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

A closer look at Swedish data

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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?

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

Fuel duty taxes face £170bn hit from electric cars

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

Financial Times, 26 June 2017
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

1924: Energy tax on petrol
1937: Energy tax on diesel
1991: Carbon tax
2013: Energy tax on certain biofuels
## Motor fuel tax rates in 2016

Table 1 Motor fuel tax rates, 2016

<table>
<thead>
<tr>
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<tbody>
<tr>
<td>Petrol (MK1)</td>
<td>3.72 (0.44)</td>
<td>2.59 (0.30)</td>
<td>6.31 (0.74)</td>
</tr>
<tr>
<td>Diesel (MK1)</td>
<td>2.36 (0.28)</td>
<td>3.20 (0.37)</td>
<td>5.56 (0.65)</td>
</tr>
<tr>
<td>Low-blended ethanol</td>
<td>0.96 (0.11)</td>
<td>0</td>
<td>0.96 (0.11)</td>
</tr>
<tr>
<td>Low-blended FAME</td>
<td>2.12 (0.25)</td>
<td>0</td>
<td>2.12 (0.25)</td>
</tr>
<tr>
<td>High-blended FAME (B100)</td>
<td>1.15 (0.13)</td>
<td>0</td>
<td>1.15 (0.13)</td>
</tr>
<tr>
<td>High-blended ethanol (in E85)</td>
<td>0.99 (0.12)</td>
<td>0</td>
<td>0.99 (0.12)</td>
</tr>
<tr>
<td>HVO</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
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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
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

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

Note: Tax excluding VAT.
Source: Swedish Ministry of Finance
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 (CO2eq) 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*

- 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)

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.
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.
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

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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

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Source: SPBI