

CHARGING FOR TRANSPORT INFRASTRUCTURE USE : QUESTIONS AND ANSWERS

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OUTLINE

- Principles good transport pricing
 - » Fundamental pricing equation
 - » External costs
- Transport sector applications:
 - » What are the imbalances
 - » What can different instruments achieve
 - » Can we expect a big surplus and how to deal with deficits?
 - » Pricing and Investment
 - » Dealing with imperfections in rest of the economy
- Transport pricing and the environment
- Transport pricing and equity
- The political process ?

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- **Principles good transport pricing**
 - **Fundamental pricing equation**
 - External costs
 - Congestion
 - Air pollution, noise
 - Accidents
 - Road wear and tear
- Transport sector applications:
 - Transport pricing and the environment
 - Transport pricing and equity
 - The political process

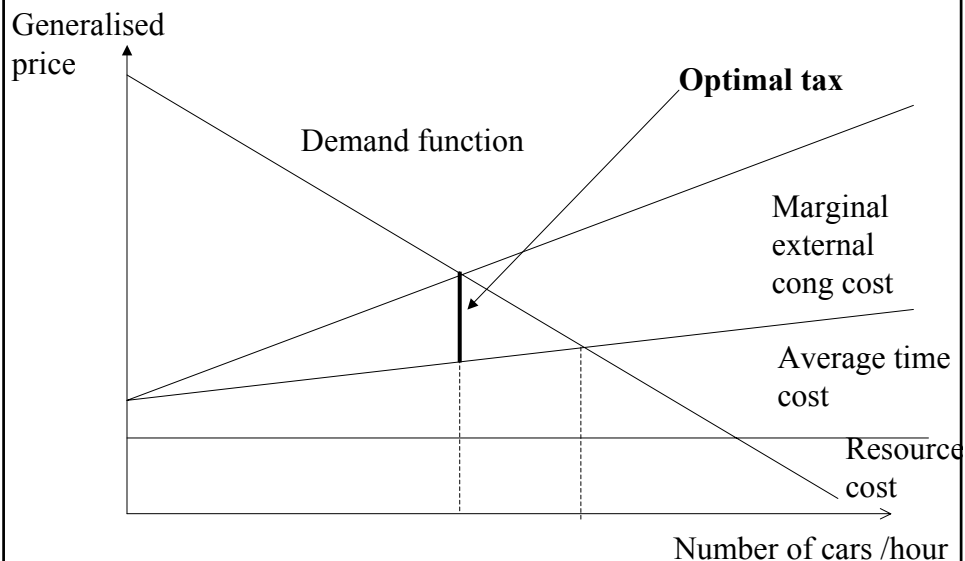
Basic Economic Principles of Transport Pricing

- Leave choice of volume and mode to users as they know best what is good to them
- Make sure prices reflect full opportunity costs of trips
 - **Full** means that economists will try to translate all policy objectives (air pollution, speed, etc.) on the same money basis
 - This is one of the distinctive features of an economic approach

The fundamental pricing equation

Users' cost = Marginal Benefit for user	Social Marginal Cost
<i>Resource costs car and fuel</i>	<i>Resource costs car and fuel</i>
<i>Own time costs</i>	<i>Own time costs</i>
Fuel + vehicle taxes	Environm.costs
Insurance (3 rd party liability)	Accidents costs others
	Time losses others

Fundamental Pricing graph



Marginal external costs methodology

- External Congestion costs: time losses for the other road users – nothing new
- Road wear and tear: improved methodologies, large range of estimates
- Air pollution costs: uncertainty, shifts in emphasis between pollutants, one CO2 damage value for European market
- External costs of accidents: rather small with non-myopic drivers and if insurance with experience rating
- Mohring effect: positive economics of density in public transport
- Check 5th framework UNITE project D15

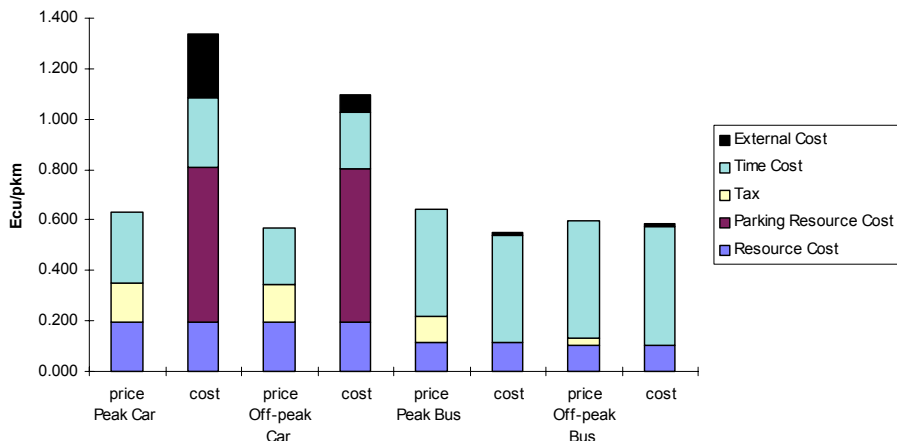
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- Principles good transport pricing
- **Transport sector applications:**
 - How wrong are current prices?
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How wrong are current prices?

- Simplify fundamental pricing equation:
- Check for each transport mode and period if the condition $TAX = MEC$ holds
- See TRENEN- II for road, rail
 - De Borger & Proost , « Reforming transport pricing in the European union » Edgar Elgar ,2002
 - ECMT, FIFI Report Efficient Transport Taxes and Charges 2003 <http://www.oecd.org/cem>
- Missing: ports, airports...

What is wrong with current prices and taxes in Europe?- London



How wrong are current prices?

- Urban peak road use underpriced in most countries
- Public transport prices too low in peak in most countries (except UK?)
- Freight transport:
 - Road peak may be overtaxed but in general pricing discrepancy is lower for freight than for passengers

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What can we do about pricing inefficiencies and does it really matter? –

Brussels —source: Proost & Van Dender, Reg Sc.Urban Econ,2001

Policy	Relative Efficiency
Benchmark	0%
Higher Fuel taxes	5%
Public Tr.Pricing	5-10%
Parking Charges	30%
Cordon Pricing	52%
Social MC pricing	100%

Other Pricing constraints

- Not all links in network can be tolled
 - Lower tolls on tolled road see Verhoef,Small etc.
- Other implementation constraints
 - Technical, political etc.
- See MC-ICAM work

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Do better prices bring surplusses?

- On average and over all modes, and for given capacity, marginal social cost pricing will bring surplusses, certainly in urban areas (see ECMT, FIFI Report Efficient Transport Taxes and Charges 2003)
- Some modes(road) will generate large surplusses, Public transport modes will generate deficits (high Fixed costs, economics of density)

Revenue changes of optimal pricing

source: ECMT, FIFI Report Efficient Transport Taxes and Charges 2003

	Britain	France	Germany	Nether lands	Finland
Welfare gain (billion E/y)	17	10	6	2	1
Revenue gain %	+65%	+56%	+64%	+31%	-20%
Air poll costs	-54%	-50%	-35%	-31%	-42%
Congestion (increase in rush hour speed)	+10%	+9%	+13%	+12%	-

How important is balancing the financial account by mode?

- Marginal social cost pricing generates a deficit or a surplus for some modes
- If one wants to break even one can choose between:
 - Average cost pricing (price=total cost/volume)
 - Ramsey pricing: mark ups on top of marginal social cost that are inversely proportional to the elasticity of demand (a monopolist would do the same)
 - Two part tarriff – not studied here
- Results of Proost & Van Dender (forthcoming) for Unite D13

Welfare impacts of pricing scenarios (2005), % full income change with respect to Ref

	REF	AVERAGE COST PRICING	RAMSEY PRICING	MARGINAL SOCIAL COST PRICING
GERMANY				
DÜSSELDORF	0	-0.8	+0.1	+0.1
MÜNCHEN	0	-0.6	+0.1	+0.4
MÜNSTER	0	-2.5	-2.2	+2.5
WESTPHALEN REGION	0	-0.2	-0.1	+0.1
UK				
LONDON	0	-0.8	+1.3	+2.7
SOUTH EAST REGION	0	-1.9	+0.2	+0.6

Budget balance per mode

- Average cost pricing does worse than the reference
- “constrained marginal cost pricing” gets between 30 and 90% of the unconstrained marginal social cost pricing
- Caveats:
 - All transport operations are run efficiently: a cost recovery target (lower or higher than 100%) may be useful here
 - Perfect instruments
 - Two part taxes may be of interest
 - Investments are not considered

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Pricing and investment 1

- Does better pricing make sense when capacity is not optimal?
 - Yes, better pricing is always worthwhile
 - Prices will be lower if capacity has been extended
- Comparing
 - an equilibrium with optimal pricing but no new investments
 - with an equilibrium with optimal pricing and optimal investments, prices are not much lower and total surplus not so different because road extension in urban areas is very costly (study for Netherlands: Dings et al.(2002) “Return on roads: optimising road investments”) ...

Pricing and investment 2

- Should we not first increase Public Transport capacity before we start charging road taxes and prices?
 - Not necessarily because PT prices may have to go up too so that net demand effect is not always positive and in general not that large
 - Sources:
 - De Borger & Proost , « Reforming transport pricing in the European union » Edgar Elgar ,2002
 - ECMT, FIFI Report Efficient Transport Taxes and Charges 2003

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Dealing with imperfections in rest of economy

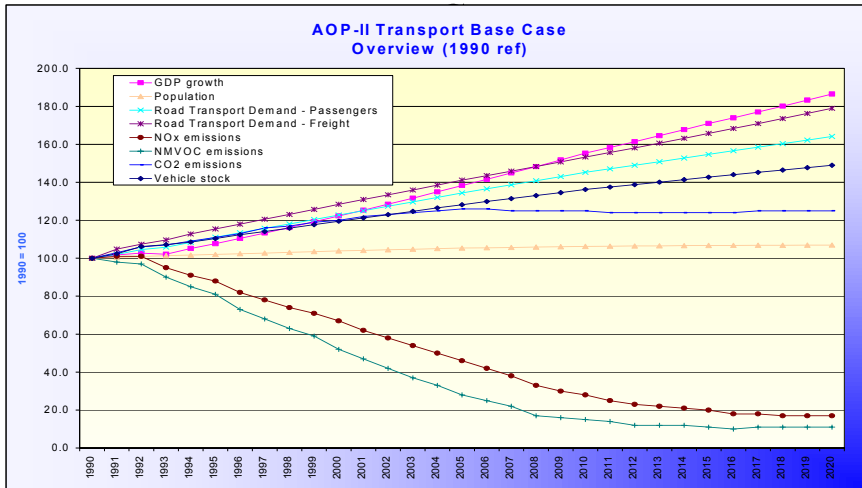
- Most important market distortion is probably the labour (and payroll) tax
- Several implications for transport pricing
 - If the only motive in peak is commuting, tax = marg ext congestion cost if revenues recycled via lower labour taxes, other wise optimal tax is much lower, see Parry & Bento, Scand J.Econ, 2001,
 - Intuition: minimize net commuting costs
 - Differentiate transport prices according to motive (make commuters pay 50% of non commuters?) –see Van Dender, Scand J.Econ, 2003)
 - Best Use of surpluses is to decrease existing labour taxes

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- **Transport pricing and the environment**
 - **What happens with conventional pollutants?**
 - Climate change and fuel efficiency of cars
 - Gasoline versus diesel cars
- Transport pricing and equity

AOP- II C/E Analysis

Transport Base Case



What happens with conventional pollutants?

- Emission of conventional pollutants decreases strongly with new emission standards (in 2020 road transport emissions may be 20% or less of 1990 emissions)
- Standards may be a bad instrument here
 - Source: Calthrop & Proost, ETE wp
- For some pollutants one may have reached the region of strongly increasing costs in road transport sector
- Turn attention to other modes
- TREMOVE 2 project see www.tremove.org

Conventional pollutants and diesel versus gasoline cars

- Many European countries favour diesel cars (France and Belgium: close to 50% of km)
- This is not really wise: a diesel car generates less tax revenue and is more polluting
 - Generates less tax revenue because diesel car consumes less per km
- What happened: tax authorities have not followed up
 - the technological progress in diesel cars
 - the changing emphasis in the damage of particulates
- Source: I.Mayeres, S.Proost, (2001), "Should diesel cars in Europe be discouraged?" *Regional Science and Urban Economics*, 31, 453-470,

Is the reduction of GHG gasses a priority for road transport?

- NO because there exist already 300% or more carbon taxes under the form of fuel excises in transport sector
- So cars are too fuel efficient
- Better turn attention to other GHG saving options
- Source:
 - : S.Proost, D.Van Regemorter, F.Lantz, V.Saint-Antonin,(2000) "Limiting air pollution from transport: economic evaluation of policy options for the European Union" *International Journal of Global Energy Issues* , Vol 14, p 320 – 330
 - S. Proost, D. Van Regemorter (2000), "Are there cost-efficient CO2-reduction possibilities in the transport sector? – Combining two modelling approaches" *International Journal of Vehicle Design*, Vol 24, N° 2/3, p 1-15

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- **Transport pricing and equity**
 - Equity requires checking loss or gain on transport markets and how revenue is used
 - Subsidies to PT may very well be a very inefficient way to favour the poor
 - **Illustration: marg tax reform, global tax reform**

Sources:

I. Mayeres, S.Proost (2001), "Tax reform for congestion type of externalities", *Journal of Public Economics*, Feb

Mayeres, Proost (2003), *Reforming Transport Pricing: an economic perspective on equity and acceptability*, <http://www.kuleuven.be/ete nrWP2002-12>

Cout marginal social de Fonds Publiques pour différents instruments

		Degré d'aversion à l'inégalité			
		$\varepsilon=0$	$\varepsilon=1$	$\varepsilon=5$	$\varepsilon=10$
<i>MCSFP</i>					
Taxe consommation non transp	t_1	1.90	1.24	0.44	0.25
Taxe transp. Voiture Pointe	t_2	0.99	0.64	0.22	0.12
Taxe transport Voit Hors Pointe	t_3	1.70	1.12	0.41	0.23
Taxe Transp Publiques	t_4	0.77	0.52	0.20	0.12
Taxe uniforme par tete	P	1.27	0.96	0.50	0.35
Reduction depense routière	R	4.74	2.95	0.90	0.46

Is SMC pricing equitable? – illustration Belgium

% equivalent income gain	Average Cost + higher labour taxes	SMC + lower labour taxes	SMC + higher social transfers
Quintile 1	-0.78%	+0.47%	+3.88%
Quintile 2	-0.04	+0.03%	+2.21%
Quintile 3	-0.24	-0.16%	+0.75%
Quintile 4	-0.20	+0.22%	+0.00%
Quintile 5	-0.49	+1.45%	-0.51%
Gain in Euro/person	-93	+161	+149