

Webb Appendix: Sensitivity analysis to:
Climate Policy within an International Emission Trading System
– A Swedish case

1 Sensitivity analysis on macro closure

In the first sensitivity analysis we evaluate the impact from the choice of macro closure. The marginal propensity to save is held constant and foreign saving is allowed to vary in order to keep savings equal to the sum of domestic investment and foreign savings.¹ Since foreign savings are allowed to vary the current account may also vary. The effects on emissions and national income are on almost the same level and are thus not very sensitive to the choice of macro closure. Private consumption in most scenarios is lower under this macro closure, but when foreign savings increase, foreign assets will accumulate and future consumption possibilities will increase. In some scenarios private consumption is higher and foreign savings decrease. The welfare gain is thus at almost the same level. All industry-specific effects have the same pattern and are not sensitive to the choice of macro closure.

¹ To implement this the following closure values are used in SAINT GOVCLOS(SIMCURNB)= 4;
ROWCLOS(SIMCURNB)= 3; SICLOS(SIMCURNB)= 6;

Table A 1.1 Results without ETS, sensitivity on macroclosure

Variable	Base	Scenarios				
		(1)	(2)	(3)	(4)	(5)
CO₂ emissions	million tonnes	Changes from base in million tonnes				
Domestic emission	43.4	-9.6	-6.3	-10.2	-4.8	2.1
Carbon leakage through electricity trade		2.6	-8.3	-8.4	1.9	-5.3
Carbon leakage through trade in other commodities		2.7	2.3	5.3	2.5	2.0
Impact on global emissions		-4.3	-12.3	-13.3	-0.4	-1.2
Economic variables	Billion sek	Changes from base in %				
National income	2 272	0.21	0.13	0.06	2.00	3.77
GDP, deflated by CPI	2 310	0.18	-0.05	-0.12	1.93	3.52
GDP, GDP-deflator	2 310	-0.07	-0.28	-0.30	0.16	0.37
Private Consumption	1 121	0.14	-0.46	-0.57	1.54	2.48
Equivalent Variation Change EV / household consumption		-0.12	-0.71	-0.78	-0.04	-0.14
Foreign Saving	138	0.83	4.97	5.51	6.27	15.25
Gross real wage		0.16	-0.14	-0.27	2.06	3.94
Disposable Real wage		0.36	0.76	0.73	3.53	7.09
Labour tax		-0.20	-0.88	-0.98	-1.42	-2.98
Capital return		0.16	-0.98	-1.16	1.89	2.74

Note: The top number in each cell refers to the long run effect, the bottom number to the short run effect. All variables are deflated with CPI if not else specified. CPI is a price index with the cost shares in the base model household's consumption as weights.

Table A 1.2 emissions in different sectors without ETS, sensitivity on macroclosure

Industry	Base	Scenarios				
		(1)	(2)	(3)	(4)	(5)
	thousand tonnes	Changes from base in thousand tonnes				
Agriculture, forestry, fishing	2263	-640	-462	-460	-463	-57
Mining	501	-350	-178	-172	-304	-77
Manufacture of food, textile and wearing apparel	1006	-735	-469	-470	-652	-197
Manufacture of wood and of products of wood, publishing	165	-96	-92	-91	-81	-53
Production of biofuel	52	-4	18	18	-1	20
Manufacture of pulp, paper and paper products	1968	-1800	-1728	-1717	-1707	-1391
Refineries	163	-138	-62	-61	-126	-12
Other energy-intensive manufacturing	2661	-2146	-1407	-1379	-1958	-600
Other manufacturing	359	-196	-144	-140	-165	-40
Electricity	440	-314	-379	-378	-266	-287
Gas	41	-37	-33	-33	-33	-22
Hot water supply	2838	-1965	-1626	-1609	-1760	-1579
Distribution of water. Construction	1605	60	94	90	295	479
Retail trade	1390	38	33	43	227	410
Hotels, financial services, post	524	13	22	30	98	185
Land transports	4087	57	18	69	452	813
Water Transports	3855	-2334	-1183	-3750	-2370	-1586
Air transports	2508	-27	-6	-1335	-81	-98
Real estate activities, Renting of equipment, R&D	989	102	113	109	405	673
Other business activities	441	17	28	36	86	155
Public services	848	69	94	33	304	465
Other service activities	567	31	44	46	149	242
Households	14154	746	964	960	3162	4672
TOTAL	43425	-9649	-6340	-10160	-4788	2118

Table A 1.3 Short run change in operating surplus (%)without ETS, sensitivity on macroclosure

Industries	Base	Scenarios				
	Billion SEK	(1)	(2)	(3)	(4)	(5)
Agriculture, forestry, fishing	25734	0.2	-1.1	-1.0	1.9	2.7
Mining	3173	-3.9	-6.1	-6.7	-0.4	1.6
Manufacture of food, textile and wearing apparel	17970	0.3	0.8	0.8	2.1	4.6
Manufacture of wood and of products of wood, publishing	8142	0.3	0.4	0.9	2.6	5.1
Production of biofuel	3289	4.7	4.0	4.3	5.6	5.4
Manufacture of pulp, paper and paper products	21617	-2.7	-12.1	-11.7	0.0	-4.7
Refineries	2172	-6.7	-6.8	-11.0	0.4	8.1
Other energy-intense manufacturing	53674	0.1	-0.5	0.2	2.1	3.7
Other manufacturing	12766	2.3	7.6	9.2	4.1	9.9
Electricity	12758	5.3	-23.6	-23.5	6.0	-11.0
Gas	1205	-34.7	-21.0	-21.3	-23.7	-4.7
Hot water supply	5064	5.8	9.6	9.5	4.7	1.6
Distribution of water. Construction	12451	-0.1	-0.7	-0.9	1.4	2.6
Retail trade	86701	0.0	-1.1	-0.9	1.9	3.1
Hotels, financial services, post	48696	-0.1	-0.5	-1.7	1.6	3.1
Land transports	22398	-0.9	-3.1	-2.5	-0.6	-1.7
Water Transports	2828	-7.9	-4.6	-46.2	-5.7	-0.9
Air transports	1222	0.4	1.7	3.8	1.2	3.6
Real estate activities, Renting of equipment, R&D	220008	0.2	-0.1	-0.6	1.8	3.2
Other business activities	46030	0.4	0.8	0.9	2.3	4.6
Public services	29686	0.1	-0.5	-0.6	1.9	3.3
Other service activities	25451	0.1	-0.5	-0.7	1.7	2.8

Table A 1.4 Long run change in employment (%)without ETS, sensitivity on macroclosure

Industries	Base	Scenarios				
	Share of labour force	(1)	(2)	(3)	(4)	(5)
Agriculture, forestry, fishing	0.8%	-1.4	-4.3	-4.1	-0.3	-2.2
Mining	0.2%	4.6	8.6	10.0	5.8	6.3
Manufacture of food, textile and wearing apparel	3.2%	-0.5	-0.9	-1.0	-0.3	-0.3
Manufacture of wood and of products of wood, publishing	0.8%	-0.2	-1.2	-0.5	1.0	1.3
Production of biofuel	0.1%	19.6	49.7	50.8	14.8	27.7
Manufacture of pulp, paper and paper products	1.1%	-9.6	-33.5	-32.7	-5.8	-26.1
Refineries	0.1%	11.6	20.0	21.1	12.2	12.0
Other energy-intense manufacturing	7.7%	0.9	-1.3	0.3	1.3	0.8
Other manufacturing	6.1%	4.0	12.8	14.8	4.0	11.6
Electricity	0.1%	13.1	-47.4	-47.3	9.3	-30.3
Gas	0.0%	-54.1	-21.5	-21.7	-43.4	-5.5
Hot water supply	0.1%	-6.2	22.3	22.9	-13.6	-15.1
Distribution of water. Construction	6.0%	-0.1	-0.2	-0.3	-0.4	-0.8
Retail trade	13.2%	0.2	-0.9	-0.5	0.5	-0.1
Hotels, financial services, post	8.7%	-1.0	-0.6	-2.3	-1.2	-1.0
Land transports	2.5%	-1.1	-4.2	-2.6	-3.1	-7.6
Water Transports	0.3%	-58.0	-25.0	-94.0	-59.0	-36.7
Air transports	0.2%	-0.3	1.6	-9.7	-2.6	-2.8
Real estate activities, Renting of equipment, R&D	8.3%	-0.1	-0.2	-0.5	-0.2	-0.4
Other business activities	8.6%	0.5	1.7	1.9	0.5	1.7
Public services	27.5%	0.0	-0.1	0.0	-0.1	-0.3
Other service activities	4.3%	-0.1	-0.3	-0.4	-0.2	-0.5

Table A 1.5 Results without ETS, sensitivity on macroclosure

Variable	Base	Scenarios			
		(1)	(1b)	(5)	(5b)
CO₂ emissions	million tonnes	Changes from base in million tonnes			
Domestic emission	43.4	-9.6	-9.6	2.1	1.9
Carbon leakage through electricity trade		2.6	2.6	-5.3	-5.1
Carbon leakage through trade in other commodities		2.7	2.7	2.0	2.1
Impact on global emissions		-4.3	-4.3	-1.2	-1.1
Economic variables	Billion sek	Changes from base in %			
National income	2 272	0.214	0.204	3.769	3.680
GDP, deflated by CPI	2 310	0.183	0.174	3.525	3.441
GDP, GDP-deflator	2 310	-0.066	-0.063	0.365	0.361
Private Consumption	1 121	0.144	0.137	2.478	2.416
Equivalent Variation Change EV / household consumption		-0.119	-0.115	-0.142	-0.139
Foreign Saving	138	0.826	0.811	15.252	14.966

Table A 1.6 Results with ETS, sensitivity on macroclosure

Variable	Base*	Scenarios				
		(6)	(7)	(8)	(9)	(10)
CO₂ emissions	million tonnes	Changes from base in million tonnes				
Domestic non-ETS emission	42.0	-9.4	-14.1	-17.1	-7.1	-6.6
Carbon leakage from ETS industries		1.8	2.2	2.1	1.7	1.7
Carbon leakage through trade in non ETS commodities.		5.3	4.9	7.0	5.3	4.8
Impact on global emissions		-2.3	-7.0	-8.0	-0.1	-0.2
Economic variables	Billion sek	Changes from base in %				
National income	2 268	-0.15	-0.94	-0.96	0.83	2.98
GDP, deflated by CPI	2 307	-0.17	-0.90	-0.93	0.79	2.91
GDP, GDP-deflator	2 307	-0.06	0.27	0.26	0.06	0.67
Private Consumption	1 120	-0.14	-0.26	-0.33	0.62	2.76
Equivalent Variation Change EV / household consumption		-0.07	1.15	1.08	-0.04	1.17
Foreign saving	138	0.02	-0.24	-0.22	0.98	3.56
Gross real wage		-0.20	-0.40	-0.49	0.84	3.71
Disposable Real wage		-0.13	-2.48	-2.45	1.62	4.52
Labour tax		-0.07	2.04	1.92	-0.76	-0.76
Capital return		-0.22	0.01	-0.11	0.72	3.72

Table A 1.7 emissions in different sectors with ETS, sensitivity on macroclosure

Industry	Base	Scenarios				
		(6)	(7)	(8)	(9)	(10)
	thousand tonnes	Changes from base in thousand tonnes				
Agriculture, forestry, fishing	2290	-699	-756	-745	-611	-347
Mining	254	-143	-143	-137	-130	-81
Manufacture of food, textile and wearing apparel	1110	-841	-830	-810	-799	-592
Manufacture of wood and of products of wood, publishing	173	-106	-111	-109	-100	-78
Production of biofuel	68	-13	-17	-17	-11	-6
Manufacture of pulp, paper and paper products	357	-278	-284	-267	-264	-212
Refineries	189	-163	-158	-153	-157	-117
Other energy-intense manufacturing	892	-568	-560	-532	-528	-330
Other manufacturing	402	-242	-246	-238	-226	-164
Electricity	210	-133	-122	-113	-121	-55
Gas	32	-29	-31	-31	-28	-27
Hot water supply	1190	-726	-1066	-1053	-682	-1001
Distribution of water. Construction	1626	5	-302	-298	125	123
Retail trade	1380	3	-71	-57	98	293
Hotels, financial services, post	533	-12	-59	-47	30	99
Land transports	4005	23	-114	-59	221	693
Water Transports	7259	-5583	-5313	-7150	-5577	-5244
Air transports	2519	-26	47	-1406	-54	-69
Real estate activities, Renting of equipment, R&D	1042	13	-302	-289	160	168
Other business activities	444	2	-43	-32	36	77
Public services	890	4	-304	-362	119	-4
Other service activities	579	3	-108	-103	61	66
Households	14576	78	-3196	-3123	1288	166
TOTAL	42022	-9431	-14090	-17132	-7149	-6641

Table A 1.8 Short run change in operating surplus (%) with ETS, sensitivity on macroclosure

Industries	Base	Scenarios				
	Billion SEK	(6)	(7)	(8)	(9)	(10)
Agriculture, forestry, fishing	25285	0.1	0.0	0.3	1.0	3.5
Mining	3296	-2.9	-4.2	-4.6	-1.2	2.4
Manufacture of food, textile and wearing apparel	17919	-0.2	0.1	0.0	0.8	4.0
Manufacture of wood and of products of wood, publishing	7967	-0.3	-0.8	0.2	1.0	4.2
Production of biofuel	4126	1.6	2.2	2.8	2.3	5.1
Manufacture of pulp, paper and paper products	19231	-0.9	-3.0	-2.3	0.4	2.0
Refineries	2207	-5.0	-8.0	-13.1	-1.6	5.7
Other energy-intense manufacturing	53213	0.2	-0.4	1.0	1.2	3.7
Other manufacturing	12847	1.1	1.2	3.9	2.1	5.4
Electricity	17098	1.2	19.5	19.9	2.0	22.2
Gas	907	-35.3	-48.6	-48.7	-29.3	-25.0
Hot water supply	6154	2.2	-10.5	-10.5	2.1	-10.6
Distribution of water. Construction	12420	-0.3	-0.4	-0.5	0.5	2.9
Retail trade	85838	-0.2	-0.4	0.0	0.8	3.6
Hotels, financial services, post	49225	-0.6	-0.7	-2.5	0.4	3.0
Land transports	21967	-0.4	0.3	1.2	-0.2	0.8
Water Transports	5266	-9.2	-9.2	-51.5	-7.9	-4.2
Air transports	1228	0.1	1.6	4.5	0.6	3.6
Real estate activities, Renting of equipment, R&D	219780	-0.2	-0.2	-0.7	0.7	3.2
Other business activities	45914	-0.1	-0.1	0.1	1.0	3.9
Public services	29602	-0.2	-0.6	-0.7	0.7	3.2
Other service activities	25402	-0.2	-0.7	-0.9	0.6	2.7

Table A 1.9 Long run change in employment (%) with ETS, sensitivity on macroclosure

Industries	Base	Scenarios				
	Share of labour force	(6)	(7)	(8)	(9)	(10)
Agriculture, forestry, fishing	0.8%	-0.8	-2.7	-2.5	-0.3	-0.4
Mining	0.2%	7.7	5.7	5.5	8.1	5.7
Manufacture of food, textile and wearing apparel	3.2%	-0.7	-0.4	-0.5	-0.6	0.0
Manufacture of wood and of products of wood, publishing	0.8%	0.6	-0.4	0.2	1.3	2.0
Production of biofuel	0.1%	10.3	3.5	3.8	8.6	1.6
Manufacture of pulp, paper and paper products	1.1%	-2.0	-11.9	-10.7	-0.3	-6.5
Refineries	0.1%	12.9	11.4	10.3	13.0	9.1
Other energy-intensive manufacturing	7.7%	2.7	0.8	2.2	2.9	1.9
Other manufacturing	6.1%	3.9	5.1	6.5	4.0	5.8
Electricity	0.1%	6.1	75.9	76.0	5.0	66.7
Gas	0.0%	-53.2	-72.5	-72.6	-47.4	-50.9
Hot water supply	0.1%	-0.2	-39.3	-39.2	-4.4	-47.6
Distribution of water. Construction	6.0%	0.0	-0.1	-0.1	-0.2	-0.6
Retail trade	13.2%	0.6	0.9	1.2	0.7	1.3
Hotels, financial services, post	8.7%	-2.3	-1.9	-3.3	-2.3	-2.2
Land transports	2.5%	0.6	1.1	2.7	-0.6	-3.6
Water Transports	0.3%	-75.4	-71.5	-96.7	-75.4	-70.6
Air transports	0.2%	-0.4	2.4	-9.6	-1.6	-2.4
Real estate activities, Renting of equipment, R&D	8.3%	-0.1	0.3	0.0	-0.2	0.0
Other business activities	8.6%	0.5	0.6	0.7	0.5	0.8
Public services	27.5%	0.0	-0.2	-0.2	0.0	-0.4
Other service activities	4.3%	-0.1	0.1	0.1	-0.1	-0.1

2 Sensitivity analysis on trade elasticities

The second sensitivity analysis evaluates the impact from a reduction of the trade elasticities. The elasticities used are found in Table A4. With lower trade elasticities carbon leakages will become smaller. Thus, the tax on electricity will be less efficient in reducing global carbon emission and scenarios 2, 3 and 5 will thus have higher emissions.

Table A 2.1 Trade elasticities

Commodity	Most scenarios		Sensitivity analysis	
	Import	export	import	export
Products from Agriculture, forestry, fishing	1.65	3.90	1.45	3.43
Mining and quarrying products	1.65	3.90	1.45	3.43
Food, textile and wearing apparel	1.65	3.90	1.45	3.43
Wood and of products of wood, publishing	1.65	3.90	1.45	3.43
Pulp, paper and paper products	1.65	3.90	1.45	3.43
Gasoline	2.25	4.50	1.98	3.96
Diesel	2.25	4.50	1.98	3.96
Jet fuels	2.25	4.50	1.98	3.96
Light fuel oil	2.25	4.50	1.98	3.96
Heavy fuel oil	2.25	4.50	1.98	3.96
Other refined petroleum products	2.25	4.50	1.98	3.96
Other energy intense manufacturing products	1.65	3.90	1.45	3.43
Other manufacturing products	1.65	3.90	1.45	3.43
Electricity	3.00	4.50	2.64	3.96
Distribution of water. Construction services	0.75	4.50	0.66	1.06
Retail trade services	0.75	1.20	0.66	1.06
Hotel services, financial services, post	1.20	1.80	1.06	1.58
Land transports	1.20	1.80	1.06	1.58
Water Transports	2.25	4.50	1.98	3.96
Air transports	2.25	4.50	1.98	3.96
Real estate services, Renting of equipment, R&D	0.75	1.20	0.66	1.06
Other business services	0.75	1.20	0.66	1.06
Public services	0.75	1.20	0.66	1.06
Other services	0.90	1.80	0.79	1.58

Table A 2.2 Results without ETS, sensitivity on trade elasticities

Variable	Base	Scenarios				
		(1)	(2)	(3)	(4)	(5)
CO₂ emissions	million tonnes	Changes from base in million tonnes				
Domestic emission	43.4	-9.4	-5.8	-9.8	-4.4	2.7
Carbon leakage through electricity trade		2.3	-7.0	-7.0	1.7	-4.4
Carbon leakage through trade in other commodities		2.6	2.4	5.6	2.6	2.4
Impact on global emissions		-4.5	-10.5	-11.2	-0.1	0.7
Economic variables	Billion sek	Changes from base in %				
National income	2 272	0.21	0.15	0.09	2.06	3.90
GDP, deflated by CPI	2 310	0.18	-0.01	-0.08	1.99	3.68
GDP, GDP-deflator	2 310	-0.06	-0.21	-0.22	0.24	0.55
Private Consumption	1 121	0.25	0.23	0.21	2.43	4.65
Equivalent Variation Change EV / household consumption		-0.01	-0.01	0.01	0.84	1.97
Gross real wage		0.13	-0.24	-0.39	2.01	3.82
Disposable Real wage		0.34	0.83	0.82	3.72	7.54
Labour tax		-0.21	-1.06	-1.19	-1.64	-3.52
Capital return		0.20	-0.85	-1.01	1.96	2.92

Note: The top number in each cell refers to the long run effect, the bottom number to the short run effect. All variables are deflated with CPI if not else specified. CPI is a price index with the cost shares in the base model household's consumption as weights.

Table A 2.3 emissions in different sectors without ETS, sensitivity on trade elasticities

Industry	Base	Scenarios				
		(1)	(2)	(3)	(4)	(5)
	thousand tonnes	Changes from base in thousand tonnes				
Agriculture, forestry, fishing	2263	-634	-441	-437	-456	-34
Mining	501	-345	-142	-116	-299	-65
Manufacture of food, textile and wearing apparel	1006	-734	-466	-466	-649	-186
Manufacture of wood and of products of wood, publishing	165	-95	-92	-91	-81	-55
Production of biofuel	52	-4	19	19	-1	20
Manufacture of pulp, paper and paper products	1968	-1798	-1718	-1705	-1707	-1376
Refineries	163	-137	-48	-39	-125	-6
Other energy-intensive manufacturing	2661	-2145	-1411	-1382	-1962	-627
Other manufacturing	359	-197	-149	-145	-167	-49
Electricity	440	-313	-380	-379	-265	-286
Gas	41	-37	-33	-33	-33	-22
Hot water supply	2838	-1959	-1619	-1597	-1747	-1556
Distribution of water. Construction	1605	62	99	97	298	485
Retail trade	1390	38	34	45	228	412
Hotels, financial services, post	524	14	26	34	102	192
Land transports	4087	66	57	121	459	833
Water Transports	3855	-2150	-913	-3733	-2237	-1622
Air transports	2508	-29	-16	-1310	-77	-94
Real estate activities, Renting of equipment, R&D	989	103	118	116	412	693
Other business activities	441	17	26	34	85	152
Public services	848	70	93	33	305	468
Other service activities	567	32	49	52	154	253
Households	14154	768	1068	1075	3337	5142
TOTAL	43425	-9406	-5839	-9805	-4428	2671

Table A 2.4 Short run change in operating surplus (%)without ETS, sensitivity on trade elasticities

Industries	Base	Scenarios				
	Billion SEK	(1)	(2)	(3)	(4)	(5)
Agriculture, forestry, fishing	25734	0.7	-0.2	0.0	2.3	3.4
Mining	3173	-1.7	-4.5	-5.2	1.2	2.3
Manufacture of food, textile and wearing apparel	17970	0.4	1.0	1.0	2.4	5.0
Manufacture of wood and of products of wood, publishing	8142	0.1	0.1	0.9	2.1	4.2
Production of biofuel	3289	1.0	2.6	3.2	2.3	3.9
Manufacture of pulp, paper and paper products	21617	0.0	-8.5	-7.9	2.1	-2.4
Refineries	2172	-2.5	-3.1	-8.5	4.4	11.7
Other energy-intense manufacturing	53674	0.6	-0.6	0.6	2.1	3.0
Other manufacturing	12766	1.1	4.9	7.2	2.2	6.4
Electricity	12758	1.3	-12.3	-12.0	2.7	-3.2
Gas	1205	-20.0	-4.3	-4.5	-6.9	14.6
Hot water supply	5064	1.0	4.6	4.7	1.0	-0.6
Distribution of water. Construction	12451	0.1	-0.4	-0.6	1.6	2.8
Retail trade	86701	0.3	-0.8	-0.5	2.1	3.3
Hotels, financial services, post	48696	-0.1	-0.2	-2.0	1.8	3.6
Land transports	22398	-0.2	-2.1	-1.3	0.0	-0.9
Water Transports	2828	-8.9	-6.0	-47.4	-7.0	-2.8
Air transports	1222	0.2	1.2	5.1	0.9	2.9
Real estate activities, Renting of equipment, R&D	220008	0.3	0.4	0.0	2.3	4.3
Other business activities	46030	0.3	0.4	0.6	2.0	3.9
Public services	29686	0.2	-0.3	-0.5	2.0	3.4
Other service activities	25451	0.3	0.1	-0.1	2.2	3.9

Table A 2.5 Long run change in employment (%) without ETS, sensitivity on trade elasticities

Industries	Base	Scenarios				
	Share of labour force	(1)	(2)	(3)	(4)	(5)
Agriculture, forestry, fishing	0.8%	-1.1	-3.4	-3.1	0.1	-1.2
Mining	0.2%	8.0	20.6	28.3	8.2	9.0
Manufacture of food, textile and wearing apparel	3.2%	-0.4	-0.4	-0.5	0.2	0.9
Manufacture of wood and of products of wood, publishing	0.8%	-0.4	-1.8	-1.1	0.4	0.0
Production of biofuel	0.1%	20.3	51.8	52.9	14.8	28.7
Manufacture of pulp, paper and paper products	1.1%	-9.0	-31.6	-30.8	-6.3	-25.2
Refineries	0.1%	15.7	36.5	47.0	15.3	15.9
Other energy-intense manufacturing	7.7%	0.7	-1.7	-0.2	0.5	-0.8
Other manufacturing	6.1%	3.4	10.2	12.0	2.7	8.1
Electricity	0.1%	13.7	-48.3	-48.2	9.6	-30.2
Gas	0.0%	-54.0	-21.0	-21.0	-43.1	-5.0
Hot water supply	0.1%	-6.0	22.7	23.4	-12.8	-14.0
Distribution of water. Construction	6.0%	-0.1	-0.1	-0.1	-0.3	-0.5
Retail trade	13.2%	0.2	-0.9	-0.5	0.5	0.0
Hotels, financial services, post	8.7%	-0.9	-0.2	-1.9	-0.7	-0.1
Land transports	2.5%	-1.0	-3.8	-2.1	-3.0	-7.2
Water Transports	0.3%	-53.1	-17.8	-93.0	-55.5	-37.9
Air transports	0.2%	-0.4	1.4	-8.1	-2.4	-2.6
Real estate activities, Renting of equipment, R&D	8.3%	0.0	0.2	0.0	0.2	0.7
Other business activities	8.6%	0.4	1.3	1.4	0.3	1.1
Public services	27.5%	0.0	0.0	0.1	0.0	-0.1
Other service activities	4.3%	0.0	0.1	0.1	0.4	0.8

Table A 2.6 Change in production and use of electricity, TWh without ETS, sensitivity on trade elasticities

	Base	Scenarios				
		(1)	(2)	(3)	(4)	(5)
Domestic electricity use	131	11	-46	-46	8	-26
Domestic electricity production	137	8	-36	-36	6	-21
Net export in electricity	6	-3	8	8	-2	5

Table A 2.7 Results without ETS, sensitivity on trade elasticities

Variable	Base	Scenarios			
		(1)	(1b)	(5)	(5b)
CO₂ emissions	million tonnes	Changes from base in million tonnes			
Domestic emission	43.4	-9.4	-9.3	2.7	2.4
Carbon leakage through electricity trade		2.3	2.3	-4.4	-4.2
Carbon leakage through trade in other commodities		2.6	2.6	2.4	2.4
Impact on global emissions		-4.5	-4.4	0.7	0.6
Economic variables	Billion sek	Changes from base in %			
National income	2 272	0.21	0.20	3.90	3.81
GDP, deflated by CPI	2 310	0.18	0.18	3.68	3.59
GDP, GDP-deflator	2 310	-0.06	-0.05	0.55	0.54
Private Consumption	1 121	0.25	0.24	4.65	4.54
Equivalent Variation Change EV / household consumption		-0.01	-0.01	1.97	1.93

Table A 2.8 Results with ETS, sensitivity on trade elasticities

Variable	Base*	Scenarios				
		(6)	(7)	(8)	(9)	(10)
CO₂ emissions	million tonnes	Changes from base in million tonnes				
Domestic non-ETS emission	42.0	-9.1	-13.8	-17.2	-6.8	-6.2
Carbon leakage from ETS industries		1.8	2.2	2.1	1.7	1.7
Carbon leakage through trade in non ETS commodities.		5.0	4.4	6.8	5.1	4.6
Impact on global emissions		-2.3	-7.3	-8.3	0	0
Economic variables	Billion sek	Changes from base in %				
National income	2 268	-0.15	-1.03	-1.04	0.86	3.01
GDP, deflated by CPI	2 307	-0.17	-0.99	-1.02	0.82	2.95
GDP, GDP-deflator	2 307	-0.05	0.17	0.16	0.10	0.72
Private Consumption	1 120	-0.08	-1.41	-1.40	1.11	3.35
Equivalent Variation Change EV / household consumption		0.00	-0.01	0.00	0.46	1.74
Gross real wage		-0.22	-0.40	-0.51	0.80	3.66
Disposable Real wage		-0.15	-2.79	-2.74	1.71	4.61
Labour tax		-0.07	2.35	2.19	-0.88	-0.90
Capital return		-0.19	0.00	-0.11	0.77	3.81

Table A 2.9 emissions in different sectors with ETS, sensitivity on trade elasticities

Industry	Base	Scenarios				
		(6)	(7)	(8)	(9)	(10)
	thousand tonnes	Changes from base in thousand tonnes				
Agriculture, forestry, fishing	2290	-693	-753	-741	-604	-339
Mining	254	-139	-137	-130	-126	-77
Manufacture of food, textile and wearing apparel	1110	-840	-830	-813	-798	-587
Manufacture of wood and of products of wood, publishing	173	-106	-110	-108	-100	-79
Production of biofuel	68	-12	-16	-16	-11	-5
Manufacture of pulp, paper and paper products	357	-277	-282	-267	-264	-211
Refineries	189	-162	-156	-151	-156	-114
Other energy-intense manufacturing	892	-569	-555	-530	-529	-329
Other manufacturing	402	-242	-245	-237	-227	-165
Electricity	210	-132	-121	-112	-121	-51
Gas	32	-29	-31	-31	-28	-27
Hot water supply	1190	-724	-1065	-1053	-678	-995
Distribution of water. Construction	1626	8	-301	-297	128	127
Retail trade	1380	4	-72	-58	98	292
Hotels, financial services, post	533	-11	-60	-48	32	101
Land transports	4005	33	-107	-48	231	696
Water Transports	7259	-5345	-4913	-7136	-5370	-5016
Air transports	2519	-27	34	-1383	-53	-70
Real estate activities, Renting of equipment, R&D	1042	14	-304	-292	164	176
Other business activities	444	1	-43	-32	36	76
Public services	890	5	-303	-361	120	0
Other service activities	579	5	-111	-105	64	70
Households	14576	91	-3329	-3247	1379	305
TOTAL	42022	-9151	-13811	-17197	-6812	-6220

Table A 2.10 Short run change in operating surplus (%) with ETS, sensitivity on trade elasticities

Industries	Base	Scenarios				
	Billion SEK	(6)	(7)	(8)	(9)	(10)
Agriculture, forestry, fishing	25285	0.3	0.1	0.4	1.1	3.5
Mining	3296	-2.8	-3.8	-4.4	-1.3	2.4
Manufacture of food, textile and wearing apparel	17919	-0.1	-0.1	-0.1	1.0	4.2
Manufacture of wood and of products of wood, publishing	7967	-0.3	-0.3	0.6	0.7	3.9
Production of biofuel	4126	1.6	2.8	3.5	2.3	5.7
Manufacture of pulp, paper and paper products	19231	-0.9	-2.6	-2.0	0.2	1.7
Refineries	2207	-5.0	-7.9	-13.3	-1.5	6.0
Other energy-intense manufacturing	53213	0.2	0.2	1.5	1.0	3.4
Other manufacturing	12847	1.0	2.4	4.8	1.6	4.8
Electricity	17098	1.4	20.5	20.9	2.1	23.4
Gas	907	-35.2	-48.6	-48.6	-29.0	-24.3
Hot water supply	6154	2.3	-10.7	-10.6	2.3	-10.1
Distribution of water. Construction	12420	-0.3	-0.4	-0.6	0.5	2.8
Retail trade	85838	-0.2	-0.4	0.0	0.8	3.5
Hotels, financial services, post	49225	-0.6	-0.9	-2.7	0.4	3.0
Land transports	21967	-0.4	0.3	1.2	-0.3	0.7
Water Transports	5266	-9.1	-8.4	-51.1	-8.2	-4.4
Air transports	1228	0.0	1.8	6.3	0.4	3.3
Real estate activities, Renting of equipment, R&D	219780	-0.1	-0.7	-1.1	0.9	3.5
Other business activities	45914	-0.1	0.2	0.3	0.8	3.7
Public services	29602	-0.3	-0.6	-0.7	0.7	3.2
Other service activities	25402	-0.2	-1.2	-1.3	0.8	2.9

Table A 2.11 Long run change in employment (%) with ETS, sensitivity on trade elasticities

Industries	Base	Scenarios				
	Share of labour force	(6)	(7)	(8)	(9)	(10)
Agriculture, forestry, fishing	0.8%	-0.6	-2.7	-2.5	0.0	-0.1
Mining	0.2%	11.4	10.5	11.7	11.2	7.7
Manufacture of food, textile and wearing apparel	3.2%	-0.6	-1.0	-1.0	-0.2	0.3
Manufacture of wood and of products of wood, publishing	0.8%	0.5	0.1	0.8	0.9	1.4
Production of biofuel	0.1%	10.6	5.4	5.8	8.7	2.7
Manufacture of pulp, paper and paper products	1.0%	-1.9	-10.1	-8.9	-0.8	-6.6
Refineries	0.1%	17.5	16.9	17.8	17.1	11.6
Other energy-intensive manufacturing	7.5%	2.4	1.8	3.2	2.3	1.3
Other manufacturing	6.2%	3.5	5.7	7.2	3.2	4.7
Electricity	0.2%	6.5	77.5	77.7	5.3	69.0
Gas	0.0%	-53.0	-72.2	-72.3	-47.1	-50.2
Hot water supply	0.1%	0.0	-39.1	-38.9	-4.0	-46.6
Distribution of water. Construction	6.0%	0.0	-0.2	-0.3	-0.1	-0.5
Retail trade	13.1%	0.6	0.8	1.1	0.7	1.3
Hotels, financial services, post	8.8%	-2.1	-2.3	-3.7	-2.0	-1.9
Land transports	2.5%	0.6	1.1	2.7	-0.6	-3.6
Water Transports	0.5%	-72.0	-65.6	-96.3	-72.4	-67.4
Air transports	0.2%	-0.4	2.0	-8.2	-1.5	-2.4
Real estate activities, Renting of equipment, R&D	8.3%	-0.1	-0.3	-0.6	0.1	0.3
Other business activities	8.6%	0.4	0.7	0.8	0.4	0.6
Public services	27.6%	0.0	-0.3	-0.3	0.0	-0.3
Other service activities	4.3%	0.0	-0.6	-0.6	0.2	0.2

Table A 2.12 Change in production and use of electricity, TWh with ETS sensitivity on trade elasticities

	Base	Scenarios				
		(6)	(7)	(8)	(9)	(10)
Domestic electricity use	118	7	60	60	6	54
Domestic electricity production	154	4	46	46	4	42
Net export in electricity	35	-3	-16	-16	-2	-14

3 Sensitivity analysis on technology, Leontief technology

In the third sensitivity analysis all assumptions are the same as in the main scenario except the assumptions about technology. It is assumed that all intermediate goods are used under Leontief technology, i.e. in fixed proportions to output. The implication of this is that the only possibility for firms to cut down on the use of fossil fuels and electricity is to reduce their output. Households have the same behavioural functions as before, meaning that the households still have a possibility of substituting between different kinds of energy.

Under these assumptions, shifting the tax burden from households to manufacturing reduces the incentives to save energy for the actors with a possibility of economizing their use of energy, and increases the incentives for actors that have no such possibility. On the other hand, as shown in Bohlin (2010a), optimal fiscal taxes on intermediate use should be higher for firms under Leontief technology. Removing tax exemptions on fuel oil gives lower welfare under Leontief technology, but increasing and equalizing the tax on electricity is still welfare improving.

Table A 3.1 – A 3.11 reports the results from the same tax rates as in the main simulation, Table A3.12 – A 3.25 reports the results from simulations where the tax rates are adjusted so that consumption or emissions are the same as in base.

Table A 3.1 Results without ETS, sensitivity on technology

Variable	Base	Scenarios				
		(1)	(2)	(3)	(4)	(5)
CO₂ emissions	million tonnes	Changes from base in million tonnes				
Domestic emission	43.4	-2.8	-2.1	-3.5	-0.4	1.5
Carbon leakage through electricity trade		0.1	-4.0	-4.0	-0.4	-2.1
Carbon leakage through trade in other commodities		3.7	4.6	6.1	3.6	4.0
Impact on global emissions		1.0	-1.5	-1.4	2.8	3.4
Economic variables	Billion sek	Changes from base in %				
National income	2 272	0.42	0.54	0.48	2.10	3.83
GDP, deflated by CPI	2 310	0.32	0.24	0.17	1.99	3.55
GDP, GDP-deflator	2 310	0.09	0.04	0.03	0.25	0.44
Private Consumption	1 121	0.67	1.04	1.01	2.53	4.54
Equivalent Variation Change EV / household consumption		0.46	0.83	0.83	0.98	1.89
Gross real wage		0.20	-0.18	-0.34	2.04	3.77
Disposable Real wage		1.42	2.81	2.82	4.11	7.61
Labour tax		-1.20	-2.95	-3.12	-2.00	-3.64
Capital return		-0.46	-2.01	-2.21	1.51	2.35

Note: The top number in each cell refers to the long run effect, the bottom number to the short run effect. All variables are deflated with CPI if not else specified. CPI is a price index with the cost shares in the base model household's consumption as weights.

Table A 3.2 emissions in different sectors without ETS, sensitivity on technology

Industry	Base	Scenarios				
		(1)	(2)	(3)	(4)	(5)
	thousand tonnes	Changes from base in thousand tonnes				
Agriculture, forestry, fishing	2263	-30	-78	-76	-10	-34
Mining	501	7	37	42	14	31
Manufacture of food, textile and wearing apparel	1006	0	4	4	4	12
Manufacture of wood and of products of wood, publishing	165	2	-1	0	3	1
Production of biofuel	52	-4	-11	-10	-4	-12
Manufacture of pulp, paper and paper products	1968	-310	-979	-974	-219	-782
Refineries	163	22	50	53	24	35
Other energy-intensive manufacturing	2661	14	-92	-65	11	-43
Other manufacturing	359	24	66	71	18	46
Electricity	440	-2	-38	-37	-7	-16
Gas	41	-2	-1	-1	-1	-2
Hot water supply	2838	-335	-119	-111	-379	-523
Distribution of water. Construction	1605	1	5	4	1	4
Retail trade	1390	7	6	10	9	11
Hotels, financial services, post	524	-4	1	-5	-4	1
Land transports	4087	-22	-119	-99	-60	-188
Water Transports	3855	-3087	-2748	-3680	-3042	-2665
Air transports	2508	22	116	-419	-10	34
Real estate activities, Renting of equipment, R&D	989	6	18	17	7	16
Other business activities	441	5	15	16	4	11
Public services	848	0	1	1	1	1
Other service activities	567	3	7	7	4	9
Households	14154	845	1770	1792	3252	5570
TOTAL	43425	-2836	-2091	-3461	-386	1515

Table A 3.3 Short run change in operating surplus (%) without ETS, sensitivity on technology

Industries	Base	Scenarios				
	Billion SEK	(1)	(2)	(3)	(4)	(5)
Agriculture, forestry, fishing	25734	-1.1	-2.8	-2.6	1.5	2.9
Mining	3173	-5.7	-8.2	-8.2	-2.1	-0.4
Manufacture of food, textile and wearing apparel	17970	-0.1	-0.4	-0.5	1.9	3.8
Manufacture of wood and of products of wood, publishing	8142	0.3	-1.8	-1.3	2.3	2.8
Production of biofuel	3289	-3.7	-14.9	-14.4	-1.5	-9.1
Manufacture of pulp, paper and paper products	21617	-4.0	-21.8	-21.5	-1.2	-11.5
Refineries	2172	-4.2	-9.4	-11.3	1.8	4.1
Other energy-intense manufacturing	53674	-0.9	-4.4	-3.6	0.9	0.3
Other manufacturing	12766	1.5	4.1	5.7	2.6	5.7
Electricity	12758	-1.1	-8.5	-8.1	0.7	3.1
Gas	1205	-7.3	-8.6	-7.6	-0.5	1.5
Hot water supply	5064	-8.9	-5.1	-5.0	-6.2	-4.8
Distribution of water. Construction	12451	0.1	-0.5	-0.7	1.9	3.3
Retail trade	86701	0.2	-0.6	-0.4	2.0	3.5
Hotels, financial services, post	48696	0.2	0.1	-1.4	2.0	3.9
Land transports	22398	0.0	-1.6	-1.4	1.2	1.4
Water Transports	2828	-15.4	-12.8	-72.8	-12.5	-7.4
Air transports	1222	0.6	1.7	-17.7	1.7	3.8
Real estate activities, Renting of equipment, R&D	220008	0.5	0.8	0.5	2.4	4.6
Other business activities	46030	0.4	0.6	0.7	2.0	3.9
Public services	29686	0.1	-0.6	-0.7	1.9	3.3
Other service activities	25451	0.4	0.2	0.0	2.3	4.3

Table A 3.4 Long run change in employment (%) without ETS, sensitivity on technology

Industries	Base	Scenarios				
	Share of labour force	(1)	(2)	(3)	(4)	(5)
Agriculture, forestry, fishing	0.8%	-3.8	-9.7	-9.6	-2.0	-6.2
Mining	0.2%	2.1	11.6	13.1	4.5	9.8
Manufacture of food, textile and wearing apparel	3.2%	-0.3	-0.3	-0.3	0.2	0.7
Manufacture of wood and of products of wood, publishing	0.8%	0.8	-1.6	-1.2	1.2	-0.1
Production of biofuel	0.1%	-10.2	-26.0	-25.6	-8.9	-26.7
Manufacture of pulp, paper and paper products	1.1%	-16.2	-50.4	-50.2	-11.5	-40.4
Refineries	0.1%	12.9	28.5	30.3	13.9	19.7
Other energy-intense manufacturing	7.7%	0.2	-4.2	-3.2	0.2	-2.2
Other manufacturing	6.1%	6.6	18.0	19.3	4.8	12.5
Electricity	0.1%	-2.1	-22.6	-22.1	-4.6	-10.8
Gas	0.0%	-5.1	-4.3	-4.0	-3.3	-6.2
Hot water supply	0.1%	-12.4	-5.8	-5.6	-13.8	-19.6
Distribution of water. Construction	6.0%	0.0	0.0	-0.1	0.0	0.0
Retail trade	13.2%	0.2	-0.3	-0.1	0.4	0.2
Hotels, financial services, post	8.7%	-1.0	-0.5	-1.6	-0.9	-0.4
Land transports	2.5%	-0.9	-3.8	-3.3	-1.7	-5.3
Water Transports	0.3%	-80.2	-71.6	-95.5	-79.0	-69.4
Air transports	0.2%	0.6	4.0	-17.2	-0.6	0.9
Real estate activities, Renting of equipment, R&D	8.3%	0.1	0.3	0.1	0.2	0.4
Other business activities	8.6%	1.0	2.7	2.9	0.7	1.9
Public services	27.5%	0.0	-0.1	-0.1	0.0	0.0
Other service activities	4.3%	0.2	0.5	0.4	0.5	1.0

Table A 3.5 Change in production and use of electricity, TWh without ETS, sensitivity on technology

	Base	Scenarios				
		(1)	(2)	(3)	(4)	(5)
Domestic electricity use	131	-1	-17	-17	-3	-8
Domestic electricity production	137	-1	-12	-12	-2	-5
Net export in electricity	6	0	5	5	1	3

Table A 3.6 Results with ETS, sensitivity on technology

Variable	Base*	Scenarios				
		(6)	(7)	(8)	(9)	(10)
CO₂ emissions	million tonnes	Changes from base in million tonnes				
Domestic non-ETS emission	42.0	-6.2	-10.0	-11.1	-4.6	-6.6
Carbon leakage from ETS industries		0	0.4	0.3	-0.1	0.4
Carbon leakage through trade in non ETS commodities.		6.2	6.0	7.2	4.3	5.9
Impact on global emissions		0	-3.7	-3.5	-0.4	-0.3
Economic variables	Billion sek	Changes from base in %				
National income	2 268	-0.02	-0.90	-0.93	0.82	2.80
GDP, deflated by CPI	2 307	-0.06	-0.92	-0.95	0.80	2.73
GDP, GDP-deflator	2 307	0.08	0.26	0.25	0.21	0.54
Private Consumption	1 120	0.16	-1.26	-1.26	1.11	2.89
Equivalent Variation Change EV / household consumption		0.26	0.16	0.16	0.56	1.34
Gross real wage		-0.22	-0.44	-0.57	0.57	3.51
Disposable Real wage		0.43	-2.26	-2.20	1.68	3.93
Labour tax		-0.63	1.80	1.61	-1.07	-0.39
Capital return		-0.49	-0.47	-0.61	0.79	3.57

Table A 3.7 emissions in different sectors with ETS, sensitivity on technology

Industry	Base	Scenarios				
		(6)	(7)	(8)	(9)	(10)
	thousand tonnes	Changes from base in thousand tonnes				
Agriculture, forestry, fishing	2290	-19	-35	-32	-17	2
Mining	254	18	14	15	159	15
Manufacture of food, textile and wearing apparel	1110	-9	-13	-13	-9	0
Manufacture of wood and of products of wood, publishing	173	2	2	2	0	4
Production of biofuel	68	0	-7	-7	-1	-7
Manufacture of pulp, paper and paper products	357	-2	-37	-34	-8	-25
Refineries	189	39	35	36	320	32
Other energy-intense manufacturing	892	27	22	32	11	16
Other manufacturing	402	17	29	33	6	22
Electricity	210	1	34	34	1	30
Gas	32	-1	-6	-5	3	-5
Hot water supply	1190	-49	-393	-391	-68	-402
Distribution of water. Construction	1626	2	0	-1	3	1
Retail trade	1380	12	18	21	8	20
Hotels, financial services, post	533	-13	-13	-18	-13	-11
Land transports	4005	41	31	51	34	-67
Water Transports	7259	-6441	-6411	-7101	-6286	-6243
Air transports	2519	-4	28	-527	-40	-29
Real estate activities, Renting of equipment, R&D	1042	3	2	1	2	5
Other business activities	444	3	6	6	0	4
Public services	890	0	0	0	1	0
Other service activities	579	1	1	1	2	4
Households	14576	139	-3279	-3191	1296	83
TOTAL	42022	-6232	-9971	-11088	-4596	-6552

Table A 3.8 Short run change in operating surplus (%) with ETS, sensitivity on technology

Industries	Base	Scenarios				
	Billion SEK	(6)	(7)	(8)	(9)	(10)
Agriculture, forestry, fishing	25285	-1.7	-2.4	-2.0	-0.3	3.1
Mining	3296	-3.2	-4.3	-4.0	-1.6	1.7
Manufacture of food, textile and wearing apparel	17919	-0.8	-1.1	-1.1	0.3	3.3
Manufacture of wood and of products of wood, publishing	7967	-0.3	-0.4	0.7	0.7	3.8
Production of biofuel	4126	-1.0	-6.6	-5.6	-0.2	-3.2
Manufacture of pulp, paper and paper products	19231	-0.8	-2.4	-1.7	0.3	1.8
Refineries	2207	-5.0	-8.6	-11.4	-2.0	3.3
Other energy-intense manufacturing	53213	-0.1	-0.4	1.0	0.8	2.9
Other manufacturing	12847	0.6	1.4	4.2	1.3	4.0
Electricity	17098	-0.4	15.7	16.3	0.5	19.0
Gas	907	-6.2	-23.3	-22.2	-2.2	-8.3
Hot water supply	6154	-3.4	-14.6	-14.4	-2.8	-11.8
Distribution of water. Construction	12420	-0.2	-0.3	-0.5	0.7	3.5
Retail trade	85838	-0.1	0.1	0.5	0.9	4.0
Hotels, financial services, post	49225	-0.4	-0.5	-2.9	0.6	3.5
Land transports	21967	-0.1	-0.2	0.3	0.6	2.4
Water Transports	5266	-16.5	-16.6	-79.9	-14.8	-10.0
Air transports	1228	0.1	0.9	-20.2	0.8	3.3
Real estate activities, Renting of equipment, R&D	219780	0.0	-0.3	-0.6	1.0	3.8
Other business activities	45914	0.0	0.2	0.5	0.9	3.6
Public services	29602	-0.2	-0.3	-0.5	0.7	3.5
Other service activities	25402	-0.1	-0.3	-0.4	1.0	4.0

Table A 3.9 Long run change in employment (%) with ETS, sensitivity on technology

Industries	Base	Scenarios				
	Share of labour force	(6)	(7)	(8)	(9)	(10)
Agriculture, forestry, fishing	0.8%	-1.8	-4.8	-4.5	-1.7	-1.7
Mining	0.2%	11.5	8.8	9.4	117.1	9.8
Manufacture of food, textile and wearing apparel	3.2%	-1.0	-1.4	-1.4	-0.8	-0.2
Manufacture of wood and of products of wood, publishing	0.8%	0.9	0.6	1.0	0.3	1.8
Production of biofuel	0.1%	-1.3	-13.9	-13.3	-2.4	-12.1
Manufacture of pulp, paper and paper products	1.0%	-0.8	-10.8	-10.0	-2.1	-7.5
Refineries	0.1%	20.3	17.9	18.3	169.0	16.2
Other energy-intense manufacturing	7.5%	2.9	2.2	3.2	1.3	1.5
Other manufacturing	6.2%	4.2	7.1	8.1	1.4	5.3
Electricity	0.2%	1.5	53.5	54.3	1.0	46.8
Gas	0.0%	-1.9	-17.7	-17.5	8.3	-14.7
Hot water supply	0.1%	-4.5	-33.5	-33.4	-5.8	-34.1
Distribution of water. Construction	6.0%	0.0	-0.1	-0.2	0.2	0.0
Retail trade	13.1%	0.7	1.0	1.2	0.5	1.2
Hotels, financial services, post	8.8%	-2.5	-2.7	-3.7	-2.4	-2.3
Land transports	2.5%	0.8	0.4	0.9	0.9	-2.0
Water Transports	0.5%	-88.7	-88.4	-97.8	-86.6	-86.1
Air transports	0.2%	-0.3	0.8	-21.2	-1.6	-1.3
Real estate activities, Renting of equipment, R&D	8.3%	0.0	-0.4	-0.6	0.1	-0.1
Other business activities	8.6%	0.6	1.0	1.1	0.1	0.7
Public services	27.6%	0.0	-0.1	-0.1	0.1	0.0
Other service activities	4.3%	0.1	-0.2	-0.2	0.3	0.5

Table A 3.10 Change in production and use of electricity, TWh with ETS sensitivity on technology

	Base	Scenarios				
	(6)	(7)	(8)	(9)	(10)	
Domestic electricity use	118	118	2	40	40	2
Domestic electricity production	154	154	1	25	25	1
Net export in electricity	35	35	-1	-17	-17	-1

Table 3.11 Results with zero tax rates in ETS industries, sensitivity on technology

Variable	Base	Scenarios			
		(6b)	(7b)	(8b)	(9b)
CO₂ emissions	million tonnes	Changes from base in million tonnes			
Domestic non-ETS emission	42.0	-6.6	-10.2	-5.0	-6.6
Carbon leakage from ETS industries		-0.1	0.3	-0.1	0.3
Carbon leakage through trade in non ETS commodities.		6.4	6.2	6.3	6.0
Impact on global emissions		-0.4	-3.7	1.2	-0.3
Economic variables	Billion sek	Changes from base in %			
National income	2 268	-0.15	-1.13	1.06	2.83
GDP, deflated by CPI	2 307	-0.17	-1.12	1.02	2.77
GDP, GDP-deflator	2 307	0.05	0.23	0.16	0.53
Private Consumption	1 120	-0.06	-1.56	1.30	2.90
Equivalent Variation Change EV / household consumption		0.13	0.03	0.54	1.31

Note: The top number in each cell refers to the long run effect, the bottom number to the short run effect. All variables are deflated with CPI if not else specified.

Table 3.12 Unit tax rates in scenarios, tables 3.13 – 3.17

Tax item	Tax rates in Scenarios				
	(1)	(2)	(3)	(4)	(5)
Gasoline, SEK/litre	4.75	4.96		4.69	4.39
Diesel, SEK/litre	3.65	3.86		3.59	3.29
Jet fuels	0	0		0	0
light fuel oil, SEK/litre	2.45	2.66		2.39	2.09
heavy fuel oil, SEK/litre	2.55	2.76		2.49	2.19
Gas, SEK/litre	1.71	1.86		1.67	1.47
Electricity, SEK /kWh	b	0.23		b	0.16

b = the same tax rates as in the base model.

* Heavy fuel oil is untaxed for water transports in all scenarios but scenario 3.

Table A 3.13 Results without ETS, sensitivity on technology

Variable	Base	Scenarios			
		(1)	(2)	(3)	(4)
CO₂ emissions	million tonnes	Changes from base in million tonnes			
Domestic emission	43.4	-4.5	-5.0	-4.2	-3.6
Carbon leakage through electricity trade		0.4	-3.3	0.4	-0.8
Carbon leakage through trade in other commodities		3.9	5.2	3.9	4.4
Impact on global emissions		-0.2	-3.1	0	0
Economic variables	Billion sek	Changes from base in %			
National income	2 272	-1.05	-2.04	-0.78	0.57
GDP, deflated by CPI	2 310	-1.14	-2.30	-0.87	0.33
GDP, GDP-deflator	2 310	-0.03	-0.18	-0.01	0.11
Private Consumption	1 121	-0.96	-1.83	-0.66	0.95
Equivalent Variation Change EV / household consumption		0.00	0.00	0.09	0.86
Gross real wage		-1.39	-3.01	-1.10	0.17
Disposable Real wage		-0.95	-1.44	-0.52	2.34
Labour tax		-0.43	-1.60	-0.58	-2.14
Capital return		-2.17	-4.85	-1.85	-1.35

Note: The top number in each cell refers to the long run effect, the bottom number to the short run effect. All variables are deflated with CPI if not else specified. CPI is a price index with the cost shares in the base model household's consumption as weights.

Table A 3.14 emissions in different sectors without ETS, sensitivity on technology

Industry	Base	Scenarios				
		(1)	(2)	(3)	(4)	(5)
	thousand tonnes	Changes from base in thousand tonnes				
Agriculture, forestry, fishing	2263	-47	-106		-44	-68
Mining	501	3	68		3	22
Manufacture of food, textile and wearing apparel	1006	-4	-4		-3	4
Manufacture of wood and of products of wood, publishing	165	1	-2		2	0
Production of biofuel	52	-4	-9		-4	-11
Manufacture of pulp, paper and paper products	1968	-381	-1026		-368	-865
Refineries	45	-3	-6		-3	-1
Other energy-intensive manufacturing	2661	16	-110		16	-56
Other manufacturing	359	30	73		29	57
Electricity	440	1	-32		0	-5
Gas	41	-2	-2		-2	-3
Hot water supply	2838	-319	-70		-321	-431
Distribution of water. Construction	1605	1	4		1	3
Retail trade	1390	6	4		7	8
Hotels, financial services, post	524	-4	0		-4	0
Land transports	4087	13	-46		6	-103
Water Transports	3855	-3122	-2868		-3116	-2859
Air transports	2508	50	161		45	95
Real estate activities, Renting of equipment, R&D	989	6	16		6	15
Other business activities	441	7	16		6	13
Public services	848	0	1		0	1
Other service activities	567	2	4		2	6
Households	14154	-800	-1152		-523	509
TOTAL	43425	-4526	-4997		-4240	-3633

Table A 3.15 Short run change in operating surplus (%) without ETS, sensitivity on technology

Industries	Base	Scenarios				
	Billion SEK	(1)	(2)	(3)	(4)	(5)
Agriculture, forestry, fishing	25734	-3.3	-6.7		-2.9	-2.1
Mining	3173	-8.7	-13.5		-8.2	-7.3
Manufacture of food, textile and wearing apparel	17970	-1.8	-3.4		-1.5	-0.1
Manufacture of wood and of products of wood, publishing	8142	-1.3	-4.7		-1.0	-0.9
Production of biofuel	3289	-5.5	-18.0		-5.2	-13.1
Manufacture of pulp, paper and paper products	21617	-6.4	-25.8		-5.9	-16.7
Refineries	2172	-9.0	-17.6		-8.2	-8.2
Other energy-intense manufacturing	53674	-2.4	-7.1		-2.1	-3.2
Other manufacturing	12766	0.6	2.5		0.8	3.6
Electricity	12758	-2.6	-11.2		-2.3	-0.2
Gas	1205	-12.8	-18.1		-11.8	-11.9
Hot water supply	5064	-11.3	-9.2		-10.8	-9.8
Distribution of water. Construction	12451	-1.5	-3.2		-1.2	-0.1
Retail trade	86701	-1.4	-3.3		-1.1	-0.1
Hotels, financial services, post	48696	-1.4	-2.7		-1.1	0.4
Land transports	22398	-1.1	-3.6		-0.9	-1.0
Water Transports	2828	-18.0	-17.3		-17.5	-13.3
Air transports	1222	-0.4	0.1		-0.2	1.7
Real estate activities, Renting of equipment, R&D	220008	-1.1	-2.1		-0.8	0.9
Other business activities	46030	-1.0	-1.8		-0.7	0.8
Public services	29686	-1.4	-3.2		-1.2	-0.1
Other service activities	25451	-1.3	-2.8		-1.0	0.5

Table A 3.16 Long run change in employment (%) without ETS, sensitivity on technology

Industries	Base	Scenarios				
	Share of labour force	(1)	(2)	(3)	(4)	(5)
Agriculture, forestry, fishing	0.8%	-5.4	-11.7		-5.1	-8.9
Mining	0.2%	0.6	21.9		0.9	6.6
Manufacture of food, textile and wearing apparel	3.2%	-0.7	-1.1		-0.6	-0.2
Manufacture of wood and of products of wood, publishing	0.8%	0.4	-2.4		0.5	-0.9
Production of biofuel	0.1%	-11.3	-24.9		-11.1	-26.5
Manufacture of pulp, paper and paper products	1.1%	-19.9	-52.8		-19.2	-44.6
Refineries	0.1%	13.1	48.6		13.0	20.5
Other energy-intense manufacturing	7.7%	0.2	-4.9		0.2	-2.8
Other manufacturing	6.1%	8.1	20.0		7.8	15.4
Electricity	0.1%	-0.4	-19.7		-0.6	-4.1
Gas	0.0%	-6.6	-6.0		-6.3	-9.3
Hot water supply	0.1%	-12.0	-4.2		-12.0	-16.5
Distribution of water. Construction	6.0%	-0.1	-0.1		-0.1	-0.1
Retail trade	13.2%	0.1	-0.5		0.1	-0.1
Hotels, financial services, post	8.7%	-1.1	-0.7		-1.1	-0.6
Land transports	2.5%	-0.1	-2.1		-0.3	-3.3
Water Transports	0.3%	-81.1	-74.7		-80.9	-74.4
Air transports	0.2%	1.7	5.7		1.5	3.2
Real estate activities, Renting of equipment, R&D	8.3%	-0.1	0.1		-0.1	0.2
Other business activities	8.6%	1.2	3.0		1.1	2.3
Public services	27.5%	-0.1	-0.1		0.0	-0.1
Other service activities	4.3%	0.0	0.0		0.0	0.4

Table A 3.17 Change in production and use of electricity, TWh without ETS, sensitivity on technology

	Base	Scenarios				
		(1)	(2)	(3)	(4)	(5)
Domestic electricity use	131	1	-14		0	-2
Domestic electricity production	137	0	-10		0	-1
Net export in electricity	6	-1	4		0	1

Table 3.18 Unit tax rates in scenarios, tables 3.19 – 3.23

Tax item	Tax rates in Scenarios				
	(1)	(2)	(3)	(4)	(5)
Gasoline, SEK/litre	4.68	4.78	4.78	4.30	3.81
Diesel, SEK/litre	3.58	3.68	3.68	3.20	2.71
Jet fuels			2.48		
light fuel oil, SEK/litre	2.38	2.48	2.48	2.00	1.51
heavy fuel oil, SEK/litre	**2.48	**2.58	2.58	**2.10	**1.61
Gas, SEK/litre	1.67	1.74	1.74	1.40	1.06
Electricity, SEK /kWh	b	0.005	0.005	b	0.005

b = the same tax rates as in the base model.

* Heavy fuel oil is untaxed for water transports in all scenarios but scenario 3.

Table A 3.19 Results with ETS, sensitivity on technology

Variable	Base*	Scenarios			
		(6)	(7)	(8)	(9)
CO₂ emissions	million tonnes	Changes from base in million tonnes			
Domestic non-ETS emission	42.0	-7.1	-10.3	-11.4	-6.3
Carbon leakage from ETS industries		0	0.4	0.3	0.4
Carbon leakage through trade in non ETS commodities.		6.2	6.0	7.2	5.9
Impact on global emissions		-0.9	-3.9	-3.9	0
Economic variables	Billion sek	Changes from base in %			
National income	2 268	-0.81	-1.40	-1.42	3.03
GDP, deflated by CPI	2 307	-0.84	-1.41	-1.44	2.95
GDP, GDP-deflator	2 307	0.01	0.22	0.21	0.56
Private Consumption	1 120	-0.73	-1.82	-1.82	3.15
Equivalent Variation Change EV / household consumption		0.00	0.00	0.00	1.41
Gross real wage		-1.07	-0.96	-1.10	3.76
Disposable Real wage		-0.90	-3.09	-3.04	4.32
Labour tax		-0.17	2.11	1.92	-0.52
Capital return		-1.36	-1.00	-1.16	3.83

Table A 3.20 emissions in different sectors with ETS, sensitivity on technology

Industry	Base	Scenarios				
		(6)	(7)	(8)	(9)	(10)
	thousand tonnes	Changes from base in thousand tonnes				
Agriculture, forestry, fishing	2290	-28	-40	-37		4
Mining	254	18	14	15		16
Manufacture of food, textile and wearing apparel	1110	-12	-14	-14		1
Manufacture of wood and of products of wood, publishing	173	1	2	2		4
Production of biofuel	68	0	-7	-7		-7
Manufacture of pulp, paper and paper products	357	-5	-38	-35		-25
Refineries	189	40	37	38		32
Other energy-intense manufacturing	892	29	23	33		16
Other manufacturing	402	19	30	34		21
Electricity	210	2	34	35		30
Gas	32	-1	-6	-6		-5
Hot water supply	1190	-34	-393	-391		-403
Distribution of water. Construction	1626	1	0	-1		1
Retail trade	1380	12	17	21		20
Hotels, financial services, post	533	-13	-13	-19		-11
Land transports	4005	62	44	65		-73
Water Transports	7259	-6467	-6429	-7106		-6230
Air transports	2519	8	35	-542		-32
Real estate activities, Renting of equipment, R&D	1042	2	1	0		5
Other business activities	444	4	6	6		4
Public services	890	0	0	0		0
Other service activities	579	1	0	0		4
Households	14576	-780	-3610	-3521		366
TOTAL	42022	-7142	-10305	-11430		-6263

Table A 3.21 Short run change in operating surplus (%) with ETS, sensitivity on technology

Industries	Base	Scenarios				
	Billion SEK	(6)	(7)	(8)	(9)	(10)
Agriculture, forestry, fishing	25285	-2.9	-3.2	-2.8		3.5
Mining	3296	-4.4	-5.1	-4.8		2.0
Manufacture of food, textile and wearing apparel	17919	-1.8	-1.7	-1.7		3.6
Manufacture of wood and of products of wood, publishing	7967	-1.3	-1.0	0.2		4.1
Production of biofuel	4126	-1.7	-7.0	-6.1		-2.9
Manufacture of pulp, paper and paper products	19231	-1.7	-3.0	-2.2		2.0
Refineries	2207	-7.5	-10.1	-12.9		4.2
Other energy-intense manufacturing	53213	-0.8	-0.9	0.6		3.1
Other manufacturing	12847	0.1	1.0	4.0		4.2
Electricity	17098	-1.2	15.2	15.9		19.2
Gas	907	-9.4	-25.1	-24.0		-7.3
Hot water supply	6154	-3.9	-15.0	-14.8		-11.6
Distribution of water. Construction	12420	-1.1	-0.8	-1.0		3.8
Retail trade	85838	-0.9	-0.4	0.0		4.2
Hotels, financial services, post	49225	-1.3	-1.1	-3.5		3.7
Land transports	21967	-0.7	-0.5	0.0		2.6
Water Transports	5266	-17.8	-17.4	-82.0		-9.6
Air transports	1228	-0.4	0.5	-21.3		3.5
Real estate activities, Renting of equipment, R&D	219780	-0.9	-0.9	-1.2		4.0
Other business activities	45914	-0.8	-0.3	0.0		3.9
Public services	29602	-1.1	-0.8	-1.0		3.8
Other service activities	25402	-1.0	-0.9	-1.0		4.2

Table A 3.22 Long run change in employment (%) with ETS, sensitivity on technology

Industries	Base	Scenarios				
	Share of labour force	(6)	(7)	(8)	(9)	(10)
Agriculture, forestry, fishing	0.8%	-2.5	-5.2	-4.9		-1.5
Mining	0.2%	11.4	9.0	9.6		9.9
Manufacture of food, textile and wearing apparel	3.2%	-1.2	-1.6	-1.6		-0.2
Manufacture of wood and of products of wood, publishing	0.8%	0.6	0.5	0.8		1.8
Production of biofuel	0.1%	-1.3	-14.2	-13.6		-12.0
Manufacture of pulp, paper and paper products	1.0%	-1.7	-11.2	-10.4		-7.3
Refineries	0.1%	20.7	18.6	19.0		16.3
Other energy-intense manufacturing	7.5%	3.1	2.3	3.3		1.5
Other manufacturing	6.2%	4.6	7.3	8.3		5.2
Electricity	0.2%	2.2	54.2	54.9		46.2
Gas	0.0%	-2.7	-18.0	-17.8		-14.5
Hot water supply	0.1%	-3.3	-33.5	-33.4		-34.2
Distribution of water. Construction	6.0%	0.0	-0.1	-0.2		0.0
Retail trade	13.1%	0.7	0.9	1.2		1.2
Hotels, financial services, post	8.8%	-2.6	-2.7	-3.8		-2.3
Land transports	2.5%	1.4	0.7	1.2		-2.1
Water Transports	0.5%	-89.1	-88.6	-97.9		-85.9
Air transports	0.2%	0.2	1.1	-21.7		-1.5
Real estate activities, Renting of equipment, R&D	8.3%	-0.1	-0.5	-0.6		0.0
Other business activities	8.6%	0.7	1.0	1.1		0.7
Public services	27.6%	0.0	-0.1	-0.1		0.0
Other service activities	4.3%	0.0	-0.3	-0.3		0.5

Table A 3.23 Change in production and use of electricity, TWh with ETS sensitivity on technology

	Base	Scenarios				
		(6)	(7)	(8)	(9)	(10)
Domestic electricity use	118	3	40	41		35
Domestic electricity production	154	1	25	25		22
Net export in electricity	35	-1	-17	-17		-15

Table 3.24 Unit tax rates in scenarios, table 3.25

Tax item	Tax rates in Scenarios				
	(6b)	(7b)	(8b)	(9b)	(10b)
Gasoline, SEK/litre	4.63	4.75	4.76	4.48	3.81
Diesel, SEK/litre	3.53	3.65	3.66	3.38	2.71
Jet fuels			2.46		
light fuel oil, SEK/litre	3.53	3.65	3.66	3.38	2.71
heavy fuel oil, SEK/litre	2.33	2.45	2.46	2.18	1.51
Gas, SEK/litre	1.63	1.72	1.72	1.52	1.06
Electricity, SEK /kWh	b	0.005	0.005	b	0.005

b = the same tax rates as in the base model.

* Heavy fuel oil is untaxed for water transports in all scenarios but scenario 3.

Table 3.25 Results with zero tax rates in ETS industries, sensitivity on technology

Variable	Base	Scenarios				
		(6b)	(7b)	(8b)	(9b)	(10b)
CO₂ emissions	million tonnes	Changes from base in million tonnes				
Domestic non-ETS emission	42.0	-7.1	-10.3	-11.3	-6.3	-6.3
Carbon leakage from ETS industries		-0.1	0.3	0.3	-0.1	0.3
Carbon leakage through trade in non ETS commodities.		6.4	6.2	7.4	6.4	6.0
Impact on global emissions		-0.8	-3.8	-3.7	0	0
Economic variables	Billion sek					
National income	2 268	-0.56	-1.23	-1.26	0.14	3.07
GDP, deflated by CPI	2 307	-0.57	-1.22	-1.26	0.11	3.00
GDP, GDP-deflator	2 307	0.02	0.22	0.21	0.08	0.56
Private Consumption	1 120	-0.52	-1.67	-1.67	0.27	3.17
Equivalent Variation		0.00	0.00	0.00	0.23	1.39
Change EV / household consumption						

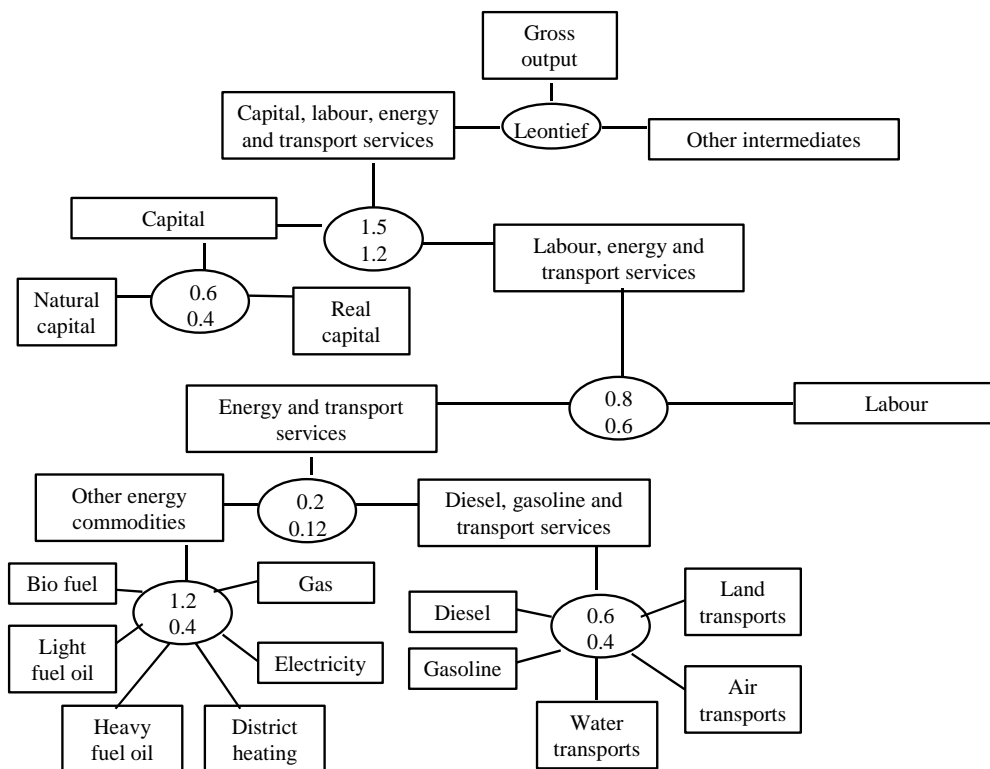
Note: The top number in each cell refers to the long run effect, the bottom number to the short run effect. All variables are deflated with CPI if not else specified.

4. Small elasticities of substitution

In the fourth sensitivity analysis the elasticities of substitution in the production function are much smaller than in the main scenario. We reduce the elasticity of substitution between different fuels from 4 to 1.2, between different transports from 2 to 0.6 and between energy and transports from 0.6 to 0.2. In this case the qualitative results are the same as in the main scenario, although the benefits are smaller. For example, the increase in equivalent variation in scenario 4 is reduced from 0.85 to 0.61 and in scenario 5 from 1.98 to 1.57. Our qualitative results are not driven by the fact that we use higher elasticities of substitution than used in other Swedish models.

Table A 4.1 – A 4.11 reports the results from the same tax rates as in the main simulation, Table A 4.12 – A 4.27 reports the results from simulations where the tax rates are adjusted so that consumption or emissions are the same as in base.

Table A 4.1 – A 4.4. uses the following elasticities in the production function:



The numbers in the ellipses refers to the elasticity of substitution between each aggregate. The top number in the long run elasticity and the bottom number is the short run elasticity.

Table A 4.1 Results without ETS, sensitivity on technology

Variable	Base	Scenarios				
		(1)	(2)	(3)	(4)	(5)
CO₂ emissions	million tonnes	Changes from base in million tonnes				
Domestic emission	43.4	-6.9	-5.4	-7.7	-3.0	1.2
Carbon leakage through electricity trade		1.4	-5.6	-5.7	0.8	-3.3
Carbon leakage through trade in other commodities		3.5	4.3	5.8	3.4	3.7
Impact on global emissions		-2.0	-6.8	-7.6	1.2	1.5
Economic variables	Billion sek	Changes from base in %				
National income	2 272	0.25	0.24	0.15	2.05	3.82
GDP, deflated by CPI	2 310	0.20	0.02	-0.08	1.96	3.56
GDP, GDP-deflator	2 310	-0.02	-0.17	-0.21	0.22	0.45
Private Consumption	1 121	0.36	0.46	0.37	2.42	4.50
Equivalent Variation Change EV / household consumption		0.13	0.23	0.17	0.86	1.84
Gross real wage		0.10	-0.30	-0.46	2.00	3.76
Disposable Real wage		0.67	1.44	1.33	3.81	7.41
Labour tax		-0.56	-1.72	-1.76	-1.75	-3.46
Capital return		-0.09	-1.35	-1.51	1.74	2.62

Note: The top number in each cell refers to the long run effect, the bottom number to the short run effect. All variables are deflated with CPI if not else specified. CPI is a price index with the cost shares in the base model household's consumption as weights.

Table A 4.2 emissions in different sectors without ETS, sensitivity on technology

Industry	Base	Scenarios				
		(1)	(2)	(3)	(4)	(5)
	thousand tonnes	Changes from base in thousand tonnes				
Agriculture, forestry, fishing	2263	-411	-456	-460	-241	-108
Mining	501	-148	-61	-61	-115	-18
Manufacture of food, textile and wearing apparel	1006	-354	-194	-198	-290	-70
Manufacture of wood and of products of wood, publishing	165	-57	-50	-50	-46	-25
Production of biofuel	52	-7	-11	-11	-4	-6
Manufacture of pulp, paper and paper products	1968	-1175	-1311	-1308	-1019	-1015
Refineries	163	-62	-15	-17	-49	-2
Other energy-intensive manufacturing	2661	-1134	-743	-732	-962	-371
Other manufacturing	359	-99	-27	-25	-79	11
Electricity	440	-154	-260	-260	-126	-157
Gas	41	-22	-19	-20	-18	-11
Hot water supply	2838	-1148	-957	-961	-1017	-971
Distribution of water. Construction	1605	21	30	25	124	220
Retail trade	1390	13	-5	-6	84	155
Hotels, financial services, post	524	-1	1	-8	26	57
Land transports	4087	-33	-273	-266	148	133
Water Transports	3855	-2964	-2589	-3726	-2931	-2567
Air transports	2508	-24	-8	-1114	-36	-7
Real estate activities, Renting of equipment, R&D	989	24	30	24	113	207
Other business activities	441	7	13	11	30	59
Public services	848	16	23	-9	83	145
Other service activities	567	8	10	8	49	92
Households	14154	802	1456	1457	3284	5399
TOTAL	43425	-6902	-5416	-7707	-2995	1150

Table A 4.3 Short run change in operating surplus (%) without ETS, sensitivity on technology

Industries	Base	Scenarios				
	Billion SEK	(1)	(2)	(3)	(4)	(5)
Agriculture, forestry, fishing	25734	0.3	-1.1	-0.9	2.0	2.8
Mining	3173	-4.1	-6.6	-7.0	-0.9	0.5
Manufacture of food, textile and wearing apparel	17970	0.4	1.2	1.1	2.3	5.0
Manufacture of wood and of products of wood, publishing	8142	0.4	0.2	0.7	2.3	4.2
Production of biofuel	3289	-6.1	-24.2	-24.0	-2.7	-13.5
Manufacture of pulp, paper and paper products	21617	-2.6	-12.8	-12.5	-0.2	-5.7
Refineries	2172	-5.6	-6.4	-10.1	0.8	7.1
Other energy-intense manufacturing	53674	0.0	-1.1	-0.4	1.5	2.5
Other manufacturing	12766	2.3	6.8	8.4	3.2	7.7
Electricity	12758	0.9	-18.6	-18.5	2.8	-6.1
Gas	1205	-25.9	-27.6	-27.9	-16.0	-9.4
Hot water supply	5064	7.1	8.4	8.1	6.5	2.5
Distribution of water. Construction	12451	-0.1	-0.8	-0.9	1.4	2.6
Retail trade	86701	-0.1	-1.1	-1.0	1.8	2.9
Hotels, financial services, post	48696	-0.1	-0.3	-1.4	1.8	3.6
Land transports	22398	-1.5	-5.0	-4.8	-0.5	-1.7
Water Transports	2828	-11.7	-8.7	-51.3	-9.4	-4.6
Air transports	1222	0.3	1.2	5.0	1.8	4.6
Real estate activities, Renting of equipment, R&D	220008	0.4	0.5	0.1	2.3	4.3
Other business activities	46030	0.3	0.5	0.6	2.0	3.9
Public services	29686	0.0	-0.5	-0.7	1.8	3.2
Other service activities	25451	0.2	0.0	-0.1	2.1	3.7

Table A 4.4 Long run change in employment (%) without ETS, sensitivity on technology

Industries	Base	Scenarios				
	Share of labour force	(1)	(2)	(3)	(4)	(5)
Agriculture, forestry, fishing	0.8%	-2.9	-7.9	-7.8	-1.3	-4.5
Mining	0.2%	5.1	14.0	14.2	6.0	9.0
Manufacture of food, textile and wearing apparel	3.2%	-0.2	0.2	0.1	0.3	1.2
Manufacture of wood and of products of wood, publishing	0.8%	0.3	-0.9	-0.6	1.0	0.5
Production of biofuel	0.1%	-1.6	-11.9	-11.7	-2.2	-14.9
Manufacture of pulp, paper and paper products	1.1%	-12.9	-42.7	-42.4	-9.1	-34.1
Refineries	0.1%	14.7	28.4	28.3	14.6	17.0
Other energy-intense manufacturing	7.7%	0.8	-1.9	-1.0	0.5	-1.0
Other manufacturing	6.1%	5.6	15.8	17.0	4.2	11.3
Electricity	0.1%	3.5	-35.0	-35.0	1.1	-19.3
Gas	0.0%	-27.3	-15.9	-16.2	-20.4	-8.7
Hot water supply	0.1%	-9.0	0.2	0.1	-12.0	-18.8
Distribution of water. Construction	6.0%	-0.1	-0.2	-0.2	-0.3	-0.5
Retail trade	13.2%	0.2	-0.5	-0.4	0.4	0.1
Hotels, financial services, post	8.7%	-1.1	-0.7	-1.7	-0.9	-0.4
Land transports	2.5%	-1.9	-6.8	-6.5	-2.5	-6.9
Water Transports	0.3%	-75.0	-64.5	-94.6	-74.3	-64.4
Air transports	0.2%	-0.1	1.6	-7.5	-0.8	0.6
Real estate activities, Renting of equipment, R&D	8.3%	0.0	0.3	0.1	0.3	0.6
Other business activities	8.6%	0.7	2.1	2.2	0.5	1.6
Public services	27.5%	0.0	0.0	0.1	0.0	-0.1
Other service activities	4.3%	0.1	0.3	0.3	0.4	0.8

Table A 4.5 Change in production and use of electricity, TWh without ETS, sensitivity on technology

	Base	Scenarios				
		(1)	(2)	(3)	(4)	(5)
Domestic electricity use	131	4	-32	-32	2	-17
Domestic electricity production	137	2	-25	-25	1	-13
Net export in electricity	6	-2	7	7	-1	4

Table A 4.6 Results with ETS, sensitivity on technology

Variable	Base*	Scenarios			
		(6)	(7)	(8)	(9)
CO₂ emissions	million tonnes	Changes from base in million tonnes			
Domestic non-ETS emission	42.0	-12.2	-14.3	-6.4	-6.4
Carbon leakage from ETS industries		1.2	1.2	0.8	0.8
Carbon leakage through trade in non ETS commodities.		5.7	7.1	6.0	5.7
Impact on global emissions		-5.3	-6.1	0.4	0.1
Economic variables	Billion sek	Changes from base in %			
National income	2 268	-0.97	-1.01	0.87	2.93
GDP, deflated by CPI	2 307	-0.96	-1.02	0.82	2.86
GDP, GDP-deflator	2 307	0.23	0.20	0.12	0.66
Private Consumption	1 120	-1.35	-1.39	1.12	3.16
Equivalent Variation Change EV / household consumption		0.08	0.03	0.48	1.60
Gross real wage		-0.43	-0.55	0.77	3.62
Disposable Real wage		-2.51	-2.57	1.78	4.39
Labour tax		2.04	1.98	-0.98	-0.73
Capital return		-0.28	-0.39	0.65	3.60

Table A 4.7 emissions in different sectors with ETS, sensitivity on technology

Industry	Base	Scenarios			
		(6)	(7)	(8)	(9)
	thousand tonnes	Changes from base in thousand tonnes			
Agriculture, forestry, fishing	2290	-510	-509	-344	-151
Mining	254	-54	-56	-42	-20
Manufacture of food, textile and wearing apparel	1110	-409	-410	-372	-252
Manufacture of wood and of products of wood, publishing	173	-68	-67	-59	-42
Production of biofuel	68	-12	-12	-7	-2
Manufacture of pulp, paper and paper products	357	-168	-166	-134	-110
Refineries	189	-72	-74	-63	-43
Other energy-intense manufacturing	892	-266	-261	-239	-143
Other manufacturing	402	-122	-120	-116	-70
Electricity	210	8	9	-51	49
Gas	32	-21	-21	-16	-15
Hot water supply	1190	-689	-690	-336	-600
Distribution of water. Construction	1626	-90	-93	54	121
Retail trade	1380	14	15	42	163
Hotels, financial services, post	533	-25	-33	0	33
Land transports	4005	-49	-40	93	308
Water Transports	7259	-6207	-7137	-6251	-6069
Air transports	2519	48	-1168	-39	22
Real estate activities, Renting of equipment, R&D	1042	-66	-70	48	128
Other business activities	444	-6	-7	13	42
Public services	890	-75	-109	35	62
Other service activities	579	-19	-21	21	65
Households	14576	-3331	-3264	1368	100
TOTAL	42022	-12189	-14304	-6395	-6425

Table A 4.8 Short run change in operating surplus (%) with ETS, sensitivity on technology

Industries	Base	Scenarios				
	Billion SEK	(6)	(7)	(8)	(9)	(10)
Agriculture, forestry, fishing	25285	-0.1	0.3	1.1	3.5	
Mining	3296	-3.9	-4.2	-1.6	2.1	
Manufacture of food, textile and wearing apparel	17919	-0.2	-0.2	0.9	4.1	
Manufacture of wood and of products of wood, publishing	7967	-0.4	0.6	0.8	3.8	
Production of biofuel	4126	0.6	1.3	-0.8	6.1	
Manufacture of pulp, paper and paper products	19231	-2.3	-1.6	0.4	1.8	
Refineries	2207	-6.7	-11.4	-1.3	5.5	
Other energy-intensive manufacturing	53213	0.3	1.6	1.0	3.4	
Other manufacturing	12847	2.5	5.1	1.8	4.8	
Electricity	17098	14.7	15.1	1.1	18.6	
Gas	907	-33.4	-33.6	-17.0	-13.0	
Hot water supply	6154	-9.6	-9.7	2.8	-8.6	
Distribution of water. Construction	12420	-0.4	-0.6	0.5	2.8	
Retail trade	85838	-0.4	0.0	0.7	3.5	
Hotels, financial services, post	49225	-1.1	-2.9	0.3	3.0	
Land transports	21967	0.1	0.5	-0.3	1.9	
Water Transports	5266	-12.4	-56.4	-11.5	-7.2	
Air transports	1228	2.3	6.8	0.7	5.4	
Real estate activities, Renting of equipment, R&D	219780	-0.7	-1.1	0.9	3.4	
Other business activities	45914	0.1	0.4	0.8	3.7	
Public services	29602	-0.6	-0.7	0.7	3.2	
Other service activities	25402	-1.2	-1.3	0.8	2.9	

Table A 4.9 Long run change in employment (%) with ETS, sensitivity on technology

Industries	Base	Scenarios				
	Share of labour force	(6)	(7)	(8)	(9)	(10)
Agriculture, forestry, fishing	0.8%		-3.6	-3.5	-0.8	-0.6
Mining	0.2%		8.4	7.8	10.4	8.2
Manufacture of food, textile and wearing apparel	3.2%		-1.0	-1.1	-0.3	0.1
Manufacture of wood and of products of wood, publishing	0.8%		0.3	0.6	1.1	1.7
Production of biofuel	0.1%		-0.3	0.0	1.0	-0.2
Manufacture of pulp, paper and paper products	1.0%		-10.8	-10.1	-0.5	-6.9
Refineries	0.1%		15.1	13.6	17.2	13.0
Other energy-intense manufacturing	7.5%		2.6	3.6	2.8	1.9
Other manufacturing	6.2%		7.1	8.1	3.9	5.3
Electricity	0.2%		55.6	55.6	1.7	50.6
Gas	0.0%		-39.7	-39.9	-20.7	-26.0
Hot water supply	0.1%		-35.7	-35.9	-4.9	-37.3
Distribution of water. Construction	6.0%		-0.2	-0.2	-0.1	-0.5
Retail trade	13.1%		0.9	1.1	0.8	1.2
Hotels, financial services, post	8.8%		-2.7	-3.7	-2.4	-2.3
Land transports	2.5%		0.5	0.8	-0.4	-1.4
Water Transports	0.5%		-84.4	-97.2	-85.1	-82.6
Air transports	0.2%		2.4	-7.2	-0.9	0.9
Real estate activities, Renting of equipment, R&D	8.3%		-0.3	-0.5	0.1	0.2
Other business activities	8.6%		0.9	1.0	0.5	0.7
Public services	27.6%		-0.3	-0.2	0.0	-0.3
Other service activities	4.3%		-0.5	-0.5	0.2	0.2

Table A 4.10 Change in production and use of electricity, TWh with ETS, sensitivity on technology

	Base	Scenarios				
		(6)	(7)	(8)	(9)	(10)
Domestic electricity use	118	48	48	3	44	118
Domestic electricity production	154	34	34	1	32	154
Net export in electricity	35	-15	-15	-2	-14	35

Table 4.11 Results with zero tax rates in ETS industries, sensitivity on technology

Variable	Base	Scenarios				
		(6b)	(7b)	(8b)	(9b)	(10b)
CO₂ emissions	million tonnes	Changes from base in million tonnes				
Domestic non-ETS emission	42.0	-7.1	-11.2	-13.1	-4.9	-5.4
Carbon leakage from ETS industries		-0.8	-0.3	-0.3	-0.8	-0.4
Carbon leakage through trade in non ETS commodities.		6.2	6.0	7.3	6.2	5.9
Impact on global emissions		-1.7	-5.5	-6.2	0.5	0.1
Economic variables	Billion sek					
National income	2 268	-0.17	-1.12	-1.11	1.10	3.02
GDP, deflated by CPI	2 307	-0.18	-1.10	-1.10	1.06	2.95
GDP, GDP-deflator	2 307	0.03	0.26	0.23	0.18	0.70
Private Consumption	1 120	-0.13	-1.56	-1.54	1.33	3.23
Equivalent Variation Change EV / household consumption		0.05	0.05	0.01	0.56	1.63

Note: The top number in each cell refers to the long run effect, the bottom number to the short run effect. All variables are deflated with CPI if not else specified.

Table 4.12 Unit tax rates in scenarios, tables 4.13 – 4.17

Tax item	Tax rates in Scenarios				
	(1)	(2)	(3)	(4)	(5)
Gasoline, SEK/litre	4.49	4.50	4.49	4.17	3.81
Diesel, SEK/litre	3.39	3.40	3.39	3.07	2.71
Jet fuels			2.19		
light fuel oil, SEK/litre	2.19	2.20	2.19	1.87	1.51
heavy fuel oil, SEK/litre	2.29	2.30	2.29	1.97	1.61
Gas, SEK/litre	1.53	1.54	1.54	1.31	1.06
Electricity, SEK /kWh	b	0.23	0.23	b	0.16

b = the same tax rates as in the base model.

* Heavy fuel oil is untaxed for water transports in all scenarios but scenario 3.

Table A 4.13 Results without ETS, sensitivity on technology

Variable	Base	Scenarios				
		(1)	(2)	(3)	(4)	(5)
CO₂ emissions	million tonnes	Changes from base in million tonnes				
Domestic emission	43.4	-7.5	-6.5	-8.3	-4.5	-0.8
Carbon leakage through electricity trade		1.5	-5.5	-5.4	1.1	-3.0
Carbon leakage through trade in other commodities		3.6	4.4	7.3	3.4	3.8
Impact on global emissions		-2.5	-7.6	-6.4	0	0
Economic variables	Billion sek	Changes from base in %				
National income	2 272	-0.08	-0.31	-0.34	1.41	3.12
GDP, deflated by CPI	2 310	-0.13	-0.52	-0.53	1.33	2.88
GDP, GDP-deflator	2 310	-0.06	-0.24	-0.22	0.13	0.35
Private Consumption	1 121	-0.02	-0.18	-0.17	1.70	3.72
Equivalent Variation Change EV / household consumption		0.00	0.00	0.00	0.61	1.57
Gross real wage		-0.24	-0.88	-1.07	1.32	3.00
Disposable Real wage		0.09	0.47	0.39	2.71	6.22
Labour tax		-0.33	-1.34	-1.45	-1.34	-3.07
Capital return		-0.42	-1.89	-1.77	1.09	1.92

Note: The top number in each cell refers to the long run effect, the bottom number to the short run effect. All variables are deflated with CPI if not else specified. CPI is a price index with the cost shares in the base model household's consumption as weights.

Table A 4.14 emissions in different sectors without ETS, sensitivity on technology

Industry	Base	Scenarios				
		(1)	(2)	(3)	(4)	(5)
	thousand tonnes	Changes from base in thousand tonnes				
Agriculture, forestry, fishing	2263	-439	-501	-492	-304	-186
Mining	501	-154	-66	136	-128	-37
Manufacture of food, textile and wearing apparel	1006	-365	-216	-216	-314	-107
Manufacture of wood and of products of wood, publishing	165	-59	-53	-53	-50	-32
Production of biofuel	52	-8	-12	-11	-6	-8
Manufacture of pulp, paper and paper products	1968	-1199	-1341	-1335	-1080	-1084
Refineries	163	-63	-17	75	-54	-10
Other energy-intensive manufacturing	2661	-1163	-803	-794	-1027	-478
Other manufacturing	359	-102	-34	-35	-87	-2
Electricity	440	-159	-265	-263	-136	-167
Gas	41	-23	-21	-20	-20	-14
Hot water supply	2838	-1171	-997	-987	-1064	-1027
Distribution of water. Construction	1605	4	1	7	86	174
Retail trade	1390	1	-25	-23	58	124
Hotels, financial services, post	524	-6	-7	-13	16	45
Land transports	4087	-63	-317	-256	82	59
Water Transports	3855	-2969	-2608	-3725	-2943	-2594
Air transports	2508	-21	-5	-1149	-32	-3
Real estate activities, Renting of equipment, R&D	989	9	6	5	80	165
Other business activities	441	3	6	4	22	49
Public services	848	5	4	-25	58	114
Other service activities	567	1	-1	1	34	74
Households	14154	413	777	874	2332	4144
TOTAL	43425	-7530	-6496	-8297	-4476	-799

Table A 4.15 Short run change in operating surplus (%) without ETS, sensitivity on technology

Industries	Base	Scenarios				
	Billion SEK	(1)	(2)	(3)	(4)	(5)
Agriculture, forestry, fishing	25734	0.0	-1.6	-1.3	1.4	2.1
Mining	3173	-4.7	-10.3	-7.8	-2.1	-0.8
Manufacture of food, textile and wearing apparel	17970	0.0	0.6	0.6	1.7	4.3
Manufacture of wood and of products of wood, publishing	8142	0.0	-0.3	0.2	1.6	3.4
Production of biofuel	3289	-6.7	-25.1	-24.7	-3.9	-14.8
Manufacture of pulp, paper and paper products	21617	-3.0	-13.4	-13.0	-1.1	-6.6
Refineries	2172	-6.7	-16.8	-11.7	-1.5	4.2
Other energy-intense manufacturing	53674	-0.3	-1.6	-0.8	1.0	1.9
Other manufacturing	12766	2.2	6.7	8.2	2.9	7.4
Electricity	12758	0.6	-19.1	-18.9	2.1	-6.8
Gas	1205	-27.7	-30.9	-30.2	-19.6	-13.8
Hot water supply	5064	7.2	8.6	8.2	6.7	2.9
Distribution of water. Construction	12451	-0.4	-1.2	-1.3	0.9	2.0
Retail trade	86701	-0.4	-1.7	-1.4	1.1	2.2
Hotels, financial services, post	48696	-0.4	-0.9	-1.9	1.1	2.9
Land transports	22398	-1.7	-5.3	-5.1	-0.8	-2.1
Water Transports	2828	-12.1	-10.2	-52.6	-10.2	-5.6
Air transports	1222	0.1	0.8	4.8	1.3	4.1
Real estate activities, Renting of equipment, R&D	220008	0.0	-0.1	-0.4	1.6	3.6
Other business activities	46030	0.0	0.1	0.2	1.4	3.3
Public services	29686	-0.3	-1.1	-1.1	1.2	2.5
Other service activities	25451	-0.2	-0.6	-0.6	1.4	3.0

Table A 4.16 Long run change in employment (%) without ETS, sensitivity on technology

Industries	Base	Scenarios				
	Share of labour force	(1)	(2)	(3)	(4)	(5)
Agriculture, forestry, fishing	0.8%	-3.2	-8.3	-8.3	-1.9	-5.0
Mining	0.2%	5.1	15.4	68.2	5.6	8.7
Manufacture of food, textile and wearing apparel	3.2%	-0.3	0.0	-0.1	0.1	1.0
Manufacture of wood and of products of wood, publishing	0.8%	0.2	-1.1	-1.2	0.7	0.2
Production of biofuel	0.1%	-1.5	-11.5	-11.4	-2.0	-14.4
Manufacture of pulp, paper and paper products	1.1%	-13.5	-43.2	-43.3	-10.6	-35.1
Refineries	0.1%	14.8	31.3	114.5	14.5	17.3
Other energy-intense manufacturing	7.7%	0.8	-2.0	-1.7	0.6	-1.0
Other manufacturing	6.1%	5.8	16.1	15.6	4.7	11.8
Electricity	0.1%	3.8	-34.6	-34.3	2.0	-18.0
Gas	0.0%	-28.5	-18.0	-15.5	-22.9	-11.9
Hot water supply	0.1%	-8.6	1.1	1.2	-10.8	-17.4
Distribution of water. Construction	6.0%	-0.1	-0.1	-0.1	-0.2	-0.5
Retail trade	13.2%	0.2	-0.6	-0.5	0.3	0.0
Hotels, financial services, post	8.7%	-1.2	-0.8	-1.8	-1.0	-0.5
Land transports	2.5%	-1.7	-6.6	-5.7	-2.3	-6.7
Water Transports	0.3%	-75.1	-65.0	-94.6	-74.5	-65.0
Air transports	0.2%	0.0	1.8	-7.8	-0.6	0.9
Real estate activities, Renting of equipment, R&D	8.3%	0.0	0.2	0.1	0.2	0.6
Other business activities	8.6%	0.8	2.1	2.0	0.6	1.6
Public services	27.5%	0.0	0.0	0.1	0.0	-0.1
Other service activities	4.3%	0.1	0.2	0.3	0.3	0.7

Table A 4.17 Change in production and use of electricity, TWh without ETS, sensitivity on technology

	Base	Scenarios				
		(1)	(2)	(3)	(4)	(5)
Domestic electricity use	131	4	-31	-31	2	-15
Domestic electricity production	137	2	-24	-24	1	-12
Net export in electricity	6	-2	7	6	-1	4

Table A 4.18 Results without ETS, sensitivity on technology

Variable	Base	Scenarios			
		(1)	(1b)	(5)	(5b)
CO₂ emissions	million tonnes	Changes from base in million tonnes			
Domestic emission	43.4	-7.5	-7.4	-0.8	-1.0
Carbon leakage through electricity trade		1.5	1.5	-3.0	-2.8
Carbon leakage through trade in other commodities		3.6	3.6	3.8	3.8
Impact on global emissions		-2.5	-2.4	0	0
Economic variables	Billion sek	Changes from base in %			
National income	2 272	-0.08	-0.08	3.12	3.03
GDP, deflated by CPI	2 310	-0.13	-0.13	2.88	2.80
GDP, GDP-deflator	2 310	-0.06	-0.06	0.35	0.34
Private Consumption	1 121	-0.02	-0.02	3.72	3.61
Equivalent Variation Change EV / household consumption		0.00	0.00	1.57	1.53

Table 4.19 Unit tax rates in scenarios, table 4.20 – 4.24

Tax item	Tax rates in Scenarios				
	(6)	(7)	(8)	(9)	(10)
Gasoline, SEK/litre		4.72	4.69	4.35	3.87
Diesel, SEK/litre		3.62	3.59	3.25	2.77
Jet fuels			2.39		
light fuel oil, SEK/litre		2.42	2.39	2.05	1.57
heavy fuel oil, SEK/litre		2.52	2.49	2.15	1.67
Gas, SEK/litre		1.69	1.67	1.43	1.10
Electricity, SEK /kWh		0.005	0.005	b	0.005

b = the same tax rates as in the base model.

* Heavy fuel oil is untaxed for water transports in all scenarios but scenario 3.

Table A 4.20 Results with ETS, sensitivity on technology

Variable	Base*	Scenarios			
		(6)	(7)	(8)	(9)
CO₂ emissions	million tonnes	Changes from base in million tonnes			
Domestic non-ETS emission	42.0	-12.4	-14.4	-6.8	-6.5
Carbon leakage from ETS industries		1.2	1.2	0.8	0.8
Carbon leakage through trade in non ETS commodities.		5.7	7.1	6.0	5.7
Impact on global emissions		-5.5	-6.2	0	0
Economic variables	Billion sek	Changes from base in %			
National income	2 268	-1.18	-1.09	0.66	2.88
GDP, deflated by CPI	2 307	-1.17	-1.09	0.61	2.80
GDP, GDP-deflator	2 307	0.21	0.19	0.09	0.65
Private Consumption	1 120	-1.60	-1.49	0.88	3.09
Equivalent Variation Change EV / household consumption		0.00	0.00	0.40	1.57
Gross real wage		-0.65	-0.64	0.55	3.56
Disposable Real wage		-2.89	-2.71	1.41	4.29
Labour tax		2.21	2.04	-0.84	-0.69
Capital return		-0.50	-0.47	0.44	3.54

Table A 4.21 emissions in different sectors with ETS, sensitivity on technology

Industry	Base	Scenarios			
		(6)	(7)	(8)	(9)
	thousand tonnes	Changes from base in thousand tonnes			
Agriculture, forestry, fishing	2290	-527	-516	-363	-157
Mining	254	-56	-56	-44	-21
Manufacture of food, textile and wearing apparel	1110	-416	-413	-380	-255
Manufacture of wood and of products of wood, publishing	173	-69	-68	-60	-42
Production of biofuel	68	-12	-12	-8	-3
Manufacture of pulp, paper and paper products	357	-171	-167	-138	-111
Refineries	189	-73	-75	-65	-43
Other energy-intense manufacturing	892	-272	-263	-246	-145
Other manufacturing	402	-125	-121	-118	-71
Electricity	210	6	8	-53	48
Gas	32	-21	-21	-16	-15
Hot water supply	1190	-694	-692	-340	-601
Distribution of water. Construction	1626	-100	-96	42	117
Retail trade	1380	7	12	34	161
Hotels, financial services, post	533	-27	-34	-3	32
Land transports	4005	-67	-46	74	302
Water Transports	7259	-6214	-7138	-6257	-6072
Air transports	2519	49	-1172	-38	22
Real estate activities, Renting of equipment, R&D	1042	-75	-73	38	124
Other business activities	444	-8	-8	11	41
Public services	890	-81	-112	27	60
Other service activities	579	-24	-22	17	63
Households	14576	-3473	-3317	1087	33
TOTAL	42022	-12441	-14402	-6798	-6532

Table A 4.22 Short run change in operating surplus (%) with ETS, sensitivity on technology

Industries	Base	Scenarios				
	Billion SEK	(6)	(7)	(8)	(9)	(10)
Agriculture, forestry, fishing	25285		-0.3	0.2	0.9	3.4
Mining	3296		-4.2	-4.3	-1.9	2.0
Manufacture of food, textile and wearing apparel	17919		-0.4	-0.3	0.7	4.0
Manufacture of wood and of products of wood, publishing	7967		-0.6	0.5	0.5	3.8
Production of biofuel	4126		0.3	1.2	-1.1	6.0
Manufacture of pulp, paper and paper products	19231		-2.5	-1.7	0.2	1.7
Refineries	2207		-7.3	-11.6	-2.0	5.3
Other energy-intense manufacturing	53213		0.1	1.5	0.8	3.3
Other manufacturing	12847		2.4	5.0	1.6	4.8
Electricity	17098		14.5	15.0	0.9	18.6
Gas	907		-34.4	-34.0	-18.2	-13.4
Hot water supply	6154		-9.6	-9.7	2.8	-8.6
Distribution of water. Construction	12420		-0.6	-0.7	0.3	2.8
Retail trade	85838		-0.6	-0.1	0.5	3.4
Hotels, financial services, post	49225		-1.3	-3.0	0.1	2.9
Land transports	21967		0.0	0.5	-0.4	1.9
Water Transports	5266		-12.7	-56.6	-11.7	-7.3
Air transports	1228		2.1	6.8	0.6	5.4
Real estate activities, Renting of equipment, R&D	219780		-0.9	-1.2	0.7	3.4
Other business activities	45914		-0.1	0.3	0.6	3.6
Public services	29602		-0.8	-0.8	0.5	3.1
Other service activities	25402		-1.4	-1.3	0.6	2.8

Table A 4.23 Long run change in employment (%) with ETS, sensitivity on technology

Industries	Base	Scenarios				
	Share of labour force	(6)	(7)	(8)	(9)	(10)
Agriculture, forestry, fishing	0.8%		-3.8	-3.5	-1.0	-0.6
Mining	0.2%		8.5	7.8	10.4	8.2
Manufacture of food, textile and wearing apparel	3.2%		-1.1	-1.1	-0.4	0.1
Manufacture of wood and of products of wood, publishing	0.8%		0.2	0.6	1.0	1.6
Production of biofuel	0.1%		-0.3	0.0	1.1	-0.2
Manufacture of pulp, paper and paper products	1.0%		-11.0	-10.1	-0.8	-6.9
Refineries	0.1%		15.3	13.7	17.2	13.0
Other energy-intense manufacturing	7.5%		2.7	3.6	2.8	1.9
Other manufacturing	6.2%		7.2	8.1	4.0	5.3
Electricity	0.2%		55.7	55.7	1.9	50.7
Gas	0.0%		-40.3	-40.1	-21.5	-26.2
Hot water supply	0.1%		-35.6	-35.9	-4.4	-37.2
Distribution of water. Construction	6.0%		-0.2	-0.2	-0.1	-0.5
Retail trade	13.1%		0.9	1.1	0.8	1.2
Hotels, financial services, post	8.8%		-2.8	-3.7	-2.4	-2.3
Land transports	2.5%		0.6	0.8	-0.3	-1.4
Water Transports	0.5%		-84.5	-97.2	-85.2	-82.6
Air transports	0.2%		2.5	-7.2	-0.9	1.0
Real estate activities, Renting of equipment, R&D	8.3%		-0.4	-0.6	0.1	0.2
Other business activities	8.6%		0.9	1.0	0.5	0.7
Public services	27.6%		-0.3	-0.2	0.0	-0.3
Other service activities	4.3%		-0.6	-0.6	0.2	0.2

Table A 4.24 Change in production and use of electricity, TWh with ETS sensitivity on technology

	Base	Scenarios				
	(6)	(7)	(8)	(9)	(10)	
Domestic electricity use	118	48	48	3	44	
Domestic electricity production	154	34	34	1	32	
Net export in electricity	35	-15	-15	-2	-14	

Table 4.25 Unit tax rates in scenarios table 4.26

Tax item	Tax rates in Scenarios				
	(6b)	(7b)	(8b)	(9b)	(10b)
Gasoline, SEK/litre	4.57	4.76	4.73	4.33	3.88
Diesel, SEK/litre	3.47	3.66	3.63	3.23	2.78
Jet fuels			2.43		
light fuel oil, SEK/litre	2.27	2.46	2.43	2.03	1.58
heavy fuel oil, SEK/litre	2.37	2.56	2.53	2.13	1.68
Gas, SEK/litre	1.59	1.72	1.70	1.42	1.10
Electricity, SEK /kWh	b	0.005	0.005	b	0.005

b = the same tax rates as in the base model.

* Heavy fuel oil is untaxed for water transports in all scenarios but scenario 3.

Table 4.26 Results with zero tax rates in ETS industries, sensitivity on technology

Variable	Base	Scenarios				
		(6b)	(7b)	(8b)	(9b)	(10b)
CO₂ emissions	million tonnes	Changes from base in million tonnes				
Domestic non-ETS emission	42.0	-7.4	-11.3	-13.2	-5.4	-5.6
Carbon leakage from ETS industries		-0.8	-0.3	-0.3	-0.8	-0.4
Carbon leakage through trade in non ETS commodities.		6.2	6.0	7.3	6.2	5.9
Impact on global emissions		-1.9	-5.6	-6.2	0	0
Economic variables	Billion sek					
National income	2 268	-0.30	-1.24	-1.14	0.82	2.94
GDP, deflated by CPI	2 307	-0.32	-1.22	-1.13	0.78	2.88
GDP, GDP-deflator	2 307	0.01	0.25	0.23	0.15	0.69
Private Consumption	1 120	-0.29	-1.70	-1.58	1.01	3.14
Equivalent Variation Change EV / household consumption		0.00	0.00	0.00	0.45	1.60

Note: The top number in each cell refers to the long run effect, the bottom number to the short run effect. All variables are deflated with CPI if not else specified.

Table 4.27 Results small tax exemptions and zero tax rates in ETS industries sensitivity on technology

Variable	Base	Scenarios			
		(6b)	(6bSE)	(10b)	(10bSE)
CO₂ emissions	million tonnes	Changes from base in million tonnes			
Domestic non-ETS emission	42.0	-7.4	-7.3	-5.6	-5.6
Carbon leakage from ETS industries		-0.8	-0.8	-0.4	-0.4
Carbon leakage through trade in non ETS commodities.		6.2	6.2	5.9	5.9
Impact on global emissions		-1.92	-1.86	0	0
Economic variables	Billion sek	Changes from base in %			
National income	2 268	-0.30	-0.31	2.94	2.91
GDP, deflated by CPI	2 307	-0.32	-0.32	2.88	2.84
GDP, GDP-deflator	2 307	0.01	0.01	0.69	0.68
Private Consumption	1 120	-0.29	-0.30	3.14	3.10
Equivalent Variation Change EV / household consumption		0.00	0.00	1.60	1.59

Note: The top number in each cell refers to the long run effect, the bottom number to the short run effect. All variables are deflated with CPI if not else specified.

5 Sensitivity analysis on the calculation of carbon leakage

In the fifth sensitivity analysis carbon leakage is calculated as if production is reallocated to countries with carbon-intense electricity production. In that case carbon leakage is increased in the situation without EU ETS. With EU ETS, carbon leakages become smaller, indicating that the net export of non-ETS commodities that are electricity-intense in production is increased by the tax reforms. The qualitative results without EU ETS changes slightly. The actual tax exemptions are still inefficient, but smaller tax exemptions of 20 percent become welfare improving in the high tax scenario 1. In the low tax scenario 5, however, small tax exemptions are still welfare reducing.

Carbon leakage is calculated as if production is reallocated to countries with carbon intense electricity production.

Table A 5.1 Results without ETS, sensitivity on the calculation of carbon leakage

Variable	Base	Scenarios				
		(1)	(2)	(3)	(4)	(5)
Tax item		Unit tax rates in scenarios				
Gasoline, SEK/litre		4.42	4.39	4.40	4.15	4.09
Diesel, SEK/litre		3.32	3.29	3.30	3.05	2.99
Jet fuels		0.00	0.00	2.10	0.00	0.00
light fuel oil, SEK/litre		2.12	2.09	2.10	1.85	1.79
heavy fuel oil, SEK/litre		2.22*	2.19*	2.20	1.95*	1.89*
Gas, SEK/litre		1.48	1.46	1.47	1.30	1.25
Electricity, SEK /kWh		B	0.23	0.23	b	0.16
CO₂ emissions	Million tonnes	Changes from base in million tonnes				
Domestic emission	43.4	-9.6	-6.3	-10.0	-6.3	-4.8
Carbon leakage through electricity trade		2.6	-8.2	-8.3	2.1	-4.0
Carbon leakage through trade in other commodities		4.7	10.0	12.4	4.2	8.8
Impact on global emissions		-2.3	-4.6	-5.9	0	0
Economic variables	Billion sek	Changes from base in %				
National income	2 272	0.22	0.17	0.12	1.50	1.81
GDP, deflated by CPI	2 310	0.19	0.01	-0.06	1.44	1.64
GDP, GDP-deflator	2 310	-0.06	-0.22	-0.23	0.14	0.20
Private Consumption	1 121	0.26	0.26	0.22	1.77	2.20
Equivalent Variation Change EV / household consumption		0.00	0.00	0.00	0.59	1.01
Gross real wage		0.16	-0.17	-0.30	1.45	1.66
Disposable Real wage		0.39	0.93	0.91	2.72	3.78
Labour tax		-0.23	-1.08	-1.19	-1.23	-2.05
Capital return		0.17	-0.93	-1.10	1.39	0.88

Table A.5.2 Tax rates in scenarios

Tax item	Scenarios					
	(1)	(1SE20)		(5)	(5SE)	
	all	Households & services	Agriculture & manufacturing	all	Households & services	Agriculture & manufacturing
Gasoline	4.417	4.438	4.010	4.092	4.106	4.015
Diesel	3.317	3.338	2.910	2.992	3.006	2.915
light fuel oil	2.117	2.138	1.710	1.792	1.806	1.715
heavy fuel oil	2.217	2.238	1.810	1.892	1.906	1.815
Gas	1.482	1.197	1.497	1.254	1.264	1.201
Electricity	b	b	b	0.16	0.16	0.16

b Same tax rates as in the base model.

Table A.5.3 Results small tax exemptions without ETS, sensitivity on the calculation of carbon leakage

Variable	Base	Scenarios			
		(1)	(1SE)	(5)	(5SE)
CO₂ emissions	million tonnes	Changes from base in million tonnes			
Domestic emission	43.4	-9.6	-9.3	-4.8	-4.8
Carbon leakage through electricity trade		2.6	2.5	-4.0	-3.8
Carbon leakage through trade in other commodities		4.7	4.5	8.8	8.7
Impact on global emissions		-2.3	-2.4	0	0
Economic variables	Billion sek	Changes from base in %			
National income	2 272	0.22	0.17	1.81	1.76
GDP, deflated by CPI	2 310	0.19	0.14	1.64	1.59
GDP, GDP-deflator	2 310	-0.06	-0.05	0.20	0.20
Private Consumption	1 121	0.26	0.20	2.20	2.14
Equivalent Variation Change EV / household consumption		0.00	0.00	1.01	1.00

Note: The top number in each cell refers to the long run effect, the bottom number to the short run effect. All variables are deflated with CPI if not else specified.

Table A 5.4 Results with ETS, sensitivity on the calculation of carbon leakage

Variable	Base**	Scenarios				
		(6)	(7)	(8)	(9)	(10)
Tax item		Unit tax rates in scenarios				
Gasoline, SEK/litre		4.51	4.67	4.67	4.25	3.79
Diesel, SEK/litre		3.41	3.57	3.57	3.15	2.69
Jet fuels		0.00	0.00	2.37	0.00	0.00
light fuel oil, SEK/litre		2.21	2.37	2.37	1.95	1.49
heavy fuel oil, SEK/litre		2.31*	2.47*	2.47	2.05*	1.59*
Gas, SEK/litre		1.55	1.66	1.66	1.37	1.05
Electricity, SEK /kWh		b	0.005	0.005	b	0.005
CO₂ emissions	million tonnes	Changes from base in million tonnes				
Domestic emission	42.0	-9.4	-14.1	-17.3	-6.5	-5.7
Carbon leakage from EU ETS industries		1.8	2.2	2.1	1.7	1.6
Carbon leakage through trade in non EU ETS commodities.		4.6	3.5	5.7	4.8	4.1
Impact on global emissions		-3.0	-8.5	-9.5	0	0
Economic variables	Billion sek	Changes from base in %				
National income	2 268	-0.14	-1.02	-1.03	1.12	3.35
GDP, deflated by CPI	2 307	-0.16	-0.99	-1.01	1.07	3.28
GDP, GDP-deflator	2 307	-0.05	0.18	0.17	0.14	0.77
Private Consumption	1 120	-0.07	-1.41	-1.40	1.41	3.75
Equivalent Variation Change EV / household consumption		0.00	0.00	0.00	0.57	1.90
Gross real wage		-0.20	-0.36	-0.46	1.07	4.03
Disposable Real wage		-0.11	-2.73	-2.69	2.19	5.26
Labour tax		-0.08	2.33	2.19	-1.08	-1.16
Capital return		-0.22	-0.07	-0.18	0.98	4.08

Table A 5.5 Results with zero tax rates in EU ETS industries

Variable	Base	Scenarios				
		(6b)	(7b)	(8b)	(9b)	(10b)
Tax item		Unit tax rates in scenarios				
Gasoline, SEK/litre		4.54	4.73	4.72	4.26	3.82
Diesel, SEK/litre		3.44	3.63	3.62	3.16	2.72
Jet fuels				2.42		
light fuel oil, SEK/litre*		2.24	2.43	2.42	1.96	1.52
heavy fuel oil, SEK/litre*		2.34	2.53	2.52	2.06	1.62
Gas, SEK/litre*		1.57	1.70	1.69	1.37	1.07
Electricity, SEK /kWh		b	0.005	0.005	b	0.005
CO₂ emissions	million tonnes	Changes from base in million tonnes				
Domestic emission	42.0	-6.1	-11.5	-14.1	-3.1	-3.4
Carbon leakage from EU ETS industries		-2.6	-1.4	-1.5	-2.6	-1.7
Carbon leakage through trade in non EU ETS commodities.		5.6	4.7	6.4	5.7	5.1
Impact on global emissions		-3.2	-8.3	-9.2	0	0
Economic variables	Billion sek	Changes from base in %				
National income	2 268	-0.13	-1.12	-1.09	1.26	3.34
GDP, deflated by CPI	2 307	-0.14	-1.08	-1.06	1.22	3.28
GDP, GDP-deflator	2 307	0.03	0.26	0.24	0.23	0.84
Private Consumption	1 120	-0.17	-1.59	-1.53	1.47	3.68
Equivalent Variation Change EV / household consumption		0.00	0.00	0.00	0.62	1.91

Note: The top number in each cell refers to the long run effect, the bottom number to the short run effect. All variables are deflated with CPI if not else specified. b = the same tax rates as in the base model. *zero tax rate in ETS industries. Heavy fuel oil is untaxed for water transports in all scenarios but scenario 8.

6 Sensitivity analysis on the calculation of the ETS introduction

In the sensitivity analysis of the introduction of EU ETS a permit price close to the lowest price during spring 2009 is evaluated. In this case the reduction in CO₂ emission is only 1.2 million tonnes and the increase in capital return just 0.3 percent. The short-run increase in capital return in electricity production is only 19 percent. In another sensitivity analysis the supply of permits is set to 100 percent of the base-year emissions. In this case the outcome is almost the same. There is a significantly higher net export of permits (5.8 million tonnes instead of 4.2), otherwise the only difference is that the increase of capital return is slightly higher (0.7 instead of 0.6) due to higher income from sold permits.

Table 6.1 Experiment parameters, introduction of ETS

Experiment parameter	Unit	Scenarios			
		(a)	(b)	(c)	(d)
Permit Price	SEK / kg	0.16	0.16	0.35	0.35
Export Price increase of electricity.	%	22	22	35	35
Import Price increase of electricity.	%	22	22	35	35
Distributed permits:					
Mining	1 000 tonnes	401	501	401	501
Manufacture of pulp, paper and paper products	1 000 tonnes	1574	1968	1574	1968
Other energy-intense manufacturing	1 000 tonnes	2129	2661	2129	2661
Electricity	1 000 tonnes	352	440	352	440
Hot water supply	1 000 tonnes	2270	2838	2270	2838
Total	1 000 tonnes	6726	8408	6726	8408

* This parameter will only have an impact on the long run scenarios.

Table 6.2 Results, introduction of ETS

Variable	Base	Scenarios			
		(a)	(b)	(c)	(d)
CO₂ emissions	million tonnes	Changes from base in million tonnes			
Domestic emission	42.3	-1.2	-1.2	-1.5	-1.5
		-1.1	-1.1	-2.1	-2.1
		<i>Export less import million tonnes</i>			
Net export of permits	0	2.2	3.9	4.2	5.8
		0	1.6	1.0	2.7
Economic variables	Billion sek	Changes from base in %			
National income	2 277	-0.11	-0.11	-0.2	-0.20
		-0.10	-0.06	-0.18	-0.19
GDP, deflated by CPI	2 315	-0.08	-0.07	-0.13	-0.12
		-0.07	-0.06	-0.12	-0.12
GDP, GDP-deflator	2 315	-0.07	-0.07	-0.13	-0.13
		-0.05	-0.05	-0.10	-0.09
Private Consumption	1 123	-0.10	-0.08	-0.11	-0.07
		-0.09	-0.07	-0.14	-0.10
Equivalent Variation		-0.10	-0.08	-0.11	-0.06
Change EV / household consumption		-0.12	-0.10	-0.18	-0.14
Gross real wage		-0.18	-0.18	-0.32	-0.32
		-0.24	-0.24	-0.42	-0.43
Disposable Real wage		-0.36	-0.35	-0.57	-0.55
		-0.39	-0.38	-0.68	-0.66
Labour tax		0.17	0.16	0.25	0.23
		0.15	0.14	0.25	0.23
Capital return		0.27	0.31	0.58	0.67
		0.32	0.36	0.59	0.68

Note: The top number in each cell refers to the long run effect, the bottom number to the short run effect. All variables are deflated with CPI if not else specified.

Table A 6.3 emissions in different sectors, introduction of ETS

Industry	Base	Scenarios			
		(a)	(b)	(c)	(d)
	thousand tonnes	Changes from base in thousand tonnes			
Agriculture, forestry, fishing	2263	12	13	26	26
Mining	501	-145	-145	-248	-247
Manufacture of food, textile and wearing apparel	1006	61	61	101	101
Manufacture of wood and of products of wood, publishing	165	4	4	7	7
Production of biofuel	52	9	9	16	16
Manufacture of pulp, paper and paper products	1968	-1161	-1161	-1612	-1612
Refineries	163	16	16	26	26
Other energy-intensive manufacturing	2661	-1129	-1129	-1771	-1772
Other manufacturing	359	25	25	42	42
Electricity	440	-126	-126	-231	-231
Gas	41	-4	-4	-9	-9
Hot water supply	2838	-975	-975	-1652	-1652
Distribution of water. Construction	1605	12	12	20	20
Retail trade	1390	-6	-6	-11	-11
Hotels, financial services, post	524	5	5	9	9
Land transports	4087	-48	-48	-78	-78
Water Transports	3855	1927	1916	3376	3345
Air transports	2508	5	5	9	9
Real estate activities, Renting of equipment, R&D	989	29	29	52	52
Other business activities	441	2	2	3	3
Public services	848	23	23	41	41
Other service activities	567	7	7	12	12
Households	14154	221	224	399	406
TOTAL	43425	-1238	-1245	-1475	-1495

Table A 6.4 Short run change in operating surplus (%) introduction of ETS

Industries	Base	Scenarios			
	Billion SEK	(a)	(b)	(c)	(d)
Agriculture, forestry, fishing	25734	-0.4	-0.4	-0.7	-0.7
Mining	3173	0.9	1.4	2.2	3.3
Manufacture of food, textile and wearing apparel	17970	0.0	0.0	-0.1	0.0
Manufacture of wood and of products of wood, publishing	8142	-0.2	-0.2	-0.3	-0.3
Production of biofuel	3289	7.5	7.5	12.8	12.8
Manufacture of pulp, paper and paper products	21617	-1.4	-1.2	-1.9	-1.3
Refineries	2172	-1.8	-1.8	-3.5	-3.5
Other energy-intense manufacturing	53674	0.2	0.4	0.6	0.9
Other manufacturing	12766	0.7	0.7	1.3	1.2
Electricity	12758	18.9	19.0	31.5	31.7
Gas	1205	-4.4	-4.4	-11.0	-11.0
Hot water supply	5064	11.7	13.5	23.8	27.8
Distribution of water. Construction	12451	-0.2	-0.2	-0.4	-0.4
Retail trade	86701	-0.4	-0.4	-0.6	-0.6
Hotels, financial services, post	48696	-0.2	-0.2	-0.3	-0.3
Land transports	22398	-0.7	-0.7	-1.2	-1.2
Water Transports	2828	0.6	0.6	1.1	1.0
Air transports	1222	-0.1	-0.1	-0.1	-0.2
Real estate activities, Renting of equipment, R&D	220008	-0.1	-0.1	-0.1	-0.1
Other business activities	46030	-0.1	-0.1	-0.2	-0.2
Public services	29686	-0.2	-0.2	-0.3	-0.3
Other service activities	25451	-0.1	-0.1	-0.2	-0.2