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The Austrian Tax Transfer Model ATTM

Version 1.1

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ATTM

Research

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1. Introduction

The Austrian Tax-Transfer Model ATTM is a microsimulation model designed to analyze the effects of fiscal and social policy reforms involving changes in the regulations on income taxes, social security contributions, unemployment benefits, family allowances, childcare benefits, social welfare payments and early retirement regulations. It has been developed by Viktor Steiner and Florian Wakolbinger in 2009. This version of the model is based on the Austrian sample of the European Union Survey on Income and Living Conditions (EU-SILC) for the year 2006. The database includes household and individual data on income and sociodemographic characteristics.

ATTM includes a detailed image of the Austrian tax-transfer system as well as a microeconomic labor supply model. The latter serves as a tool to analyze potential changes in labor supply triggered by fiscal and social policy reforms. This makes it possible to investigate first round effects of policy reforms (distributional and fiscal effects under the assumption that labor supply does not change) as well as second-round effects occurring when households' labor supply changes.

Some examples for questions which ATTM is designed to answer are:

- How does a reduction of marginal tax rates for lower incomes change the distribution of household income in the population and which groups (families, single-parents, employees…) are affected and to which extent?
- By how much can employment be expected to increase as a cause of changes in the regulations of social welfare payments?
- To which extent do tax-reform alternatives finance themselves by spurring labor supply?
- What is the difference between employment and non-employment income for various types of households?

There are several decisive advantages of microsimulation models (MSM) like ATTM. First, MSM incorporate a comprehensive image of the various components of the tax-transfer system including all the interactions among them at the level of individual households. Thus, MSM are, unlike other ways of empirical analysis, capable of investigating the effects of policy changes on net household income taking into account all the potential changes in transfer income a change in a single component, for example, the marginal tax rate, may trigger. Another important advantage of MSM is that changes in labor supply can be estimated taking into account non-convexities of budget constraints induced by the complexities of the tax-benefit system prevalent in modern welfare states. For example, an increase in means-tested social transfers may affect net household income quite differently depending on eligibility rules, the presence of children in the household and the source of other income, and thus lead to

heterogeneous response in household labor supply. Last not least, since behavioral MSM allow differentiating between behavioral response and the change of the household's budget constraint induced by some policy, ex-ante evaluations of fiscal and social policies become possible. This is an important advantage of MSM over ex-post evaluation methods which are not useful for the evaluation of policies which have not been implemented yet, or have been implemented only very recently or in a substantially different form than the one under consideration.

ATTM is programmed in the statistical software package STATA and designed in a flexible way which enables the researcher to quickly analyze a wide variety of fiscal policy alternatives that involve changing the parameters of the tax- and transfer system. More fundamental reform alternatives (i.e. replacing an individual-based taxation by household taxation) requires changing the program code and will thus require more time, though.

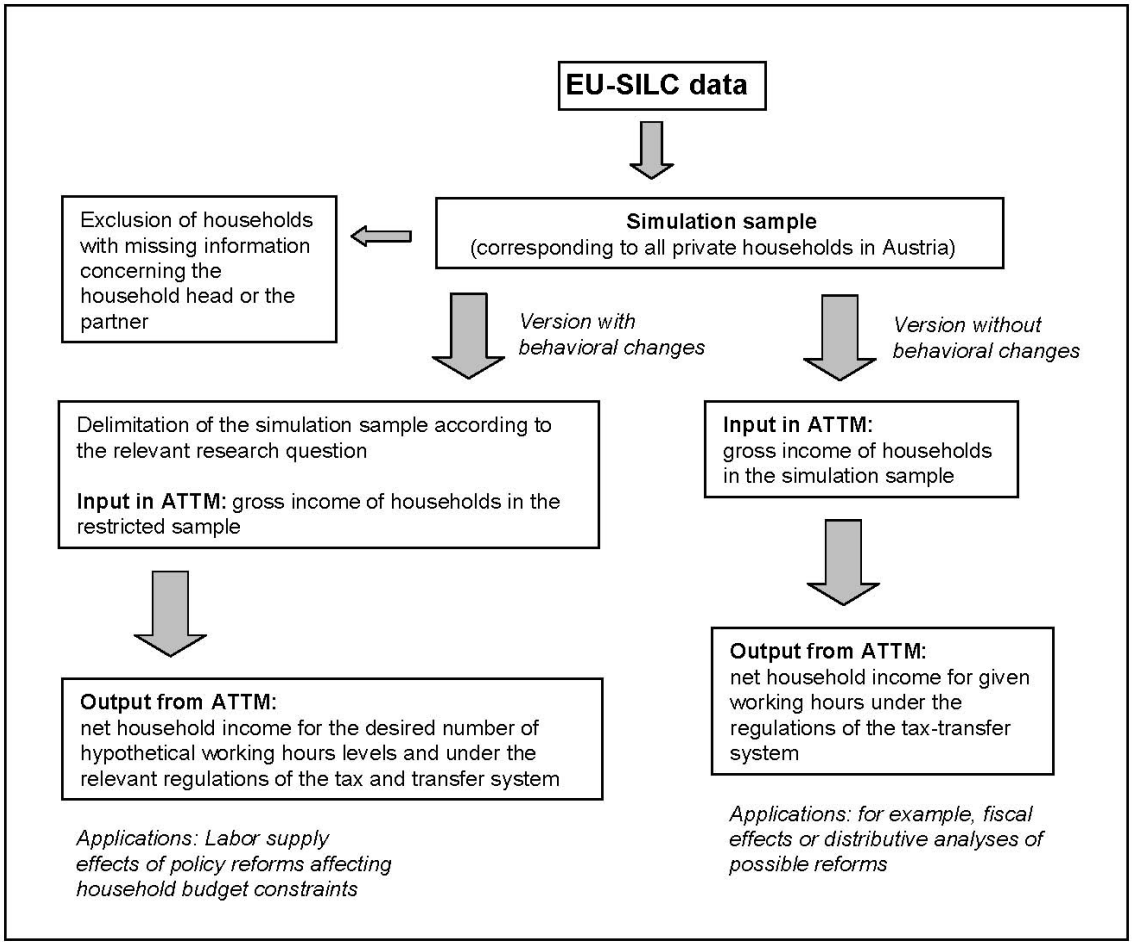
Section 2 of this documentation describes the scope and possibilities of ATTM. Section 3 documents the data ATTM is based on, while Section 4 describes the microeconometric household labor supply model. Section 5 describes the relevant components of the Austrian tax-transfer system and how they are implemented in ATTM.

2. The scope of ATTM

Tax-Benefit Microsimulation Models (MSM) are tools to analyze actually implemented or potential reform alternatives of the tax-transfer system. The decisive advantage of microsimulation models in this context is that, by comprehensively describing the tax-transfer system, they allow investigating the income as well as distributional effects of fiscal- and social policy reforms. Moreover, by employing household survey data which include a variety of sociodemographic characteristics as well as employment history and gross income, it is possible to estimate potential shifts in household labor supply, which might occur because fiscal policy reforms might change net hourly wages or income when being not employed. Other margins of behavioral response, which are currently not implemented in ATTM, relate to household consumption and savings decisions, retirement behavior and the take-up of social transfers.

Thus, ATTM is capable of analyzing fiscal and social policy reforms under the assumption that labor supply remains constant, it allows for investigating the effects of exogenous labor supply changes, and, by making use of a microeconometric labor supply model, it can be used to analyze both first order (income) as well as second order effects (induced labor supply shifts) of such reforms. Figure 1 presents the two simulation versions that are possible in the current version of ATTM, and which are described in more detail in the following sections.

Figure 1: Simulation versions and potential applications of ATTM



Source: Official statistic refers to Statistik Austria 1) (2008a), 2) (2009), 3) (2008b)

2.1. Simulations under constant labor supply

ATTM can be used to simulate how a person's or household's tax burden and benefit claims would change under the assumption that her labor supply does not change. The resulting shift in household income can be interpreted as the short-run effect of a fiscal policy reform alternative. Projecting the individual effects to the whole population using sampling weights allows determining the aggregate costs of the analyzed reform alternatives, how income for various different groups of households would change, and it allows checking whether and to what extent the microsimulation results match reality. This can be done by comparing incomes, taxes and transfers simulated by ATTM under status quo conditions to official statistics. The data base for the current version of ATTM is the Austrian sample of the European Union Survey on Income and Living Conditions (EU-SILC) for 2006 which is described in Section 3. The income data in EU-SILC 2006 refer to the year 2005.

Table 1: Income, taxes and benefits in ATTM/SILC and official statistics using 2005 data

		ATTM/SILC (bn. €)	Official statistic (bn. €)
Wage income (dependent employment, pensions) [1)]	re-aligned	110.83	111.71
	original	106.73	
Other income (agriculture, self-employment, renting and leasing) [1)]	re-aligned	10.81	10.53
	original	9.66	
Income tax[1)]	re-aligned	20.60	20.69
	original	19.14	
Social Security Contributions (employees, employers, self-employed) [2)]	re-aligned	35.51	35.61
	original	34.69	
Family supplement (Familienbeihilfe) [3)]	re-aligned	2.95	2.94
	original	2.82	
Unemployment benefits (Arbeitslosengeld, Notstandshilfe) [1)]	re-aligned	1.27	1.53
	original	1.26	

Source: Official statistic refers to Statistik Austria 1) (2008a), 2) (2009), 3) (2008b)

Table 1 shows that the total income originally reported in EU-SILC for 2005 is lower than the income in the official wage and income tax statistic (Statistik Austria, 2008a, for an additional comparison see also Statistik Austria, 2008c). Consequently, income tax revenues and social security contributions simulated by ATTM are somewhat lower than the amounts reported in the official statistics. To account for this deviation we have adjusted the weights of the survey data such that the distribution of individual incomes in the survey converges to the distribution of incomes in the official statistics.[1]

After this re-alignment ATTM simulations only slightly (by 0.43%) underestimate the wage and income tax revenues for 2005. This small difference can be explained by the lack of accurate data on commuting distances and membership in churches, which allow for tax exemptions. The best fit is achieved for the aggregate social security contribution, where the difference between the simulation and the official statistic is only 0.28%. Thus, eliminating the discrepancies between the database of ATTM and the official data by adjusting the survey weights makes possible producing very accurate calculations on income shifts as well as the costs of fiscal and policy reforms.

2.2. Simulations under exogenous variation in labor supply

Another useful application of ATTM is the analysis of hypothetical changes in the labor supply of one or more household members and its implications on household income. For instance, ATTM can determine the changes of household income if one

[1] We use the software package „Adjust for Windows 1.1“ (Merz et al., 2004) to align the survey weights. The adjustment procedure is described in Appendix 7.1.

spouse stops working because of taking care of a newborn child, or if both partners reduce their labor supply from 40 to 25 hours a week. A key assumption in this context is that gross hourly wages do not change with shifts in the number of hours worked.

Such analyses can be performed for the households actually observed in the database as well as for "representative" households. ATTM contains a module to construct and graphically depict hypothetical budget constraints of representative households. Household types can be differentiated by marital status (single or a couple household), gender of the household head, his or her labor force status, and the number and age group of children living in the household. Households with at least one earner can also be differentiated by the level of the hourly wage of the household's main earner. By making use of the wage regressions described in Section 4, it is also possible to use predicted wages, i.e. for currently non-employed people for whom wages are not observed.

The module also allows performing these calculations by the federal state of residence of the household. This is of special importance for assessing the impact of certain social transfers, such as child or housing benefits whose level and eligibility criteria differ between the nine Austrian federal states. ATTM can be used to compare budget constraints of model households for all nine states simultaneously.

2.3. Simulations with labor supply adjustment

Other than the already mentioned wage estimation, ATTM does also include a structural labor supply model which makes possible estimating the labor supply shifts a fiscal or social policy reform might induce (see Section 4.2). Such shifts could result from, say, higher net hourly wages which make additional working hours more profitable, or higher family supplements which could allow parents to work less hours.

This type of analysis is performed for people whose labor supply can reasonably be assumed to be "flexible" with respect to the fiscal policy system's parameters. Thus, people being in fulltime-education, on maternity leave, already retired or severely disabled are excluded, since their labor supply is considered as being fixed and invariant towards policy changes. Moreover, entrepreneurs and civil servants are excluded from the analysis, since their employment behavior might also be independent from fiscal policy changes. One could, of course, question the latter view and quite easily include those people into the analysis.

The inclusion of labor supply effects in the analysis makes it possible to estimate potential self-financing effects of policy reforms. If, say, a reduction in the marginal tax rates induces people to work longer hours, the loss in tax revenue will at least partially be compensated by a higher tax base resulting from higher employment. By the same token, it is also possible to determine how and to what extent a fiscal or social policy reform will boost or reduce employment of various groups of society, and how many jobs are likely to be created in the longer run.

3. The data base EU-SILC

The analysis of income and above all, labor supply and distributional effects of fiscal policy reforms requires detailed and comprehensive household data that is representative for the Austrian population. The Austrian sample of the European Union Survey on Income and Living Conditions (EU-SILC) is the most appropriate data base for a behavioral tax-benefit microsimulation model for Austria. It provides a fairly detailed account of individual and household incomes and contains all the relevant information for the estimation of wage and labor supply models embedded in the ATTM.[2]

The 2006 wave of EU-SILC, which is the basis of this version of ATTM, contains a survey of 14,883 persons living in 6,028 households. The sample consists of 12010 persons above an age of 15 and 2,873 children below the age of 16. EU-SILC surveys the living conditions at the time of the interview, but retrospectively collects income and employment data such that the 2006 wave contains income and types of employment out of the year 2005. The following table shows some descriptive statistics on sociodemographic and income data from the EU-SILC 2006 survey. By using the sample weights in SILC, it is possible to calculate grossed up population statistics[3].

Wages are the primary source of income in Austria. More than 3.5 million out of a population in employable age of some 5.6 million people received wages from dependent employment. Slightly more than 20 Percent of the Austrian population receives some form of pension income, making pensions the second most important

[2] The microsimulation study by Dearing et al. (2007) is based on the first wave (2003) of the Austrian sample of EU-SILC. The Austrian sub-model of the EUROMOD (see Sutherland, 2001), which is a non-behavioral microsimulation model for a number of EU countries, is based on the European Community Household Panel (ECHP). This data base was terminated and is now superseded by EU-SILC. There are two other data sources which could potentially be used for building a MSM for Austria. First, the Wage and Income Tax Statistics (Lohn- und Einkommensteuer) by the Federal Statistical Office (Statistik Austria) provide information on personal income, the amount of wage or income tax assessed, and on variables relevant for tax purposes, such as the source of income and certain tax expenditures. Since there is individual taxation and child transfers are not integrated in the Austria tax code, these data do not provide information related to the household composition, such as marital status and the number of children. This severely restricts the simulation of transfer incomes at the individual and household level. Since information on socio demographic individual characteristics, like education or labor market experience, is also not available in the tax statistics, the estimation of labor supply reactions would not be possible. Another disadvantage of these data is that only wage income is timely available, whereas the integrated statistics of wages and income have a lag of three to four years (Statistik Austria, 2008a) and seem currently not to be available for academic research. A non-behavioral MSM using a 1%-sample of the Austrian Wage Tax statistics has recently been constructed by Berka et al. (2009). Another potential data source is the Consumption and Income Survey (Statistik Austria, 2005). The main shortcoming of the 2004/05 survey is that only total net household income is recorded, while simulation analysis requires gross income by type of income, like wage income, pensions or income from self-employment. Other disadvantages of this data sources are that employment is only coded in three categories (non-employed, part-time, and full-time employed) and that it is available only every five years. There is a somewhat outdated non-behavioral MSM named ITABENA, (Hofer et al. 2003) based on the Consumption and Income Survey 1999/2000 which has more detailed information in income components but otherwise suffers from the same shortcomings as the recent survey.

[3] For a more extensive documentation see Statistik Austria (2008c).

income source. Next to quite generous pensions for retirement with a low effective retirement age and high replacement rates especially for high-income earners (OECD, 2007), the Austrian social security system features pensions for widows and widowers, orphans and victims of severe accidents.

Income from self-employment including income from agriculture is on average lower than wage income. Only about six percent of the Austrian population received income from this source. EU-SILC does also include income from renting and leasing, which 1.4 percent receive. Not mentioned in the table is capital income, since EU-SILC does only feature net income from dividends and interest. This is due to the fact that personal capital income is not recorded since it is not included in the personal tax base[4], but taxed differently with a flat rate of 25%. A comparison of capital income in EU-SILC with household financial assets surveyed by the Austrian National Bank (Beer et al., 2006) shows that capital income is very much under-recorded in EU-SILC[5].

Some 600,000 persons in Austria receive unemployment benefits or social assistance: The latter is paid if unemployment benefits or other sources of income are not available or lower than some standard rates differing according to the household size. All parents having children below the age of 18 or below the age of 26 in case the children are disabled or in education are eligible for family allowances. Their amount differs according to the age of and the number of the children in a household. More than 30 percent of all Austrian households receive family allowances since they do not depend on income, i.e. are not means tested.

While apart from the fact that EU-SILC covers the population living in households and does not include people living abroad or in institutions like asylums and old age homes, the survey represents the Austrian population very well with respect to its sociodemographic distribution. However, we already mentioned earlier that the household income in EU-SILC is on average somewhat lower than the income documented in the official wage statistics (Statistik Austria, 2008c).

[4] It is, however, possible to voluntarily include capital income in the tax-base, which is profitable in case of a marginal tax rate of less than 25%.

[5] While according to Beer et al., 2006, average household financial assets are € 54,666, which yield gross capital income of € 2733 if an interest rate of 5% is assumed, average gross household capital income in EU-SILC was only € 311.

Table 2: Descriptive Statistics on Households and Income in EU-SILC 2006 survey data

		mean	s.d.	n
Number of Persons	sample	–	–	14,883
	grossed up	–	–	8,182,229
Number of households	sample	–	–	6,028
	grossed up	–	–	3,508,430
Household Size	Sample	2.46	1.37	–
	grossed up	2.33	1.35	–
Age (years)	Sample	39.28	22.28	–
	grossed up	39.72	22.04	–
Gross-income from dependent employment (Euro)	sample	24,911.16	18,932.29	6,254
	grossed up	24,478.41	18,651.02	3,590,363
Gross-income from self-employment including agriculture (Euro)	sample	20,046.52	21,117.05	1,047
	grossed up	19,702.95	21,287.25	570,048
Gross-income from renting and leasing (Euro)	sample	9,918.49	19,470.75	217
	grossed up	9,695.15	18,992.20	118,349
Gross pension income (Euro)	sample	18,730.69	12,528.32	3,045
	grossed up	18,816.36	12,662.01	1,657,060
Unemployment and social benefits (Euro)	sample	4,552.79	4,372.25	724
	grossed up	4,587.94	4,016.74	636,836
Family allowance (Euro)	sample	4,298.40	2,440.70	8,131
	grossed up	4,158.02	2,466.34	1,080,723

Source: Statistic Austria (2006), own calculations

The Table below shows that the difference between the percentiles of the distribution of wage income in the official statistics and in EU-SILC is positive for p60 and higher as well as the arithmetic mean, but negative for the median and lower percentiles. Thus, compared to the official wage statistic, lower incomes are overestimated and higher incomes underestimated by EU-SILC, resulting in a lower average income in EU-SILC compared to the official statistic. Due to incoherencies in definitions of taxable pensions and self-employment income there is no such statistic for those sources of income. However, as the total revenues for self-employment income in Table 1 suggest, the relative differences between the tax statistics and EU-SILC tend for self-employment income to be at least as large as for wage income.

Thus, in order to obtain grossed up taxes and transfers that match official statistics, we adjust incomes recorded in EU-SILC by a re-weighting procedure (see Appendix 7.1) so that they represent the marginal distributions observed in the tax statistic. In Table 3 the columns with the percentiles of the re-aligned data show that the differences between survey and official data can be considerably reduced, if some differences at various deciles of the income distribution remain. Thus, aggregate statistics like wage- and income tax revenues, aggregate social security contributions or family supplements can be accurately simulated by ATTM.

Table 3: Comparison of wage income in official wage tax statistics and EU-SILC 2005 by percentiles of the wage distribution (Euro)

	wage tax statistics			EU-SILC 2006					
	total	women	men	total		women		men	
				original	re-aligned	original	re-aligned	original	re-aligned
p10	2,567	1,921	3,778	4,800	4,060	3,758	3,125	7,634	6,268
p20	7,620	5,086	12,050	10,200	10,152	7,118	6,907	15,167	14,898
p30	13,093	9,350	19,470	14,700	14,803	10,500	10,500	19,600	20,300
p40	17,931	12,961	23,800	18,302	18,648	14,000	14,000	23,100	23,883
p50	22,320	16,296	27,375	22,120	22,558	16,802	17,082	26,400	27,368
p60	26,394	19,911	31,205	25,200	26,600	19,600	20,100	29,400	30,800
p70	30,937	23,951	36,180	29,322	30,800	22,800	23,800	33,960	35,370
p80	37,441	29,285	43,729	35,000	36,500	27,403	28,000	40,500	43,000
p90	49,476	38,299	57,914	44,800	49,033	35,309	36,449	50,400	56,748
mean	25,704	19,005	31,426	24,478	26,596	18,815	19,596	29,118	31,966
n	3,644,382	1,678,882	1,965,500	3,590,363	3,555,142	1,616,939	1,543,367	1,973,424	2,011,775

Source: Statistik Austria (2008c)

4. Estimation of wage and labor supply models

To analyze behavioral response of households to changes in fiscal and social policies, estimates of wages of individuals currently not employed and labor supply elasticities are required. Behavioral effects may occur because policy reforms could, at given gross hourly wages, increase or decrease net wages or, by changing the system of social transfers, increase or decrease the income for persons not being employed. Through these channels, the incentives to supply labor are likely to be altered. The procedure of investigating those incentives and their results involves two steps. First, since hourly wages of currently non-employed people cannot be observed, they are estimated from a wage regression. Secondly, a structural labor supply model is estimated which determines the labor supply of households as a function of net household income, leisure of the household head and, in case of a couple household, of her or his spouse, and other characteristics affecting a household's utility of leisure, such as the age of the spouses and the presence of children. These two steps are linked by the calculation of net household income, of which individual labor income is only one important component, taking into account the complex interactions of the Austrian tax-benefit system at the level of private households.

4.1. The wage regression

Estimation of hourly wages of currently non-employed people is based on the two-step Heckman (1979) procedure which accounts for potential selection bias with respect

to the individual's employment decision. In ATTM, this procedure is performed separately for women and men. In the first step, the probability of being employed is estimated by a binary probit model with marital status, the number and age of children a dummy indicating whether a person has ever been employed as well as household income included as explanatory variables in addition to the variables also included in the wage regression. The variables excluded from the wage regression are jointly highly significant in the employment probits. Hence, these exclusion restrictions seem sufficient for identification purposes without reliance on functional form assumptions.

Given the parameter estimates from the employment probits we can calculate the selection-correction term[6] for each person in our sample which, in the second step, is included in the wage regression estimated on the sub-sample of currently employed people. The other explanatory variables in the wage equation include age and age squared, dummies for educational attainment and vocational training, and variables describing an individual's previous labor market history. In addition, we also include dummy variables for region, industry and firm size. The variables on industry and firm size are orthogonalized, i.e. they are defined in such a way that setting all dummies referring to a particular variable, such as industry, equal to zero yields the mean effect of the respective variable on the wage.

This two-step procedure yields consistent estimates of the parameters of the wage equation. From these estimates we obtain consistent wage predictions for both the sample of currently employed people and, by adjusting the sample-selection term accordingly, the sub-sample of currently non-working people. The industry and firm size dummies, for which we do not observe values for the non-employed, are all set to zero, which yields the average industry or firm-size effect on the wage.

Using EU-SILC 2006 data yields wage-predictions documented in the following Table. Note that we predict gross hourly wages including both regular as well as extra payments. Those extra payments play a quite important role in Austria since they account in most cases for one sixth of the regular monthly payments and are paid typically as two additional monthly wages in summer (holiday allowance) and December (Christmas allowance). Detailed estimation results including all explanatory variables used and their parameter estimates are relegated to the Appendix.

The table shows that the estimated mean wages of currently employed people are much higher than those of currently non-employed people. In relative terms, this wage differential amounts to about 30% and is of similar magnitude for both men and women. Since the selection effect in the wage equations is fairly small, and statistically not significantly different from zero (see Table A1 in the Appendix), this wage differential is mainly related to differences in the means of the explanatory variables in the two

[6] This selection-correction term is also called the Inverse Mills Ratio in the literature: It is defined as the ratio of the standard normal density function and the cumulative normal distribution function, both evaluated at $Z'\hat{\gamma}$. where Z is the vector of explanatory variables in the employment probit and $\hat{\gamma}$ is the corresponding vector of estimated coefficients form the first-stage.

groups, especially regarding the level of education and vocational training, and labor market experience.

Table 4: Predictions of gross hourly wages using EU-SILC data

	Women		Men	
	currently employed	currently not employed	currently employed	currently not employed
mean [s.d.]	13.32 [6.60]	10.90 [5.40]	17.11 [8.59]	14.51 [8.18]
p10	7.47	6.05	9.89	7.61
p25	9.30	7.58	12.18	9.42
p50	11.80	9.86	15.22	12.99
p75	15.68	12.80	19.79	17.56
p90	20.76	16.91	26.64	23.69

Source: ATTM and SILC (2006)

Mean imputation of wages for currently non-employed people leads to a rather small variance of this group's wage distribution. To adjust this variance we add to each observation in the sub-sample a residual drawn randomly from the residual wage distribution estimated from the sub-sample of currently employed people. After this adjustment, the variance of the distribution of imputed wages is very similar to the empirical variance of the observed wages on currently employed people.

4.2. The household labor supply model

ATTM uses a static structural discrete-choice labor supply model as suggested by van Soest (1995) and applied by Steiner et al. (2008), among others. A great advantage of discrete-choice models is that non-linearities in household budget constraints can be modeled much easier than using more traditional specifications of continuous labor supply models. Another important advantage is that they allow, in combination with a MSM, to account for the endogeneity of net household income in a consistent way.

The discrete-choice model implemented in ATTM assumes that the observed households can choose between *J* working hour categories. One of these categories typically represents unemployment, i.e. zero working hours. The ranges of those categories can be flexibly determined in the ATTM parameter file. The choice of hours-categories is motivated by both economic considerations as well as the distribution of working hours in the data. In this context, ATTM faces, as other microsimulation-models (see i.e. Steiner et al., 2008) the problem that for some ranges of working hours there are too few observations in the dataset, which makes fine-tuning of categories problematic and restricts *J* to a small number. This is typically the case for men who most probably work close to 40 hours a week or work overtime, or work not at all, while

only a few have part-time jobs. This restricts the number of male hour-categories to three or four.[7]

For estimating the labor supply elasticities presented in the following, we chose to specify six working hours categories for women (0, 1-12, 13-20, 21-34, 35-40 and more than 40 hours) and only four for men (0, 1-20, 21-40 and more than 40 hours). The following Tables document the distribution of persons with flexible labor supply with respect to the different hour-categories in EU-SILC. Since ATTM separately estimates labor supply effects for partner-households where both partners have flexible labor supply, partner-households where only one of the partners is flexible, and flexible singles of either gender, we document for the distribution separately for each of these groups.

Table 5: Distribution of observed working hours for partner-households where both are flexible

			Men				
	Weekly hours*		**0 (–)**	**1-20 (14.2)**	**21-40 (38.6)**	**> 40 (47.9)**	**Sum**
Women	**0**	**(–)**	32 (1.9)**	4 (0.2)	322 (18.9)	167 (9.8)	525 (30.8)
	1 – 12	**(8.5)**	10 (0.6)	15 (0.9)	453 (26.6)	209 (12.3)	687 (40.3)
	13 – 20	**(18.4)**	10 (0.6)	15 (0.9)	453 (26.6)	209 (12.3)	687 (40.3)
	21 – 34	**(27.3)**	10 (0.6)	15 (0.9)	453 (26.6)	209 (12.3)	687 (40.3)
	35 – 40	**(38.9)**	15 (0.9)	12 (0.7)	312 (18.3)	152 (8.9)	491 (28.8)
	> 40	**(47.1)**	15 (0.9)	12 (0.7)	312 (18.3)	152 (8.9)	491 (28.8)
	Sum		57 (3.3)	31 (1.8)	1087 (63.8)	528 (31)	1703 (100)

* Average weekly working hours (per category) in parentheses,
** Percentage share in parentheses

Source: ATTM and SILC (2006)

[7] If students and pensioners were included in the analysis part-time working patterns would be more diverse and additional hour-categories could be introduced. In general, we do not include these groups in the household labor supply model, however, since their working behavior is structurally different from people of working-age. Technically, the structure of the discrete-choice model (conditional logit) does allow for the inclusion of categories with only a few observations. However, in general we refrain from this possibility to avoid out-of-sample prediction of estimation results, although the ATTM parameter file allows for changing the definitions of working hour categories to up to ten categories for each gender.

Table 6: Distribution of observed working hours for partner-households where only the female partner is flexible, and flexible female singles

	Inflexible spouse		Singles	
Hour category	**av. hours***	**n****	**av. hours***	**n****
0	(–)	299 (38.4)	(–)	111 (11.4)
1 – 12	(8.8)	45 (5.8)	(7.9)	32 (3.3)
13 – 20	(18.6)	89 (11.4)	(18.7)	66 (6.8)
21 – 34	(27.2)	115 (14.8)	(27.5)	160 (16.4)
35 – 40	(38.9)	166 (21.3)	(39.1)	447 (45.8)
> 40	(49.3)	64 (8.2)	(47.2)	160 (16.4)
Sum		778 (100)		976 (100)

* Average weekly working hours (per category) in parentheses,
** Percentage share in parentheses

Source: ATTM and SILC (2006)

Table 7: Distribution of observed working hours for partner-households where only the male partner is flexible, and flexible male singles

	Inflexible spouse		Singles	
Hour category	**av. hours***	**n****	**av. hours***	**n****
0	(–)	14 (6.2)	(–)	60 (6.3)
1 – 20	(16.6)	12 (5.3)	(14.8)	35 (3.7)
21 – 40	(37.9)	131 (58.2)	(38)	639 (67.3)
> 40	(50.4)	68 (30.2)	(48.34)	216 (22.7)
Sum		225 (100)		950 (100)

* Average weekly working hours (per category) in parentheses,
** Percentage share in parentheses

Source: ATTM and SILC (2006)

Under the assumption of constant gross hourly wages across labor supply categories, there is a corresponding level of disposable income for each household *i* choosing hour category *j*. Since the current version of the model does not model the household's savings decision, disposable income corresponds to the household's consumption level, C_{ij}. This allows formulating a household utility function

$$V_{ij} = U(Lf_{ij}, Lm_{ij}, C_{ij}, Z_i) + \varepsilon_i$$

which assigns for each possible choice *j* of hour-categories a utility level *V* depending on the leisure of the female and male partner in household i, Lf_{ij} and Lm_{ij}, their disposable income or consumption C_{ij}, some household characteristics Z_i and an error term ε_i.

If the error terms ε_i are assumed to be independently and identically distributed across hour categories and households according to the Extreme-Value type I (EVI) distribution, the probability that alternative *k* is chosen by household *i* is given by a conditional logit model following McFadden (1974).

$$P_{ik} = \Pr(V_{ik} > V_{ij}, \forall j = 1...J) = \frac{\exp(U_{ik})}{\sum_{j=1}^{J} \exp(U_{ik})}, k \in J .$$

The decision rule is simple: Alternative *k* is chosen if the net income and the level of leisure under this alternative yield a utility index which is greater than that for any other alternative. This specification implies that individuals and households are not restricted in their choice of hours. In particular, there is no "involuntary" unemployment in the current specification of the labor supply model.[8]

Another limitation of the labor supply model is that the conditional logit specification implies the independence-of-irrelevant-alternatives (IIA) assumption. This assumption implies that the relative probabilities (odds-ratios) of two alternatives do not depend on the presence of the other alternatives in the model, or in fact any other alternative. This assumption is especially problematic if some of the alternatives considered are very similar. On the other hand, if the IIA is valid the conditional logit model can also be used to simulate the effect of some policy change on some alternative which currently does not exist, e.g. a special type of subsidized part-time employment.[9]

In order to estimate the parameters of the utility function *U*, one maximizes the likelihood for the observed choices, which is derived from the expression above. ATTM allows for a quadratic as well as a translog-specification of the utility function. Both specifications are local second-order approximations of a general utility function which does not restrict substitution between leisure and consumption to be independent of the utility level or income. In fact, elasticities may vary freely across households, depending on the level of income, the level of leisure or working hours of the two spouses, and household composition.

In case of a quadratic specification of the utility function, the systematic part of a partner-household's utility function is given by

[8] The model can be extended to allow for "involuntary" unemployment in the sense that there is some positive probability that people who chose to participate in the labor market do not get a job offer at the current market wage (see, e.g., Steiner et al. 2008, Section 2.3.3.2).

[9] The IIA does not hold in the presence of unobserved household characteristics which vary across alternatives. These effects can be accommodated by a random-effects specification of the conditional logit model. Estimated labor supply elasticities derived from a random-effects model (mixed conditional logit) do not differ significantly from those derived from the standard conditional logit model, which we present in Tables 8 and 9. Steiner et al. (2008, pp. 9f.) do the same using German data and find no significant differences either.

$$U_{ij} = \beta_1 C_{ij} + \beta_2 C_{ij}^2 + \beta_3 Lf_{ij} + \beta_4 Lm_{ij} + \beta_5 Lf_{ij}^2 + \beta_6 Lm_{ij}^2 + \beta_7 C_{ij} Lf_{ij} + \beta_8 C_{ij} Lm_{ij} + \beta_9 Lf_{ij} Lm_{ij}$$

Of course, we would expect the marginal utility to be positive with respect to income and leisure of both spouses, and decreasing in the level of income and leisure consumed. Theory does not, however, imply restrictions on the sign of the marginal utility of one spouse's leisure to changes in the level of the other spouse's leisure.

The utility function for a single household is a special case of the above equation, with β_9, and, depending on whether the household head is female or male, the respective coefficients on male and female leisure being restricted to zero. The above specification allows for varying household preferences by employing "taste shifters" which affect the coefficients of the linear income and leisure terms, i.e.:

$$\beta_1 = \alpha_0^C + X_1' \alpha_1^C$$
$$\beta_3 = \alpha_0^{Lf} + X_2' \alpha_1^{Lf}$$
$$\beta_4 = \alpha_0^{Lm} + X_3' \alpha_1^{Lm}$$

X_1, X_2 and X_3 are column vectors including sociodemographic characteristics like age, number and age of children, disability indicators and whether the observed person is Austrian citizen, and the α's are vectors of coefficients which are jointly estimated with the β's from the utility function above.

ATTM estimates, as already noted, this labor supply model separately for couple households where both spouses are flexible in labor supply, for partner-households where either only the female or the male partner is flexible, and for singles of either gender. To illustrate the procedure and results, the regression results for partner-households are presented in the Appendix. Due to the quite large number of interaction terms, coefficient estimates are hardly interpretable. Thus, estimation results are usually interpreted in terms of labor supply elasticities, as described in the tables below.

To obtain the expected elasticities, we calculate the expected value of weekly working hours, given the observed working hours in each hour-category and the estimated probability that the household is in this category. Note that since we employ six hour-categories for women and four for men, there are in total 24 hour-categories a household could choose from. We do this calculation once with the observed or estimated (for currently non-employed people) wages and once under the assumption that gross wages for either females or males increase by one percent. Then, assuming that the estimated parameters of the structural labor supply model are invariant to changes in the wage (or, more generally, the tax-benefit system), we can derive labor supply elasticities at the extensive (labor force participation) and intensive margin (hours adjustment). These elasticities can be computed using the so-called probability

technique[10] by simply taking the absolute difference employment probabilities and the relative difference in the expected value of weekly working hours, respectively. The results of these calculations for various types of households are given in the tables below. To get the labor supply effects of fiscal policy reforms, we would simply replace the simulation of a one-percent-increase in gross wages by a simulation with the same gross wages as under the status quo but with a change in the tax-benefit system, where this change would be translated into changes in households' budget constraints using the tax-transfer calculator.

Table 8: Estimated labor supply elasticities for flexible couples

	Couples, both spouses flexible			
	changes in participation rates (in percentage points)			
	with respect to own wage		**with respect to spouse's wage**	
	Women	**Men**	**Women**	**Men**
mean [s.d.]	0.099 [0.219]	0.044 [0.039]	-0.014 [0.098]	0.008 [0.036]
p10	0.047	0.017	-0.071	-0.003
p20	0.075	0.023	-0.039	-0.001
p50	0.113	0.037	-0.012	0.005
p80	0.146	0.058	0.016	0.012
p90	0.169	0.079	0.036	0.019
	Couples, both spouses flexible			
	changes in hours worked (in percent)			
	with respect to own wage		**with respect to spouse's wage**	
	Women	**Men**	**Women**	**Men**
mean [s.d.]	0.258 [0.778]	0.126 [0.096]	-0.069 [0.507]	0.007 [0.096]
p10	0.127	0.062	-0.216	-0.017
p20	0.176	0.077	-0.124	-0.01
p50	0.266	0.111	-0.053	-0.001
p80	0.369	0.169	0.022	0.015
p90	0.455	0.213	0.074	0.028

Source: ATTM and SILC (2006)

Tables 8 and 9 document average changes in participation rates and working hours to a one-percent in gross wages, where we differentiate between a change in the own wage and – in case of couple households – the wage of the spouse[11]. Own-wage elasticities for married women are, on average, substantially larger than for men, both at the extensive and the intensive labor supply margin. We obtain the largest elasticities

[10] An alternative method would be the so-called „calibration"-technique, see Steiner et al. (2008, p. 10) for a description.

[11] The estimated elasticities differ surprisingly little and not significantly between women with and without children.

for women with an „inflexible“ spouse, for whom the average hours elasticity is 0.35 and the change in labor force participation to a 10% change in the own wage is about 1 percentage point.[12] For couples with both partners' labor supply assumed to be flexible, we calculate both the elasticities with respect to the own wage as well as the elasticities with respect to the partner's wage. As can be seen from the table, the latter are substantially lower than the former and close to zero for both women and men.[13]

Table 9: Estimated labor supply elasticities for couples with only one flexible spouse and singles

	changes in participation rates (in percentage points)			
	Inflexible Spouse		**Single**	
	Women	**Men**	**Women**	**Men**
mean [sd]	0.104 [0.426]	0.013 [0.059]	0.063 [0.105]	0.049 [0.027]
p10	0.054	0.005	0.034	0.027
p20	0.082	0.007	0.046	0.032
p50	0.136	0.013	0.065	0.045
p80	0.182	0.027	0.091	0.059
p90	0.216	0.043	0.107	0.075
	changes in hours worked (in percent)			
	Inflexible Spouse		**Single**	
	Women	**Men**	**Women**	**Men**
mean [sd]	0.345 [1.043]	0.040 [0.197]	0.194 [0.456]	0.101 [0.065]
p10	0.157	0.017	0.1	0.053
p20	0.239	0.026	0.124	0.063
p50	0.389	0.044	0.183	0.082
p80	0.517	0.089	0.26	0.127
p90	0.589	0.121	0.323	0.175

Source: ATTM and SILC (2006)

[12] Given this group's average labor force participation rate is 55%, this percentage change translates into a participation elasticity of 0.36%.

[13] Estimated own-wage participation elasticities for married women are similar to those reported by Steiner et al. (2008, Table 2) for Germany, whereas the point estimate of the highest hours elasticity, also obtained for women with an inflexible spouse, is somewhat smaller (0.37). Estimated participation and hours elasticities for German men are surprisingly large compared to our estimates for Austria. Average cross-wage elasticities are estimated to be close to zero for all groups in Germany.

5. The Austrian tax-transfer system in ATTM

ATTM basically features two types of contributions, one being the social security contributions ("Sozialversicherungsbeiträge") levied on income from employment, the other being the personal income tax ("Lohn- and Einkommensteuer") levied on personal income from employment and other sources. The transfers included in the microsimulation model are unemployment benefits ("Arbeitslosengeld" and "Notstandshilfe"), family allowances ("Familienbeihilfe"), childcare benefits ("Kinderbetreuungsgeld"), social welfare payments ("Sozialhilfe") and supplements to low pensions ("Ausgleichszulage"). Moreover, ATTM determines the eligibility for early retirement and subsidized part-time work for elderly people according to rules allowing for it in case of employment for more than 40 (women) and 45 (men) years ("Hackler-Regelung" and "Altersteilzeitgeld"). Table 10 comprehensively documents the components of household income we just mentioned and notes whether they are determined within the simulation model or drawn from exogenous data sources. Below we describe the above mentioned taxes and transfers in more detail and we document to which extent they are implemented in the microsimulation model.

Table 10: Simulated and exogenous components of household income

		Income and tax components	**determined within ATTM**
Gross income	+	Income from agriculture and forestry	
	+	Income from self-employment and business	
	+	Income from dependent employment (including apprentice allowances)	
	+	Income from capital	
	+	Income from renting and leasing	
	+	Other income including pensions	
Transfer income	+	Unemployment benefit type 1 (Arbeitslosengeld) or	✓
	+	Unemployment benefit type 2 (Notstandshilfe)	✓
	+	Nationwide family allowance (Familienbeihilfe)	✓
	+	Federal state family allowance (Familienförderung der Länder)	✓
	+	Childcare benefits for newborn children (Kinderbetreuungsgeld)	✓
	+	Social welfare payments, including housing, clothing and heating allowances (Sozialhilfe)	✓
	+	Low-pension supplements (Ausgleichszulage)	✓
	+	Scholarships (Studienbeihilfe)	
Taxes	–	Employees' social security contributions	✓
	–	Income Tax	✓
	=	Net household income	

Source: ATTM

5.1. Social security contributions

The basis for the assessment of social security contributions (SCC) is gross wage income from dependent employment and self-employment income from entrepreneurship and agriculture. There are no social security contributions levied on income from capital or renting and leasing. Moreover, in case of dependent employment, part of the social security contributions is assigned to the employee, and a (typically slightly larger) part to the employer.

Employees' SCC include payments for health-, pension- and unemployment insurance, to the chamber of employees ("Arbeiterkammerumlage") and to a fund which feeds subsidies for residential building ("Wohnbauförderungsbeitrag"). Employers' SCC are more comprehensive and include next to the payments for health, pension and unemployment insurance for the respective employee additional payments for accident insurance, the fund for residential building subsidies, another fund to feed, amongst other transfers, family allowances ("Familienlastenausgleichsfonds"), another fund securing payments for employees of bankrupt enterprises ("Insolvenzentgeltsicherungsfonds"), contributions for the employee's severance pay reserves ("Abfertigungsrücklage") and a municipality tax.[14.]

In principle, both the social employees' and employers' SCC are paid as a fixed percentage rate of earnings. There are a few exceptions, though: If wage income or self-employment income is below the lower SCC threshold – the so-called insignificance limit ("Geringfügigkeitsgrenze") – there are no social security contributions apart from the contributions to severance pay reserves and accident insurance. On the other hand, the amount of income exceeding the assessment base for highest contributions ("Höchstbeitragsgrundlage", the upper SCC threshold) is exempt from social security contributions, apart from the payments to the funds feeding the family allowances and severance payments, and the municipality tax. Both the lower and the upper SCC threshold are adjusted every year by multiplying last year's value by a factor linked to wage or price inflation, respectively. In 2009, the yearly lower SSC threshold was € 357.74[15] multiplied by 14 (due to the fact that there are typically 14 wage payments a year, one for each month plus holiday and Christmas allowances). The upper SSC threshold in that year was 14 times € 4,020 = € 56,280.

Since July 2008 low wage incomes are either totally or partially exempt from contributions to the unemployment insurance, and health insurance payments differ

[14] The contributions to these funds, the severance pay reserves fund, and the community tax are not part of the social-security system which comprises health, pension, unemployment and accident insurance. However, the Austrian tax-benefit system treats those payments like the social security contributions (i.e. they are fully exempt from income taxes).

[15] For self-employment income this threshold is 357.76 × 12=4,392.12 if the respective person receives other income as well (i.e. from dependent employment) and 6,453.36 if the person has no other income source. Although there is no insurance coverage in this case, it is possible to opt into health and accident insurance at the given percentage rates. This would result in quite low payments since there is no pension insurance then (SVA, 2009).

with respect to whether the employee is a blue or white collar worker, employed in the public sector or a so-called "free employee" ("freier Dienstnehmer")[16].

The Austrian social security system features quite generous regulations concerning health insurance coverage of non-employed family members. Children's health insurance is always free, while the spouse's insurance is free in case she is currently taking care for children or has in the past taken care for children for at least four years, or if she or the spouse who pays the health insurance contributions is disabled to a certain degree such that they need care ("Pflegestufe 4"). If those exceptions do not apply, the fee for health insurance of non-employed spouses is 3.4% of the gross wage (Sozialversicherung, 2009). The following table gives an overview of the rates charged for various features of the Austrian social security system as of 2009.

Implementation in ATTM

Since the type of employment (blue-collar, white-collar, self-employment) as well as the type of industry is well-documented, ATTM features all the fine differences in SSC-regulations affecting these groups. A slight inaccuracy is due to EU-SILC data containing no information on whether non-employed spouses took care of children in the past for at least four years, which would allow them to be covered by the partner's health insurance without an additional fee. ATTM thus attributes the additional fee for health insurance to all non-employed spouses without children in their household who have past periods of non-employment of at least four years.

[16] Additional nuances of the Austrian social security system include different rates for health insurance of blue collar workers employed in agriculture, pension insurance of persons employed in mining. Moreover, pension insurance payments for civil servants are slightly higher (12.55 %) than the payments for private economy employees, and they do not feature an assessment base for highest contributions. On grounds of this feature, pension payments for civil servants are typically higher.

Table 11: Payments to the social security system as percentage rates of gross wage/income

	blue collar workers		white collar workers		civil servants		self-employed	farmers	pensioners
	employee	employer	employee	employer	employee	employer			
Health Insurance	3.60%	3.45%	3.47%	3.48%	3.85%	3.30%	7.15%	7.05%	5.10%
Addition health insurance (Zusatzbeitrag)	0.25%	0.25%	0.25%	0.25%	0.25%	0.25%	0.50%	0.50%	–
Supplement Health Insurance (Ergänzungsbeitrag)	0.10%	–	0.10%	0.10%	–	–	–	0.10%	–
Pension Insurance	10.25%	12.55%	10.25%	12.55%	12.55%	***	16.00%	–	–
Unemployment Insurance*	3.00%	3.00%	3.00%	3.00%	–	–	–	–	–
Contribution Chamber of employees (Arbeiterkammerumlage)**	0.50%	–	–	–	–	–	–	15.00%	
Contribution Fund for residential building (Wohnbauförderungsbeitrag)**	0.50%	–	0.50%	0.50%	–	–	–	–	–
Fund securing payments at bankruptcy (Insolvenzentgeltsicherungszuschlag)	–	–	0.50%	0.55%	–	–	–	–	–
Accident Insurance	–	1.40%	–	1.40%	–	0.47%	€ 7.65/month	1.90%	–
Contribution for assistance at farm (Betriebshilfebeitrag)	–	–	–	–	–	–	–	0.40%	–
Severance pay reserves (Abfertigungsrücklage)	–	1.53%	–	1.53%	–	–	1.53%	–	–
Fund for Family allowances (Familienlastenausgleichsfonds)	–	4.50%	–	4.50%	–	–	–	–	–
Supplement for Fund for Family allowances	–	0.43%	–	0.43%	–	–	–	–	–
Municipality Tax (Kommunalsteuer)	–	3.00%	–	3.00%	–	–	–	–	–
Underground-tax (U-Bahn Steuer)**	–	0.72%	–	0.72%	–	–	–	–	–
Yearly lower SSC threshold (Geringfügigkeitsgrenze)	5008.64	5008.64	5008.64	5008.64	5008.64	5008.64	4293.12/6453.36	–	–
Yearly upper SSC threshold (Höchstbeitragsgrundlage)	56280	56280	56280	56280	56280	56280	56280	56280	–

* Employees contribution for monthly gross income below 1128 0%, below 1230 1% and below 1384 2%, ** Only levied on regular payments, not on holiday- and Christmas allowances, *** contribution differing with operational area of civil servant, **** in Vienna only

Source: Hauptverband (2009)

5.2. Wage and income tax

The Austrian personal income tax system features a progressive tax scale with stepwise increasing marginal tax rates. It is a system based on the incomes of individuals ("individual taxation") which provides deductibles in case of marriage/family and low partner income, however. The system makes a distinction between wage income from employment and pensions, and income from other sources, in particular self-employment, agriculture, renting and leasing. Capital income as well as income from corporate enterprises is taxed with a flat rate of 25%, without a basic allowance. Whereas wage income and pensions are divided into regular (12 monthly earnings) and special payments (Holiday- and Christmas allowances and dispatches), other income is fully subject to the progressive tax scale. While regular payments of the former are taxed according to the scale, special payments are subject to a lower flat rate of 6%, with a general yearly allowance of € 620. The tax scale for both regular and special wage payments and income from other sources is documented in the following table.

Table 12: Regular and special tax scale (in Euro)

Regular income	marginal tax rate	Special income	Marginal tax rate
≤ 11,000	0.0%	≤ 620*	0.0%
> 11,000 and ≤ 25,000	36.5%		
> 25,000 and ≤ 60,000	43.2%	> 620	6.0%**
> 60,000	50.0%		

* no such allowance for dispatch payments

** if total special income is below € 1640, the marginal tax rate is 0%, if it is above € 1640, total special tax due must not exceed 30% of (Special income – 1640)

Source: EStG (2009)

5.2.1. Determination of taxable income

Regular income is determined by subtracting all income-related expenses, including social security contributions. Thus, the social security contributions are completely tax-free in the Austrian system. If there are, apart from those social security contributions, no other income related expenses, taxpayers can subtract flat expenses of € 132 ("Werbungskostenpauschale") and additional flat special expenses ("Sonderausgabenpauschale") of € 60 a year. Moreover, disabled persons can subtract disability allowances ranging from € 75 to € 726, according to the degree of disability ("Behindertenfreibetrag"), blue collar workers employed in agriculture have an additional allowance ("Landarbeiterfreibetrag") of € 171.

If an employee receives, in addition to her wage earnings, income from other sources up to € 730, the other income is not taxed ("Freibetrag für zu veranlagende Einkommensarten"). If other income exceeds € 730 however, this allowance is reduced

by the difference between the income and € 730. Thus, with an additional income higher than € 1,460, there is no such allowance anymore.

Up to 10 percent of the income from self-employment is tax exempted provided this amount is invested in assets satisfying certain standards ("Gewinnfreibetrag"). Beginning with 2010, this allowance will be increased to 13 percent, and up to an income of € 30,000, the allowance will not be subject to the requirement that the amount is invested is certain assets.

Since 2009 there is a child allowance ("Kinderfreibetrag") of € 220 per child if one parent subtracts the allowance and € 130 per child if both parents subtract it. Moreover, child care costs can be subtracted from income up to an amount of € 2300[17] per child below the age of ten years if the child is taken care of in qualified institutions.

There is a commuting allowance ranging from € 546 to € 2,931 ("Pendlerpauschale"), depending on the distance between residence and place of employment, and whether public transport is available.

5.2.2. Deductibles

There are several deductibles in the Austrian tax system which may reduce the income tax assessed. Married taxpayers whose spouse's gross yearly income is less than € 2,200 qualify for a single-earner deductible of € 364 ("Alleinverdienerabsetzbetrag"). If the couple has children, they don't need to be married and the spouse may have an income of up to € 6,600 and still be eligible for the single-earner deductible plus supplements of € 130 for the first, € 175 for the second and € 220 for the third and any other children. Single parents are eligible to this deductible as well ("Alleinerzieherabsetzbetrag"). In case the income tax becomes negative by subtracting the single-earner deductible, the taxpayer receives a tax credit.

If a taxpayer has to pay alimony payments, he is eligible to a monthly *alimony deductible* of € 25.5 for the first, € 30.2 for the second and € 50.9 for the third and any other child not living in the taxpayer's household. In order to be eligible for the alimony deductible, children have to be eligible for the family allowance described below.

There is a *child deductible* of € 58.4 per month and child eligible to the family allowance and living in the taxpayer's household. This deductible is paid in cash together with the family allowance, even if the taxpayer does not have any income.

All dependent employees are eligible for an *employee's deductible* ("Arbeitnehmerabsetzbetrag") of € 54 per year and a *traffic deductible* ("Verkehrsabsetzbetrag") of € 291 per year, while pensioners are eligible for a *pensioner deductible* ("Pensionistenabsetzbetrag") of € 400 a year. Two things are noteworthy in this context. First, those deductibles are only applicable in case the amount of the assessed income tax is positive, i.e. there is no tax credit in this case. Second, beginning

[17] Since this allowance is framed as an "extraordinary burden" ("Außergewöhnliche Belastung"), there are retention rates ranging, dependent on income, from six to twelve percent. Thus, child care cost will decrease income up to a maximum amount of € 2,024 to € 2,162.

with a taxable pension income of € 17,000 per year, the pensioner deductible is decreased at a marginal rate of 5 percent until it turns zero at a taxable pension income of € 25,000.

If a taxpayer is in principal eligible for an employer deductible but the amount of her income tax assessed is zero or negative, then there is an additional *negative income tax* amounting to 10 percent of her social security contributions, up to a maximum amount of € 110 per year[18].

The following table documents the determination of income taxable according to the Austrian regular and special tax scales. It also lists the articles where the respective features are to be found in the Income Tax Act (EStG).

Table 13: Determination of taxable income according to regular and special tax scales

	Income and tax-scale components	regular tax scale	special tax scale	EStG
Gross Income	Income from agriculture and forestry*	+		§ 21
	Income from self-employment	+		§ 22
	Income from business	+		§ 23
	Regular Income from dependent employment (12 monthly payments)	+		§ 25
	Special payments for dependent employment (holiday and Christmas payments, dispatches)		+	§ 67
	Income from capital**	+		§ 27
	Income from renting and leasing	+		§ 28
	Regular other income (i.e. 12 monthly pension payments)	+		§ 29
	Special pension income (i.e. holiday and Christmas pensions payments)		+	§ 67
	Unemployment benefits and income from military service (progression proviso)	+		§ 3 (1) 5, (2)
Expenditure	Social security contributions levied on regular employment income and pensions	–		§ 16 (1) 4
	Social security contributions levied on special employment income and pensions		–	§ 16 (1) 4
	Other expenditure (actual or lump-sum (Werbungskostenpauschale))	–		§ 16
	Extraordinary expenditure (actual or lump-sum (Sonderausgabenpauschale))	–		§ 18
	Extraordinary burden (i.e. cost for child care, with retention)	–		§§ 34 - 35
	Church tax (up to € 200 per year)	–		§ 18 (5)

Table continued ./.

[18] If the taxpayer is eligible for the commuting allowance („Pendlerpauschale“), the negative income tax amounts to 15 percent of her social security contributions, up to a maximum amount of € 240 per year.

Table 13: continued

	Income and tax-scale components	regular tax scale	special tax scale	EStG
Allowances	Disability allowance (Behindertenfreibetrag)	–		§ 35 (3)
	Allowance for blue collar workers in agriculture (Landarbeiterfreibetrag)	–		§ 104
	Allowance for assessed income (Veranlagungsfreibetrag)	–		§ 41 (3)
	Profit allowance (for income from self-employment and business, Gewinnfreibetrag)	–		§ 10
	Childrens' allowance (Kinderfreibetrag)	–		§ 106a
	Lump-sum commuters allowance (Pendlerpauschale)	–		§ 16 (1) 6
	Income subject to regular and special tax scale	=	=	
	Income tax according to respective tax scale	–	–	
Deductibles	Single-earners deductible (including childrens' surcharge, Alleinverdienerabsetzbetrag)	+		§ 33 (4) 1
	Single-parents deductible (Alleinerzieherabsetzbetrag)	+		§ 33 (4) 2
	Alimony payment deductible (Unterhaltsabsetzbetrag)	+		§ 33 (4) 3
	Children deductible (paid together with nationwide family allowance, Kinderabsetzbetrag)	+		§ 33 (3)
	Dependent employees' deductible (Arbeitnehmerabsetzbetrag, Grenzgängerabsetzbetrag)	+		§ 33 (4) 5
	Traffic deductible (Verkehrsabsetzbetrag)	+		§ 33 (4) 5
	Pensioners' deductible (Pensionistenabsetzbetrag)	+		§ 33 (4) 6
	Personal net income excluding tax-free transfers	=	=	

** special optional rules in determining income according to § 17 (5), ** optional flat-tax of 25%

Source: 13 EStG (2009)

Implementation in ATTM

The income tax system in ATTM incorporates all the mentioned allowances and deductibles mentioned above, with the following exceptions:

First, farmers have the possibility to opt for a flat income determination procedure most frequently resulting in very low taxable incomes (“Pauschalierung der Landwirte”). Since there is no direct information in EU-SILC to determine whether or not this option is chosen, this system is currently not implemented in ATTM.

Second, lacking detailed information on the use of child-care facilities in EU-SILC, in case parents are both employed ATTM assumes that their children are taken care of in qualified institutions and taxpayers can therefore subtract child care costs from income (“Abzug von Kinderbetreuungskosten”). Since there is no information on child care cost in the data, the average child care costs for Austria, as reported in Dearing et al. (2007), are imputed for each household. These costs range from € 163 per month for part-time care of 3-6 year old children to € 635 per month for full-time care of 0-2 year old children.

Third, as there is only little information on the degree of disability in EU-SILC, but the disability allowance ("Behindertenfreibetrag") is quite differentiated with respect to the degree of disability, we assign to all individuals who are denoted "somewhat handicapped" in the data, the allowance for a degree of 25%, and to all who are denoted "severely handicapped" the allowance for a degree of 75%.

Fourth, as there is no information on the number of children eligible for the alimony deductible ("Unterhaltsabsetzbetrag") in the data, we assume all persons paying alimonies to do so for one child only.

Fifth, as there is no information on membership in churches in the data, we assume that somebody is a member of the Catholic or Protestant Church with a probability equal to the overall fraction of members of the Catholic and Protestant Church in the respective federal state (Statistik Austria, 2007). Since a maximum amount of € 200 per year of contributions to religious communities is exempt from taxation, we subtract the contribution up to a maximum of € 200 from taxable income[19].

Sixth, EU-SILC does not contain any information on the share of income which the self-employed keep within the own enterprise or invest. Thus, the self-employed are assumed to invest 9.05 percent[20] of their income in assets that qualify for the profit allowance ("Gewinnfreibetrag").

Seventh, since there is no information on the distance between residence and workplace and the availability of public transport on the way in our data base, the commuting allowance ("Pendlerpauschale") cannot be implemented in detail. ATTM uses data from the Austrian wage tax statistics (Statistik Austria, 2006) on the number of employees eligible for the commuting allowance and the aggregate allowance in each of the nine federal states. The share of eligible employees is highest in Burgenland (33.5%) and lowest in Vienna (4.2%), while the average allowance, given eligibility, ranges from € 530 (Vorarlberg) to € 968 (Burgenland). ATTM uses a random procedure to assign the average commuting allowance to dependent employees with a probability equal to the share of eligible employees.

5.3. Unemployment benefits

There are two types of unemployment insurance payments. For the first 20 weeks[21] of unemployment there is the "unemployment benefit" ("Arbeitslosengeld", UB), thereafter there is "unemployment assistance" ("Notstandshilfe", UA) until

[19] According to 2001 census data, 73,6% of the Austrian population are Catholics and another 4,7% Protestants. Another 4,2% are Muslims, however, since we do not have detailed information on how contributions to Muslim Communities are calculated, we do not implement those contributions.

[20] According to a telephone inquiry at Statistik Austria on September 22, 2008.

[21] If the employee has been employed for at least 156 weeks during the last 5 years, the UB is paid for 30 weeks. If the employee is older than 40 and has been employed for at least 312 weeks during the last 10 years, the duration is 40 weeks, and for employees older than 50 who have been employed for 468 weeks during the last 15 years, the duration is 52 weeks.

unemployment ends. Both payments require showing efforts in finding a job as well as being principally able to take up a new job.

The amount of UB is 55 percent of the previous net income and paid as a daily benefit. In case the benefit is lower than the basis for pension supplements ("Ausgleichszulage"), the UB replacement ratio rises to up to 60 percent. In 2009 the maximum monthly UB amount is 55 percent of the upper social security threshold of € 4020. Since the UB is considered to be based on the insurance principle (AMS, 2009), it is not means tested.

The amount of UA is 92 or 95 percent (depending on whether unemployment benefit is below or above the basis for pension supplements) of the amount previously received as UB. If the UB was received for the maximum entitlement period of 30 weeks, its maximum amount is € 901 per month. In case the entitlement period for UB was 20 weeks or less, the maximum amount is € 772.4 per month (the basis for pension supplements). UA is partially means tested: Whereas the income of the spouse reduces the eligible amount, the income of other household members is not counted. Own wage income exceeding an allowance of € 488 plus € 288 times the number of dependent children is deducted from the benefit at a rate of 100 percent.[22]

Both the UB and UA include a small family supplement of € 29.7 per month and dependent child (AMS, 2009).

Implementation in ATTM

The implementation of the system of unemployment benefits in ATTM faces the problem that, although EU-SILC records the cumulated duration of previous employment spells for each person, it does not provide sufficient information to determine the duration of employment during the reference period relevant for the UB entitlement period. It is thus currently not possible to precisely determine how long somebody would receive the UB, and whether she is eligible to it at all.[23]

Given this limitation, the current version of ATTM assumes that all persons who received income from dependent employment during the year before being questioned are eligible for both UB and UA, since eligibility for UA requires to have received UB before. Since for estimations of labor supply elasticities the longer-term eligibility to benefits is relevant, we set the amount of the benefit received by those eligible to UB equal to the level of UA rather than to that of the UB. Since there is no information in EU-SILC on extraordinary hardships associated with a more generous means test, these rules cannot be implemented in ATTM.

[22] For employees older than 50 who received the UB for 52 weeks, the allowance increases by 100 percent. For male employees older than 55 and female employees older than 54, the allowances increase by 200 percent. Moreover, there is the possibility for allowances to increase by 50 percent in case of extraordinary "hardships", e.g. disabilities, pregnancy, ill health or due loan repayments.

[23] When additional waves of EU-SILC become available it will be possible to derive employment spells within the reference period using the panel structure of the data base.

5.4. Family allowances

There is a nationwide family allowance ("Familienbeihilfe") paid out of a fund ("Familienlastenausgleichsfonds") from employers' contributions amounting for 4.5 percent of gross wages, plus a smaller supplement that differs between federal states. All children younger than 19 years are automatically and without regard of the parent's income eligible to the family allowance. Children who are severely disabled or follow some tertiary education can receive the allowance up to the age of 26 (girls) and 27 (boys). The maximum age is higher for boys only in case they completed military or community service.

The amount of the nationwide family allowance depends on the age and the number of children in the household. As shown by Table 14, the total family allowance consists of a basic payment, an additional payment if the number of children is two and two higher additional payments ("Geschwisterstaffelung" plus "Mehrkindzuschlag") if the family has more than two children. Moreover, there is a supplement of € 138 per month if the respective child is severely disabled. Since autumn 2008, the monthly family allowance is paid 13 times a year.

Table 14: Nationwide family allowance in € per month

	age of child			
	0 – 2	**3 – 9**	**10 – 18**	**19 – 27**
Basic allowance	105.4	112.7	130.9	152.7
Addition if two children („Geschwisterstaffelung")	12.8	12.8	12.8	12.8
Addition if three children („Geschwisterstaffelung")	47.8	47.8	47.8	47.8
Addition if more than three children per child ("Geschwisterstaffelung")	50	50	50	50
General addition if more than two children (Mehrkindzuschlag)	36.4	36.4	36.4	36.4
Supplement for severely disabled children	138.3	138.3	138.3	138.3

Source: Own tabulation based on Bundeskanzleramt (2009).

In addition to the nationwide family allowance, the Austrian federal states provide payments for low-income families. Eligibility rules vary widely across the nine federal states (Table 15), in one of them (Salzburg) there is no such additional allowance.

Table 15: Family allowances issued by the federal states

		age		maximum equivalence income*	amount	additional prerequisite
		from	to	€ per month	€ per month	
Burgenland	**Kinderbonus**	0	2.5	700	140 – 190	–
	Kinderbetreuungsbonus	2.5	3.5	700	50% of childcare cost, max € 100	only if childcare not at home
Carinthia	**Familienzuschuss**	0	10	567	15 – 436	–
Lower Austria	**Familienhilfe**	2.5	3.5	580	75 – 436	only if childcare at home
Upper Austria	**Kinderbetreuungsbonus**	2	6	700	35	only if childcare not at home
Salzburg	**no such allowance**	–	–	–	–	–
Styria	**Kinderzuschuss**	0	1	772	145.35	–
Tyrol	**Kinderbetreuungshilfe**	0	14	747	40 – 60% of childcare cost, max € 100	only if childcare not at home
Vorarlberg	**Familienzuschuss**	2.5	4	764.3	43.6 – 436	–
Vienna	**Familienzuschuss**	1	3	508.71	50.87 – 152.61	–

*weights used in calculation differ across the federal states

Source: Own tabulation based on Federal States (2009).

Implementation in ATTM

Both the nationwide allowances as well as the additional payments provided by the federal states are implemented in ATTM, with some restrictions. Since there is insufficient information on the degree of disability in our data base, we have to assume that all handicapped children qualify for the supplement. In practice it is restricted to severely handicapped children. Since our data base does not provide sufficient information on childcare costs, we further have to assume that children eligible to the additional family allowances in Burgenland and Tyrol receive the maximum amount of € 100 per month.

5.5. Childcare benefits

Parents of new-born children receive childcare benefits ("Kinderbetreuungsgeld") if their yearly gross income does not exceed the maximum of € 16,200 (in 2009) and 60 percent of the applicant's yearly gross income. Only one parent can receive childcare benefits at a time, though the overall duration of the benefit increases if both parents use it subsequently. There are five options: i) Receive € 14.53 per day for 30 months (if only one parent uses it) or up to 36 months (if both parents use it subsequently), ii) receive € 20.8 per day for up to 20 (24) months, iii) receive € 26.6 per day for up to 15 (18) months, iv) receive € 33 per day for up to 12 (14) months, v) receive 80 percent of your net income, but at least € 33 and at most € 66 per day. For the latter option, the

upper limit for yearly gross income reduces from € 16,200 to € 5,008. If parents have twins or triplets, they are eligible for a supplement of 50% of the daily benefit (Bundeskanzleramt, 2009).

Single parents whose spouse has died, is imprisoned or who have a monthly income of less than € 1,200 and a pending case on alimonies, can receive the childcare benefits for two month longer than couples (given only one parent uses it). Moreover, single parents and couples who choose option i) – iv) and whose income is less than € 5,800 (singles) and € 5,800 (spouse who receives benefit) plus € 16,200 (other spouse) are eligible for a supplement of € 6,06 per day, with a maximum duration of one year.

Implementation in ATTM

Since there is no direct information on the duration parents choose to receive childcare benefits in EU-SILC, we impute the amount of the benefit for each household by the arithmetic mean of the amounts of options i) – iii) as given above. As soon as data on take-up of the just introduced options iv) and v) are available, the imputation procedure will be updated.

5.6. Social assistance

At the bottom of the Austrian social safety is social assistance (SA). Typical receivers of SA are single-parents, since many of them are not eligible for UB or UA because they are not able to take up a job, often due to child care responsibilities. Moreover, self-employed persons with no income and no entitlement to unemployment insurance payments[24] are also entitled to SA.

The amount of social assistance ("Sozialhilfe", SA) is determined by the difference between a respective standard rate (see Table 16) and actual household income, including all sources of income plus transfer income plus "exploitable" assets.[25][26]. Standard rates for SA typically include average costs of renting and vary substantially across the federal states, as Table 16 shows.[27] Typically, the standard rates of SA are paid 14 times a year. In addition, there are irregular payments, including coverage of the costs for heating in winter, clothing and medical care. Some federal states offer supplements for residential rent payments.

[24] Since 2009 self-employed persons can voluntarily insure against unemployment. In order to prevent moral hazard to some extent, one has to choose to take up unemployment insurance within 6 month from the beginning of self-employment, and is obliged to pay contributions for at least 8 years (SVA, 2009).

[25] These are monetary assets as well as property not used for own residence. There are, however, restrictions in some federal states. In Carinthia, for example, monetary assets up to € 3,500 do not reduce the amount of social assistance.

[26] The nationwide family allowances are not included in the income subtracted from the standard rates when determining the payment, however, as can be seen from the Table, the standard rates for persons eligible for the nationwide family allowance are typically lower.

[27] Discussion is on harmonizing those rates and constructing a nationwide social welfare system („Bedarfsorientierte Mindestsicherung").

Table 16: Social assistance standard rates in € per month

	Singles	Singles receiving family allowance	Household heads	Household heads receiving family allowance	living together in household/homes	not household head	not household head and receiving family allowance	not household head and receiving family allowance and younger than 10
Burgenland	473.6	–	391.9	–	–	285.9	140.3	–
Carinthia	490.0	–		–	367.5	–	196	147
Lower Austria	532.3	–	467.5	–	362.4	257.3	144.3	–
Upper Austria	569.5	–	514.7	–	424.3	333.9	160.4	–
Salzburg*	464.5	–	418.5	–	–	268.0	155.5	–
Styria	540.0	374	492.0	327	–	329.0	201.0	–
Tyrol**	459.0	152.9	393.5	–	–	273.7	152.9	–
Vorarlberg	514.5	–	432.0	–	–	159.8	275.5	–
Vienna	454.0	–	–	–	352.0	–	135.0	–

* Salzburg does not fully deduct employment income from social welfare payments (Allowance of € 67 for part time and € 134 for fulltime-employment)

** Tyrol does not deduct some individually determined part of employment income, especially for single-parents

Source: Federal States (2009)

Implementation in ATTM

ATTM includes the standard rates of social welfare payments for each federal state and calculates the payment by subtracting total wage and self-employment income plus transfer income (excluding the nationwide family allowance) and assets from the relevant standard rates. Irregular SA payments mentioned above are currently not included in ATTM.

By using the procedure described above, we overestimate the total amount of SA payments for two reasons. First, we assume a take-up rate of 100 percent; second, EU-SILC does not include data on exploitable assets, the approximate amount of which can only be inferred from information on capital income recorded in the data.

5.7. Low-pension supplements

Poor pensioners are eligible to low-pension supplements ("Ausgleichszulage"). The supplement is determined by the difference between a low-pension standard rate ("Ausgleichszulagenrichtsatz") and the actual pension. The standard rates are changed every year according to the inflation rate. In 2009, the standard rate was € 772.4 per month for singles and € 1,158.08 for couples. There are lower rates for orphan's

pensions, depending on whether one or both parents have died already (Bundeskanzleramt, 2009).

Implementation in ATTM

ATTM applies the standard rates for singles and couples and, given the amount of pensions actually received, calculates the amount of low-pension supplements, if applicable. The regulations for orphan's pensions are not implemented since the data do not provide the necessary information on parents' status.

5.8. Early retirement supplements

Full-time employees who reach the minimum retirement-age within the next five years and have been employed for at least 15 during the last 25 years are eligible for supplements in case of part-time employment ("Altersteilzeitgeld") if they reduce working hours by 40-60 percent. This early-retirement supplement amounts to 50 percent of the lost wage income[28].

While early retirement before the regular retirement age (60 for women and 65 for men) leads, as a rule, to a reduction of the pension payments, there is a special regulations for people having been employed for more than 40 (women) and 45 (men) years ("Vorzeitige Alterspension aufgrund langer Versicherungsdauer", colloquially also called "Hackler-Regelung"). This regulation allows eligible people to retire at the age of 55 (women) and 60 (men) without any reduction of their pension income. This regulation is not restricted to people who have been performing physically strenuous work, despite the connotation of the Austrian expression "Hackler" which means just this.

For people actually performing physically strenuous work[29] there is another possibility to retire early without a reduction of their pension income. Men and women aged 60 or older who have been employed in such jobs for at least 10 out of the last 20 years are eligible for "strenuous work" pension ("Schwerarbeitspension").

Implementation in ATTM

ATTM determines eligibility for part-time work and early retirement due to long cumulated duration of employment. Eligibility to early retirement due to strenuous work cannot be determined since EU-SILC does not provide information on the specific types of job an observed person performed in the years before having been interviewed. Implementation of the early retirement supplement rules described above is relevant for simulations in ATTM, since some persons with flexible labor supply might be eligible for

[28] This regulation allows working part-time at 20 weekly hours for, e.g., a duration of 5 years until retirement or to work full-time for 2.5 years and stop working afterwards.

[29] Strenuous work is defined according by decree of the Ministry of Labor according to the consumption of calories. Jobs in which the necessary daily consumption of calories exceeds 2,000 (men) or 1,400 (women) calories are defined as strenuous work (Bundeskanzleramt, 2009).

early retirement supplements which may affect their working hours and retirement decisions.

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7. Appendix

7.1. Re-alignment of EU-SILC data to national statistics

Since the distribution of incomes in EU-SILC differs from the distribution in the official wage- and income tax statistics, we re-align the survey data to these latter statistics. For this purpose we use the software-package "Adjust for Windows 1.1" (Merz et al., 2004) which applies the minimum information loss principle to adjust the survey weights such that the survey distribution converges to the distribution given by official statistics.

We re-align the data by employing two dimensions (marginal distributions), one being the region and the other being the amount of total income. The first dimension has nine categories (one for each federal state), while the second dimension has 16 categories. Whereas the official wage and income tax statistics distinguishes between 18 categories of income cross-classified by federal states, we use, depending of population size of the federal states, a less detailed classification. We use 16 income categories and merge the lowest two ("negative income", "income between € 0 and € 2000) and the highest two categories ("income between € 150.000 and € 200.000" and "income above € 200.000) for observations from the federal state of Vienna. We merge the lowest two and, respectively, the highest three income categories for observations from Lower Austria, Upper Austria, and Styria, the highest four categories for observations from Salzburg, Tyrol and Vorarlberg, and the highest five categories for observations from the very small federal states of Burgenland and Carinthia. By using the two dimensions with nine and up to 16 categories we get 129 groups (i.e. people from Lower Austria with an income ranging from € 15,000 to € 20,000). Our choice of dimensions and categories was restricted by the requirement of having a sufficient number of observations within each cell in the survey data since the data adjustment procedure does not converge if the number of observations is too small.

The software package compares the number of persons belonging to a specific group according to the official statistics with the grossed-up number of persons belonging to the group according to the survey data, and adjusts the survey weights such that the two numbers are equal. For example, according to the 2005 official wage and income tax statistics, the number of Viennese people earning above € 150.000 per year was 7.461. The adjustment process uses this number (as well as numbers on other income categories and regions) and the existing survey weights q to construct updated survey weights p such that $Z(p,q)$, which is a function of the distance between old and new adjustment factors, is minimized subject to the restrictions given by the numbers of people satisfying certain characteristics (Merz et al., 2004).

7.2. Wage regression results

Table A-1: Regression results from a Heckman type wage estimation using EU-SILC data

	Women		Men	
	Wage equation	**Selection equation**	**Wage equation**	**Selection equation**
age	0.016	-0.018	0.016	0.015
	[0.008]**	[0.036]	[0.008]**	[0.061]
age²	0	0	0	0
	[0.000]	[0.000]	[0.000]	[0.001]
Human capital variables				
severely handicapped	-0.093	-0.623	-0.06	-0.615
	[0.051]*	[0.213]***	[0.038]	[0.288]**
somewhat handicapped	-0.051	-0.264	-0.036	-0.42
	[0.024]**	[0.124]**	[0.022]*	[0.215]*
completed apprenticeship	0.038	-0.247	0.113	0.387
	[0.024]	[0.121]**	[0.024]***	[0.221]*
master craftsman	0.008	0.022	0.121	0.34
	[0.115]	[0.472]	[0.037]***	[0.506]
compulsory school	0.148	-0.122	0.144	0.701
	[0.032]***	[0.171]	[0.039]***	[0.538]
vocational school	0.172	-0.286	0.238	0.232
	[0.032]***	[0.168]*	[0.035]***	[0.370]
general college	0.147	-0.188	0.181	0.738
	[0.040]***	[0.215]	[0.041]***	[0.408]*
university	0.313	-0.51	0.307	0.141
	[0.042]***	[0.225]**	[0.042]***	[0.394]
experience	0.01	0.131	0.013	0.001
	[0.005]**	[0.020]***	[0.005]***	[0.038]
experience²	0	-0.003	0	0
	[0.000]	[0.000]***	[0.000]**	[0.001]
executive position	0.085	0.187	0.066	0.038
	[0.020]***	[0.117]	[0.016]***	[0.243]
low qualified	0.064	0.285	0.01	0.46
	[0.023]***	[0.117]**	[0.020]	[0.227]**
semi-qualified	0.186	0.429	0.13	0.22
	[0.029]***	[0.153]***	[0.030]***	[0.424]
qualified	0.236	0.545	0.203	0.343
	[0.035]***	[0.188]***	[0.029]***	[0.433]
high-qualified	0.351	1.102	0.394	0.47
	[0.043]***	[0.285]***	[0.034]***	[0.527]
white collar	0.04	0.201	-0.016	0.04
	[0.024]*	[0.118]*	[0.023]	[0.276]
public white collar	0.025	0.994	-0.047	0.798
	[0.040]	[0.234]***	[0.041]	[0.827]
month unemployed in last year	0.017	0.11	-0.028	0.05
	[0.023]	[0.106]	[0.016]*	[0.130]
month unemployed in last year²	-0.002	-0.025	0.001	-0.027
	[0.002]	[0.009]***	[0.002]	[0.011]**
month unemployed missing	-0.025	7.083	0.02	5.504
	[0.017]	[9,276.951]	[0.014]	[407,056.955]

Table continued ./.

Table A-1 continued:

	Women		Men	
	Wage equation	**Selection equation**	**Wage equation**	**Selection equation**
Human capital variables				
month working part-time last year	-0.027	1.142	–	–
	[0.017]	[0.238]***	–	–
month working part-time last year²	0.002	-0.061	–	–
	[0.001]*	[0.026]**	–	–
unemployment years	-0.005	-0.157	-0.03	-0.244
	[0.004]	[0.019]***	[0.006]***	[0.048]***
unemployment years²	0	0.002	0.001	0.009
	[0.000]	[0.001]***	[0.000]***	[0.002]***
unemployment missing	0.036	0.436	-0.019	-1.337
	[0.068]	[0.331]	[0.075]	[0.562]**
Industry				
agriculture	-0.224	0.746	-0.045	0.228
	[0.076]***	[0.603]	[0.055]	[0.632]
mining and energy	-0.079	0.557	0.014	-0.041
	[0.074]	[0.611]	[0.031]	[0.449]
construction	-0.032	0.122	0.009	0.614
	[0.058]	[0.368]	[0.019]	[0.334]*
retailing	-0.052	-0.143	-0.036	-0.359
	[0.018]***	[0.129]	[0.021]*	[0.280]
transport	0.035	0.457	-0.081	-0.117
	[0.058]	[0.544]	[0.033]**	[0.477]
hoteliers	-0.059	0.615	-0.131	0.275
	[0.032]*	[0.206]***	[0.040]***	[0.666]
information/communication	-0.07	0.357	0.147	-0.429
	[0.057]	[0.452]	[0.045]***	[0.605]
finance	0.114	-0.473	0.105	-0.475
	[0.032]***	[0.210]**	[0.034]***	[0.476]
science	-0.042	0.174	-0.014	0.135
	[0.022]*	[0.156]	[0.028]	[0.434]
other services	0.012	0.167	0.006	0.172
	[0.026]	[0.192]	[0.026]	[0.387]
public administration	-0.02	-0.622	-0.062	0.307
	[0.036]	[0.228]***	[0.035]*	[0.579]
education	0.165	-0.364	0.091	-0.396
	[0.039]***	[0.256]	[0.066]	[0.911]
health care	0.029	-0.165	-0.08	-0.333
	[0.020]	[0.135]	[0.036]**	[0.523]
Firm size				
< 5 employees	-0.058	-0.106	-0.065	-0.498
	[0.020]***	[0.139]	[0.028]**	[0.279]*
5 -9 employees	-0.037	-0.218	-0.09	0.418
	[0.020]*	[0.140]	[0.022]***	[0.393]
10 - 19 employees	-0.023	0.267	-0.02	-0.147
	[0.020]	[0.148]*	[0.020]	[0.283]
20 - 49 employees	0.005	0.078	-0.002	-0.025
	[0.018]	[0.120]	[0.014]	[0.207]

Table continued ./.

Table A-1 continued:

	Women		Men	
	Wage equation	**Selection equation**	**Wage equation**	**Selection equation**
Region				
Burgenland	0.038	-0.406	-0.004	-0.508
	[0.048]	[0.263]	[0.041]	[0.440]
Carinthia	-0.005	-0.571	0.036	0.039
	[0.038]	[0.183]***	[0.032]	[0.403]
Lower Austria	0.035	-0.19	0.048	0.208
	[0.027]	[0.148]	[0.024]**	[0.273]
Upper Austria	0.034	-0.499	0.084	-0.06
	[0.028]	[0.146]***	[0.024]***	[0.286]
Salzburg	0.071	-0.172	0.075	-0.286
	[0.036]**	[0.211]	[0.033]**	[0.377]
Styria	-0.002	-0.307	0.058	-0.345
	[0.028]	[0.152]**	[0.025]**	[0.266]
Tyrol	0.04	-0.314	0.065	-0.041
	[0.034]	[0.179]*	[0.030]**	[0.376]
Vorarlberg	0.171	-0.585	0.171	1.04
	[0.041]***	[0.194]***	[0.034]***	[0.629]*
Additional variables in partic. equation				
ever been employed	–	2.614	–	2.173
	–	[0.338]***	–	[0.542]***
married	–	-0.525	–	0.315
	–	[0.120]***	–	[0.218]
Child of age 0 - 3	–	-1.351	–	-0.465
	–	[0.100]***	–	[0.201]**
Child of age 4 - 6	–	-0.797	–	0.182
	–	[0.117]***	–	[0.364]
Child of age 7 - 12	–	-0.319	–	-0.069
	–	[0.081]***	–	[0.203]
Child of age 13 - 18	–	0.109	–	0.259
	–	[0.081]	–	[0.235]
Other income	–	0	–	0
	–	[0.000]	–	[0.000]**
Constant	1.733	-0.555	1.899	0.475
	[0.127]***	[0.727]	[0.118]***	[1.041]
rho	–	-0.142	–	-0.081
sigma	–	0.368	–	0.339
lambda	–	-0.052	–	-0.027
Observations	3155	3155	2647	2647

Standard errors in brackets; * significant at 10%; ** significant at 5%; *** significant at 1%

Source: ATTM and SILC (2006)

Table A-2: Descriptive statistics (means or shares in %, standard deviation in brackets)

		Women		Men	
		Wage equation	Selection equation	Wage equation	Selection equation
Variable	**Unit**	**mean [s.d.]**			
hourly wage	Euro	13.33	–	17.12	–
	Euro	[6.6]	–	[8.59]	–
age	years	39.37	40.48	39.2	39.34
	years	[10.45]	[11.13]	[10.99]	[11.14]
age²	years²	1659.57	1762.19	1656.89	1671.92
	years²	[815.15]	[912.13]	[870.96]	[885.4]
Human capital variables					
severely handicapped	–	0.03	0.04	0.03	0.04
somewhat handicapped	–	0.13	0.14	0.12	0.13
completed apprenticeship	–	0.36	0.34	0.52	0.52
master craftsman	–	0	0.01	0.06	0.06
compulsory school	–	0.12	0.11	0.05	0.05
vocational school	–	0.18	0.16	0.12	0.11
general college	–	0.06	0.06	0.05	0.05
university	–	0.09	0.08	0.09	0.09
experience	years	17.1	14.49	20.95	20.71
	years	[10.16]	[10.49]	[11.44]	[11.61]
experience²	years²	395.36	319.92	569.72	563.65
	years²	[389.45]	[372.38]	[509.86]	[511]
executive position	–	0.26	0.21	0.4	0.38
low qualified	–	0.35	0.33	0.24	0.24
semi-qualified	–	0.24	0.21	0.13	0.13
qualified	–	0.14	0.12	0.15	0.15
high-qualified	–	0.07	0.05	0.13	0.12
white collar	–	0.67	0.59	0.47	0.46
public white collar	–	0.08	0.06	0.05	0.04
month unemployed in last year	months	0.26	0.48		0.67
	months	[1.36]	[2.12]	0.28 [1.33]	[2.47]
month unemployed in last year²	months²	1.91	4.72	1.84	6.56
	months²	[13.08]	[23.9]	[12.91]	[28.34]
month working part-time last	months		2.95	–	–
year	months	4.2 [5.6]	[5.07]	–	–
month working part-time last	months²	48.94	34.44	–	–
year²	months²	[66.98]	[60.46]	–	–
unemployment years	months	3.89	6	0.91	1.12
	months	[5.71]	[8.92]	[2.64]	[3.15]
unemployment years²	months²	47.7	115.56	7.79	11.16
	months²	[114.85]	[283.91]	[52.74]	[63.01]

Table continued ./.

Table A-2 continued:

		Women		Men	
		Wage equation	Selection equation	Wage equation	Selection equation
Variable	**Unit**	**mean [sd]**			
Industry					
agriculture	–	0.01	0.01	0.02	0.02
mining and energy	–	0.01	0.01	0.05	0.04
construction	–	0.02	0.01	0.12	0.12
retailing	–	0.17	0.12	0.1	0.09
transport	–	0.02	0.01	0.04	0.04
hoteliers	–	0.07	0.05	0.03	0.03
information/communication	–	0.02	0.01	0.02	0.02
finance	–	0.06	0.04	0.04	0.04
science	–	0.12	0.08	0.06	0.05
other services	–	0.09	0.06	0.07	0.06
public administration	–	0.05	0.04	0.04	0.04
education	–	0.05	0.04	0.01	0.01
health care	–	0.14	0.1	0.04	0.04
Firm size					
< 5 employees	–	0.15	0.11	0.06	0.06
5 -9 employees	–	0.14	0.1	0.09	0.08
10 - 19 employees	–	0.14	0.1	0.11	0.1
20 - 49 employees	–	0.17	0.12	0.19	0.18
Region					
Burgenland	–	0.03	0.03	0.03	0.03
Carinthia	–	0.06	0.07	0.07	0.07
Lower Austria	–	0.19	0.17	0.18	0.18
Upper Austria	–	0.18	0.18	0.2	0.19
Salzburg	–	0.07	0.06	0.06	0.06
Styria	–	0.15	0.15	0.16	0.16
Tyrol	–	0.09	0.09	0.08	0.08
Vorarlberg	–	0.05	0.06	0.06	0.05
Additional variables in partic. equ.					
ever been employed	–	–	0.93	–	0.99
married	–	–	0.72	–	0.68
Child of age 0 - 3	–	–	0.16	–	0.17
Child of age 4 - 6	–	–	0.12	–	0.12
Child of age 7 - 12	–	–	0.27	–	0.24
Child of age 13 - 18	–	–	0.28	–	0.23
Other income	Euro	–	30226.8	–	20538.56
	Euro	–	[21338.48]	–	[18526.17]

Source: ATTM and SILC (2006)

7.3. Labor supply estimation results

Table A-3: Labor supply estimation results using EU-SILC Data

	flexible couples	women with inflexible spouse	single women	men with inflexible spouse	single men
	category	**category**	**category**	**category**	**category**
monthly net income	0	0.002	0.001	0.002	0
	[0.001]	[0.002]	[0.001]	[0.003]	[0.001]
monthly net income²	0	0	0	0	0
	[0.000]**	[0.000]*	[0.000]	[0.000]	[0.000]
women's leisure time	-0.074	0.11	0.086	–	–
	[0.038]*	[0.065]*	[0.038]**	–	–
men's leisure time	0.228	–	–	0.216	0.103
	[0.045]***	–	–	[0.112]*	[0.041]**
women's leisure²	0.001	0.001	0	–	–
	[0.000]***	[0.000]***	[0.000]	–	–
men's leisure²	-0.001	–	–	-0.001	-0.001
	[0.000]***	–	–	[0.000]**	[0.000]***
income × women's leisure	0	–	–	0	0
	[0.000]	–	–	[0.000]	[0.000]
income × men's leisure	0	0	0	–	–
	[0.000]*	[0.000]*	[0.000]*	–	–
women's leisure × Austrian	0.02	0.039	-0.001	–	–
	[0.017]	[0.030]	[0.013]	–	–
men's leisure × Austrian	0.022			0.008	-0.008
	[0.023]			[0.074]	[0.019]
women's leisure × age	-0.003	-0.013	-0.007	–	–
	[0.002]*	[0.002]***	[0.001]***	–	–
women's leisure × age²	0	0	0	–	–
	[0.000]***	[0.000]***	[0.000]***	–	–
men's leisure × age	-0.007	–	–	-0.008	-0.002
	[0.002]***	–	–	[0.004]**	[0.001]*
men's leisure × age²	0	–	–	0	0
	[0.000]***	–	–	[0.000]**	[0.000]*
women's leisure × men's leisure	0.001	–	–	–	–
	[0.000]*	–	–	–	–
women's leisure × men's leisure × Austrian	0	–	–	–	–
	[0.000]	–	–	–	–
Income × Austrian	0.001	0	0.001	-0.002	0.001
	[0.000]***	[0.002]	[0.001]	[0.003]	[0.001]

Table continued ./.

Table A-3 continued:

	flexible couples	women with inflexible spouse	single women	men with inflexible spouse	single men
	category	**category**	**category**	**category**	**category**
income² × Austrian	0	0	0	0	0
	[0.000]***	[0.000]	[0.000]	[0.000]	[0.000]
women's leisure × somewhat handicapped	0.008	0.003	0.065	–	–
	[0.010]	[0.012]	[0.012]***	–	–
women's leisure × severely handicapped	0.006	0.014	0.007	–	–
	[0.005]	[0.007]*	[0.006]	–	–
men's leisure × somewhat handicapped	0.025	–	–	0.041	0.035
	[0.008]***	–	–	[0.021]**	[0.009]***
men's leisure × severely handicapped	0.019	0.019	–	–	–
	[0.012]	[0.007]***	–	–	–
women's leisure × child aged 0-2	0.056	0.057	0.073	–	–
	[0.007]***	[0.013]***	[0.015]***	–	–
women's leisure × child aged 3-10	0.038	0.049	0.026	–	–
	[0.005]***	[0.010]***	[0.009]***	–	–
women's leisure × child aged 11-18	0.011	0.024	0.026	–	–
	[0.004]***	[0.007]***	[0.007]***	–	–
men's leisure × child aged 0-2	0.001	–	–	0.007	0.007
	[0.006]	–	–	[0.028]	[0.029]
men's leisure × child aged 3-10	-0.005	–	–	-0.002	0.016
	[0.005]	–	–	[0.021]	[0.033]
men's leisure × child aged 11-18	-0.01	–	–	-0.004	-0.005
	[0.005]**	–	–	[0.014]	[0.016]
Observations	1703	778	976	225	950

Standard errors in brackets; * significant at 10%; ** significant at 5%; *** significant at 1%

Source: ATTM and SILC (2006)

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