Indicator fact sheet

TERM 2006 21 — Fuel prices and taxes

Indicator code / ID	
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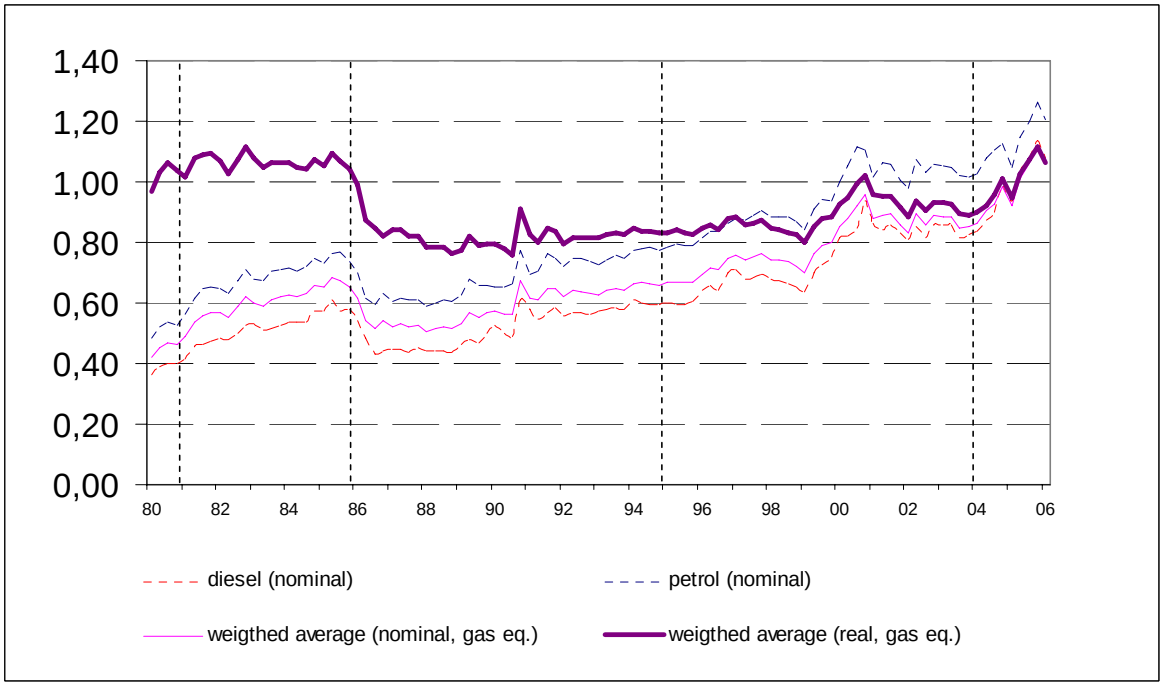
😐 **The inflation-corrected average price of road fuel has increased slightly during the last decades, apart from periodical increases due to political instabilities. Fuel taxes have risen during the nineties, but since 2000 the growth slows down. The average level of external costs of road transport is not balanced by these taxes and as other appropriate instruments such as regultion lack, fuel taxes may need to be increased faster. In rail transport, fuel taxes are even lower; inland and seaborne shipping and aviation pay no fuel tax at all.**

Figure 1: Nominal and real fuel prices in the EU (Euro's per litre)

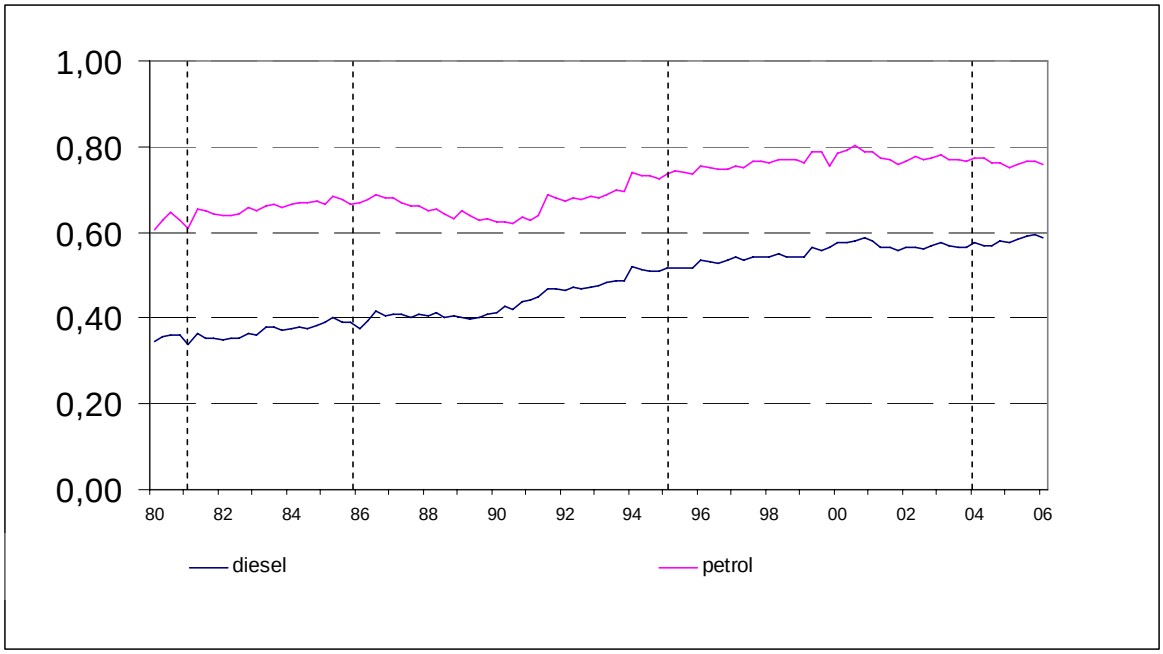


Note: Fuel prices include cost price, excise duty and VAT. The weighted average price of all fuels is expressed per LITRE OF PETROL EQUIVALENT (diesel prices are adjusted for their higher energy content). Prices are those applicable in the middle of January, April, July and October each year. Real prices are corrected for inflation and expressed as Euros of 2006 (January)

Only EU Member States are included: EC-9 since 1980, EC-10 since 1981, EC-12 since 1986, EU-15 since 1995, EU-25 since 2004 (---).

Source: DG TREN Oil bulletin, different volumes.

Figure 2: Real average level of road fuel VAT and excise duty in EU Member States, 1980–2006 (Euro's per litre)



Note: Tax prices are corrected for inflation and expressed as Euros of 2006 (January). Only EU Member States are included: EC-9 since 1980, EC-10 since 1981, EC-12 since 1986, EU-15 since 1995, EU-25 since 2004 (---).

Source: DG TREN Oil bulletin, different volumes.

Results and assessment

Policy relevance

Fuel prices can explain developments in transport demand, as they both are closely linked. A change in the price of fuels leads to a change in the demand for fuels and vice versa. Furthermore, fuel taxes indicate the extent of internalisation of externalities (See TERM 22 Progress in charge levels). The European Commission aims at fair and efficient transport pricing (European Commission, 2001), which means that transport charges should reflect the external costs of transport. This can amongst others be done by taxation of fuel consumption.

Policy context

Fair and efficient transport pricing is a crucial precondition for sustainable transport. It includes that *users pay for the full costs (environmental costs included) of transport*.

The price and tax level of fuel are important for three reasons:

- *Fuel taxation* is an instrument that serves different policy objectives, among others to internalise external costs. If prices and duties of transport (including fuel taxes) covered all social costs, the demand for transport would be economically optimal for the welfare of society as a whole, since prices would reflect all health, environmental and infrastructure costs. However, fuel taxes are certainly not the only way towards fair pricing (see "TERM 22 Progress in charge levels" for more 'fair pricing' tools e.g. kilometre charging or vehicle regulation);
- Higher *fuel prices* give incentives to reduce fuel consumption, e.g. by more fuel efficient vehicles, a shift to non-motorized or public transport modes, fewer trips, and less transport dependent patterns of settlements;
- *Differentiated fuel taxes* can stimulate a shift towards cleaner fuels, for example from leaded towards unleaded petrol, to low-sulphur fuels or to biofuels. However, there can be unwanted side effects. For example the lower fuel tax on diesel – once introduced to support shippers - also fostered a shift from petrol to diesel passenger cars.

Fuel taxes are the subject of a number of EU initiatives:

- The first is the White Paper 'European transport policy for 2010: time to decide' (European Commission, 2001). It proposes to harmonise 'excise duty on diesel for commercial uses, which in practice would be higher than the current average tax on diesel'. The aim of this harmonisation is:
  - A better internalisation of external costs. From the internalisation point of view there is no reason to tax diesel at a lower rate than petrol
  - Improvement of the internal market by establishing level playing field for shippers from different member states and more stable prices in road transport. However, a 2002 Commission proposal to do so was rejected by the Council. The proposal resulted in decreases in excise duty incomes for several countries, up to 50 % in the UK. Also transport organisations argued against fuel tax revision.
- The second is a Council Directive on the taxation of energy products, (2003/96/EC[1]) of 27 October 2003, which contains *inter alia* new EU minimum levels for road fuel taxes. Due to this Directive, the minimum excise duty for unleaded petrol increased from € 287 per 1000 litres to € 359 per 1000 litres. For diesel fuel, the minimum rate increased from € 245 per 1000 litres to € 302 per 1000 litres.

Environmental context

Fossil fuel consumption is directly linked with CO_2 emission (the primary greenhouse gas). The links with other pollutant emissions (e.g. NOx, HC, NMVOC, etc.) and noise depend on the vehicle technology used (EURO and noise classes, type of engine and fuel needed) and trip conditions, as well as the type of fuel. Therefore fuel taxes are also seen as instruments to reduce emissions from transport, in particular CO_2 (see TERM 26 EU – Internalisation of external costs').

Assessment

General overview

While nominal prices of transport fuels increased considerably (see Box 2), the real (inflation corrected) average price of road fuel in the EU has increased only slightly during the past decades, apart from short periods of price increases due to political and market instabilities.

In the new Member States, the level of fuel prices and taxes is about 20 % below the level in the old member states. However, the accession of the EU-10 in 2004 has not lead to a reduction of the average fuel price (figure 1), because of high crude oil prices and the limited fuel consumption in the EU-10 region. The growth of the average level of taxes (figure 2) slows down in recent years, since many countries do not increase their tax rates during high oil price periods. In 2000 some member states started a milder fuel taxation policy (figure 2).

Because of differences in prosperity, location, economic structure and other arguments, there are differences in fuel taxation levels within the EU Member States. Several Member States do not meet the EU minimum of 0.30 €/l for diesel and 0.36 €/l for petrol. These countries may apply a transitional period to adjust its fuel tax levels to the EU minimum - See Table 1 for details.

Internalisation of external costs

External costs of diesel run vehicles are on average higher than those from petrol vehicles (see TERM 25 External costs of transport and CE, 2004). Nevertheless, in all Member States (except for the UK) diesel is taxed less than petrol. This contributed to a shift from petrol to diesel vehicles in the last decades: the fuel mix has moved from the relatively expensive petrol to cheaper diesel fuel. In 1980, petrol accounted for about 70 % and diesel for 30 % of the fuel sales. In 2006, the share of diesel was 58 % and unleaded petrol about 42 %. This is due to both a growth in road freight transport, and dieselification of the passenger vehicle fleet. From an environmental point of view, it is not justified to tax diesel fuel lower than petrol. Diesel cars' particulate emissions are the main reasons for this. They are responsible for health problems and the associated costs (see TERM 03 Transport emissions of air pollutants). The duties on diesel cars do not fully offset this effects, so there is a need for other instruments to deal with this problem. However, with the introduction of Euro V emission standards for road vehicles, particulate emissions will be strongly

[1] OJ L 283, Volume 4631, October 2003

reduced. But penetration of the Euro V standards into the entire vehicle fleet will take more than a decade. A rise in the tax on diesel fuel could still contribute to a better internalisation of environmental costs of diesel cars

The effects of fuel prices on CO_2 emissions

An increase in fuel prices results in a decrease in fuel demand (see also box 1), transport demand, GHG emissions and thereby in an decrease in the pressure on the environment. A 10 % increase in fuel price leads, in the long run, according to the international literature (Goodwin, Dargay and Hanly, 2004) a decrease in:

- Total fuel demand with 6 %,
- Total vehicle kilometres with 3 %,
- Vehicle stock with 3%

This implies that a 10 % increase of the fuel price will, in the long run, decrease CO2 emissions by 4–10 %, compared to the situation where prices remain stable, and vice versa. The effect on fuel demand is bigger than on vehicle kilometres since the fuel efficiency of vehicles improves[2]. This can be exemplified by comparing the UK and the US: fuel taxes in the US are 8 times higher than in the UK: UK vehicles are about twice as fuel efficient as vehicles in the US. In the shorter term, the effects are smaller (3 %). The main effect is then on the total mileage and the mileage per vehicle.

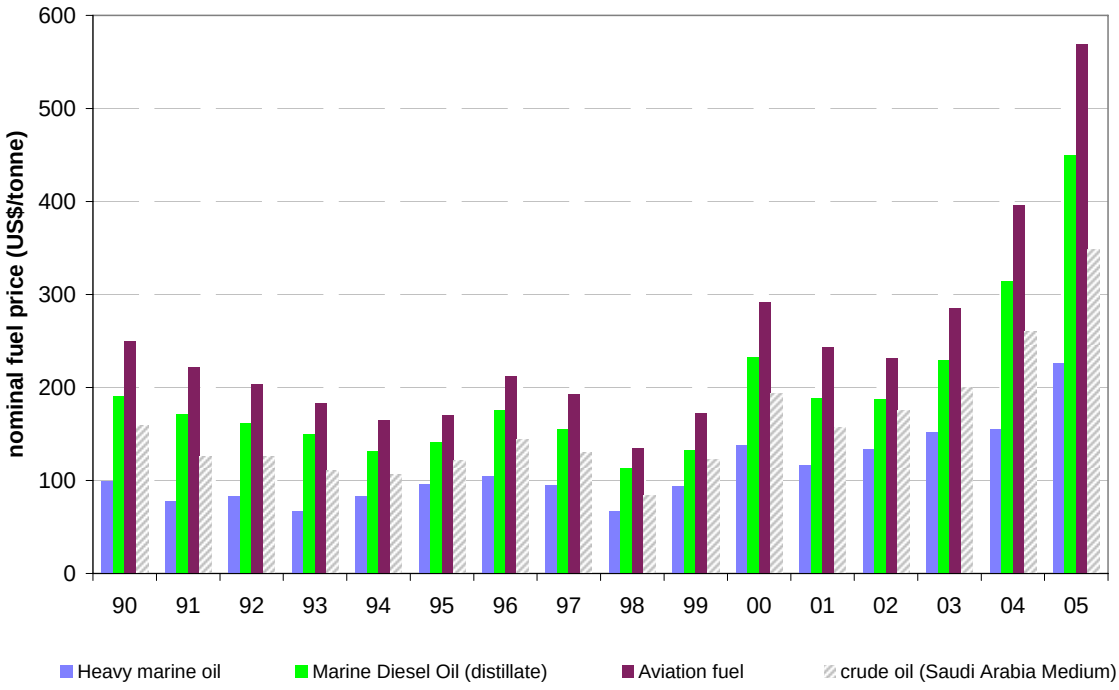
A 10 % price increase in freight transport costs results in a reduction of traffic with 8 %, while total shipped volume reduces with 5 %. This is due to improved logistics and transport management (Small & Winston, 1999).

[2] Engine efficiency improvements in new ship engines were accelerated during periods of high oil price. The rate of fuel consumption per kWh fell at over 1.5 per cent per year during the period 1974-1985, but only 0.5 per cent per year during the period before 1974; there has been little reduction in new ship fuel consumption since 1985 (OECD, 1997).

Sub-indicator: Price of non-road fuels

☹ **The price of non-road fuels is low compared with road fuels. This is because non-road fuels are not levied due to international conventions (the Mannheim convention for inland shipping and bilateral agreements for air transport). For rail transport, the case is somewhat different. In several countries, fuel taxes are levied, but in most of these countries the levels are much lower than for road transport. Thus non-road fuel prices reflect only the volatile mineral oil prices on the world market and are affected by fiscal policy to a much lower degree.**

Figure 3: Trends in prices of non-road fuels



Note: Prices are those at the Rotterdam spot market, applicable for the whole EU-25. Marine diesel oil is the fuel used in inland shipping.

Source: IEA, 2005.

Assessment for the sub-indicator

The costs of fuel for the non-road modes are much lower than for road transport. Per unit, road transport fuels are about 5 times more expensive than fuels used in aviation, maritime shipping and inland navigation and about 3 times more expensive than aviation fuels. For rail transport, the limited available information on fuel taxation indicates that taxes are below the levels of that applicable for road transport[3].

Because of the absence of fuel taxes and other levies in shipping and aviation, transport is not allocated in an efficient manner. Low (fuel)taxes cause an unsustainable transport demand and fuel consumption due to uncovered environmental costs. Because of the low prices for transport, there are many less value-adding transport movements in product life cycle. Numerous products are

[3] Diesel excise duties for rail transport are 0.05 € and 0.47€ (equal to road tax) per litre in The Netherlands and Germany respectively (2003). Belgium does not levy taxes on rail diesel.

transported between the sites of raw material extraction, production, distribution and consumption (e.g. clothes, production in low-wage countries). Introduction of fuel taxes or other environmental charges would reduce the demand for this type of transport related to production and consumption patterns and increase the overall welfare of the society.

However, the room for improvement is limited:

- There are two main legal constraints on the introduction of a tax on aircraft fuel. The first results from the 1944 Chicago Convention, which states that "fuel, lubricating oils, spare parts regular equipment and aircraft stores on board an aircraft of a contracting state shall be exempt from customs duty, inspection fees or similar national duties or charges". The ICAO Council of 14 December 1993 confirmed that not only goods already on board the aircraft, but also fuel embarked on aircraft shall be exempt of excise duties and other consumption taxes. All EU Member States are members of ICAO and have to abide by this regulation. The second constraint results from the numerous bilateral Air Service Agreements, which exist between individual Member States and also between Member States and third countries. These agreements govern the treatment of fuel loaded on to an aircraft and usually contain a clause to the effect that both fuel in transit and fuel supplied in the territory of the contracting party are exempt from fuel taxes.
- The “diesel oil convention” of 1952 that forbids the levying of shipping fuel at the Rhine and its tributaries is a legal constraint for fuel taxation. This convention is a supplementary protocol to prevent different interpretations of the Mannheim convention (which dates back to 1868) with reference to shipping fuel. The Rhine and its tributaries are the most important waterways in the EU.
- There are also clearly major political barriers to implement a maritime bunker fuel charge. The United Nations Convention on the Law of the Sea (UNCLOS) guarantees the right of innocent passage for foreign ships in the territorial sea without being subject to any charges, except for services received.

At the moment, systems of emission trading for aviation (CO_2) and maritime transport (sulphur) are studied by the European Commission. Also initiatives for bringing land transport under an emission trading system are currently investigated in several countries. Big advantage of these emission trading systems is an absolute emission cap to stop CO_2 emission growth. However, political will is needed to make it an effective instrument. Emissions can be charged within the current legal frameworks.

The current high oil price (close to 80$/barrel) gives incentives to improve the fuel efficiency of transport modes, but the environmental costs remain uncovered. Decisions on improved logistics and the purchase of more efficient engines are taken only on the basis of fuel costs. Environmental costs are still not taken into account. To take these into account, government intervention (regulation, emissions trading, etc.) is indispensable.

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Data

Table 1: Excise duty on road transport fuels in EU countries (January 2006)

	petrol (Euro 95)	diesel
Austria	425	334
Belgium	592	341
Denmark	540	365
Finland	587	319
France	589	417
Germany	655	470
Greece	*296*	*245*
Ireland	443	368
Italy	564	413
Luxembourg	442	*277*
Netherlands	665	380
Portugal	558	339
Spain	396	*294*
Sweden	534	392
United Kingdom	689	689
Cyprus	*304*	*249*
Czech Republic	410	345
Estonia	*288*	*245*
Hungary	427	352
Lithuania	*288*	*245*
Latvia	*275*	*235*
Malta	*310*	*246*
Poland	371	*316*
Slovakia	414	387
Slovenia	360	*301*
Bulgaria (2002)	*155*	*90*
Romania (2002)	401	*255*
Minium excise duty	359	302 (2010: 330)

Some countries are exempted from the minimum levels, according to Directive 2003/96/EC, 2004/74/EC and 2004/75/EC

Unit: EUR per 1 000 litres

Note: Numbers in italic are under the EU minimum excise duty level. For Switzerland, Norway, Liechtenstein and Iceland, not data is available.

Source: DG TREN, different volumes; DG TAXUD, 2003.

Spreadsheet file: TERM 2006 21 EU — Fuel prices and taxes.xls

Metadata

Web presentation information

1. Abstract / description / teaser:

The inflation-corrected average price of road fuel has increased slightly during the nineties in the EU-25, apart from short increases. However, the growth in taxes slows down, leaving the gap between external costs and charges.

2. Policy issue / question:

The fuel price has influence on the demand for fuel and thereby on the burden of transport to the environment. An increase of fuel price improves the efficiency of transport (engine and logistics) and decreases the demand for the least value adding trips. Fuel taxes are amongst the instrument to internalise external costs. Since the external costs are not met and other appropriate instruments lack, there is room for an increase of fuel taxes.

3. EEA dissemination themes: Transport

4. DPSIR: D

Technical information

5. Data source: TERM 21 2006 Fuel prices.xls

   DG TREN (Oil bulletin) http://europa.eu.int/comm/energy/oil/bulletin/2003_en.htm

   IEA (Energy prices and taxes) http://data.iea.org/ieastore/statslisting.asp

6. Description of data:

   Original file name: TERM 2006 21 EU — Fuel prices and taxes.xls

   Original measure units: old EU-15: ECU, market prices (until 1998), EUR, market prices (from 1999 onwards) and new EU countries: national currencies.

7. Geographical coverage: EU-25 : Belgium, Denmark, Germany, Greece, Spain, France, Ireland, Italy, Luxembourg, the Netherlands, Austria, Portugal, Finland, Sweden, United Kingdom, Cyprus, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Malta, Poland, Slovakia, Slovenia

8. Temporal coverage: January 1980 to January 2006.

9. Methodology and frequency of data collection: fuel prices are corrected for inflation and weighted with consumption to calculate an EU average. Data is collected 4 times a year by DG TREN.

10. Methodology of data manipulation: Nominal prices corrected for inflation rate (Eurostat).

Quality of information

11. Strengths and weaknesses (at data level): All data are comparable.

12. Reliability, accuracy, robustness, uncertainty (at data level): data quality is assumed to be very good.

13. Overall scoring (give 1 to 3 points: 1 = no major problem, 3 = major reservations): 1

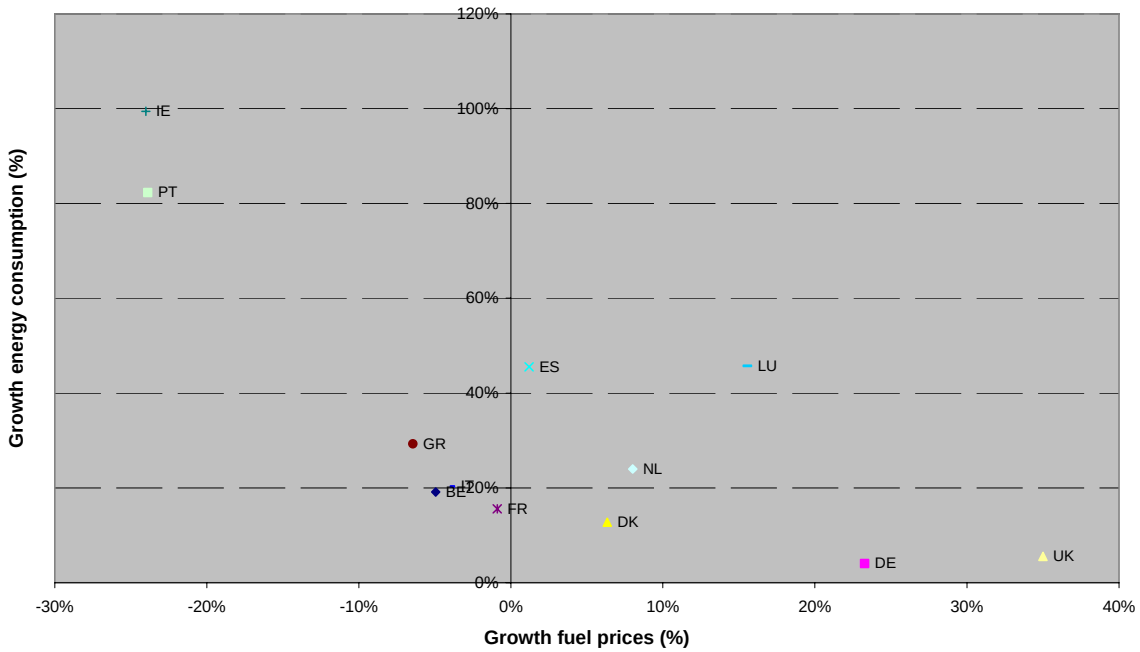
    Relevancy: 1
    Accuracy: 1
    Comparability over time: 2 (country coverage is limited over the entire timeframe)
    Comparability over space: 2 (country coverage is limited over the entire timeframe)

Future work

Gathering information on rail diesel and electricity taxes.

Box 1: Growth in energy consumption versus growth in fuel prices

The figure shows a combination of growth in road transport energy consumption and development in fuel prices (in constant prices) over the period 1991–2002. A correlation between decreasing fuel prices and high transport volume growth is clearly visible. This does not imply that price development in itself can explain the transport volume development, but clearly indicates that price is likely to have played a role. This however underpins the argument made in the factsheet that transport demand is price sensitive.



Source: adapted from TERM 01 Transport energy consumption and data from this fact sheet.

Box 2: The myth about expensive fuel

The cost of fuel has not risen as much as many people think. Petrol and diesel fuel prices have slightly more than tripled since 1960. In comparison, the price of bread rose by a factor of more than six during the same period. Also compared to public means of transportation, the petrol price has increased less. Between 1960 and today, the average bus fare has increased by a factor of ten.

The average gross hourly wage in German industry was DM 2.84 in 1960. Today, it is about DM 28. In 1960, an industrial labourer earned one litre of regular petrol in about thirteen minutes, whereas today it takes a little over four minutes. This data is based on gross wages, since net wages cannot easily be compared due to differences in social security contributions and taxation structures.

Source: German Federal Environmental Agency

Box 3: Road fuel EU versus US

In the United States the fuel mix is very different from that of the EU. Diesel fuel consumption by passenger cars is limited. Diesel passenger cars are hardly sold, and diesel fuel is unobtainable at many filling stations. Sulphur limits for road diesel are also less stringent than in Europe. The poor image of the diesel car plays an important role in this. In the early 1980s diesel cars were introduced in the United States under the CAFE standards. The CAFE standards have not gotten stricter in the 80s and 90s and the fluctuating diesel fuel price and the falling price of gasoline and disappointing technological results (the solutions developed were not sufficiently reliable) led to a rapid decline in sale of diesel vehicles. Today, there are indications that diesel engine might make a comeback in the United States. Several vehicle manufacturers (have plans to) put diesel vehicles on the US market

Source: IFP, 2004.