

Decoupling the Environmental Impacts of Transport from Economic Growth

Transport and environment: a policy challenge



ORGANISATION FOR ECONOMIC CO-OPERATION AND DEVELOPMENT

Table of Contents

Executive Summary	9
Chapter 1. Introduction	13
1. Background	14
2. Decoupling: the concept	15
3. Some caveats	17
Chapter 2. Transport and the Economy	21
1. Introduction	22
2. General links between transport and economic activity	22
3. Factors influencing transport demand	24
4. Passenger transport	28
5. Freight transport	30
6. Elasticities	32
7. Transport infrastructure and economic growth	37
8. Elasticity of growth to transport infrastructure investments	39
Chapter 3. Transport and the Environment	43
1. Transport externalities	44
2. Overview of transport externalities in Europe	50
3. Energy consumption	52
4. CO ₂ emissions	52
5. CO emissions	55
6. Trends across selected air pollutants	56
Chapter 4. Decoupling Indicators	59
1. Economic indicators of transport versus GDP	60
2. Environmental impacts of transport versus GDP	62
Chapter 5. Policy Instruments for Decoupling	65
1. Introduction	66
2. General approaches for decoupling	66
3. Economic instruments	70
4. Regulatory instruments	76
5. Investment instruments	81
6. Institutional arrangements	83

7. Educational instruments	84
8. Overview of "soft" measures	85
9. Synergies	85
Chapter 6. National Case Studies	87
1. Background	88
2. Austria	88
3. Germany	89
4. Italy	90
5. Japan	91
6. Spain	91
7. Sweden	92
8. Heavy goods vehicle fee – Switzerland	92
9. Congestion charging – London	94
Chapter 7. Conclusion: Towards a Decoupling Strategy	97
1. Overview of available instruments	98
2. Conclusions and recommendations for policy action	101
Glossary	105
References	109

List of boxes

5.1. Transport fuel taxation – Germany	74
5.2. Overview of existing congestion pricing policies	77
7.1. Decoupling in Eastern Europe	102

List of tables

2.1. Transport ranking of top five freight sectors by value per tonne and tonne-miles	23
2.2. External trade by mode of transport in the EU25, 2004	26
2.3. Trips by purpose in Great Britain, Germany and the USA	27
2.4. Estimated long-term transport elasticities	34
2.5. Overall results: various elasticities	36
2.6. Vehicle travel elasticities with respect to user costs	37
2.7. Output elasticities derived from aggregated production functions ..	40
2.8. Output elasticities derived from aggregate production functions ..	41
3.1. Total external costs of road transport in 2000 by cost category and transport mode (EU17)	51
3.2. Range of reported external costs in cost-of-driving studies in the US	52

3.3. CO ₂ emissions from the transport sector, million tonnes CO ₂ (excluding international bunkers)	53
4.1. Growth rate of GDP, passenger and freight transport in the US, 1970 to 2003	60
4.2. Growth rate of GDP, passenger and freight transport in the EU, 1970-2003	60
5.1. Road pricing categories	75
5.2. Benefits of road-pricing	75
5.3. Selected road pricing schemes	79
5.4. Summary of results from Dutch CO ₂ benchmarking study	80
5.5. Impact of telecommuting on mass transit congestion in Tokyo, 2010	83
5.6. Main results of studies on the impact of "soft" measures on transport demand	86
7.1. Instruments for decoupling: overview	99

List of figures

2.1. Major sectoral contributions to US GDP, 2003	23
2.2. Modal share of types of goods transported in the EU15, 2003	24
2.3. Growth in world trade, GDP and transport, 1980-2000	25
2.4. Motorisation level and wealth in selected OECD countries, 1970-2000	28
2.5. Modal split of passenger transport in the EU, the USA and Japan, 2003	29
2.6. Passenger transport trends by modes in the US, EU and Japan, 1970-2003	30
2.7. Trends of road freight intensity and GDP per capita in the OECD area, 1970-2000	31
2.8. Modal split of freight transport in the EU, the USA and Japan, 2003	31
2.9. Freight transport trends by modes in the US, the EU15 and Japan, 1970-2002	33
2.10. Links between transport infrastructure investment and economic growth	38
3.1. US greenhouse gas emissions by economic sector, 2003	47
3.2. Energy consumption of transport and all sectors in the US, Japan and Europe, 1970-2002	53
3.3. CO ₂ emissions by source in Austria	54
3.4. CO ₂ emissions by sectors in the US, Japan and the EU, 1970-2002	55
3.5. CO ₂ emissions by modes of transport in the EU15, 1970-2005	56

3.6. CO emissions of the transport sector, road transport and all sectors in the US and the EU, 1970-2002	57
3.7. Trends in CO ₂ , CO, NO _x and VOC emissions from road transport and rail transport in the US, 1970-2002.....	58
4.1. Comparison of trends of total transport, GDP growth, road freight transport and air passenger transport in the US and the EU, 1970-2003, 1970 = 100	61
4.2. Trends in CO ₂ , CO, NO _x and VOC emissions from road transport and GDP growth in the US, 1970 to 2002, 1970 = 100.....	62
4.3. Comparison of trends of CO ₂ , CO, NO _x and VOC emissions from road transport and GDP growth in the EU, 1970 to 2002, 1970 = 100	63
5.1. Strategies for decoupling freight transport from economic growth	67
5.2. Revenues from environmentally related taxes in % of GDP.....	71
5.3. Revenues from environmentally related taxes in % of total tax revenue	71
5.4. Environmentally related taxes.....	72
5.5. Tax rates on petrol and diesel in OECD member countries.....	73
5.6. Potential emissions reduction through pricing.....	76