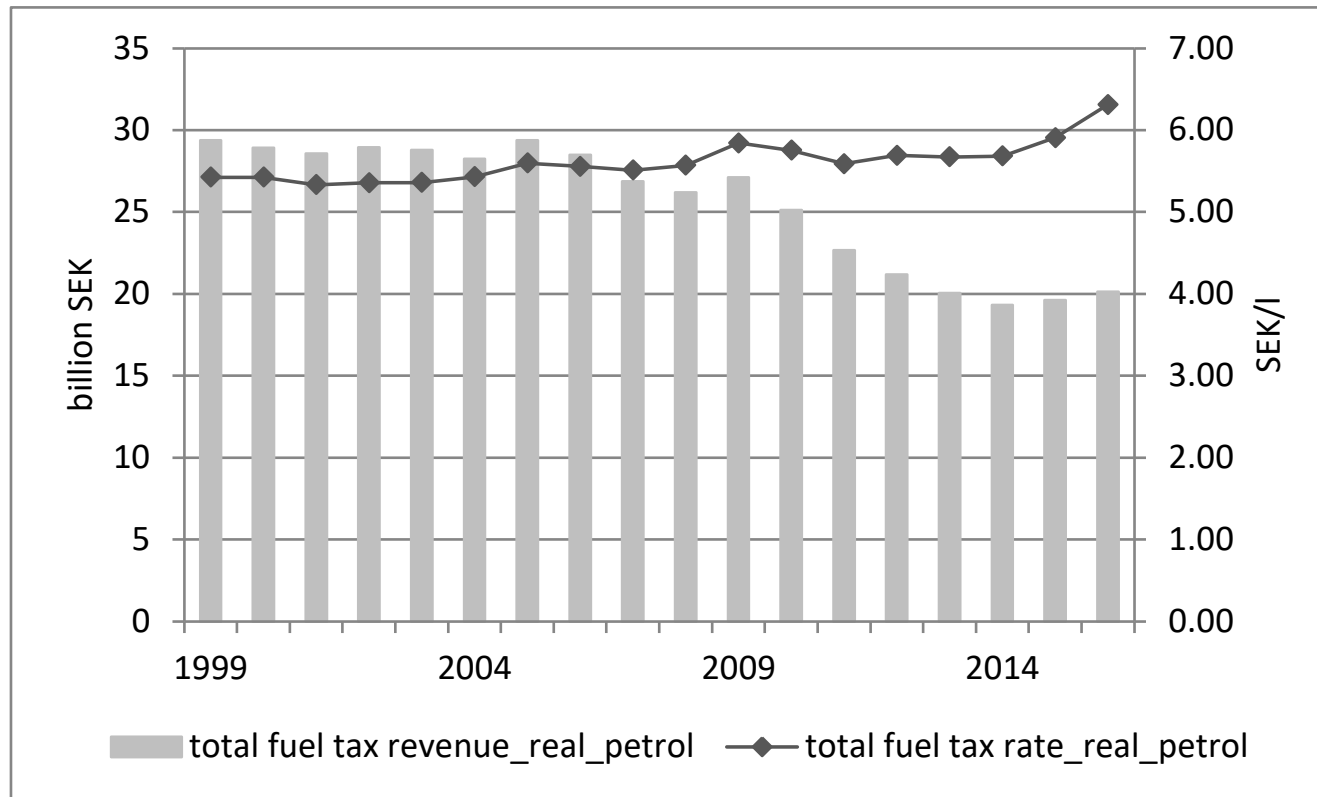


Note: Taxes excluding VAT. Real prices in 2016. Tax revenues have been calculated using fuel tax rates and energy use data.

Source: Swedish Ministry of Finance, SEA and own calculations

# Declining fuel tax revenues from petrol

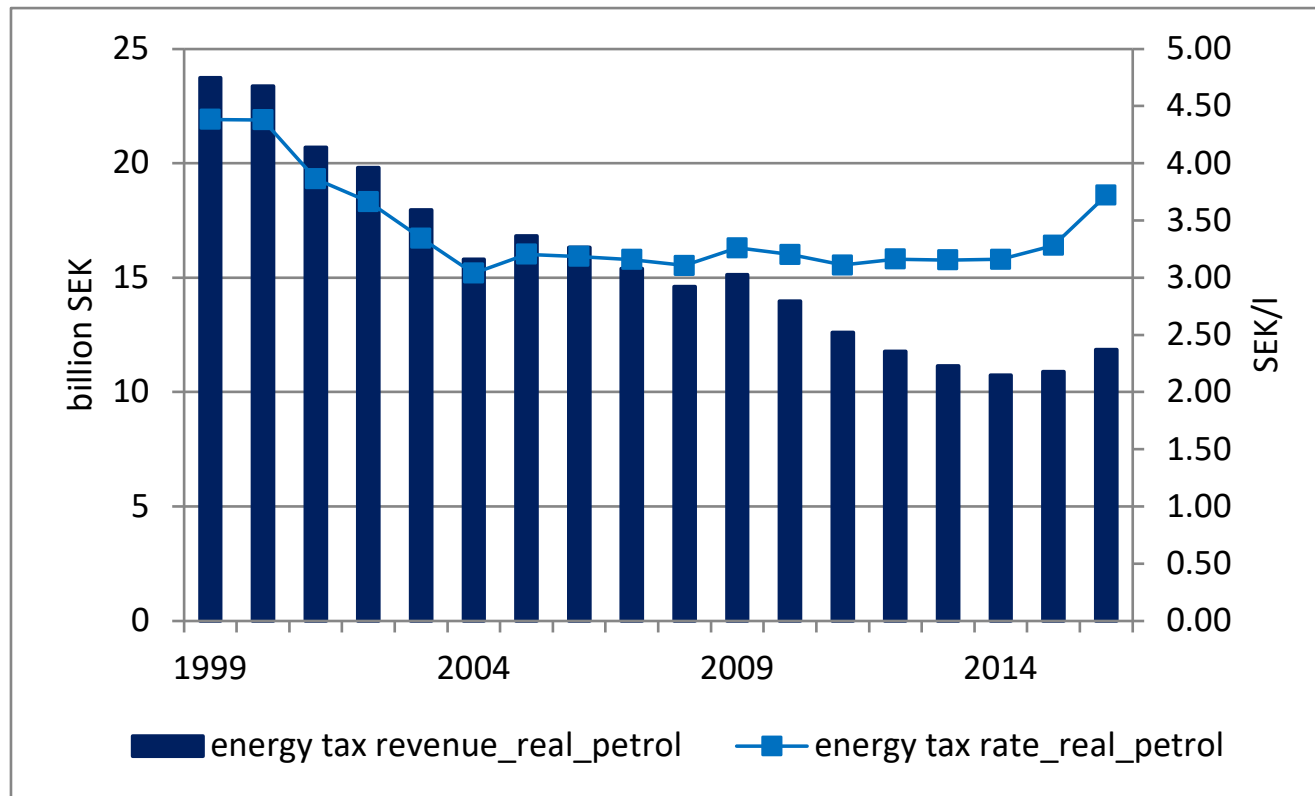
Figure 1. Total fuel tax revenues and tax rates (real) from petrol, 1999-2016



Note: Taxes excluding VAT. Real prices in 2016. Tax revenues have been calculated using fuel tax rates and energy use data.  
Source: Swedish Ministry of Finance, SEA and own calculations

# ...both energy tax revenues

Figure 1. Energy tax revenues and tax rates (real) from petrol, 1999-2016

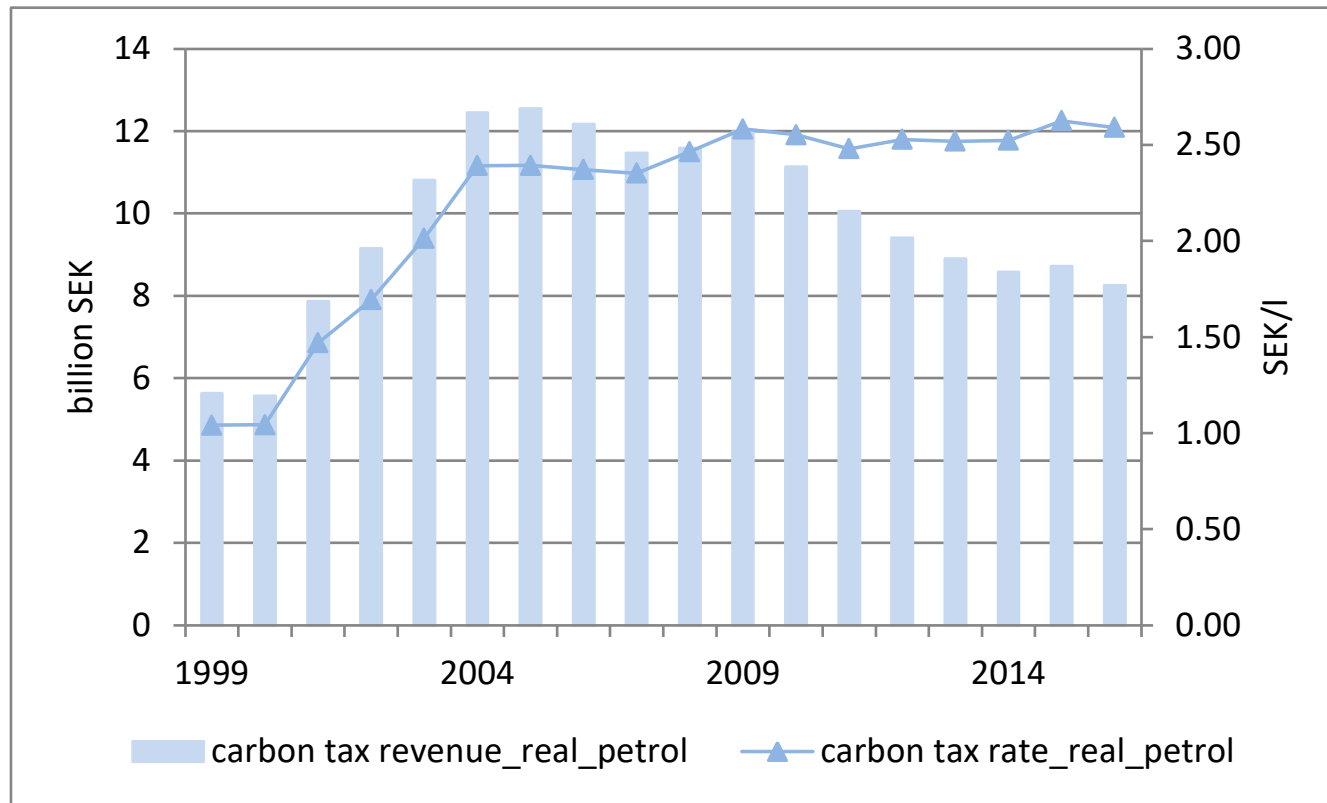


Note: Taxes excluding VAT. Real prices in 2016. Tax revenues have been calculated using fuel tax rates and energy use data.

Source: Swedish Ministry of Finance, SEA and own calculations

# ...and carbon tax revenues

Figure 1. Carbon tax revenues and tax rates (real) from petrol, 1999-2016

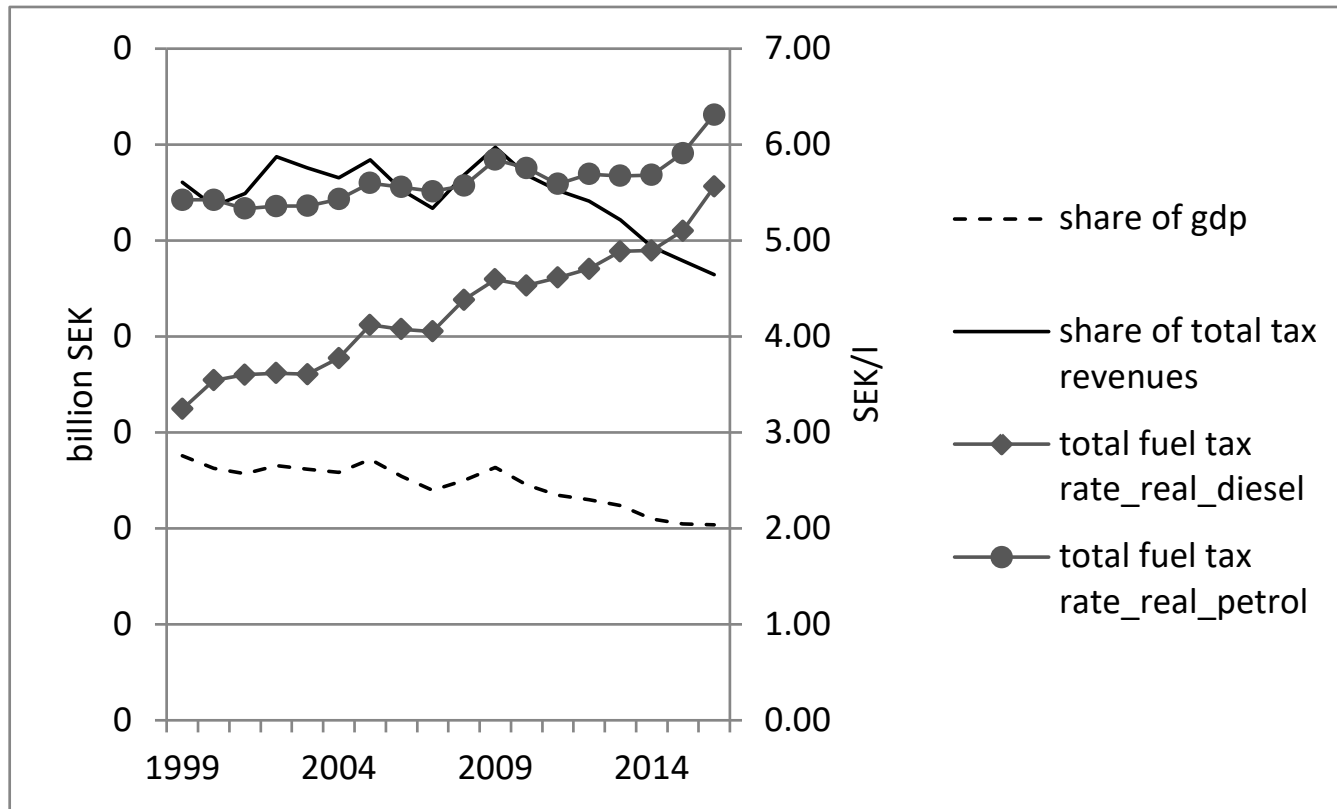


Note: Taxes excluding VAT. Real prices in 2016. Tax revenues have been calculated using fuel tax rates and energy use data.

Source: Swedish Ministry of Finance, SEA and own calculations

# Declining share of total tax revenues and GDP

Figure 1. Total fuel tax rates and tax revenues as a share of national income and total tax revenues, 1993-2016



Note: Tax excluding VAT. Real prices in 2016.

Source: The Swedish Tax Agency, Statistics Sweden, ESV and own calculations.

# Tax reforms and outlook

- National climate goal of reducing GHG emissions by 70 percent by 2030 compared to 2010
- Bonus malus-system for the purchase of new cars
- Emission reduction obligation for suppliers of petrol and diesel



# In conclusion, stable source of tax revenue historically

- Motor fuel taxation a stable source of tax revenue over decades in Sweden
- No evidence of total motor fuel tax revenue levelling out, despite compositional changes in fuel demand
- Declining share of GDP and total tax revenues





# But the policy landscape is changing

- Eroding carbon tax base among motor fuels
- Structural shift in motor fuel taxation?
- Towards biofuels and electrification
- Planning for a smooth transition



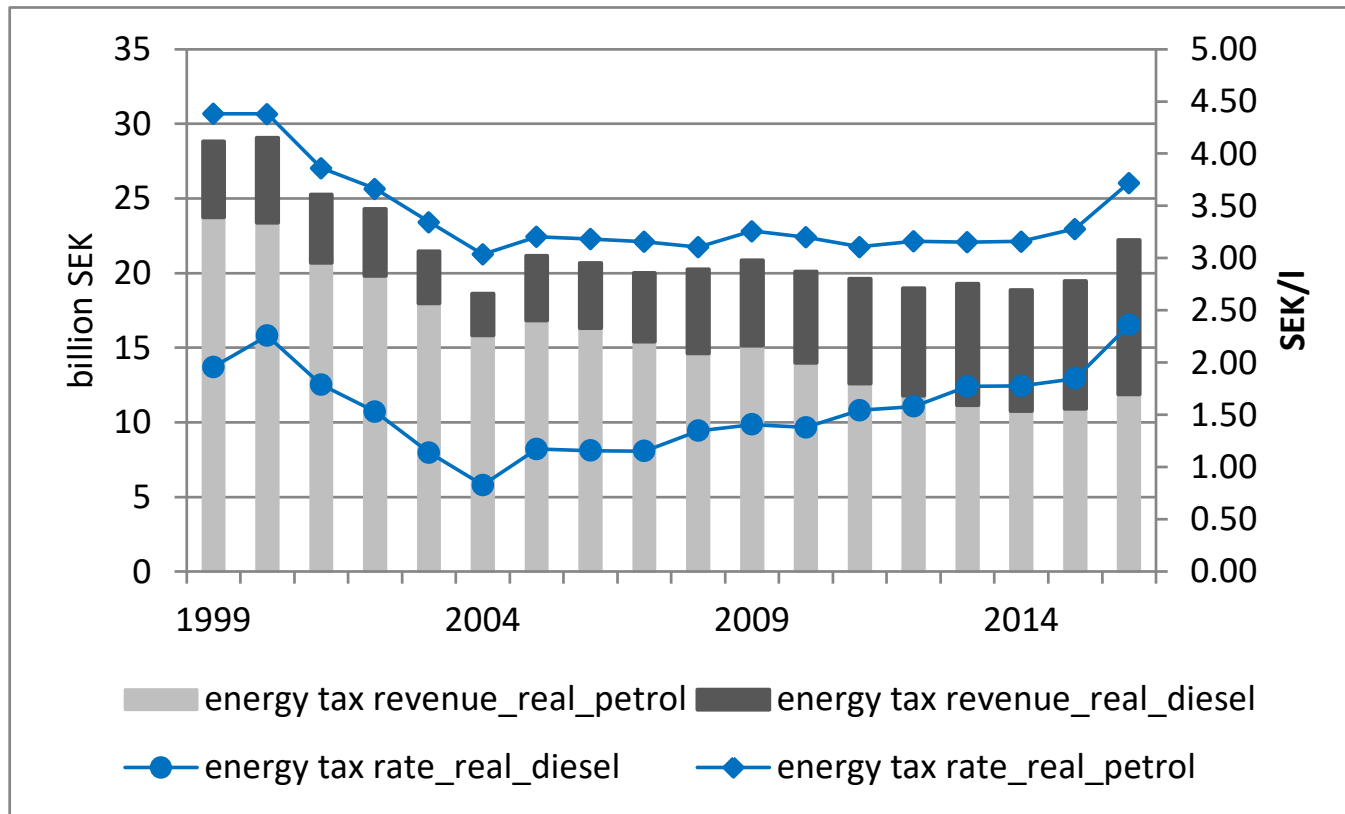
# Disclaimer

The views and opinions expressed in this presentation are those of the author and do not necessarily reflect the official policy or position of the Swedish Ministry of Finance or Swedish Government Offices.



# Energy tax revenues

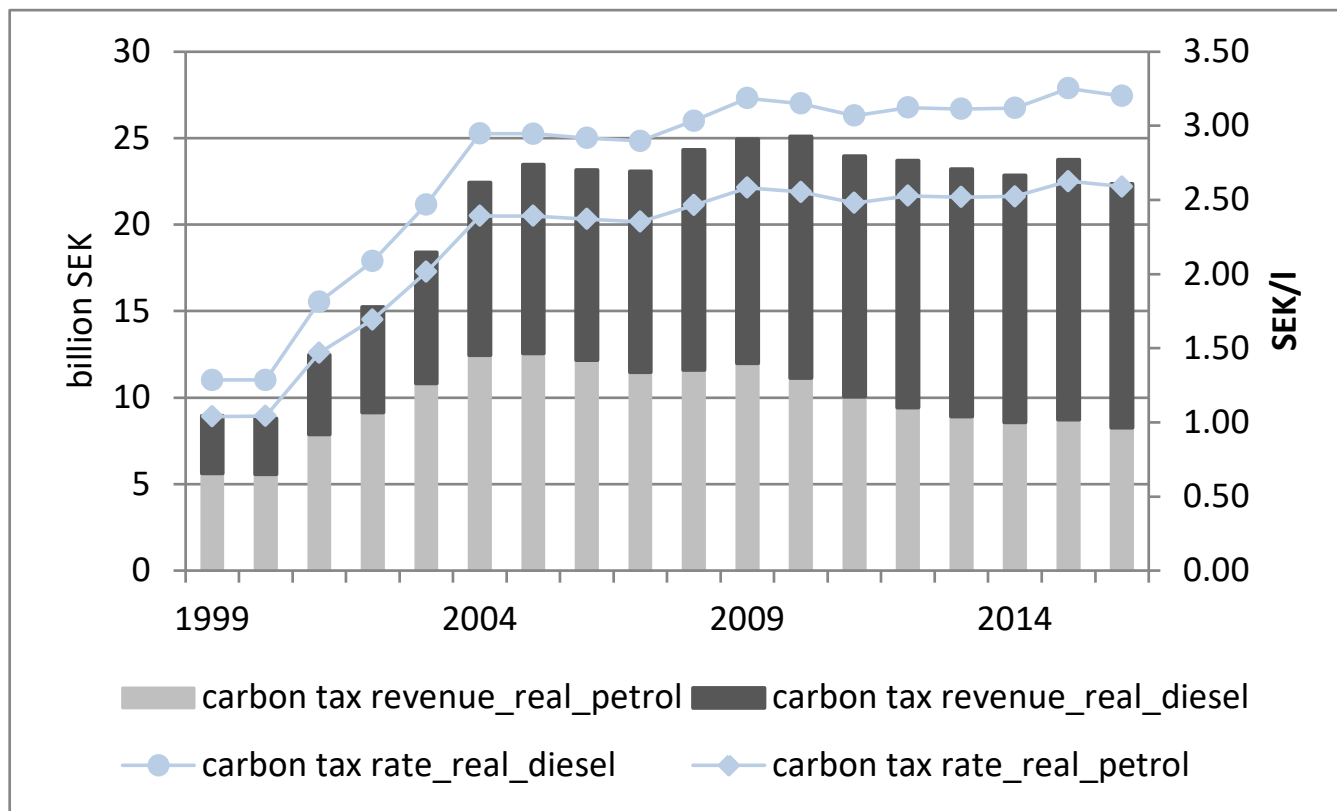
Figure 1. Total energy tax revenues and tax rates (real), 1999-2016



Note: Taxes excluding VAT. Real prices in 2016. Tax revenues have been calculated using fuel tax rates and energy use data.  
 Source: Swedish Ministry of Finance, SEA and own calculations

# Carbon tax revenues

Figure 1. Total carbon tax revenues and tax rates (real), 1999-2016

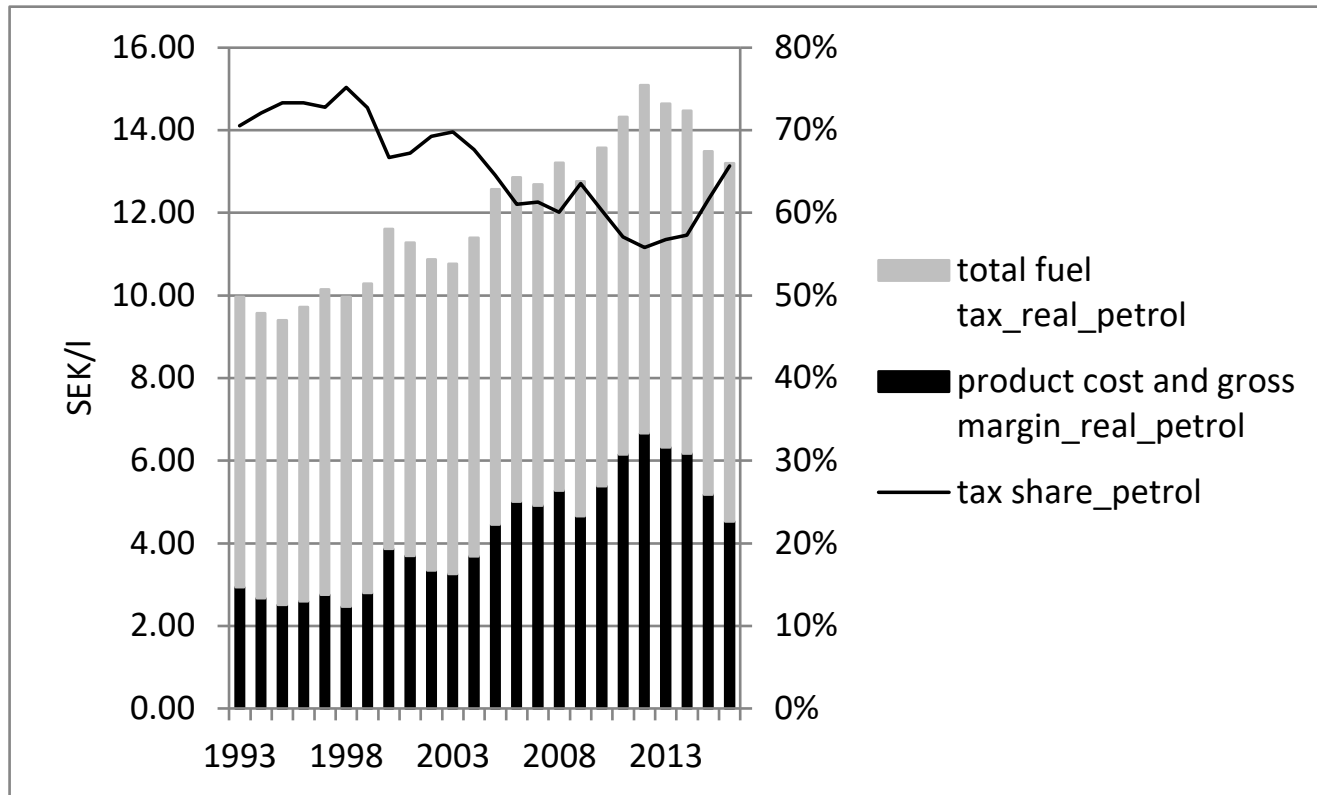


Note: Taxes excluding VAT. Real prices in 2016. Tax revenues have been calculated using fuel tax rates and energy use data.

Source: Swedish Ministry of Finance, SEA and own calculations

# Final price and tax share for petrol

Figure 1. Final price at pump and tax share for petrol, 1993-2016

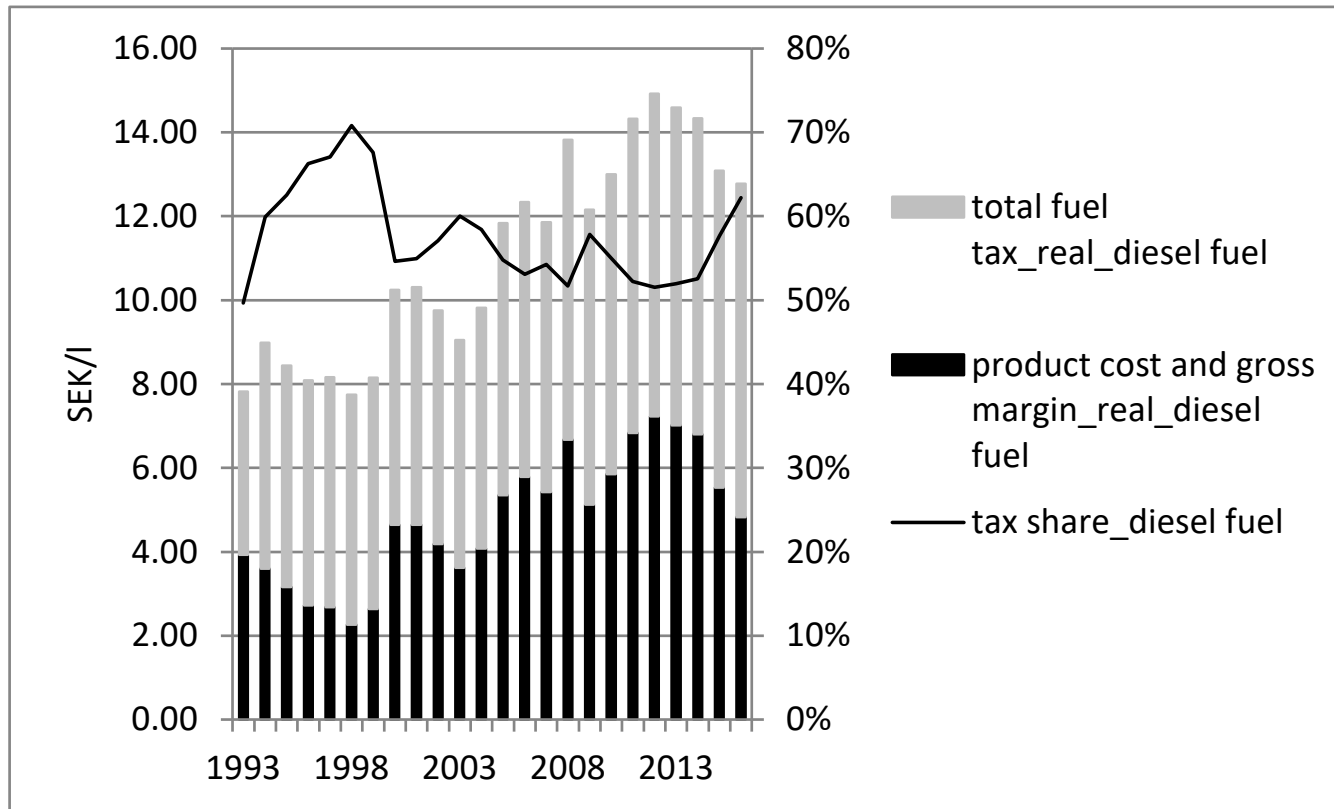


Note:

Source: SPBI

# Final price and tax share for diesel

Figure 1. Final price at pump and tax share for diesel, 1993-2016



Note:  
Source: SPBI