

ANNEX

AI. CLASSIFICATION AND ASSIGNMENT PROCEDURES

This study goes back to the '93/'94 investigations [Tax Policy, Jarass/Obermair, 1994] for the EC, DG XXI, Task Force on Statutory Contributions and Charges.

In '94/'95 the Task Force has made further investigations for many EU countries in order to classify and assign taxes to production factors: for the respective country investigations see [Statutory, EC, 1995]. The results of an application to all EU Member States have been published in [Structures, Eurostat, 1996], a revised and updated version has been published in [Tableaux, CEC, 1996]; a detailed description of the classification and assignment procedures used is available in [Key, CEC, 1997].

A complete list of all taxes levied in the Member States of the European Union can be found in [Inventory, EC, 1996].

The following gives a detailed description of the classification and assignment procedures used in this report. To allow for international comparability between the EU-Member States and their international competitors Japan, Switzerland and USA revenue data from [Revenue, OECD, 1996], complemented by [Taxes, Eurostat, 1996] have been used. The data bank built up in the course of this study can be supplied on request.

Tab. AI.1 : Assignments of Taxes to Economic Factors - DENMARK												
		(1) taxes on employed labour		(2) taxes on capital		(3) taxes on natural resources & environment				(4) tax on general consumption	(5) taxes on transfers	
		(1a) tax	(1b) soc. contrib.	(2a) capit. income	(2b) capit. property	(3a) transport	(3b) other energy	(3c) water etc	(3d) pollution			
1000	Taxes on income, profits, cap. gains			x								
except	1110 of individuals income&profits	split		x								split
	from which is central gov. inc. tax	split ¹										split ¹
	county income tax	split ¹										split ¹
	municipality income tax	split ¹										split ¹
	seaman's income tax	x										
	old-age pension fund contributions	x										
	sickness benefit fund contributions	x										
	church tax	split ¹										split ¹
	labour market contribution	x										
2000	Social security contributions		x									
except	from self- or non employed ²											
3000	Taxes on pay roll and work force	x										
4000	Taxes on property				x							
5000	Taxes on goods and services										x	
except	5121 petrol					x						
	5121 motor vehicle registration					x						
	5121 aircraft registration					x						
	5121 ship registration					x						
	5121 electric bulbs						x					
	5121 sales of vehicle number plates					x						
	5121 electricity						x					
	5121 certain oil products					split ³	split ³					
	5121 gas						x					
	5121 extract.&imp. of raw materials						x					
	5121 insecticides, herbicides, etc								x			
	5121 coal, etc							x				
	5121 waste								x			
	5121 large yacht registration duty					x						
	5121 CFC								x			
	5121 CO2							x				
	5121 rechargeable Ni cd-batteries								x			
	5121 piped water							x				
	5121 disp. tableware+retail cont.								x			
	5126 motor vehicle compl. insur.					x						
	5126 insurance on pleasure boats					x						
	5126 duty on charter flight					x						
	5126 passenger duty					x						
	5211 motor vehicles: by household					x						
	5211 motor vehicles: paid by others					x						
	5121 excises: duty on mineral oils					split ⁴	split					
	5126 tax on electricity bills						x					
	5211 motor vehicles: by households					x						
	5211 motor vehicles: paid by others					x						
6000	Other taxes				x							
PRODUCTION												
CONSUMPTION												

Disaggregation into taxes on production and taxes on consumption:

(a) Taxes on production: (1) taxes on employed labour + (2) taxes on capital + from (3) taxes on nat. resources & environment: 5121 aircraft registration, 5121 ship registration, 5121 certain oil products for transport (=diesel), 5211 motor vehicles: paid by others, 5121 insecticides, herbicides, etc, 5121 coal, etc, 5121 extract. & imp. of raw materials, 5121 CFC, 5126 passenger duty.

(b) Split between taxes on production and on consumption:

- 5121 sales of vehicle number plates + 5126 motor vehicle compl. insur. + 5121 motor vehicle registration: acc. to (5211 motor vehicles: paid by others / 5211 motor vehicles: by households).
- 5121 electricity: acc. to (taxes on electricity for household / taxes on electricity for industry)⁵.
- 5121 gas: acc. to (taxes on gas for household / taxes on gas for industry).
- 5121 certain oil products for other energy use (=heating oil etc): acc. to (taxes on non-transport mineral oil for household) / (taxes on non-transport mineral oil for industry).
- 5121 CO2: acc. to (taxes on non-transport mineral oil / gas / coal for household) / (taxes on non-transport mineral oil / gas / coal for industry).

(c) Taxes on consumption: (4) taxes on consumption + from (3) taxes on nat. resources & environment: 5121 petrol, 5121 electric bulbs, 5121 waste, 5121 large yacht registration duty, 5121 rechargeable Ni cd-batteries, 5121 piped water, 5121 carrier bass (paper/plastic/etc), 5126 insurance on pleasure boats, 5126 duty on charter flight, 5211 motor vehicles: by households.

		(1) taxes on employed labour		(2) taxes on capital		(3) taxes on natural resources & environment				(4) taxes on general consumption	(5) taxes on transfers
		(1a) tax	(1b) soc. contrib.	(2a) capit. income	(2b) capit. property	(3a) transport	(3b) other energy	(3c) water etc	(3d) pollution		
1000	Taxes on income, profits, cap. gains			x							
except	1110 of individuals income&profits										
	taxes on income from employment	x									
2000	Social security contributions		x								
except	from self- or non employed ⁶										
	from which is unallocable										x
3000	Taxes on pay roll and work force	x									
4000	Taxes on property				x						
5000	Taxes on goods and services									x	
except	special excises on hydrocarbons					split ⁷	split ⁷				
	5122 profits of fiscal petroleum monopolies					split ⁷	split ⁷				
	tax on imported hydrocarbons					split ⁷	split ⁷				
	5211 motor vehicles: paid by households					x					
	5211 motor vehicles: paid by others					x					
	municipal road tax paid by enterprises					x					
6000	Other taxes				x						
PRODUCTION											
CONSUMPTION											

Disaggregation into taxes on production and taxes on consumption:

(a) Taxes on production: (1) taxes on employed labour + (2) taxes on capital + from (3) taxes on nat. resources & environment: 5211 motor vehicles: paid by others, municipal road tax paid by enterprises.

(b) Split between taxes on production and on consumption:

- special excises on hydrocarbons, 5122 profits of fiscal petroleum monopolies, tax on imported hydrocarbons acc. to (taxes on diesel + non-transport mineral oil for industry) / (taxes on petrol + non-transport mineral oil for household).

(c) Taxes on consumption: (4) taxes on consumption + from (3) taxes on nat. resources & environment: 5211 motor vehicles: paid by households; taxes on consumption.

Tab. AI.3 : Assignments of Taxes to Economic Factors - GERMANY												
		(1) taxes on employed labour		(2) taxes on capital		(3) taxes on natural resources & environment				(4) taxes on general consumption	(5) taxes on transfers	
		(1a) tax	(1b) soc. contrib.	(2a) capit. income	(2b) capit. property	(3a) transport	(3b) other energy	(3c) water etc	(3d) pollution			
1000	Taxes on income, profits, cap. gains			x								
except	1110 of individuals income&profits											
	from which is wage tax	x										
	assessed income tax			x								
	withholding tax on dividends			x								
	supplementary tax	split ⁸		split ⁸								
	enterprise tax			x								
	withholding tax on interest			x								
2000	Social security contributions		x									
except	from self- or non employed ⁹											
3000	Taxes on pay roll and work force	x										
4000	Taxes on property				x							
5000	Taxes on goods and services										x	
except	5121 excises: duty on mineral oils					split ¹⁰	split ¹⁰					
	5126 tax on electricity bills						x					
	5211 motor vehicles: by households					x						
	5211 motor vehicles: paid by others					x						
6000	Other taxes				x							
PRODUCTION												
CONSUMPTION												

Disaggregation into taxes on production and taxes on consumption:

(a) Taxes on production: (1) taxes on employed labour + (2) taxes on capital + from (3) taxes on nat. resources & environment: 5211 motor vehicles: paid by others.

(b) Split between taxes on production and on consumption:

- 5121 excises: duty on mineral oils acc. to (taxes on diesel + non-transport mineral oil for industry) / (taxes on petrol + non-transport mineral oil for household).
- 5126 tax on electricity bills acc. to (taxes on electricity for industry) / (taxes on electricity for household).

(c) Taxes on consumption: (4) taxes on consumption + from (3) taxes on nat. resources & environment: 5211 motor vehicles: paid by households.

		(1) taxes on employed labour		(2) taxes on capital		(3) taxes on natural resources & environment				(4) taxes on general consumption	(5) taxes on transfers
		(1a) tax	(1b) soc. contrib.	(2a) capit. income	(2b) capit. property	(3a) transport	(3b) other energy	(3c) water etc	(3d) pollution		
1000	Taxes on income, profits, cap. gains			x							
except	1110 of individuals income&profits										
	from which is income tax			x							
	wage tax	x									
	dividend tax			x							
	directors tax	x									
	inhabited house tax			x							
2000	Social security contributions		x								
except	from self- or non employed ¹¹										
3000	Taxes on pay roll and work force	x									
4000	Taxes on property				x						
5000	Taxes on goods and services									x	
except	5121 spec. excise on motor vehicles					x					
	5121 excise on petrol					x					
	5121 excise on mineral oil					split ¹²	split				
	5121 taxes for nuclear reactor						x				
	5121 taxes on noise pollution								x		
	5121 taxes on air pollution								x		
	5121 taxes on petroleum products						x				
	5211 motor vehicles: by households					x					
	5211 motor vehicles: paid by others					x					
	5213 taxes on water pollution								x		
6000	Other taxes				x						
PRODUCTION											
CONSUMPTION											

Disaggregation into taxes on production and taxes on consumption:

(a) Taxes on production: (1) taxes on employed labour + (2) taxes on capital + from (3) taxes on nat. resources & environment: 5121 taxes for nuclear reactor, 5121 taxes on noise pollution, 5121 taxes on air pollution, 5211 motor vehicles: paid by others.

(b) Split between taxes on production and on consumption:

- 5121 spec. excise on motor vehicles acc. to (5211 motor vehicles: paid by others / 5211 motor vehicles: paid by households).
- 5121 excises: duty on mineral oils acc. to (taxes on diesel + non-transport mineral oil for industry) / (taxes on non-transport mineral oil for household).
- 5121 taxes on petroleum products acc. to (taxes on non-transport mineral oil for industry) / (taxes on non-transport mineral oil for household).

(c) Taxes on consumption: (4) taxes on consumption + from (3) taxes on nat. resources & environment: 5121 excise on petrol, 5211 motor vehicles: paid by households, 5213 taxes on water pollution.

		(1) taxes on employed labour		(2) taxes on capital		(3) taxes on natural resources & environment				(4) tax on general consumption	(5) taxes on transfers
		(1a) tax	(1b) soc. contrib.	(2a) capit. income	(2b) capit. property	(3a) transport	(3b) other energy	(3c) water etc	(3d) pollution		
1000	Taxes on income, profits, cap. gains			x							
except	1110 of individuals income&profits										
	from which is wage tax	x									
	rent of land and buildings			x							
	dividend interest and trading income			x							
	social security benefits										x
	surtax			x							
	special charges			x							
2000	Social security contributions		x								
except	from self- or non employed ¹³										
3000	Taxes on pay roll and work force	x									
4000	Taxes on property				x						
5000	Taxes on goods and services									x	
except	5121 excises: hydrocarbon oil					split ¹⁴	split ¹⁴				
	5121 excises: car tax										
	5121 excises: gas levy						x				
	5121 excises: non-fossil fuel oblig.					split ¹⁴	split ¹⁴				
	5126 air passenger duty								x		
	5211 motor vehicles: by households					x					
	5211 motor vehicles: paid by others					x					
6000	Other taxes				x						
PRODUCTION											
CONSUMPTION											

Disaggregation into taxes on production and taxes on consumption:

(a) Taxes on production: (1) taxes on employed labour + (2) taxes on capital + from (3) taxes on nat. resources & environment: 5126 air passenger duty, 5211 motor vehicles: paid by others.

(b) Split between taxes on production and on consumption:

- 5121 excises: hydrocarbon oil acc. to (taxes on diesel + non-transport mineral oil for industry) / (taxes on petrol + non-transport mineral oil for household).
- 5121 excises: car tax acc. to (5211 motor vehicles: paid by others) / 5211 motor vehicles: by households).
- 5121 excises: gas levy acc. to (taxes on non-transport mineral oil for industry) / (taxes on non-transport mineral oil for household).
- 5121 excises: non-fossil fuel obligations acc. to (taxes on diesel + non-transport mineral oil for industry) / (taxes on petrol + non-transport mineral oil for household).
- 5126 tax on electricity bills acc. to (taxes on electricity for industry) / (taxes on electricity for household).

(c) Taxes on consumption: (4) taxes on consumption + from (3) taxes on nat. resources & environment: 5211 motor vehicles: paid by households.

Tab. AI.6 : Assignments of Taxes to Economic Factors - SWITZERLAND												
		(1) taxes on employed labour		(2) taxes on capital		(3) taxes on natural resources & environment				(4) tax on general consumption	(5) taxes on transfers	
		(1a) tax	(1b) soc. contrib.	(2a) capit. income	(2b) capit. property	(3a) transport	(3b) other energy	(3c) water etc	(3d) pollution			
1000	Taxes on income, profits, cap. gains			x								
except	1110 of individuals income&profits											
	from which is federal tax	split ¹⁵		split ¹⁵								
	exemption of military service	x										
	kanton tax	split ¹⁵		split ¹⁵								
	municipal tax	split ¹⁵		split ¹⁵								
	withholding tax			x								
2000	Social security contributions		x									
except	from self- or non employed ¹⁶											
3000	Taxes on pay roll and work force	x										
4000	Taxes on property				x							
5000	Taxes on goods and services									x		
except	5121 excises: duty on mineral oils					split ¹⁷	split ¹⁷					
	5121 suppl. duty on mineral oils					split ¹⁷	split ¹⁷					
	5121 road tax					x						
	5122 fiscal monopolies: water							x				
	5211 motor vehicles: by households					x						
	5211 motor vehicles: paid by others					x						
6000	Other taxes				x							
PRODUCTION												
CONSUMPTION												

Disaggregation into taxes on production and taxes on consumption:

(a) Taxes on production: (1) taxes on employed labour + (2) taxes on capital + from (3) taxes on nat. resources & environment: 5211 motor vehicles: paid by others.

(b) Split between taxes on production and on consumption:

- 5121 excises: duty on mineral oils acc. to (taxes on diesel + non-transport mineral oil for industry) / (taxes on petrol + non-transport mineral oil for household).
- 5121 suppl. duty on mineral oils acc. to (taxes on diesel + non-transport mineral oil for industry) / (taxes on petrol + non-transport mineral oil for household).
- 5121 road tax acc. to (5211 motor vehicles: paid by households) / (5211 motor vehicles: by households + 5211 motor vehicles: paid by others).

(c) Taxes on consumption: (4) taxes on consumption + from (3) taxes on nat. resources & environment: 5122 fiscal monopolies: water, 5211 motor vehicles: paid by households.

		(1) taxes on employed labour		(2) taxes on capital		(3) taxes on natural resources & environment				(4) tax on general consumption	(5) taxes on transfers
		(1a) tax	(1b) soc. contrib.	(2a) capit. income	(2b) capit. property	(3a) transport	(3b) other energy	(3c) water etc	(3d) pollution		
1000	Taxes on income, profits, cap. gains			x							
except	1110 of individuals income&profits	split ¹⁸		split ¹⁸							
except	from which is enterprise tax			x							
2000	Social security contributions		x								
except	from self- or non employed ¹⁹										
3000	Taxes on pay roll and work force	x									
4000	Taxes on property				x						
5000	Taxes on goods and services									x	
except	5121 excises: local road tax					x					
	5121 excises: gasoline tax					x					
	5121 exc.: liquefied petroleum gas						x				
	5121 excises: aviation fuel tax					x					
	5121 excises: mineral product tax						x		x		
	5121 excises: electricity and gas tax						x		x		
	5121 excises: light oil delivery					x					
	5121 exc.: vehicle acquisition tax					x					
	5121 exc.: prom. of power res. dev.						x				
	5121 excises: petroleum tax					split ²⁰	split ²⁰		x		
	5126 travel tax					x					
	5210 automobile tax					x					
	5210 light vehicle tax					x					
	5210 motor vehicle tonnage tax					x					
6000	Other taxes				x						

PRODUCTION

CONSUMPTION

Disaggregation into taxes on production and taxes on consumption:

(a) Taxes on production: (1) taxes on employed labour + (2) taxes on capital + from (3) taxes on nat. resources & environment: 5121 excises: aviation fuel tax, 5121 excises: light oil delivery tax, 5126 travel tax, 5210 light vehicle tax, 5210 motor vehicle tonnage tax.

(b) Split between taxes on production and on consumption:

- 5121 excises: electricity and gas tax acc. to taxes on industry gas & electricity / taxes on household gas & electricity.
- 5121 exc.: vehicle acquisition tax acc. to (5210 light vehicle tax + 5210 motor vehicle tonnage tax) / (5210 automobile tax + 5210 light vehicle tax + 5210 motor vehicle tonnage tax).
- 5121 exc.: promotion of power resources development acc. to taxes on industry electricity / taxes on household electricity.

(c) Taxes on consumption: (4) taxes on consumption + from (3) taxes on nat. resources & environment: 5121 excises: gasoline tax, 5121 excises: local road tax²¹, 5121 exc.: liquefied petroleum gas, 5121 excises: mineral product tax, 5121 excises: petroleum tax, 5210 automobile tax.

		(1) taxes on employed labour		(2) taxes on capital		(3) taxes on natural resources & environment				(4) tax on general consumption	(5) taxes on transfers
		(1a) tax	(1b) soc. contrib.	(2a) capit. income	(2b) capit. property	(3a) transport	(3b) other energy	(3c) water etc	(3d) pollution		
1000	Taxes on income, profits, cap. gains			x							
except	1110 of individuals income&profits	split ²²		split ²²							
2000	Social security contributions		x								
except	from self- or non employed ²³										
3000	Taxes on pay roll and work force	x									
4000	Taxes on property				x						
5000	Taxes on goods and services									x	
except	5121 airport, airway, highway fed.					x					
	5121 public utilit. state&local gov.						x				
	5121 mot. fuel tax. state&local gov.					x					
	5121 coal tonnage tax federal						x				
	5121 hazardous substances tax fed.								x		
	5121 boat fuels&equipment tax fed.					x					
	5121 leak. undergr. storage fed.								x		
	5121 excises: ozon deplet. tax fed.								x		
	5121 excises: oil spill liability fed.								x		
	5121 exc.: transport. fuels tax fed.					x					
	5126 transportation of persons fed.					x					
	5126 transport of property					x					
	5126 inland water way tax federal					x					
	5211 motor vehicles: households					x					
	5211 motor vehicles: paid by others					x					
	5213 use tax of certain vehicles fed.					x					
	5213 use of int. travel facilities fed.					x					
	5213 public utilities license tax						x				
6000	Other taxes				x						

PRODUCTION
CONSUMPTION

Disaggregation into taxes on production and taxes on consumption:

(a) Taxes on production: (1) taxes on employed labour + (2) taxes on capital + from (3) taxes on nat. resources & environment: 5121 coal tonnage tax federal, 5121 hazardous substances tax fed., 5121 leak. undergr. storage fed., 5121 excises: ozon deplet. tax fed., 5121 excises: oil spill liability fed., 5126 transport of property, 5126 inland water way tax federal, 5211 motor vehicles: paid by others, 5213 use tax of certain vehicles fed., 5213 use of int. travel facilities fed..

(b) Split between taxes on production and on consumption:

- 5121 airport, airway, highway fed. acc. to taxes on diesel / taxes on petrol.
- 5121 public utilit. state&local gov. acc. to industry electricity / household electricity.
- 5121 mot. fuel tax. state&local gov. acc. to taxes on diesel / taxes on petrol.
- 5121 exc.: transport. fuels tax fed. acc. to taxes on diesel / taxes on petrol.
- 5213 public utilities license tax acc. to industry electricity / household electricity.

(c) Taxes on consumption: (4) taxes on consumption + from (3) taxes on nat. resources & environment: 5121 boat fuels&equipment tax fed., 5126 transportation of persons fed., 5211 motor vehicles: paid by households.

AII. CALCULATION OF NOMINAL TAX RATES

AII.1 Nominal Tax Rates for Average Earned Income

The tax bases 'income' and 'wealth' are reduced by many allowances, deductions etc. before the table tax rates are applied. For the calculations of the following tables only general personal allowances and all social contributions has been deducted.

Fig. AII.1 : Calculation of Nominal Tax Rates for Average Earned Income

compensation				
- employers' social contribution	= compensation / (1 - social contribution rate for employer)			
= gross income	* contribut. rate for employee	= soc. contribut. of employee	+ s.c. employer) / compensation	= social contribution rate
- allowances & deductions				
- soc. contributions of employee				
= tax base for state & local taxes	* table rate for state&local tax	= state&local tax	/ compensation	= state&local tax rate
- local & state tax (if deductible)				
= tax base for federal tax	* table rate for federal tax	= federal tax	/ compensation	= federal tax rate

Tab. AII.1 : Nominal Tax Rates²⁴ on a Typical Single Tax Payer [% of earned income]

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
year '85/'86	DK	ESP	GER	NL	UK	CH	²⁵ JAP	²⁶ USA
average ²⁷ compensation unit	[1,000 DKR]	[1,000 ESP]	[1,000 DEM]	[1,000 NLG]	[1,000 GBP]	[1,000 SFR]	[1,000 YEN]	[1,000 USD]
(1a) federal tax	²⁹ 14.5	³⁰ 13.7	³¹ 15.5	³² 13.7	³³ 13.7	³⁴ 1.3	³⁵ 9.1	³⁶ 7.6
(1b) state/local tax	³⁷ 22.6	-	-	-	-	³⁸ 9.1	³⁹ 6.1	⁴⁰ 3.7
(2) social contributi.	⁴¹ 4.5	⁴² 28.3	⁴³ 30.0	⁴⁴ 35.2	⁴⁵ 17.7	⁴⁶ 10.1	⁴⁷ 18.4	⁴⁸ 14.8
(3) total	41.6	42.0	45.5	48.9	31.4	20.5	33.6	26.1
year '95								
average ⁴⁹ compensation unit	[1,000 DKR]	[1,000 ESP]	[1,000 DEM]	[1,000 NLG]	[1,000 GBP]	[1,000 SFR]	[1,000 YEN]	[1,000 USD]
(1a) federal tax	⁵¹ 11.6	⁵² 13.0	⁵³ 14.1	⁵⁴ 4.1	⁵⁵ 10.4	⁵⁶ 1.4	⁵⁷ 5.3	⁵⁸ 7.5
(1b) state&local tax	⁵⁹ 23.6	⁶⁰ -	-	-	-	⁶¹ 10.1	⁶² 3.9	⁶³ 4.6
(2) social contributi.	⁶⁴ 8.0	⁶⁵ 28.4	⁶⁶ 33.0	⁶⁷ 41.2	⁶⁸ 18.4	⁶⁹ 11.9	⁷⁰ 23.3	⁷¹ 14.2
(3) total	43.2	41.4	47.1	45.3	28.8	23.4	32.5	26.3

Fig. AII.2 : Calculation of Nominal Tax Rates for an Increase of Average Earned Income				
marginal rates apply for an increase of tax base				
increase of compensation				
- increase of employers' social contribution	= increase of compensation / (1 - marginal social contribution rate for employer)			
= increase of gross income	* marginal social contribution rate for employee	= increased soc. contribut. of employee	+ incr. soc.contr. of employer) / increased comp.	= marginal social contribution rate
- increased allowances				
- incr. soc. contr. of employee				
= tax base for state & local taxes	* marginal table rate for state&local tax	= increased state&local tax	/ increased compensation	= marginal state&local tax rate
- increased local & state tax (if dedu.)				
= tax base for federal tax	* marginal table rate for federal tax	= increased federal tax	/ increased compensation	= marginal federal tax rate

Tab. AII.2 : Nominal Tax Rates on a Typical Single Tax Payer [% of an <u>increase</u> of earned income]								
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
year '85/'86	DK	ESP	GER	NL	UK	CH	⁷² JAP	USA
average ⁷³ compensation unit	[1,000 DKR]	[1,000 ESP]	[1,000 DEM]	[1,000 NLG]	[1,000 GBP]	[1,000 SFR]	[1,000 YEN]	[1,000 USD]
(1a) federal tax	⁷⁴ 28.8	⁷⁵ 15.9	⁷⁶ 25.4	⁷⁷ 25.6	⁷⁸ 24.7	⁷⁹ 2.7	⁸⁰ 14.0	⁸¹ 9.2
(1b) state&local tax	⁸² 28.0	-	-	-	-	⁸³ 15.0	⁸⁴ 9.9	⁸⁵ 4.2
(2) social contributi.	⁸⁶ 0.0	⁸⁷ 28.3	⁸⁸ 30.0	⁸⁹ 29.0	⁹⁰ 17.6	10.1	⁹¹ 18.4	⁹² 13.3
(3) total	56.8	44.2	55.4	54.6	42.3	27.8	42.3	27.7
year '95								
average ⁹³ compensation unit	[1,000 DKR]	[1,000 ESP]	[1,000 DEM]	[1,000 NLG]	[1,000 GBP]	[1,000 SFR]	[1,000 YEN]	[1,000 USD]
(1a) federal tax	⁹⁴ 16.8	⁹⁵ 19.4	⁹⁶ 23.7	⁹⁷ 6.4	⁹⁸ 17.0	⁹⁹ 5.3	¹⁰⁰ 6.6	¹⁰¹ 9.5
(1b) state&local tax	¹⁰² 28.0	-	-	-	-	¹⁰³ 14.7	¹⁰⁴ 6.6	¹⁰⁵ 6.8
(2) social contributi.	¹⁰⁶ 7.0	¹⁰⁷ 28.5	¹⁰⁸ 33.0	¹⁰⁹ 43.8	¹¹⁰ 18.3	11.9	¹¹¹ 23.3	¹¹² 14.2
(3) total	51.0	47.9	56.7	50.2	35.3	31.9	36.5	30.5

AII.2 Nominal Tax Rates for Corporations

<i>Fig. AII.3 : Calculation of Nominal Tax Rates for Corporations</i>				
operating surplus				
- deductions				
= tax base for enterprise tax	* table rate for enterprise tax	= enterprise tax	/ operating surplus	= enterprise tax rate
- enterprise tax (if deductible)				
= tax base for state & local tax	* table rates for state&local tax	= state&local tax	/ operating surplus	= state&local tax rate
- state&local tax				
= tax base for federal tax	* table rates for federal tax	= federal tax	/ operating surplus	= federal tax rate

Tab. AII.3 : Nominal Corporation Tax Rates [% of income]								
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
year '85/'86	DK	ESP	GER	NL	UK	CH	¹¹³ JAP	USA
(1a) federal tax	50.0	35.0	¹¹⁴ 44.8	43.0	40.0	¹¹⁵ 3.6-9.8	¹¹⁶ 37.6	¹¹⁷ 43.2
(1b) state&local tax	-	-	-	-	-	¹¹⁸ 8.2-23.8	¹¹⁹ 7.8	¹²⁰ 6.0
(1c) enterprise tax	-	2.0	¹²¹ ≈20	-	-	-	¹²² 13.2	-
(2) total	50.0	37.0	¹²³ 64.8	43.0	40.0	11.8-33.6	¹²⁴ 58.6	49.2
year '95								
(1a) federal tax	34.0	35.0	¹²⁵ 38.7	35.0	33.0	¹²⁶ 3.6-9.8	¹²⁷ 32.8	31.5
(1b) state&local tax	-	-	-	-	-	¹²⁸ 9.5-28.6	¹²⁹ 6.8	¹³⁰ 9.9
(1c) enterprise tax	-	2.0	¹³¹ ≈20	-	-	-	¹³² 12.6	-
(2) total	34.0	37.0	¹³³ 58.7	35.0	33.0	13.1-38.4	52.2	42.4

Taxes on property, even if the nominal tax rate as percentage is well-defined, depend completely on the valuation of the tax base, which in some countries, particularly for real estate, is only a small fraction of the market value (in Germany only about 10 %). With these caveats the following table AII.4 quote nominal rates on real estate, business assets and net wealth.

Tab. AII.4 : Nominal Tax Rates on Property [% of value]								
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
year '85/'86	DK	ESP	GER	NL	UK	CH	¹³⁴ JAP	USA
(1) real estate tax	1.0-5.5	0.8	≈0.2	¹³⁵	¹³⁶	¹³⁷	¹³⁸ 1.7	0.5-3
(2) business assets	-	¹³⁹	¹⁴⁰ 1.1-1.5	-	-	¹⁴¹ 0.44	1.4	¹⁴²
(3) net wealth tax	2.2	-	0.5	0.8	-	¹⁴³ 0.71	no	no
year '95								
(1) real estate tax	1.6-3.4	0.3-1	≈0.3	¹⁴⁴	¹⁴⁵	¹⁴⁶	¹⁴⁷ 1.7	0.5-3
(2) business assets	-	¹⁴⁸	¹⁴⁹ 1.2-1.6	-	-	¹⁵⁰ 0.44	1.4	¹⁵¹
(3) net wealth tax	1.0	0.2-2.5	0.5-1.0	0.8	-	¹⁵² 0.71	-	-

AIII. CRITICAL OVERVIEW OF LITERATURE AND STUDIES

Since tax shift is the central subject of this study, the following evaluation concentrates on literature in this field.

Tax shift: the cost of labour should go down in order to stimulate employment; governments should contribute to this development by reducing levies on labour (taxes and social security contributions) and compensating for this by increased taxation of other factors of production, among others those that have negative environmental impact.

AIII.1 Classification of Cited Literature

This section gives a list of the most important literature and sources, ordered to the themes of data, tax classification, tax policy, tax shift.

(1) Data:

- (a) economic data: [Accounts, Eurostat, 1997], [Accounts, OECD, 1996], [Accounts II, OECD, 1996], [Energy Prices, Eurostat, 1996], [Energy, Eurostat, 1996], [Energy, OECD, 1996],
- (b) tax data: [Revenue, OECD, 1996] [Taxes, Eurostat, 1996],
- (c) tax rates and tax systems : [Consumption, OECD, 1997], [Report, IBFD, 1997], [Taxation, IBFD, 1997], [Corporate, Price, 1996], [Individual, Price, 1996], [Studies, Pola, 1996], [Summaries, C&L, 1996], [Inventory, EC, 1993], [Taxation, OECD, 1993].
- (d) taxes on natural resources & environment: [Prices, OECD, 1997], [Tax Provisions, Moret, 1996], [Environment, OECD, 1995].

(2) Tax Classification according to Economic Functions

[Key, EC, 1997], [Methodology, EC, 1997], [Tax Policy, Jarass/Obermair, 1997], [Manual, Eurostat, 1996], [Structures, Eurostat, 1996], [Tableaux, EC, 1996], [Employment, OECD, 1995], [Statutory, EC, 1995], [Tax Policy, Jarass/Obermair, 1994].

(3) Tax Policy

- (a) labour : [Employment, OECD, 1995].
- (b) capital: [Emerging, Owens, 1997], [Taxation, CFE, 1997], [Taxing, OECD, 1997], [USA, Blumenberg, 1997], [Hybrid, IBFD, 1996], [Model, OECD, 1996], [Simplest, Slemrod, 1996], [Who Pays?, Ettliger, 1996], [Merger, IBFD, 1993], [Harmonization, Rädler, 1992], [Integration, Treasury, 1992], [Parent, IBFD, 1992].
- (c) environment : [Environmental, EC, 1997], [Rädler, Interaction, 1997], [Economic, EC, 1996], [Environmental, EEA, 1996], [Implementation, OECD, 1996], [Policies, Norway, 1996], [Tax Provisions, Moret, 1996], [Dynamic, Mauch, 1995], [Industry, Denmark, 1995], [Distributive, OECD, 1994], [Environment, OECD, 1993].

(4) Tax Shift

[Green, SiD, 1997], [Roodman, Worldwatch, 1997], [Tax, Hammond, 1997], [Tax Policy, Jarass/Obermair, 1997], [Economic, Aaron/Gale, 1996], [EU, Rädler, 1996], [Paper, EC, 1996], [Report, EC, 1996], [Employment, Mors, 1995], [Employment, EC, 1994], [Tax Policy, Jarass/Obermair, 1994], [White Book, EC, 1994].

AIII.2 Critical Overview of the Scientific Literature and Studies in the Field of Tax Shift

An excellent overview and brief descriptions of such studies is available in 'Wuppertal Bulletin', quarterly, Wuppertal Institute, FRG, english version also available in the internet at the address

<http://www.wuppertal-forum.de/wuppertal-bulletin> .

AIII.2.1 Studies on Classification of Levies according to Economic Functions

Only in the last few years scientific efforts have been made to classify all statutory levies (i.e. all taxes, social security contributions and other compulsory payments to general government) according to economic functions, in particular according to production factors and consumption.

- (1) The most recent EU publication in this field: [Structures, Eurostat, 1996] contains a description of this development and major improvements with respect to uniform, comparable and reproducible assignments. It presents the essential guidelines for the economic classification of taxes and for the application of the assignments to national tax statistics.
- (2) [Methodology, EC, 1997] gives an explanation of the problems of the methodology used in [Structures, Eurostat, 1996]. [Key, EC, 1997] gives a detailed description of the classification and assignment procedures.
- (3) [Tax Provisions, Moret, 1996] shows numerous 'green' features now evident in national tax systems

In the study all taxes with environmental relevance are examined for the Member States. The result is a set of long but well organised reports, mostly country-by-country, identifying several hundred policy measures. These are partly presented in tabular form. In the study all taxes with environmental relevance Final Report, the chapters containing discussions of the issues are the most interesting, not least because the budgetary and environmental impact of all tax rates are represented in graphs. The study should be of greatest interest to economists and politicians, many of whom will find in it an innovative perspective on tax systems, written by Moret Ernst & Young, a leading financial consultancy firm.

For instance, it is revealed that tax provisions in the industrial sector have not been particularly successful. On the one hand, generous tax deductions for investment in the new German Länder have led to marginal improvements in the modernity and efficiency of the capital stock. But on the other hand, tax incentives in the Netherlands have had disappointingly little effect, since little attention had been paid to them in investment decision-making.

An interesting section compares the costs and tax rates of various car models (Nissan Micra, Ford Escort, Citroen Aura, and Audi A6) in all Member States. 'First place' in all cases goes to Denmark, where the acquisition of a car is taxed at over 100 percent of the retail price. Denmark leads in both fixed and variable costs, followed by Finland, the Netherlands, Ireland, and Portugal. Germany lies in mid-table positions.

- (4) [Manual, Eurostat, 1996] comprises the consensus on definitions, classifications, operational procedures and the treatment of borderline cases reached between a group of experts on environment and taxes from the European Commission (DG II, DG XI, DG XXI, DG XXXIV), from several Member States (Finland, France, Sweden, UK) and from OECD (department for environmental affairs and dept. for financial affairs).
- (5) A first effort of a classification of levies according to economic functions was [Tax Policy, Jarass/Obermair, 1994]: The novelty of this approach lies in the fact that all the taxes and statutory levies have been disaggregated and reagggregated in such a way that they are directly assigned to the production factors labour, capital and natural resources/environment. This classification stands in contrast to the traditional classification of taxes into fiscal categories like direct/indirect or income/wealth etc. Hence a

universal methodology allowing each tax in any country to be uniquely ascribed to these economic categories is still under development.

- (6) [White Book, EC, 1994] was the first official EU declaration of a support of a tax shift. In chapters 9 and 10 it explains in detail possible policies and their eventual outcomes and supports the necessity to assign tax according to economic functions. It was the political basis for the investigations listed above.

AIII.2.2 Other Selected Studies on Tax Shift

There are hundreds of books and studies on tax shift. The following is a selected list and brief description.

- (1) [Green, SiD, 1997] is the proceedings of a conference "Green taxes and duties in international perspective", organized by SiD, The General Workers Union of Denmark. It concentrated on papers delivered by Scandinavian participants on the topics of increase of ecological taxes and decrease of labour taxes.
- (2) [Roodman, Worldwatch, 1997] gives worldwide information about tax reforms shifting taxes away from labour and investment compensated by increased taxation of use of environment.
- (3) [Tax, Hammond, 1997] gives, similar as Roodman worldwide information about tax shifts; due to the wide coverage the information is quite general.
- (4) [Economic, Aaron/Gale, 1996] gives on a sound theoretical basis precise estimates of economic effects of a number of potential tax shifts. They are very sceptical about the double dividend hypothesis.
- (5) [Paper, EC, 1996] supports strongly a quick tax shift within the EU. Unfortunately due to the unanimity rule no further action has been taken up to now. [Report, EC, 1996] is a follow-up paper which gives a deep insight in the real world of EU tax policy. Just opposite to the first paper with clear cut analysis and proposals for political action is a typical 'may be' paper with many questions and hardly any answers.
- (6) Anatomy of Double Dividend Models (Towards explaining congruences and discrepancies in models with double dividend predictions), Samuel Mauch, Rolf Iten, Silvia Banfi, INFRAS, Zürich, R. van Nieuwkoop, ECOPLAN, Wirtschafts- und Umweltstudien, Bern, 1996.

The problem and the aim of the study: In recent years the double-dividend-hypothesis of Ecological Tax Reform (ETR) turned out to be one of the key issues in the scientific and political discussions of strategies towards sustainable development. In particular, the hypothesis that an ETR leads to an improvement in both environmental quality and economic performance has attracted much attention.

This study investigates the following studies:

- Barker T. (1995), Taxing Pollution instead of Employment: Greenhouse Gas Abatement through Fiscal Policy in the UK, Paper to Appear in Energy and Environment, 1995.
- Bovenberg A.L. and Van der Ploeg F. (1994), Tax reform, Structural Unemployment and the Environment, Paper presented at the international workshop on "Environmental Taxation, Revenue Recycling and Unemployment" on December 1994 at Milano, organised by the "Fondazione ENI Enrico Mattei", Milano.
- Bovenberg A.L. (1994), Environmental Policy, Distortionary Labour Taxation and Employment: Pollution Taxes and the Double Dividend, Paper presented at the international workshop on "Environmental Taxation, Revenue Recycling and Unemployment" on December 1994 at Milano, organised by the "Fondazione ENI Enrico Mattei", Milano.
- Bureau du Plan (1993), Effects of a General Reduction in Employers' Social Security Contributions Financed by a CO₂/Energy Tax, Brussels 1993.
- Capros P. et al., Double dividend Analysis: First results of a General Equilibrium Model (GEM-E3) linking the EU-12 countries, Paper presented at the international workshop on "Environmental Taxation,

Revenue Recycling and Unemployment" on December 1994 at Milano, organised by the "Fondazione ENI Enrico Mattei", Milano.

- Carraro C. and Soubeyran A. (1994), Environmental Taxation and Employment in a Multi-Sector General Equilibrium Model, Paper presented at the international workshop on "Environmental Taxation, Revenue Recycling and Unemployment" on December 1994 at Milano, organised by the "Fondazione ENI Enrico Mattei", Milano.
- CE/De Witt G. (1994), The Effects in Employment of a Shift in Taxation from Labour to the Environment; Delft 1994.
- Cline W. R. (1994), Costs and Benefits of Greenhouse Abatement: A Guide to Policy Analysis, in: OECD, The Economics of Climate change - Proceedings of an OECD/IEA Conference.
- DIW (Deutsches Institut für Wirtschaftsforschung) (1994), Gutachten im Auftrag von Greenpeace, Wirtschaftliche Auswirkungen einer ökologischen Steuerreform, Berlin.
- Goulder L. H. (1994), Environmental Taxation and the „Double Dividend“: A Readers's Guide, NBER (National Bureau of Economic Research) Working Paper Series, Cambridge MA.
- Jorgenson D. W., Wilcoxon P. J. (1993), Reducing US Carbon Emissions: An Econometric General Equilibrium Assessment, in: Resource and Energy Economics, 1993, 7-25.
- Kirchgässner G. (1996), Environmental Policy in Switzerland: Methods, Results, Problems and Challenges, Paper presented at the workshop about „Actual Problems of Swiss Economic Policy“, Studienzentrums Gerzensee, March 21-23, 1996.
- Koopman J.: Eco-taxes and Employment in Europe: Under which Conditions can an Employment benefit from Green Fiscal Reform be expected? Brussels 1994 OECD: Implementation Strategies of Environmental Taxes; Paris 1995.
- Mauch S., Iten R. et al. (1995), Ökologische Steuerreform: Wettbewerbsfähigkeit, Beschäftigung und Umwelt - Marktwirtschaftliche Bewältigung des ökologisch und ökonomisch bedingten Strukturwandels zu einer nachhaltigen Entwicklung, FMU (Forum Marktwirtschaft und Umwelt), Zürich.
- Porter M. E. and van der Linde C. (1995), Toward a New Conception of the Environment-Competitiveness Relationship, in: Journal of Economic Perspectives, Vol. 9, Nr. 4, pp. 97-118.
- Previdoli P. and Stephan G. (1996), Die Volkswirtschaftlichen Auswirkungen der Energie-Umwelt-Initiative: Eine empirische, dynamische Gleichgewichtsanalyse, Gutachten im Auftrag des Bundesamtes für Energiewirtschaft, Universität Bern.
- Proost S. and Van Regemorter D. (1994), Testing the Double Dividend Hypothesis for a Carbon Tax in a Small Open Economy, Paper presented at the international workshop on "Environmental Taxation, Revenue Recycling and Unemployment" on December 1994 at Milano, organised by the "Fondazione ENI Enrico Mattei", Milano.
- Welsch H. and Hoster F., A (1994), General-Equilibrium Analysis of European Carbon/Energy Taxation: Model Structure and Preliminary Results, Institute of Energy Economics, University of Cologne, Köln.
- WiFo (Österreichisches Institut für Wirtschaftsforschung) (1995), Makroökonomische und sektorale Auswirkungen einer umweltorientierten Energiebesteuerung in Österreich, Wien.

The most important convergent results among models have been found to be the following: The effects of an ETR depend on its key design parameters, both on the levy side of the tax reform and on the side of revenue recycling.

In general a tax shift from the relative abundant factor labour to the scarce factor environment/energy leads to positive effects on employment (substitution effect) and negative effects on GDP (monetary income

effect). There exists a trade-off between employment and GDP effects. Theoretical studies show that negative employment effects have to be expected if negative income effects of the tax dominate over the substitution effect due to the change in the relative factor input prices. However, simulation studies - based on regular assumptions regarding substitution elasticities - show a dominance of the substitution effect. In these cases we can expect positive employment effects.

Positive employment effects can be expected if the revenues are used for cutting taxes on labour in general and social security contributions of employers (and employees) in particular. The use of revenues for lump sum payments to households and for cutting VAT leads to less important or no positive employment effects. For most European countries numerically stronger employment effects can be expected if the cut in social security contributions is designed as a targeted cut towards the low qualified labour force. (This, however, implies also a conservative effect on the structural change of technology and economy.)

Positive effects on GDP are to be expected if the revenues are used for a cut in capital taxes, as this design favours investment. Negative effects on GDP will be limited if the tax is phased in stepwise. An increase in the speed of introduction of the tax leads to negative effects on GDP. Both GDP and employment effects depend on the size of the tax reform: The results of the simulations show positive effects on GDP and on employment when the energy tax is introduced stepwise and the (energy) price increase does not exceed 4-5% per year. Higher tax rates lead to negative effects on employment and GDP. In general the simulation results show more distinct effects in the long run than in the short run.

The results of the studies diverge with regard to the relevance of the effects on employment and GDP. There are studies showing negligible effects and others showing quite relevant effects. To a certain degree the differences are due to the model approach chosen: Macroeconomic models lead usually, *ceteris paribus*, to more optimistic results compared to computable general equilibrium models. The explanation for this tendency seems to be the comparative advantage of macroeconomic models in implementing disequilibria, which allows for a more adequate estimation of the employment effects.

The relative effects of a harmonised scenario, compared to a first mover scenario, are not yet clear. Some studies show relative advantages of a first mover scenario, other studies show clearly negative effects for a country acting as a first mover. The main reason for this divergence are differences between models in the assumptions with respect to international trade and corresponding feed-back effects in the models.

Open questions: In general the dynamic effects of technical progress are not considered in the models applied so far. This is the first major deficiency. The majority of the models considers only voluntary unemployment and therefore only situations where the labour supply determines the real wage. The consideration of involuntary unemployment probably strengthens positive employment effects. The effects of compensation for offsetting negative competitiveness effects are not considered in the models. The substitution elasticities introduced in the models are usually derived from an empirical basis that analyses changes in one direction. For example, the substitution elasticities between capital and labour are derived from a data basis reflecting a time period with substitution only in one direction, i.e. substitution of labour by capital. For the time being the symmetry of these elasticities is not very well established, even if it is quite decisive for the estimation of employment effects due to a change in the relative prices. Models do not explicitly address the issue of the optimal level of an energy- CO₂-tax and the optimal speed of introduction that minimizes adjustment costs and maximises environmental benefits generated from a reduction in energy consumption.

The following major policy conclusions can be drawn from the analysis:

According to the state-of-the-art of the available theoretical and empirical studies the double dividend hypothesis in the weak sense, i.e. positive environmental and positive employment effects, can be expected to hold true for the EU member countries and for Switzerland - at least in the long run. This has to do with the existence of structural involuntary unemployment. With regard to the levy side, a combined energy and

carbon tax is the most effective solution. The tax has to be phased in stepwise in order to minimize structural adjustment costs of firms and households.

The most favourable impacts on economic performance are achieved if the revenues are fully recycled to households and industries. Employment effects are maximised by using the revenues for lowering the social security contributions of (low skilled) employers and employees.

Negative impacts on international competitiveness can be controlled effectively by introducing offsetting methods, such as border tax adjustments, sectoral recycling of the revenues or a rebate scheme for buffering the negative short term effects on energy intensive industries. Rebate schemes are in the center of interest with regard to policy implementation because their political acceptance is quite high and work on the practical problems related to the implementation is more advanced.

- (7) Werkgroep Vergroening van het Fiscale Stelsel: Eerste Rapportage (The Hague, September 1995, 26 pages) and Tweede Rapportage (The Hague, March 1996, 154 pages). Dutch Green Tax Commission: Greening the Tax System -Summary of Two Report by the Dutch Green Tax Commission, The Hague, 1996.

Netherlands: green tax commission calls for more positive incentives: Following the introduction of a CO₂/energy tax at the beginning of 1996, the Commission on Environmental Taxes of the Dutch Finance Ministry published a report in March 1996. This proposes the introduction of further positive incentives in the tax regime: 'greening the tax system requires a good balance between rewards and penalties. Rewarding environmentally sound behaviour now needs to be strengthened to attain this balance' (10).

Specifically, the Commission proposes that investment initiatives aimed at saving energy and water should be deductible from the CO₂/energy levy and the water resources tax. This incentive would be financed by index-linking existing environmental taxes. So far, only taxes on transport fuels are linked to inflation. As well as indexing the water tax and the 1996 CO₂/energy tax, it is suggested that water rates for industry should be raised to the higher levels applicable to households. Several proposals are made for the transport sector.

- (8) Denmark's new tax policy, Skatteministriet, Slotholmsgade 12, 1216 Copenhagen K, Denmark

The first effects of environmental tax reform in Denmark are becoming visible. Calls are now growing for Germany to make progress in this field, creating more room for further Danish measures.

In particular, the sulphur tax introduced in early 1996 has had a beneficial environmental impact. Although according to the Danish Ministry of Taxes the price differentials between coals and oils that are high and low in sulphur content remain narrow, industry has used fuels with a high content of sulphur to a large extent until the end of 1995 and only then it has shifted to using more low-sulphur fossil fuels. The new tax led to a tangible short-term fall in sulphur emissions. The Environment Ministry estimates that industrial sulphur emissions fell by around 50 percent in the first six months of the tax.

The sewage tax passed by parliament in July 1996 entered into force at the start of 1997. The method of calculating its level takes account of the presence of nitrates, phosphorus, and biodegradable substances, depending on their amount and concentration. Merely the announcement of the measures prompted changes in behaviour: water treatment plants have been installing improved monitoring systems. An international comparison conducted by Mikael Skou Andersen, leading political scientist in Denmark had previously shown that Holland's water and sewage treatment plants were substantially more efficient and environmentally friendly than Denmark's. Anderson had identified the Dutch sewage tax policy as one of the biggest reasons for this.

The completion of the 1996 report on green tax reforms still requires the resolution of certain problems over the CO₂ tax, relating to the taxation of electricity. Designed as an output tax, the tax base does not allow to distinguish between electricity from Denmark's numerous coal-fired power stations, or from hydroelectric plants in Sweden.

A list of 31 energy-intensive economic activities has been drawn up, to differentiate tax rates according to the use of fuels and to allow such firms concessions on the CO₂/energy tax, provided they undertake measures to boost energy-efficiency, to be agreed upon with the Energy Ministry.

Denmark wants to further extend its CO₂/energy taxation. In future, ships (e.g. the numerous internal ferry services) and aeroplanes (for their aviation fuel) were to be covered. But here, the EU Commission blocked Denmark's path, referring to the EU mineral oil tax guidelines, under which these items are not to be taxed.

- (9) Majocchi, Alberto: Green Fiscal Reform and Employment: A Survey, in: Environmental and Resource Economics No. 8, 1996, S. 375-397.

This survey gives a broad overview on studies in the field of tax shift and some information about the validity of the expected results. It reports on several simulation studies on environmental and employment effects of CO₂/energy taxes. The optimum shift scenario: lowering social security contributions shows small but significant employment effects.

- (10) Carraro, Carlo and Siniscalco, Domenico (ed.): Environmental Fiscal Reform and Unemployment, Dordrecht, Kluwer Academic Publishers, 1996

The book contains 5 contributions from a 1994 workshop on the double dividend hypothesis and its simulation testing. In contrast to what most economists still teach and practice, "environmental externalities are ubiquitous and inevitable ...". Hence the goal must be a "dematerialization" of the economy by a change of relative factor prices. First results with the GEM-E3-simulation developed for the EU confirm that "some positive dividend in employment occurs, provided that the degree of labour supply flexibility is significant.

- (11) [Employment, Mors, 1995] and [Employment, EC, 1994] gives an excellent overview about economic results of potential tax shifts within the EU, especially if tax revenues are used to cut VAT, soc. security or social security for lower incomes (targeted reduction).

- (12) Changing the Use of Economic Instruments in Europe: Dietz, Frank J./Vollebergh, Herman R.J./Vries, Jan de (Hrsg): Environment, Incentives and the Common Market, Dordrecht: Kluwer, Academic Publications 1995.

A working party on the environment and the economy from the Dutch National Economic Forum has recently published a book with six concrete proposals for green taxes and tradeable pollution permits in Europe. They consciously avoid contributing any further ideas to the theoretical discussion of economic instruments, and instead focus on what actual trade structures could work in Europe. Individual articles consider possible taxes on, for example, fertilizer and solvents, economic instruments in European waste policy and price directing mechanisms in the transport sector.

Further contributions look at existing regulations and some recommend certain measures. In the concluding chapter all proposals are analysed to see whether they are politically achievable in Europe; the results are, however, somewhat vague and provisional.

- (13) Distributional Results of Eco-Tax Reform, Bundesamt für Energiewirtschaft (Hrsg.): Wirtschaftliche Auswirkungen und Verteilungseffekte verschiedener CO₂-/Energieabgabe-Szenarien, Bern, April 1995.

A study carried out by the Bern consulting company ECOPLAN for the "Energy Sector Fundamentals" programme for the Swiss Department for Energy investigates the economic and social sustainability of two variants of a carbon/energy tax in Switzerland. They also consider different means of compensation for which the revenue might be used. A static equilibrium model is used for the analysis implying that the results will only be valid for 10-15 years. The model was further developed in order to look at the social effects arising from these energy measures. This aspect of the report, which analyses the distributional impact of ETR reform makes the model particularly interesting. The two alternative taxes examined were modelled as a combined carbon/energy tax; the level of the first, Euro-CH, is very similar to that proposed by the EU. In the second, "Reflecting the full costs", the tax rate is dependent on the social costs arising

through energy use. Those who cause damage to the environment through energy use will have to pay for it. The tax rates in this model are clearly higher than in the Euro-CH variant - the petrol tax level is fourteen times higher and electricity twice as high.

The report analyses three ways of using the tax revenue: 1. Revenue should go to the treasury (budget scenario), 2. Households should receive rebates (bonus system), 3. Income tax should be reduced (tax reform)

A much-vaunted aspect of tax reform is confirmed in this study, which is that when evaluating ETR reform the most significant question is how you use the revenue, rather than the level of the actual tax. But it is impossible to draw a very clear judgement about how much the economy, the environment and income distribution would benefit from the different ways of using the revenue (total expense, gross production value etc) from the results of the study. The tax reform variant will benefit the economy as a whole and economic sectors more than the other alternatives.

This is not true if you look at income. The bonus system is the only one which benefits poorer households. The other ways of using the revenue will have regressive effects, although the tax reform scenario is better than the budget scenario because each household group is better off with this option.

The results are practically the same when revenue use is examined on environmental criteria (the level of energy consumption). The Carbon tax in the Euro-Ch scenario will lead to a fall in energy consumption (if prices remain constant) of about 7 percent with the bonus system, compared with 9 percent with the other options. Energy use falls perceptibly in the "true costs" scenario. Energy use falls about 26 percent (bonus system) and 32 percent (tax reform scenario).

- (14) Green Taxes Compared in Great Britain and Germany. Smith, Stephen: Green Taxes and Charges: Policy and Practice in Britain and Germany, London, November 1995.

The United Kingdom, not only geographically, 'is obviously swimming in water'. Even price structures permit unrestricted water consumption. Basically, water prices are not linked to use in the UK. Far less than 10 percent of all British households have a water meter. In Germany it is the norm to pay for the amount of water used. Obviously water services privatisation in December 1989 in the UK has meant that water meters are not only being built into new houses. Hefty rebates are available on water bills where meters are installed, leading to price levels declining about 3.2 percent in real terms between 1989-1990 and 1994-5. Unmetered water prices have risen by one-third in the same period in real terms.

These facts are to be found in a report from Stephen Smith at the Institute of Fiscal Studies (IFS). Eco taxes and charges for water, waste, energy and transport in the UK and Germany are compared in detail in this study. It was written in conjunction with the Anglo-German Foundation for the study of Industrial Society and the Tübingen Institute for Applied Economic Research (IAW). Curiously enough it has been published twice, with identical content, a different format and different price (warning: fiscal incentive!).

The author asks pointedly, in view of the very few number of eco-taxes which have been actually introduced in Germany: "Should the UK draw any negative conclusions from the fact that Germany, once in the forefront of the policy debate over environmental taxation has made such limited progress towards translating theory into practice over the past decade?" It looks as if the hesitation over introducing eco taxes might have a negative effect on other countries - and on the image of Germany.

- (15) Weidner, Helmut: Basiselemente einer erfolgreichen Umweltpolitik. Eine Analyse und Evaluation der Instrumente der japanischen Umweltpolitik, Berlin: Edition Sigma 1996. Foljanty-Jost, Gesine: Ökologie und Ökonomie in Japan. Politik zwischen Wachstum und Umweltschutz, Opladen, 1995.

Japan Back as World-Beater - this Time with Green Taxes? This impression is certainly not given by two studies in German of Japan's record on environment policy, but more recent political developments have fuelled renewed speculation.

In general, according to Weidner, Japan's environment policies are in the form of a range of regulatory, 'command and control' instruments, whose "implementation and enforcement is conducted highly pragmatically" (491). Overall, this analysis of Japanese environment policy is commendable above all for its detailed and thorough treatment of its subject-matter.

Gesine Foljanty-Jost's book examines the role of the state in structural economic change. Up until the mid-1980s, Japan's structural policies succeeded in decoupling economic growth from growth in the consumption of raw materials. Subsequently, however, this success declined as raw material prices fell. Foljanty-Jost concludes from this experience that "the existence of favourable political and institutional conditions for ecologically-positive structural change is not, on its own, a successful formula for structural policy aimed at environmental protection" (212). Rather, the economic and social context is crucial. This is also demonstrated by the debate in Japan about an Ecological Tax Reform (ETR), which is surveyed in this book within the broader context of climate policy.

- (16) Ribbe, Lutz/Seifert, Katrin: *Ökologische Steuerreform. International Erfahrungen und praktische Perspektiven*, published by: Stiftung Europäisches Naturerbe (Euronatur), commissioned by the Friedrich Ebert Stiftung, November 1995.

No European Country As Yet With Comprehensive Green Tax Regime. "Economic instruments are used for environmental protection in many European countries. The measures adopted so far tend to be aimed at tackling problems of detailing individual sectors, or at raising tax revenues. A truly comprehensive approach, aimed at fundamentally altering the economic system, has nowhere been attempted" (40). This is the finding of Lutz Ribbe and Katrin Seifert in their study of green tax policies in a selection of European countries.

Ribbe and Seifert focus on the countries that are usually thought of as 'progressive' in their stance on environmental taxation, and that have adopted concrete measures: the Scandinavian states Denmark, Finland, Norway and Sweden; Belgium and the Netherlands; and to a lesser extent Estonia, Lithuania, and Poland. The authors also consider the situation in United Kingdom and Germany, and end with a short survey of the state of the debate in the European Union. The empirical part of the study is informative and conveys an overview of the green tax policies that have so far been implemented in Europe. In two further chapters, the authors then analyse the current level of political willingness to pursue further reform, and also set out the basic advantages of environmental taxes - including their advantages over voluntary arrangements and regulatory measures. Ribbe and Seifert base their assessment of the overall economic effects of green taxes on the study by the Austrian Institute for Economic Research on the effects of such taxation on energy consumption. These two general/theoretical chapters can be skipped by readers with less time to spare: on these subjects, there are much better and more original pieces of research.

- (17) Goulder, Lawrence H.: *Environmental Taxation and the Double Dividend: A Reader's Guide*, in *International Tax and Public Finance*, Vol. 2, No. 2, 1995, Dordrecht, p. 157-183.

Double Dividend: At Last, a Proof of the Obvious. The idea that green taxes produce a 'double dividend' is as simple as it is enlightening. Green taxes lead, on the one hand, to an improved environment. At the same time, they can improve the efficiency of the tax system. This second dividend arises because the levying of green taxes produces revenues which can be used to reduce allocation-distorting taxes (e.g. income tax and sales tax). And the assumption is that the excess burden created by the green taxes is outweighed by the efficiency gains from the resulting reduction in distorting taxes.

In the contemporary literature on fiscal economics, the validity of the double dividend has been questioned. Goulder stated in a much-quoted paper in *International Tax and Public Finance* (1995) that most empirical research on the question had denied the existence of a double dividend.

- ¹ split: 85 % ('80 to '92) is assigned to taxes on employed labour (84 % in '93, 79 % from '94), 15 % (19 %, 21 %) to taxes on transfers (pensions etc.), ie. neither assigned to production factors labour nor capital, they are unallocable. Split acc. to [Key, CEC, 1996].
- ² not applicable, because payment is not compulsory and therefore no tax.
- ³ split for tax on diesel and other oil products acc. to estimated revenues for diesel based on [Energy, OECD, 1996], [Prices, OECD, 1996].
- ⁴ split = (tax on petrol & diesel) / total mineral oil taxes; data from [Energy, OECD, 1996], [Prices, OECD, 1996].
- ⁵ data from [Energy, OECD, 1996], [Prices, OECD, 1996].
- ⁶ not applicable, because payment is not compulsory and therefore no tax.
- ⁷ split = (tax on non-transport mineral oil for industry) / (taxes on non-transport mineral oil for household); data from [Energy, OECD, 1996], [Prices, OECD, 1996].
- ⁸ split = wage tax / (1110 taxes on income, profits and capital gains).
- ⁹ not applicable, because payment is not compulsory and therefore no tax.
- ¹⁰ split = (tax on petrol & diesel) / total mineral oil taxes; data from [Energy, OECD, 1996], [Prices, OECD, 1996].
- ¹¹ not applicable, because payment is not compulsory and therefore no tax.
- ¹² split into tax on diesel and other oil products acc. to estimated revenues for diesel based on data from [Energy, OECD, 1996], [Prices, OECD, 1996].
- ¹³ not applicable, because payment is not compulsory and therefore no tax..
- ¹⁴ split = (tax on petrol & diesel) / total mineral oil taxes; data from [Energy, OECD, 1996], [Prices, OECD, 1996].
- ¹⁵ split acc. to compensation of employees / (compensation of employees + operating surplus of unincorporated enterprises).
- ¹⁶ not applicable, because payment is not compulsory and therefore no tax.
- ¹⁷ split = (tax on petrol & diesel) / total mineral oil taxes; data from [Energy, OECD, 1996], [Prices, OECD, 1996].
- ¹⁸ split acc. to compensation of employees / (compensation of employees + operating surplus of unincorporated enterprises).
- ¹⁹ not applicable, because payment is not compulsory and therefore no tax.
- ²⁰ split = (tax on petrol & diesel) / total mineral oil taxes; data from [Energy, OECD, 1996], [Prices, OECD, 1996].
- ²¹ collected as surcharge on gasoline tax.
- ²² split acc. to compensation of employees / (compensation of employees + operating surplus of unincorporated enterprises).
- ²³ not applicable, because payment is not compulsory and therefore no tax.
- ²⁴ Note: Employers' soc. contr. are added to employee's gross income to arrive at compensation of employees, which is the starting point for calculating tax rates. Assumption: Employee's soc. sec. contributions are tax deductible; see [Taxation, OECD, 1993]; ceilings for soc. contributions are of hardly any importance, because they are mostly above average earned incomes.
- ²⁵ [Summaries, C&L, 1996].
- ²⁶ [Summaries, C&L, 1996].
- ²⁷ [Accounts, Eurostat, 1996], year '86.
- ²⁸ from Eurostat, nat. accounts.
- ²⁹ Employers' share of soc. sec. 7,012 DKR per year (soc. sec.); gross income = $(155' - 7') = 148'$. $111.3' * 14.4 \% + 37' * 28.8 \% = 26.6' - 26.6' / (26.6' + 41.4') * 10.5' = 22.5' / 155,000 = 14.5 \%$. Note: Soc. contr. tax not deductible!
- ³⁰ Employers' share of soc. sec. is 30.7 % of gross income: gross income = $1,824' / (1+0.307) = 1,396'$. Taxable income federal = $1,396' - 1,396' * 6.3 \% = 1,307'$. Federal tax = $183' + 307' * 22.08 \% = 251' / 1,824' = 13.7 \%$.
- ³¹ Employers' share of soc. sec. is 17.65 % of gross income: gross income = $45.1' / (1+0.1765) = 38.3'$. Taxable income federal = $38.3' - 38.3' * 17.65 \% = 31.54'$. Federal tax = $6.542' + 1.54' * 35.1 \% = 6.99' / 45.1' = 15.5 \%$.
- ³² Taxable income federal = $45.0' - 9.51' = 35.49'$. Employee's soc. sec. - 7.2' personal basic deduction = $28.3'$. Federal tax = $3.3' + (28.3' - 16.5') * 36 \% = 7.54' / 54.9' = 13.7 \%$.
- ³³ Taxable income federal = $8.9' - \text{assumed } 25 \% \text{ pension premiums as in '96 - personal basic deduction (} = \text{assumed } 3.765' * \text{ratio of compensation } 9.8' / 16.6' = 2.2') = 4.48'$. Federal tax = $4.48' * 30 \% = 1.34' / 9.8' = 13.7 \%$.
- ³⁴ Taxable income federal = $49' - \text{soc. contr. (} 10.6 \% * 46.5' = 4.93') - \text{personal basic deduction (} = 3.2') - \text{insurance premiums (} 2.7') = 39.2'$. Federal tax = $0.169' + 15.47' * 3.0 \% = 0.633'$. Tax rate = $0.633' / 49' = 1.3 \%$.
- ³⁵ Taxable income federal tax = $3,411' - \text{employment income deduction (} 20 \% * 3,411 - 495,000 \text{ YEN} = 187') - \text{personal basic deduction (} = 330') - \text{employee's contribution } 331' = 2,633'$. Federal tax = $248.5' + (2,633' - 2,000) * 0.12 = 344' / 3,773' = 9.1 \%$.
- ³⁶ Taxable income = $(24.24' - 1.04' - \text{employee's contribution } 1.73' - 1' \text{ state tax} - 5.3' \text{ pension premiums}) = 14.9'$, tax (assumption: brackets for single are 60 % of those for married which are given in C&L): ca. $2', 2' / 26.4' = 7.6 \%$; minimum tax for incomes above 30' is 20 %.
- ³⁷ Employers' share of soc. sec. 7,012 DKR per year (soc. sec.); gross income = $(155' - 7') = 148'$. $148' * 28.0 \% = 41.4' - 41.4' / (26.6' + 41.4') * 10.5' = 35' / 155' = 22.6 \%$. Note: Soc. contr. tax not deductible!
- ³⁸ Taxable income cantonal = $49' - \text{soc. contr. (} 10.6 \% * 46.5' = 4.93') - \text{personal basic deduction (} = 3.5') - \text{insurance premiums (} 1.7') = 38.9'$. Cantonal tax = $(4' * 2 \% + 5' * 3 \% + 6' * 4 \% + 6' * 5 \% + 7' * 6 \% + 9.9' * 7 \%) * 2.38 \text{ multiplier} = 4.48'$. Tax rate = $4.48' / 49' = 9.1 \%$.
- ³⁹ Taxable income inhabitants tax = $3,411' - \text{employment income deduction (} 20 \% * 3,411 - 495,000 \text{ YEN} = 187') - \text{personal basic deduction (} = 260') - \text{employee's contribution } 331' = 2,633'$. Inhabitants tax = $178' + (2,633' - 2,000) * 0.12 = 230' / 3,773' = 6.1 \%$.
- ⁴⁰ 6 % on taxable income, see example on p. U-43. Assumption: payment to pension fund 20 % of compensation = $5.3'$. Taxable income = $(24.24' - 1.04' - \text{employee's contribution } 1.73' - 5.3') = 16.3'$, tax = $16.3' * 6 \% = 1' / 26.4' = 3.7 \%$.
- ⁴¹ Employers' share of soc. sec. 7,012 DKR per year (soc. sec.); gross income = $(155' - 7') = 148'$. Soc. contr. = $5.5 \% * 148' = 7' / 155' = 4.5 \%$. This soc. sec. tax is not deductible for federal and local taxes.
- ⁴² Employers' share of soc. sec. 30.7 % of gross income: gross income = $1,824' / (1+0.307) = 1,396'$. Soc. contr. = $0.37 * 1,396' = 517' / 1,824' = 28.3 \%$.
- ⁴³ Employers' share of soc. sec. 17.65 % of gross income: gross income = $45.1' / (1+0.1765) = 38.3'$. Soc. contr. = $0.353 * 38.3' = 13.5' / 45.1' = 30.0 \%$.
- ⁴⁴ Compensation = gross income - gross income * 17.32 % employers' share of soc. sec. - $41' * 4.6 \% - 44.6' * 0.15 \% = 9.8'$. Employee's share = $41' * 4.6 \% + 44.6' * 0.167 \% + 45.1' * 16.575 \% = 9.51'$. Total soc. contr. = $19.3' / 54.9' = 35.2 \%$.
- ⁴⁵ Employer's share of soc. sec. is 10.45 % of gross income: gross income = $9.8' / (1+0.1045) = 8.9'$. Employee's share of soc. sec. is 9 % of gross income = $8.9' * 9 \% = 0.8'$. Soc. contr. = $0.1945 * 8.9' = 1.73' / 9.8' = 17.7 \%$.
- ⁴⁶ Employer's share of soc. sec. is 5.3 % of gross income: gross income = $49' / (1+0.053) = 46.5'$. Employee's share of soc. sec. is 5.3 % of gross income. Soc. contr. = $0.106 * 46.5' = 4.93'$; rate = $4.93' / 49' = 10.1 \%$.

⁴⁷ social security: Health, welfare pensions, unemployment and workmen's accident compensation insurance are government sponsored and participation is compulsory, as a rule, for both employers and employees. Except for workmen's accident compensation insurance, the premiums are generally paid equally by the employer and employee. The combined monthly health insurance premium approximates 8.4 % of standard monthly compensation up to Y695,000 and remains the same thereafter. The combined monthly welfare pension contribution approximates 10.0 % (average of male and female) of their standard monthly compensation up to Y425,000. The combined monthly unemployment and workmen's accident compensation insurance premium approximates 1.95 % of monthly compensation, with 1.4 % borne by the employer and 0.5 % borne by the employee.

Employer's share: $10.6\% \times \text{gross income}$; gross income = $3,773 / 1.106 = 3,411$; Employer's contribution = $3,411 \times 10.6\% = 362$; employee's contribution = $3,411 \times 9.7\% = 331$. Total $693 / 3,773 = 18.4\%$.

⁴⁸ Employer's share: $7.15\% \times \text{gross income} + 6.2\% \times 7$; gross income = $(26.4 - 6.2 \times 7) / 1.0715 = 24.24$; Employer's contribution = $24.24 \times 7.15\% + 6.2\% \times 7 = 2.17$; employee's contribution = $24.24 \times 7.15\% = 1.73$. Total $3.90 / 26.4 = 14.8\%$.

⁴⁹ [Accounts, Eurostat, 1996], year '94.

⁵⁰ estimated from Statistical Yearbook Switzerland.

⁵¹ Taxable income federal = $218.5 - \text{employee's contribution } 16.1 = 202$; Tax = $202 \times 13\% + (202 - 133.2) \times 5\% = 29.7 - 29.7 / (29.7 + 60.4) \times 12.6\% = 25.5 / 220 = 11.6\%$.

⁵² Employers' share of soc. sec. 30.8 % of gross income: gross income = $3,154 / (1 + 0.308) = 2,411$. Taxable income federal = $2,411 - 2,411 \times 6.4\%$ employee's soc. sec. - personal basic deduction (=??) = $2,257$. Federal tax = $398 + 42 \times 27\% = 409 / 3,154 = 13.0\%$.

⁵³ Employers' share of soc. sec. is 19.75 % of gross income: gross income = $57.8 / (1 + 0.1975) = 48.3$. Taxable income federal = $48.3 - 48.3 \times 19.75\%$ employee's soc. sec. - personal basic deduction (=??) = 38.7 . Federal tax = $4.9 + 8.7 \times 31\% = 7.6 \times 1.075$ sur tax / $57.8 = 14.1\%$.

⁵⁴ Taxable income federal = 6.35% of $43.6 = 2.8$. Federal tax rate = $2.8 / 67.3 = 4.1\%$.

⁵⁵ Taxable income federal = $15.1 \times \text{gross income} - 15.1 \times 25\%$ pension premium, see [IBFD, Taxation, 1997, UK, taxation of individuals, 1.4.6.] - 3.765 personal basic deduction = 7.56 . Federal tax = $0.64 + (7.56 - 3.2) \times 25\% = 1.73 / 16.6 = 10.4\%$.

⁵⁶ Taxable income federal = $66 - \text{soc. contr. } (12.7\% \times 62.1 = 7.9) - \text{personal basic deduction } (=1.7) - \text{insurance premiums } (1.3) = 55.0$. Federal tax = $0.807 + 1.6 \times 5.97\% = 0.902$. Tax rate = $0.9 / 66 = 1.4\%$.

⁵⁷ Taxable income inhabitants = $4,254 - \text{employment income deduction } (20\% \times 4,254 - 540 = 311) - \text{personal basic deduction } (=380) - \text{employee's contribution } 542 = 3,021$. Federal tax = $3,021 \times 10\% = 302 - (15\%, \text{ max. } 50 \text{ due to } 1995 \text{ tax reduction measure}) = 257$. Tax rate = $257 / 4,837 = 5.3\%$.

⁵⁸ Taxable income = $28.17 - \text{state \& city tax } 1.7 - 7 \text{ pension premiums} = 18.77$. Tax = $15\% \times 18.77 = 2.8$; $2.8 / 37.5 = 7.5\%$.

⁵⁹ Taxable income state & local = $218.5 - \text{employee's contribution } 16.1 = 202$; Tax = $202 \times 29.9\% = 60.4 - 60.4 / (29.7 + 60.4) \times 12.6\% = 51.95 / 220 = 23.6\%$.

⁶⁰ Some autonomous regions apply province tax.

⁶¹ Taxable income cantonal = $66 - \text{soc. contr. } (12.7\% \times 62.1 = 7.9) - \text{personal basic deduction } (=1.7) - \text{insurance premiums } (1.7) = 54.7$. Cantonal tax = $(5 \times 2\% + 6.3 \times 3\% + 7.5 \times 4\% + 8.8 \times 5\% + 11.2 \times 6\% + 15.9 \times 7\%) \times 2.38$ multiplier = 6.69 . Tax rate = $6.69 / 66 = 10.1\%$.

⁶² Taxable income inhabitants = $4,254 - \text{employment income deduction } (20\% \times 4,254 - 540 = 311) - \text{personal basic deduction } (=330) - \text{employee's contribution } 542 = 3,071$. Inhabitants tax = $100 + (3,071 - 2,000) \times 10\% + 3.2$ (per capita tax in Tokyo) = $210 - (15\%, \text{ max. } 20,000 \text{ due to } 1995 \text{ tax reduction measure}) = 190$. Tax rate = $190 / 4,837 = 3.9\%$.

⁶³ Taxable income = $34.84 \text{ US\$} - 4 - \text{employee's contribution } 2.67 - 20 \text{ pension } (=7) = 21.17$. $12 \times 4.55\% + (21.17 - 12) \times 7.593\% = 1.24$ (state tax); $2.25\% \times 21.17 = 0.48$ (city tax); total $1.72 / 37.5 = 4.6\%$; all numbers for New York, see [Waterhouse, Individual, 1996], p. 437.

⁶⁴ Employer's share: $64.8 \times 2 \times 12 = 1.55$; gross income = $220 - 1.55 = 218.5$; Employer's contribution = 1.55 ; employee's contribution = $218.5 \times 7.0\% + 64.8 \times 12 = 16.1$. Total $17.6 / 220 = 8.0\%$.

⁶⁵ Employers' share of soc. sec. 30.8 % of gross income: gross income = $3,154 / (1 + 0.308) = 2,411$. Soc. contr. = $0.372 \times 2,411 = 897 / 3,154 = 28.4\%$.

⁶⁶ Employers' share of soc. sec. 19.75 % of gross income: gross income = $57.8 / (1 + 0.1975) = 48.3$. Soc. contr. = $0.395 \times 48.3 = 19.1 / 57.8 = 33.0\%$.

⁶⁷ Pension premiums are deductible, assumption: 20 % of gross income.

(1) Roll over compensation paid by employer: 10 % of $(67.3 - 20\% \times 67.3 - 2.5 \text{ basic deduction} - 2 \text{ transport}) = 10\%$ of $49.4 = 4.94$.

(2) Soc. sec. contributions paid by employer: 6.3% of $(67.3 - 20\% \times 67.3) = 6.3\%$ of $53.8 = 3.4$.

(3) Soc. sec. contributions paid by employee: 10.75% of $(67.3 - 20\% \times 67.3) = 6.3\%$ of $53.8 = 5.8$.

(4) Gen. soc. sec. contributions paid by employee, part of tax: 31.15% of $(49.4 - 5.8) = 31.15\%$ of $43.6 = 13.6$.

Soc. contr. rate = $27.74 / 67.3 = 41.2\%$.

⁶⁸ Employer's share of soc. sec. is 10.2 % of gross income: gross income = $16.6 / (1 + 0.102) = 15.1$. Employer's soc. sec. contr. = $10.2\% \times 15.1 = 1.54$. Employee's share = $15.1 \times 10.0\% = 1.51$. Soc. contr. = $3.05 / 16.6 = 18.4\%$.

⁶⁹ Employer's share of soc. sec. is 6.35 % of gross income: gross income = $66 / (1 + 0.0635) = 62.1$. Employee's share of soc. sec. is 6.35 % of gross income. Soc. contr. = $0.127 \times 62.1 / 66 = 11.9\%$.

⁷⁰ social security: Health, welfare pensions, unemployment and workmen's accident compensation insurance are government sponsored and participation is compulsory, as a rule, for both employers and employees. Except for workmen's accident compensation insurance, the premiums are generally paid equally by the employer and employee. The combined monthly health insurance premium approximates 8.2 % of standard monthly compensation up to Y980,000 and remains the same thereafter. The combined monthly welfare pension contribution approximates 16.5 % of their standard monthly compensation up to Y590,000. The combined monthly unemployment and workmen's accident compensation insurance premium approximates 1.75 % of monthly compensation, with 1.35 % borne by the employer and 0.4 % borne by the employee.

Employer's share: $13.7\% \times \text{gross income}$; gross income = $4,837 / 1.137 = 4,254$; Employer's contribution = $4,254 \times 13.7\% = 583$; employee's contribution = $4,254 \times 12.75\% = 542$. Total $1,125 / 4,837 = 23.3\%$.

⁷¹ Employer's share: $7.65\% \times \text{gross income}$; gross income = $37.5 / 1.0765 = 34.8$; Employer's contribution = $34.8 \times 7.65\% = 2.67$; employee's contribution = $34.8 \times 7.65\% = 2.67$. Total $5.3 / 37.5 = 14.2\%$.

⁷² [Summaries, C&L, 1996].

⁷³ [Accounts, Eurostat, 1996], year '86.

⁷⁴ Employers' share of soc. sec. is constant at 7%. Gross income increase = 100 % of increase of compensation. Tax rate for gross income increase is 28.8 %; tax rate for compensation increase is 28.8 %.

⁷⁵ Employers' share of soc. sec. 30.7 % of gross income; gross income increase = $100\% / (1 + 0.307) = 76.5\%$ minus employees share which is tax deductible which makes it $0.765 / (1 + 0.063) = 0.72$ of increase of compensation. Tax rate for gross income increase is 22.08 %; tax rate for compensation increase is $22.08\% \times 0.72 = 15.9$.

⁷⁶ Employers' share of soc. sec. 16.75 % of gross income; gross income increase = $100\% / (1 + 0.1675) = 85.6\%$ of increase of compensation. Tax base increase = 85.6% minus employees share which is tax deductible which makes it $0.856 / (1 + 0.1765) = 0.722$ of increase of compensation. Tax rate for gross income increase is 35.1 %; tax rate for compensation increase is $35.1\% \times 0.72 = 25.4\%$.

- ⁷⁷ Employers' share of soc. sec. is 17.32 % of gross income increase; employees' share of soc. sec. is 16.75 % of gross income increase; tax base increase = $100 \% / (1+0.1732) * (1-0.1675) = 71 \%$ of increase of compensation. Tax rate for tax base increase is $36 \% * 0.71 = 25.6 \%.$
- ⁷⁸ Employers' share of soc. sec. is 10.45 % of gross income increase; employees' share of soc. sec. is 9.0 % of gross income increase; gross income increase = $100 \% / (1+0.1045) = 90.5 \%$ of increase of compensation; tax base increase = $100 \% / (1+0.1045) * (1-0.09) = 82.4 \%$ of increase of compensation. Tax rate for tax base increase is $30 \% * 0.824 = 24.7 \%.$
- ⁷⁹ Gross income increase = $(49' -4.93') / 49' = 0.899$ of increase of compensation. Tax rate for an increase of gross income = $3 \% * 0.899 = 2.7 \%.$
- ⁸⁰ Employer's share: 10.6 % * gross income; employee's contribution = 9.7 %, total 20.3 % of gross income; gross income = $100 / 1.106 = 0.904$ of compensation; minus employees share which is tax deductible which makes it $0.904 / (1+ 0.097) = 0.824.$ Gross income increase = 0.824 of increase of compensation. Tax rate for gross income increase is 17.0 %; tax rate for compensation increase is $17.0 \% * 0.824 = 14.0 \%.$
- ⁸¹ Employer's share: 7.15 % * gross income; employee's contribution = 7.15 %, total 14.3 % of gross income; gross income = $100 / 1.0715 = 0.933$ of compensation; minus employees share which is 7.15 %, assumed to be tax deductible: $0.933 / (1+ 0.0715) = 0.871;$ state tax deductible: $0.871 / 1.06 = 0.822.$ Tax base increase after state tax = $0.822 * 0.8$ pension premiums = 0.66 of increase of compensation. Tax rate for gross income increase is 14.0 %; tax rate for compensation increase is $14.0 \% * 0.66 = 9.20 \%.$
- ⁸² Employers' share of soc. sec. is constant at 7'. Gross income increase = 100 % of increase of compensation. Tax rate for gross income increase is 28.0 %; tax rate for compensation increase is 28.0 %.
- ⁸³ Gross income increase = $(49' -4.93') / 49' = 0.899$ of increase of compensation. Tax rate for an increase of gross income = $7 \% * 2.38 * 0.899 = 15.0 \%.$
- ⁸⁴ Employer's share: 10.6 % * gross income; employee's contribution = 9.7 %, total 20.3 % of gross income; gross income = $100 / 1.106 = 0.904$ of compensation; minus employees share which is tax deductible it is $0.904 / (1+ 0.097) = 0.824.$ Gross income increase = 0.824 of increase of compensation. Tax rate for gross income increase is 12.0 %; tax rate for compensation increase is $12.0 \% * 0.824 = 9.9 \%.$
- ⁸⁵ Employer's share: 7.15 % * gross income; employee's contribution = 7.15 %, total 14.3 % of gross income; gross income = $100 / 1.0715 = 0.933$ of compensation; minus employees share which is assumed to be tax deductible which is $0.933 / (1+ 0.0715) * 0.8$ pension premiums = 0.7. Gross income increase = 0.7 of increase of compensation. Tax rate for gross income increase is 6.0 %; tax rate for compensation increase is $6.0 \% * 0.7 = 4.2 \%.$
- ⁸⁶ Acc. to C&L soc. sec are fix at 7'.
- ⁸⁷ Employers' share of soc. sec. 30.7 % of gross income; gross income increase = $100 \% / (1+0.307) = 76.5 \%$ of increase of compensation. Soc. contr. rate for gross income increase is 37.0 %; rate for compensation increase is $37.0 \% * 0.765 = 28.3.$
- ⁸⁸ Employers' share of soc. sec. 16.75 % of gross income; gross income increase = $100 \% / (1+0.1675) = 85.6 \%$ of increase of compensation. Soc. contr. rate for gross income increase is 35.3 %; rate for compensation increase is $35.3 \% * 0.850 = 30.0 \%.$
- ⁸⁹ Employers' share of soc. sec. is 17.32 % of gross income increase; employees' share of soc. sec. is 16.75 % of gross income increase; gross income increase = $100 \% / (1+0.1732) = 85.2 \%$ of increase of compensation. Soc. contr. rate for gross income increase is 34.07 %; rate for compensation increase is $34.07 \% * 0.852 = 29.0 \%.$
- ⁹⁰ Employers' share of soc. sec. is 10.45 % of gross income increase; employees' share of soc. sec. is 9.0 % of gross income increase; gross income increase = $100 \% / (1+0.1045) = 90.5 \%$ of increase of compensation. Soc. contr. rate for gross income increase is 19.45 %; rate for compensation increase is $19.45 \% * 0.905 = 17.6 \%.$
- ⁹¹ Employer's share: 17.32 % * gross income increase. Employee's share of gross income increase = 16.575 %; total 33.9 % of gross income increase; gross income increase = $100 / 1.1732 = 0.852$ of compensation; $33.9 \% * 0.852 = 28.9 \%.$
- ⁹² Employer's share: 7.15 % * gross income; employee's contribution = 7.15 %, total 14.3 % of gross income; gross income = $100 / 1.0715 = 0.933$ of compensation; $14.3 \% * 0.933 = 13.3 \%.$
- ⁹³ [Accounts, Eurostat, 1996], year '94.
- ⁹⁴ Employer's share is fix; employee's contribution = 7.0 %, total 7.0 % of gross income increase; gross income increase = 100 % of compensation increase; minus employees share which is assumed to be tax deductible which is $1 / (1+ 0.07) = 0.935.$ Gross income increase = 0.935 of increase of compensation. Tax rate for gross income increase is 18.0 %; tax rate for compensation increase is $18.0 \% * 0.935 = 16.8 \%.$
- ⁹⁵ Employers' share of soc. sec. 30.8 % of gross income; gross income increase = $100 \% / (1+0.308) = 76.5 \%$ of increase of compensation minus employees share which is tax deductible which makes it $0.765 / (1+ 0.064) = 0.719.$ Tax rate for gross income increase is 27.0 %; tax rate for compensation increase is $27.0 \% * 0.719 = 19.4.$
- ⁹⁶ Employers' share of soc. sec. 19.75 % of gross income; gross income increase = $100 \% / (1+0.1975) = 83.5 \%$ minus employees share which is tax deductible which makes it $0.85 / (1+0.1975) = 0.71$ of increase of compensation. Tax rate for gross income increase is 31 %; tax rate for compensation increase is $31 \% * 1.075$ sur tax * $0.71 = 23.7 \%.$
- ⁹⁷ Marginal tax rate = 37.5 % - 31.15 % soc. sec. = 6.35 %.
- ⁹⁸ Employers' share of soc. sec. 10.2 % of gross income; gross income increase = $100 \% / (1+0.102) = 90.7 \%$ minus pension premium of 25 % of gross income increase which is tax deductible: tax base increase = $0.907 * 0.75 = 0.68$ of increase of compensation. Tax rate for gross income increase is 25 %; tax rate for compensation increase is $25 \% * 0.68 = 17.0 \%.$
- ⁹⁹ Taxable income federal = 66' - soc. contr. $(12.7 \% * 62.1' = 7.9')$ - personal basic deduction (=1.7') - insurance premiums (1.3') = 55.0'. Gross income increase = $(66' -7.9') / 66' = 0.88$ of increase of compensation. Tax rate for an increase of gross income = $5.97 \% * 0.88 = 5.3 \%.$
- ¹⁰⁰ Employers' share of soc. sec. 13.7 % of gross income: gross income increase = $100 \% / (1+0.137) = 88.0 \%$ of increase of compensation minus employees share which is tax deductible: $0.88 / (1+ 0.1275) = 0.78.$ Gross income increase = 0.78 of increase of compensation. Tax rate for gross income increase is $10 \% * 0.85$ (tax reduction); tax rate for compensation increase is $8.5 \% * 0.78 = 6.63 \%.$
- ¹⁰¹ Employer's share: 7.65 % * gross income; employee's contribution = 7.65 %, total 15.3 % of gross income; gross income = $100 / 1.0765 = 0.929$ of compensation; minus employees share which is 7.65 %, assumed to be tax deductible: $0.929 / (1+ 0.0765) = 0.863;$ state tax deductible: $0.871 / 1.0985 = 0.793.$ Tax base increase after state tax = $0.793 * 0.8$ pension premiums = 0.634 of increase of compensation. Tax rate for gross income increase is 15.0 %; tax rate for compensation increase is $15.0 \% * 0.634 = 9.52 \%.$
- ¹⁰² Employer's share is fix; employee's contribution = 7.0 %, total 7.0 % of gross income increase; gross income increase = 100 % of compensation increase; minus employees share which is assumed to be tax deductible which is $1 / (1+ 0.07) = 0.935.$ Gross income increase = 0.935 of increase of compensation. Tax rate for gross income increase is 29.9 %; tax rate for compensation increase is $29.9 \% * 0.935 = 28.0 \%.$
- ¹⁰³ Taxable income cantonal = 66' - soc. contr. $(12.7 \% * 62.1' = 7.9')$ - personal basic deduction (=1.7') - insurance premiums (1.7') = 54.7'. Cantonal tax = $(5' * 2 \% + 6.3' * 3 \% + 7.5' * 4 \% + 8.8' * 5 \% + 11.2' * 6 \% + 15.9' * 7 \%) * 2.38$ multiplier = 6.69'. Gross income increase = $(66' -7.9') / 66' = 0.88$ of increase of compensation. Tax rate for an increase of gross income = $7 \% * 2.38 * 0.88 = 14.7 \%.$
- ¹⁰⁴ Employers' share of soc. sec. 13.7 % of gross income: gross income increase = $100 \% / (1+0.137) = 88.0 \%$ of increase of compensation minus employees share which is tax deductible: $0.88 / (1+ 0.1275) = 0.78.$ Gross income increase = 0.78 of increase of compensation. Tax rate for gross income increase is $10 \% * 0.85;$ tax rate for compensation increase is $8.5 \% * 0.78 = 6.63 \%.$
- ¹⁰⁵ Employer's share: 7.65 % * gross income; employee's contribution = 7.65 %, total 15.3 % of gross income; gross income = $100 / 1.0765 = 0.929$ of compensation; minus employees share which is assumed to be tax deductible which is $0.929 / (1+ 0.0765) * 0.8$ pension premiums = 0.69. Gross income increase = 0.69 of increase of compensation. Tax rate for gross income increase is 9.85 %; tax rate for compensation increase is $9.85 \% * 0.69 = 6.8 \%.$

- ¹⁰⁶ Employer's share is fix; employee's contribution = 7.0 %, total 7.0 % of gross income; gross income increase = 100 % of compensation increase; contr. rate for increase = 7.0 %.
- ¹⁰⁷ Employers' share of soc. sec. 30.8 % of gross income; gross income increase = $100 \% / (1+0.308) = 76.5 \%$ of increase of compensation. Soc. contr. rate for gross income increase is 37.2 %; rate for compensation increase is $37.2 \% * 0.765 = 28.5$.
- ¹⁰⁸ Employers' share of soc. sec. 19.75 % of gross income; gross income increase = $100 \% / (1+0.1975) = 83.5 \%$ of increase of compensation. Soc. contr. rate for gross income increase is 39.5 %; rate for compensation increase is $39.5 \% * 0.835 = 33.0 \%$.
- ¹⁰⁹ Pension premiums are deductible, assumption: 20 % of gross income.
- (1) Roll over compensation paid by employer: 10 % of increase - additional pension premiums, i.e. 10 % of 80 % of increase = 8 %.
- (2) Soc. sec. contributions paid by employer: 6.3 % of increase - additional pension premiums, i.e. 6.3 % of 80 % of increase = 5 %.
- (3) Soc. sec. contributions paid by employee: 10.75 % of increase - additional pension premiums, i.e. 10.75 % of 80 % of increase = 8.6 %.
- (4) Gen. soc. sec. contributions paid by employee, part of tax: 31.15 % of increase - additional pension premiums - additional soc. sec. contr. paid by employees, i.e. 31.15 % of (80 % - 8.6 %) of increase = 31.15 % of 71.4 % = 22.2 %.
- Soc. contr. rate on increase = 43.8 %.
- ¹¹⁰ Employers' share of soc. sec. 10.2 % of gross income; gross income increase = $100 \% / (1+0.102) = 90.7 \%$ of increase of compensation. Soc. contr. rate for gross income increase is 20.2 %; rate for compensation increase is $20.2 \% * 0.907 = 18.3 \%$.
- ¹¹¹ Employer's share: 13.7 % * gross income; employee's contribution = 12.75 %, total 20.3 % of gross income; gross income = $100 / 1.137 = 0.88$ of compensation; $26.45 \% * 0.88 = 23.3 \%$.
- ¹¹² Employer's share: 7.65 % * gross income; employee's contribution = 7.65 %, total 15.3 % of gross income; gross income = $100 / 1.0765 = 0.929$ of compensation; $15.3 \% * 0.929 = 14.2 \%$.
- ¹¹³ [Summaries, C&L, 1996].
- ¹¹⁴ Taxable base = profit - enterprise tax of 20 %; federal table tax rate = $56.0 \% * 0.80 = 44.8 \%$ (federal tax rate for operating surplus).
- ¹¹⁵ table tax rates 3.63 % minimum to 9.8 for profit rates on equity above 22 %.
- ¹¹⁶ Taxable base = profit - enterprise tax = 6.0 %; federal table tax rate = $46.0 \% * 0.94 = 43.2 \%$ (federal tax rate for operating surplus).
- ¹¹⁷ Taxable base = profit - state&local tax of 9.9 %: federal table tax rate = 35 %, tax rate for operating surplus = $35 \% * 90.1 \% = 31.5 \%$.
- ¹¹⁸ all numbers for Zurich; table tax rates (3.45 % to 10 %) times multiplier of 2.38; within these limits, the rate is equal to half the ratio of profits to net worth.
- ¹¹⁹ Taxable base = profit - enterprise tax = 86.8 %; state&local table tax rate = $9.0 \% * 0.868 = 7.8 \%$ (state&local tax rate for operating surplus).
- ¹²⁰ 6 % on taxable income, see example on p. U-43. Taxable income = gross profit.
- ¹²¹ between 15 % and 25 %.
- ¹²² Tokyo.
- ¹²³ different rates apply for dividends: 20.0 % enterprise tax + 36.0 % federal table tax on dividends * 0.8 = 48.8 %; withholding taxes on dividends not taken into account.
- ¹²⁴ different rates apply for dividends: 13.2 % + 86.8 % * (33.3 % federal + 20.7 % inhabitant * 33.3 %) = 48.1 %; withholding taxes on dividends not taken into account.
- ¹²⁵ Taxable base = profit - enterprise tax of 20 %; federal table tax rate = $48.376 \% * 0.80 = 38.7 \%$ (federal tax rate for operating surplus).
- ¹²⁶ table tax rates 3.63 % minimum to 9.8 for profit rates on equity above 22 %.
- ¹²⁷ Taxable base = profit - enterprise tax of 12.6 %; federal table tax rate = $37.5 \% * 0.874 = 32.8 \%$ (federal tax rate for operating surplus).
- ¹²⁸ all numbers for Zurich; table tax rates 4 % * 2.38 = 9.52 % minimum to 28.6 % for profit rates on equity above 22 %.
- ¹²⁹ Taxable base = profit - enterprise tax = 87.4 %; Corporate inhabitant table tax rate = $7.8 \% * 0.874 = 6.8 \%$ (Corporate inhabitant tax rate for operating surplus).
- ¹³⁰ 9.85 % (7.6 % state tax + 2.25 % city tax, all numbers for New York) on taxable income. Taxable income = gross profit.
- ¹³¹ between 15 % and 25 %.
- ¹³² Tokyo.
- ¹³³ Germany is the only country where different rates apply for dividends: 20.0 % enterprise tax + 32.25 % federal table tax on dividends * 0.8 = 45.8 %; withholding taxes on dividends not taken into account.
- ¹³⁴ [Summaries, C&L, 1996].
- ¹³⁵ [Theorie, Kruimel, 1987], p.193. The tax on immovable property can be assessed in two ways: on the basis of the market value; or on the basis of the surface area, adjusted by coefficients for type of property, location, quality and usage. The rates vary strongly between municipalities. Residencies used by the owner pay up to three times more than for rented dwellings. The band width is given by the following examples: Amsterdam taxes on the basis of surface with a factor of 49.43 for owners and 16.45 for rented dwellings, Markelo with 0.30 and 0.20. Appingedam taxes on the basis of value with a factor of 15.34 for owners and 10.07 for rented dwellings, Willeskop with 1.28 and 0.60.
- ¹³⁶ [UK, Tolley's, 1996], 1985 edition: rates ranged in '85/'85 from 132 to 292 pence in the pound.
- ¹³⁷ Some cantons and municipalities impose property taxes.
- ¹³⁸ of 'assessed' value. Additional: new land value tax 0.3 %, tax base assessed value less 1.5 mio YEN. Rate is same as in USA!
- ¹³⁹ per m² office space.
- ¹⁴⁰ 0.6-1.0 Gewerkekapitalsteuer + 0.6 % net wealth tax on business property.
- ¹⁴¹ see [IBFD, Taxation, 1986], taxation of corporations, Switzerland, rates are for Zürich, p. 55. Federal tax 0.0825 % + state/municipality tax 0.15 % * 2.38 = 0.44
- ¹⁴² some states do.
- ¹⁴³ see [IBFD, Taxation, 1985], taxation of individuals, Switzerland, rates are for Zürich, p. 56. State/municipality tax (0.05 % to 0.3 %) * 2.38 = 0.12 % (0.15 mio CHF) to 0.71 % (> 2 mio CHF).
- ¹⁴⁴ total revenue almost 5 billion NGL in 1995. For rate structure see footnote for year '85/'86; for details of '95 rates see [Tarifen, Amsterdam, 1996] and [Lokale, IBFD, 1996].
- ¹⁴⁵ [UK, Tolley's, 1996]: Basis of assessment: The rateable value of property (related to its annual rental value which is assessed by the valuation officers of the Board of Inland Revenue) and the rate poundage fixed by the rating authority; the tax bill is calculated according to which of the valuation bands the property falls in (e.g. over GBP 320.000 it is three times that below GBP 40.000); rates ranged from 117 to 354 pence in the pound.
- ¹⁴⁶ Some cantons and municipalities impose property taxes.
- ¹⁴⁷ of 'assessed' value. Included is the new land value tax 0.3 %, tax base is assessed value less 1.5 mio YEN.
- ¹⁴⁸ per m² office space.

¹⁴⁹ 0.6-1.0 Gewerbesteuer + 0.6 % net wealth tax on business property.

¹⁵⁰ see [IBFD, Taxation, 1997], taxation of corporations, Switzerland, rates are for Zürich, p. 55. Federal tax 0.0825 % + state/municipality tax 0.15 % * 2.38 = 0.44.

¹⁵¹ some states do.

¹⁵² see [IBFD, Taxation, 1997], taxation of individuals, Switzerland, rates are for Zürich, p. 62. State/municipality tax (0.05 % to 0.3 %) * 2.38 = 0.12 % (0.19 mio CHF) to 0.71 % (> 2.5 mio CHF).