Institute for Transport Studies
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Charging for use of infrastructure by road freight: European experience

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Outline

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1. Introduction
2. Legislation
3. Measuring marginal social costs
4. HGV charging systems in practice
5. Regulation
6. Conclusions

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Why is EC concerned about taxes and charges on road haulage?

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- Fair competition between operators in different countries
- Fair competition between modes of transport
- Internalisation of externalities and promoting efficient and environmentally less damaging road haulage in terms of vehicle types and how they are used
- Raising funds for investment in transport infrastructure

Adopted short run marginal cost pricing as basis of policy (White Papers in 1998)

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The marginal social costs of road freight transport consist of:

- Road damage, which is sensitive to axle load and road quality;
- Congestion, which varies with traffic volume, and thus with location and time of day
- Environmental and accident costs, which vary widely with vehicle characteristics, geographical location and time of day.

Charges for HGVs in Europe

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- Normal charges in all countries are:
  - Fuel taxes
  - Fixed annual charges
  - Insurance
- In terms of supplementary charges there are three approaches:
  - Eurovignette countries (time or distance based)
  - Countries with tolls on specific roads
  - Countries with no direct road charging at all but usually higher fuel tax and or annual charges

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Directive 2011/76/EU

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Permits kilometre based charging for:

marginal maintenance and renewals costs

noise

air pollution

differentiating charges according to levels of congestion,

(although the overall revenue raised from this charge must not exceed the costs of providing the road system as a whole to avoid giving an incentive to countries with a high level of transit traffic to limit capacity and force up price).

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Road wear and tear costs

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Description	PCU-km	AV.gwt-km	Max gwt-km	Sa-km	Include in MC?
Long-life pavements				100%	✓
Resurfacing				100%	✓
Overlay				100%	✓
Surface Dressing	20%	80%			✓
Patching and minor repairs		20%		80%	✓
Drainage	100%				✓
Bridges and remedial earthworks		100%			
Footways, cycle tracks and kerbs		100%			
Fences and barriers	33%	67%			
Verges, traffic signs and crossings	100%				
Sweeping and cleaning	100%				
Road markings	10%	90%			✓
Winter maintenance and misc.	100%				
Street lighting	100%				
Policing and traffic wardens	100%				

Note: av.gwt – average gross weight; max gwt – maximum gross vehicle weight; sa – standard acles (a measure of the relative damage due to axle weights). The costs attributed to pedestrians for roads other than motorways (50% of the categories from Fences and barriers through to Street lighting) are removed prior to allocation to motorised vehicles.

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Average elasticity of road costs with respect to traffic levels

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- Renewals 0.5 - 0.8
- Maintenance cost 0.4 - 0.7
- Operations cost 0

Source: Review of econometric studies by Link et al (2013)

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Accident and environmental costs

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- Based on willingness to pay for reduced risk and improved amenity
- For accident costs, big issue is how far they are external
- Noise costs generally based on hedonic studies of house prices
- Air pollution costs follow the impact pathway approach (dose response)
- Greenhouse gases best handled by a separate carbon tax based on costs of reaching targets

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Example of Marginal Social Cost calculation (hgv euro2 euros per km)

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	Basel-Duisburg			Duisburg-Rotterdam		
	Peak	Off-Peak	Night	Peak	Off-Peak	Night
Noise	0.036	0.059	0.178	0.058	0.095	0.287
Congestion	0.657	0.009	0.004	0.660	0.009	0.004
Accident	0.050	0.050	0.050	0.028	0.028	0.028
Air pollution	0.031	0.031	0.031	0.032	0.032	0.032
Climate change	0.021	0.021	0.021	0.021	0.021	0.021
Wear and tear	0.151	0.151	0.151	0.158	0.158	0.158
Total	**0.946**	**0.321**	**0.435**	**0.957**	**0.343**	**0.530**
Notes: Peak Period – 07.00 to 18.00, Off-Peak – 18.00 to 00.00. Night – 00.00 to 07.00. Source: Ricci et al. (2008)..						

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Comparison of HGV km charges in three countries

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	Switzerland	Austria	Germany	
Implementation date	2001	2004	2005	
Roads to which charges are applied	All Swiss road network	Initially motorways	Initially Motorways	
Lorry weight charged	>3.5 tonnes	>3.5 tonnes	>12 tonnes	
Technology	Tachograph + GPS	Microwave	GPS	
Differentiation by euro Class?	Yes	No	Yes	

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Modelled impact Europe-wide (IASON/TIPMAC/GRACE)

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- Biggest traffic reduction in core countries – they benefit more than periphery
- Reassignment of traffic from urban to rural areas
- Higher proportion of large trucks
- 6% of road tonne km diverted to rail and water
- But 50% of traffic reduction comes from changing distribution systems and more local sourcing of inputs and consumer goods
- Substantial benefits (1.6% of GDP) from a km charge on all vehicles not differentiated by location and time of day

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Regulation

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- Both road and rail natural monopolies
- Issues about efficiency, pricing, investment
- No requirement for a road regulator
- European legislation does require a rail regulator, largely to prevent discrimination against new entrants, but also requires a multi annual investment plan
- Often this is simply negotiated between government and rail infrastructure manager, but in Britain the regulator plays a key role

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A 5 yearly cycle comprising:

- High level output specification HLOS (capacity, reliability, safety) and statement of funds available SOFA by DfT
- Periodic review of Network Rail by Rail Regulator (determination of revenue requirements, to be met by access charges, government and borrowing)
- Regulator undertake benchmarking studies of Network Rail costs
- Regulator must ensure Network Rail has adequate finance; otherwise it must reduce planned outputs

Advantages

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- Well considered long term plan with committed funding
- Pressure for efficiency

Government now proposing essentially to transfer this approach to the Highways Agency, which would become a publicly owned company.

The rail regulator would conduct benchmarking studies for road as well

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Conclusions

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- There is now much evidence on how to measure marginal social cost
- Technologies exist to implement marginal social cost pricing for HGVs, although whether a full GPS based system as opposed to a simple kilometre charge is worthwhile remains uncertain.
- There are benefits from having an independent regulator to examine efficiency, charges and funding.

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