

# Taxes and Time Use: Fiscal Policy in a Household Production Model

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Online Appendix

## 1 Labor Supply

The length of the day is normalized to 14 hours that can be allocated to a variety of activities which are broadly categorized as either market work, home work, or leisure. Home work is further decomposed into time spent in activities such as maintenance and meal preparation where market substitutes for home work are generally not subject to public subsidies, and other activities such as child care where market substitutes are subject to subsidy or transfer by the public sector. The data and definitions used to construct market and home sector labor supply measures are described below.

### 1.1 Home Sector Labor Supply

Each data source is described along with how data was compiled to compute the averages reported in Table 1. To construct measure of home work across countries I rely on multiple time use survey sources. This section describes the source data with specific reference to

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tables and publication from which data was compiled, or how data was constructed from micro data files.

The time use data used to construct measures of home work share a common focus on 'primary tasks'. As a result, the amount of time dedicated to secondary activities such as caring for others is underreported. For example, if an adult is preparing a meal for a child while also supervising the child this time will be categorized as meal preparation, not child care. In this respect primary child care measures understates the true amount of child care performed since such care frequently is classified as a secondary activity. High levels of primary 'home work' may translate into high levels of secondary care for other household members.<sup>1</sup> With this caveat in mind, I do distinguish between time spent in activities where market substitutes are generally not subsidized, as separate from other types of home work. Food preparation, dish washing, construction, maintenance, and repair activities are used to quantify those home work activities whose market substitutes are not subject to subsidy, denoted  $h_f$ , while the remaining home work activities, inclusive of care activities, are denoted by  $h_s$ .<sup>2</sup> In order to construct home work measures for the working age population (ages 25-64), time use measures for different cohorts are aggregated using population weights computed from the O.E.C.D. Labor Force Statistics (LFS) database.<sup>3</sup>

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<sup>1</sup>Primary child care activities are limited to physical care; playing with children; reading to children; assistance with homework; attending children's events; taking care of children's health care needs; and dropping off, picking up and waiting for children. Passive childcare when done as a primary activity is also included as a primary childcare, and example being watching your children while swimming. Watching television with your child is considered leisure, not childcare.

<sup>2</sup>It should also be noted that time spent in related transportation are included in home work measures.

<sup>3</sup>O.E.C.D. data can be found at <http://stats.oecd.org/Index.aspx>.

### **1.1.1 American Time Use Survey (2003)**

The American Time Use Survey (2003) produced by the U.S. Bureau of Labor Statistics is the primary source for U.S. time use data. Table 3 of the U.S. Department of Labor publication USDL 04-1797 titled "Average hours per day spent in primary activities for the total population by age, sex, race, Hispanic or Latino ethnicity, and educational attainment, 2003 annual averages" presents data on hours per day spent in the primary activities by 10 year age groups inclusive of travel time. The primary activities that correspond to home work include household activities, purchasing goods and services, caring for and helping household members, and caring for and helping non-household members. These broad activity categories correspond to the first two digits of the activity codes in the American Time Use Survey Activity Lexicon (2003). Table 1 summarizes this data along with presenting population weights for the corresponding age groups computed from the O.E.C.D..

Table 1: Time Use by Primary Activity and Age from ATUS

Hours Per Day in Primary Activities Inclusive of Travel by Age

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<i>Age</i>	<i>Household Activities</i>	<i>Purchasing Goods/Services</i>	<i>Caring for HH Members</i>	<i>US Population 2003</i>
25-34	1.59	0.78	1.11	39022
35-44	1.99	0.82	1.05	43745
45-54	1.97	0.84	0.38	40523
55-64	2.28	0.90	0.15	27728

Shares of Day in Primary Activities Inclusive of Travel by Age

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25-34	0.114	0.056	0.079	0.258
35-44	0.142	0.059	0.075	0.290
45-54	0.141	0.060	0.027	0.268
55-64	0.163	0.064	0.011	0.184
25-64	0.138	0.059	0.051	1.000

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Source: USDL 04-1797, Table 3, and O.E.C.D. LFS database. Shares expressed per 14 hour day.

In order to compute measures of home work which distinguish between meal preparation/clean-up and home maintenance/repair activities calculations were made using the 2003 micro data files. Both meal preparation/clean-up and home maintenance activities are subcategories of household activity. Meal preparation/clean-up corresponds with time spent in activity codes 020201(food and drink preparation), 020202 (food presentation), 020203 (kitchen and food clean-up), and 020299 (miscellaneous food and drink prep, presentation, and clean-up), while home maintenance and repair activities include activity codes 020301 (interior arrangement, decoration, and repairs), 020302 (building and repairing furniture), 020303 (heating and cooling), 020399 (miscellaneous interior maintenance, repair and decoration), 020401 (exterior cleaning), 020402 (exterior repair, improvements, and decoration), and 020499 (miscellaneous

exterior maintenance, repair and decoration). Table 2 describes how household activity time was spent, breaking out the share of household activity time spent in meal preparation/clean-up, home maintenance and repair, and all other household activities by age groups. The share calculations computed using the ATUS use the 2004 population weights included in the ATUS data files. These are the same weights used by the BLS in computing the summary statistics reported in BLS (2004) replicated above. The total population values reported in the final row of Table 1 and Table 2 use the population weights from the O.E.C.D., reported in the final column of Table 1.

Table 2: ATUS Household Activity in Detail

<i>Age</i>	<i>Share of Household Activity</i>			<i>Total Household Activity Share</i>	<i>Share of 14 Hour Day</i>		
	<i>Meal Prep</i>	<i>Maintenance Repair</i>	<i>Other HH Activity</i>		<i>Meal Prep</i>	<i>Maintenance Repair</i>	<i>Other HH Activity</i>
25-34	0.322	0.057	0.621	0.114	0.037	0.006	0.071
35-44	0.332	0.042	0.627	0.142	0.047	0.006	0.089
45-54	0.356	0.041	0.602	0.141	0.050	0.006	0.085
55-64	0.382	0.038	0.580	0.163	0.062	0.006	0.095
25-64				0.138	0.048	0.006	0.084

Source: Author's computation using ATUS (2003) from <http://www.bls.gov/tus>, and USDL 04-1797. The bottom row is computed using population weights from the O.E.C.D. LFS database.

### 1.1.2 Danish Time Use Survey (DTUS)

The Danish Time Use Survey (DTUS) was conducted in 2001. Data from this survey was reported in Eurostat (2003). Time use is reported for the population between 16-74. Total time spent in household and family care activities is reported without distinguishing between

time spent in food prep/dishwashing and construction/repair. According to Eurostat (2003), Danes between 16-74 spent 2 hours and 51 minutes performing home work, just over 20 per cent of the 14 hour day.

The DTUS data reported by Eurostat does not break down time use for the prime aged (25-64) separately from the broader population. In order to impute time spent in home work for the prime aged in Denmark I compute the proportion of time spent in home work for the same broad and working age populations in Norway and adjust Danish time use measures proportionally given the relative difference in time use across populations observed in Norway. Norway was the only other Scandinavian country that reported time use measures for the same population as reported in the Danish data. Although those aged 65+ do spend more time in home work than the prime aged, the very low levels of home work by those aged 15-24 lead to lower home work time for the broad population relative to the prime aged in Norway. The prime aged spend 8.2 per cent more time in home work in Norway relative to the broader population. This observation is used to adjust upwards the home work share of the broad population in Denmark by 8.2 per cent, from a share of 0.2036 for the broad population to a share of 0.2195 for the prime aged population.

Time spent in meal preparation/clean-up and maintenance/repair activities is imputed in a similar manner. The average share of time spent in these activities as a fraction of total home work time for those aged 25-64 is computed for all of the Scandinavian countries and these shares are used to impute the share of home work time in these activities for Denmark. Time spent on meal preparation and clean-up accounted for 24 per cent of home work, while repair and maintenance accounted for another 6 per cent. Time use on these activities in Denmark is imputed using the same share of home work time to these activities,

which implies that maintenance accounted for just over 1 percent of the day (0.013), while meal preparation and clean-up accounted for just over 5 percent (0.053).

### **1.1.3 Canadian General Social Survey (GSS)**

Cycle 12 of the Canadian General Social Survey (GSS) included a time use diary survey. The survey was completed by 10,749 non-institutionalized Canadians in 1998 and 1999.<sup>4</sup> Table 2 of General Social Survey (1999) reports the main results used to compute measures of time spent in home work.<sup>5</sup> Hours per day spent in household work by sex and age as well as certain components of household work, such as meal preparation, maintenance/repair, shopping, and child care are reported. In order to compute averages for the total population aged 25-64, population weights from the O.E.C.D. are constructed for each gender/age group.

### **1.1.4 Harmonized European Time Use Survey (HETUS)**

The Harmonized European Time Use Survey (HETUS) is a comparable cross-country time use survey. The country level surveys that comprise HETUS were undertaken by national statistical authorities and the results of HETUS are published by Eurostat as well as the statistical agencies of participating countries. The main sources used for compiling time use data from the HETUS are the detailed tables published by Eurostat.<sup>6</sup> The data on time spent in certain household activities in minutes per day for different age groups are presented in Table 3 along with corresponding population statistics computed from the O.E.C.D.. The minutes per day measures, inclusive of travel times, were computed directly from the national

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<sup>4</sup>Residents of the Yukon, Nunavut and the Northwest Territories were not included in the survey.

<sup>5</sup>The report can be found at <http://www.statcan.gc.ca/pub/12f0080x/4194543-eng.pdf>

<sup>6</sup>See Eurostat (2003), Eurostat (2005), Eurostat (2006) and the summary tables found at [http://circa.europa.eu/Public/irc/dsis/tus/library?l=/comparable\\_statistics/national\\_tables&vm=detailed&sb=Title](http://circa.europa.eu/Public/irc/dsis/tus/library?l=/comparable_statistics/national_tables&vm=detailed&sb=Title)

tables.<sup>7</sup>

### 1.1.5 Portugal's Inquerito a Ocupacao do Tempo 1999

The Instituto Nacional De Estatistica (INE) of Portugal conducted a time use study in 1999. Published results and detailed tables of time use are available through the INE website.<sup>8</sup> Most published data refer to the population aged 15+. Through inquiries to INE I obtained time use in home work activities for those 25-64 years of age.<sup>9</sup> Just as in the published statistics, INE reports time use in mean hours and minutes spent in an activity for those whom engaged in the activity, as well as the number of individuals who reported positive time spent in an activity. Table 4 presents these data in terms of minutes per day and shares of the 14 hour day, and presents participation rates as a fraction of the population between 25-64 from the O.E.C.D.. Travel time related to home activities is not reported separately but non-work related travel accounts for 8.7 percent of the standard day. Home work related travel is then imputed using the share of time not spent in work or personal care spent in home work (0.4256) to compute the share of this non-work related travel that is allocated to home work.

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<sup>7</sup>See source note in the table.

<sup>8</sup>See [http://www.ine.pt/xportal/xmain?xpid=INE&xpgid=ine\\_publicacoes&PUBLICACOESpub\\_boui=5592143&PUBLICACOESmodo=2](http://www.ine.pt/xportal/xmain?xpid=INE&xpgid=ine_publicacoes&PUBLICACOESpub_boui=5592143&PUBLICACOESmodo=2)

<sup>9</sup>INE's e-mail address is [info@ine.pt](mailto:info@ine.pt).



**Table 3: HETUS Time Use Data by Age and Detailed Activity  
for Nine European Countries**

Age	OECD Pop Weights	Total Homework	<i>Time Use in Minutes Per Day</i>				<i>Share of 14 Hour Day</i>						
			Meal Prep	Meal Clean-up	Maint./ Repair	Shopping	Child Care	Total Homework	Meal Prep	Meal Clean-up	Maint./ Repair	Shopping	Child Care
<b>Belgium</b>													
25-44	0.55	234	37	14	14	43	46	0.279	0.044	0.017	0.017	0.051	0.054
45-64	0.45	261	47	18	17	53	20	0.310	0.056	0.021	0.020	0.063	0.023
25-64		246	42	16	15	48	34	0.293	0.049	0.019	0.018	0.057	0.040
<b>Finland</b>													
25-44	0.50	210	32	9	12	41	48	0.250	0.038	0.011	0.014	0.049	0.057
45-64	0.50	206	44	11	12	42	4	0.245	0.052	0.013	0.014	0.050	0.005
25-64		208	38	10	12	41	26	0.248	0.045	0.012	0.014	0.049	0.031
<b>France</b>													
25-44	0.54	215	38	11	15	41	40	0.256	0.045	0.013	0.018	0.049	0.048
45-64	0.46	240	47	14	23	45	10	0.285	0.056	0.017	0.027	0.054	0.012
25-64		226	42	12	19	43	26	0.270	0.050	0.015	0.022	0.051	0.031
<b>Germany</b>													
25-44	0.52	222	29	12	12	44	48	0.264	0.035	0.014	0.014	0.052	0.057
45-64	0.48	227	36	16	11	55	5	0.270	0.043	0.019	0.013	0.066	0.006
25-64		224	32	14	12	49	27	0.267	0.039	0.017	0.014	0.059	0.032
<b>Italy</b>													
25-44	0.55	210	37	17	3	37	47	0.250	0.044	0.020	0.004	0.044	0.056
45-64	0.45	261	56	24	4	52	7	0.311	0.067	0.029	0.005	0.062	0.008
25-64		233	46	20	3	44	29	0.277	0.054	0.024	0.004	0.052	0.035
<b>Norway</b>													
25-44	0.55	211	32	12	13	36	55	0.251	0.038	0.014	0.015	0.043	0.065
45-64	0.45	200	42	16	16	36	6	0.238	0.050	0.019	0.019	0.043	0.007
25-64		206	36	14	14	36	33	0.245	0.043	0.016	0.017	0.043	0.039
<b>Spain</b>													
25-44	0.59	207	43	14	4	32	50	0.246	0.051	0.017	0.005	0.038	0.060
45-64	0.41	238	61	21	5	43	6	0.283	0.073	0.025	0.006	0.051	0.007
25-64		220	50	17	4	36	32	0.262	0.060	0.020	0.005	0.043	0.038
<b>Sweden</b>													
25-44	0.52	216	33	15	11	40	53	0.257	0.039	0.018	0.013	0.048	0.064
45-64	0.48	208	41	16	13	42	9	0.248	0.049	0.019	0.016	0.050	0.011
25-64		212	37	15	12	41	32	0.253	0.044	0.018	0.014	0.049	0.038
<b>U.K.</b>													
25-44	0.55	218	38	11	10	44	47	0.260	0.045	0.013	0.012	0.053	0.056
45-64	0.45	227	47	15	13	49	7	0.271	0.056	0.018	0.015	0.058	0.008
25-64		222	42	13	11	46	29	0.265	0.050	0.015	0.014	0.055	0.035

Source: [http://circa.europa.eu/Public/irc/dsis/tus/library?l=/comparable\\_statistics/national\\_tables&vm=detailed&sb=Title](http://circa.europa.eu/Public/irc/dsis/tus/library?l=/comparable_statistics/national_tables&vm=detailed&sb=Title). Total homework, shopping and child care are inclusive of travel times. Travel times were not disaggregated for other categories. Belgian travel times were only reported in the aggregate. Activity level travel time for Belgium were constructed using weights from the U.K., Germany, and France by activity level to decompose total travel by activity. OECD population weights for 2001.

Table 4: Time Use in Portugal

	Minutes per Day	Participation Rate	Share of Day
<b>Home Work Activities</b>	247	0.7734	0.2622
Meal Prep	107	0.5954	0.0874
Construction/Repair	93	0.0394	0.0050
Shopping	49	0.3253	0.0219
Child Care	78	0.2253	0.0241
<i>Home Work Travel (Total)</i>			0.0371

Source: Instituto Nacional De Estatistica (INE) Portugal and O.E.C.D..

Home work per day and participation rates for the 25-64 population in 1999. Minutes are per participant and shares are per 14 hour day.

## 1.2 Market Sector Labor Supply

Measures of market work are constructed from labor force statistic sources that span the same time 1998-2003 period as the time use studies used to compile home work measures.

Market sector labor supply is a function of the employment to population ratio and the average hours worked per employed person. Measures of each component are constructed from the O.E.C.D. LFS database. This captures both extensive and intensive labor supply variations across countries, though it understates market work to the extent that prime age workers work more hours per year than the average worker. Hours worked in the market sector are then expressed as a share of the total time available to the population:

$$h_m = \frac{\text{employment} \times \text{average annual hours worked in employment}}{\text{population} \times 5110}$$

Table 5 presents the employment to population ratio, average annual hours worked and the market work share,  $h_m$ , for each country included in the study.

Table 5: Market Work

	O.E.C.D. LFS			The Conference Board		
	Emp/Pop	Average Hours Worked	$h_m$	Average Hours Worked	$h_m$	
Belgium	0.6650	1,590	0.2069	1,567	0.2039	
Canada	0.7438	1,757	0.2558	1,757	0.2558	
Denmark	0.7835	1,548	0.2374	1,549	0.2374	
Finland	0.7318	1,743	0.2496	1,743	0.2496	
France	0.7054	1,584	0.2186	1,585	0.2187	
Germany	0.6896	1,468	0.1982	1,468	0.1982	
Italy	0.6005	1,853	0.2177	1,853	0.2177	
Norway	0.8159	1,441	0.2301	1,441	0.2301	
Portugal	0.7496	1,776	0.2605	1,883	0.2763	
Spain	0.6260	1,813	0.2222	1,725	0.2113	
Sweden	0.7955	1,609	0.2505	1,626	0.2532	
U.K.	0.7432	1,709	0.2486	1,710	0.2487	
U.S.	0.7671	1,831	0.2748	1,832	0.2661	

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Source: O.E.C.D. Labor Force Statistics (LFS) database for the 1998-2003 period and the Conference Board Total Economy Database  
<http://www.conference-board.org/economics/database.cfm>.

The O.E.C.D. annual hours worked series is derived from national surveys. In making cross-country comparisons we want to be confident that the differences in market work reflect differences in labor supply and not definitions of hours worked. Measurement issues related to the O.E.C.D. labor data have been detailed in van Ark and McGuckin (2002). To address this market work measures are also constructed using data from the Total Economy Database, constructed by the Groningen Growth and Development Centre and The Conference Board. The differences in annual hours worked are relatively small for the countries studied here, resulting in upward revisions for Belgium and Portugal, and reductions in the market work measure for Spain. Both measures of market work paint a similar pattern across the 13 countries studied here for the 1998-2003 period.

## 2 Tax Rates

Tax rates are constructed following Prescott (2002, 2004) who uses the growth model to decompose national accounts data into taxes that fall on consumption and labor. Prescott's tax measures rely on data from the U.N. System of National Accounts discontinued in 1997.<sup>10</sup> The period studied, 1998-2003, falls just after this period. Average tax rates are relatively constant, but in order to account for differential changes in average tax rates possibly due to tax code reforms or changes in the distribution of earnings and in turn tax payments I project Prescott's measures forward using similar measures constructed by McDaniel (2007).

McDaniel uses O.E.C.D. Revenue Statistics and national accounts data to construct average tax rates on consumption and labor income, though her measures differ from Prescott's in several dimensions, differences which result in sizable differences in estimates of labor income tax rates for Scandinavian countries as seen in Table 6. According to McDaniels, average income tax rates are 17 per cent lower than those computed using Prescott's measure, and they are 27 percent lower in Finland, Sweden and Denmark. Prescott's consumption tax measure is slightly larger than McDaniels', though for Scandinavian countries the difference is small. Social security tax rates computed by McDaniels are 10 percent greater than those computed by Prescott. When these tax rates are use to compute marginal tax rates on labor income and the tax wedge following Prescott (2002, 2004), that is, price of consumption in terms of foregone leisure, the differences in these tax measures are striking, especially for high income tax economies such as Sweden.

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<sup>10</sup>See the file 'National Accounts Data' for a selection of the UN SNA data used to construct Prescott's tax measures.

Table 6: Average Tax Rate Measures 1993-1996

	Prescott				McDaniels			
	$\tau_{inc}$	$\tau_{ss}$	$\tau_{cons}$	Wedge	$\tau_{inc}$	$\tau_{ss}$	$\tau_{cons}$	Wedge
U.S.	0.130	0.117	0.120	1.66	0.111	0.110	0.080	1.52
U.K.	0.128	0.103	0.237	1.79	0.134	0.134	0.171	1.80
Portugal	0.082	0.189	0.217	1.79	0.068	0.171	0.177	1.63
Spain	0.114	0.210	0.127	1.85	0.088	0.260	0.143	1.91
Canada	0.185	0.093	0.278	2.10	0.153	0.088	0.200	1.80
Italy	0.156	0.218	0.182	2.22	0.127	0.279	0.166	2.25
France	0.097	0.330	0.238	2.40	0.074	0.359	0.255	2.40
Germany	0.129	0.293	0.210	2.41	0.108	0.316	0.154	2.26
Belgium	0.183	0.263	0.172	2.63	0.152	0.304	0.191	2.63
Norway	0.162	0.162	0.278	2.21	0.132	0.182	0.266	2.08
Finland	0.217	0.255	0.233	3.11	0.175	0.287	0.231	2.84
Sweden	0.245	0.225	0.214	3.18	0.199	0.236	0.262	2.83
Denmark	0.398	0.065	0.321	4.41	0.328	0.039	0.305	2.99
Mean (Full Sample)	0.171	0.194	0.218	2.44	0.142	0.213	0.200	2.23
sd (Full Sample)	0.082	0.082	0.058	0.76	0.068	0.099	0.062	0.49
Mean (FI,SW,DK)	0.287	0.182	0.256	3.57	0.208	0.186	0.266	2.69
sd (FI,SW,DK)	0.097	0.103	0.057	0.74	0.084	0.107	0.030	0.41

Source: McDaniels (2007), Prescott (2004), and United Nations (2000).

Both methods for computing average tax rates rely on strong assumptions regarding the allocation of income and tax payments. In decomposing factor payments, Prescott assumes a constant capital share across countries and time,  $\theta = 1/3$ , while McDaniels allows the capital share parameter to vary across countries (and time), choosing the capital share to match observations from different periods for different countries, or in some cases capital shares imputed from other countries.<sup>11</sup> Prescott's (2002) computation of consumption taxes treats indirect taxes less subsidies as net taxes on output, and assumes that two thirds of these net taxes falls directly on private consumption expenditures and the remaining third is distributed over total product.<sup>12</sup> The consumption tax rate is then computed as the ratio

<sup>11</sup>The specific values of the capital shares are not reported in McDaniel (2007).

<sup>12</sup>The motivation for this assignment of indirect taxes, Prescott argues, is that most indirect taxes fall on consumption whether as value added taxes, sales taxes, excise taxes, or as property taxes. Some taxes, such

of these indirect taxes to consumption net of indirect tax. McDaniels (2007) treats property taxes paid by firms as a tax on investment, and allocates taxes on product net of these taxes between consumption and investment by allocating specific tax revenues when possible, or allocating taxes that are not clearly borne by either consumption or investment in a manner proportional to private expenditure shares in each country. Consumption taxes measures do not differ much depending on the measure used, and this is the case both for the full sample as well as the Scandinavian countries.

Table 7 presents the McDaniels (2007) average tax rate measures for the 1998-2003 period as well as the alternative measure which uses the same UN SNA data as Prescott, and the same formulas for computing average taxes on income and consumption, but the capital share is allowed to differ across countries according to the estimates obtained by Gollin (2002), hence altering the social security tax rate.<sup>13</sup> In addition to allowing the capital share to vary across countries, the Ragan measures also adjust output in Norway to account for petroleum production by the government run petroleum monopoly. Fifty percent of petroleum extraction value added is deducted from output, hence reducing the base over which the income and social security tax rates are computed to reflect the fact that petroleum extraction income is largely diverted to the Norwegian oil fund and not subject to taxation. The Ragan tax rates are computed for the 1993-1996 period and then projected forward using the same proportional changes in the average tax rates observed in the McDaniels series. This projection should capture changes in the tax code or earnings distribution

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as fuel taxes on diesel fuel used by trucks that transport goods, property taxes on office buildings, and sales taxes on equipment purchases by businesses, fall on all forms of output.

<sup>13</sup>See the column titled 'Adjustment 2' in Table 2 of Gollin (2002) where estimates of the labor share are reported for Belgium (0.743), Finland (0.734), France (0.717), Italy (0.717), Norway (0.643), Portugal (0.748), Sweden (0.774), the U.K. (0.782), and the U.S. (0.743).

which may in turn affect tax payments and average tax measures that occurred from the middle to the late 1990's.

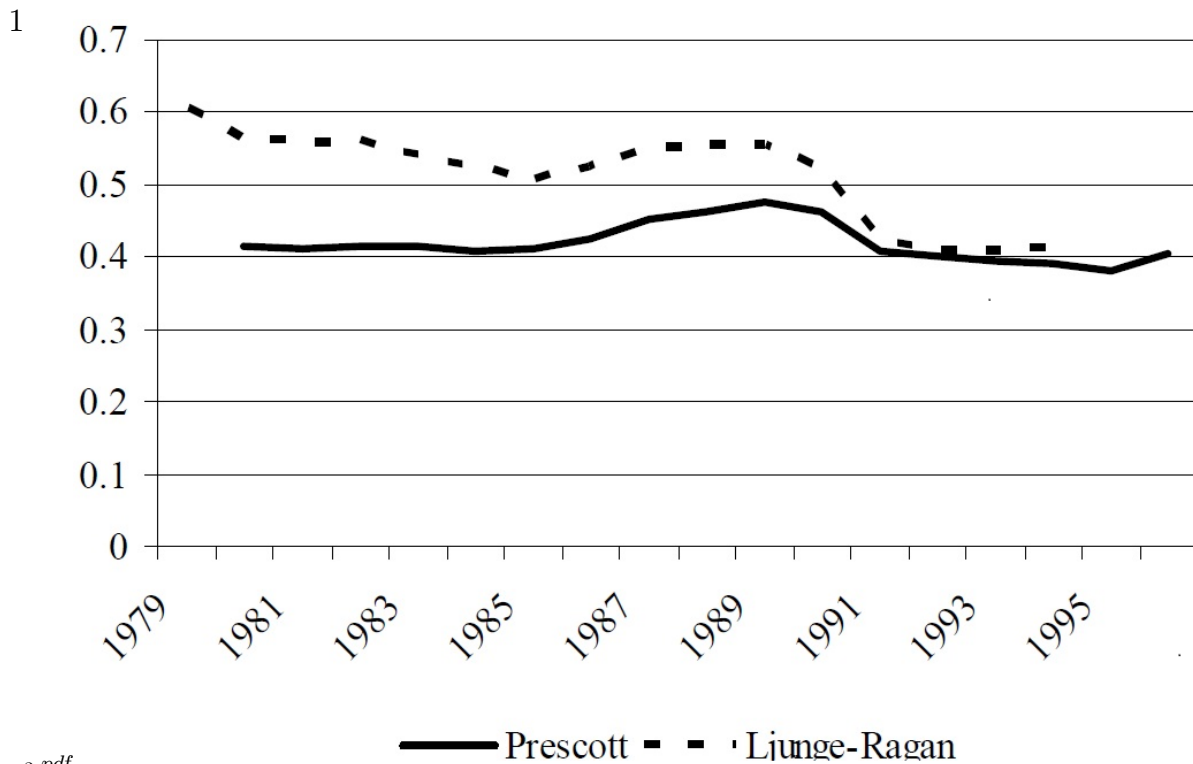
Table 7: Average Tax Rate Measures 1998-2003

	Ragan				McDaniels			
	$\tau_{inc}$	$\tau_{ss}$	$\tau_{cons}$	Wedge	$\tau_{inc}$	$\tau_{ss}$	$\tau_{cons}$	Wedge
U.S.	0.141	0.107	0.112	1.67	0.121	0.107	0.074	1.54
U.K.	0.137	0.089	0.247	1.80	0.143	0.130	0.178	1.84
Portugal	0.079	0.192	0.230	1.81	0.065	0.186	0.188	1.67
Spain	0.101	0.196	0.140	1.77	0.078	0.231	0.157	1.80
Canada	0.179	0.097	0.254	2.04	0.148	0.087	0.182	1.75
Italy	0.164	0.195	0.248	2.30	0.133	0.257	0.225	2.31
France	0.137	0.285	0.245	2.51	0.105	0.318	0.262	2.45
Germany	0.134	0.302	0.234	2.55	0.112	0.310	0.172	2.30
Belgium	0.187	0.231	0.188	2.53	0.156	0.284	0.209	2.59
Norway	0.283	0.196	0.280	3.66	0.132	0.188	0.267	2.11
Finland	0.203	0.210	0.264	2.71	0.163	0.247	0.263	2.57
Sweden	0.250	0.197	0.290	3.20	0.203	0.228	0.354	3.03
Denmark	0.379	0.075	0.362	4.28	0.313	0.043	0.344	2.95
Mean	0.18	0.18	0.24	2.53	0.14	0.20	0.22	2.22
sd	0.08	0.07	0.06	0.79	0.06	0.09	0.08	0.49
Mean (FI,SW,DK)	0.28	0.16	0.31	3.40	0.23	0.17	0.32	2.85
sd (FI,SW,DK)	0.09	0.07	0.05	0.80	0.08	0.11	0.05	0.25

Source: McDaniels (2007) and author's computation based on Prescott (2004) and United Nations (2000).

Both Table 6 and Table 7 report a value of the tax wedge following the formulation in Prescott (2002, 2004) where average income taxes are transformed into marginal tax rates using a common scaling factor. The implicit assumption here, as in Prescott (2002,2004), is that the relationship between average and marginal tax rates is similar across countries to that of the U.S. Following Prescott (2002, 2004) I scale average income tax rates by 1.6 to compute the marginal income tax rate used in the computation of the tax wedge, and the total tax on labor income used in the main paper. If the tax measures chosen are systematically overstating the tax distortions faced by Scandinavian households this could

create the illusion that labor supply in Scandinavian countries is too high, relative to predicted values, when in fact it is the tax measure that is too large. Ljunge and Ragan (2009) use micro data to compute marginal labor income tax rates for a representative sample of the Swedish population. The income weighted marginal tax rate on labor income computed in Ljunge and Ragan is approximately identical to the rate computed using the Prescott measure reported in Table 7. Prescott's marginal income tax measure tracks the actual measure computed by Ljunge and Ragan (2009) very closely during the 1990s suggesting that Prescott's tax measure is not overstating the true income tax burden in Sweden.





### 3 Public Expenditures

In order to quantify public expenditures on fiscal policies directed at the home sector we use data from the O.E.C.D. Social Expenditures database (SOCX) from 1999-2003. SOCX describes public expenditures on social benefits, cash transfers and direct service provision at a detailed level. Public expenditures on in-kind transfers to families and the elderly consist of the following SOCX categories: old age benefits in kind, day care and home help services to families, other in-kind family transfers. These expenditures are used to proxy for public expenditures on services that substitute for home goods. Public expenditures are expressed as a share of consumption net of indirect taxes. Final consumption data comes from the O.E.C.D. National Accounts database (category P31DC) and indirect taxes as a share of consumption are computed following Prescott (2004) using UN SNA data from 1993-1996 and imputed for this later period. The SOCX data is comprehensive for the countries considered here, except for the case of Canada, where data on in-kind public services expenditure on the elderly is missing. Under the assumption that these expenditure are zero, Canadian in kind transfers would account for 0.45 percent of consumption net of indirect taxes from 1999-2003. Assuming in kind expenditures on the old were of similar magnitude, the expenditure share would be 0.9 percent of consumption. Expenditures on in kind transfers to families generally account for the largest share of in-kind benefits, so concluding that total in-kind expenditures do not exceed 0.9 percent in Canada seems reasonable. The results reported are robust to either imputation regarding the magnitude of in-kind expenditures on the old in Canada.

Table 8: Public Expenditure Shares

	In-Kind Benefits		
	Family	Old	Total
Belgium	1.99	0.30	2.30
Canada	0.45	0.45	0.90
Denmark	4.68	5.01	9.69
Finland	3.29	2.13	5.43
France	3.54	0.52	4.06
Germany	1.57	0.45	2.02
Italy	1.24	0.16	1.40
Norway	3.70	6.22	9.92
Portugal	1.00	0.24	1.24
Spain	1.14	0.47	1.61
Sweden	3.84	6.72	10.6
United Kingdom	1.82	0.92	2.74
United States	0.99	0.07	1.06

Note: Canadian elderly benefits are imputed.

## 4 U.S. Private Expenditure

In order to calibrate the model to the U.S. a measure of the home services consumption share is constructed using public and private expenditure data. Public expenditures use the O.E.C.D. SOCX data and the computation described above. Private consumption uses data from the Consumer Expenditures Survey (2003). Home services consumption as a share of private consumption consists of personal services (which includes baby-sitting, day care, adult day care); ten percent of private expenditures on education (tuition; fees; and textbooks, supplies, and equipment for public and private nursery schools); ten percent of private expenditures on medical services such as medical care in a retirement community, and care in convalescent or nursing home; and five percent of expenditures on meals away from home to reflect expenditures on school lunches. Home services account for the majority of private expenditures. The consumption share used to calibrate the model is the sum of the public and private consumption shares.

Private expenditures on restaurant meals and maintenance activities are computed as a share of total consumption expenditures from the CES (2003). Meals away from home, exclusive of the five percent of these expenditures allocated to school lunches, account for the majority of these expenditures and the remainder is made up of other household expenses described in the CES as "housekeeping services, gardening and lawn care services, coin-operated laundry and dry-cleaning (non-clothing), termite and pest control products and services, home security systems service fees, moving, storage, and freight expenses, repair of household appliances and other household equipment, repair of computer systems for home use, computer information services, reupholstering and furniture repair, rental and repair of lawn and gardening tools, and rental of other household equipment." According to the model and the SOCX data on public expenditures, the maintained assumption in the calibration is that there are no public in-kind transfers that take the form of meal and maintenance expenditures. Private expenditures are then equivalent to the entire consumption of such services. Private expenditure shares may overstate consumption shares as they are not adjusted to account for government consumption.

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