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A Microsimulation Analysis

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0. Statement of the Objective

"Families need time with each other. In Austria, the reconciliation of work and family life for women and men is of central concern. Financial support or other forms of support as well as the creation of an optimal framework and infrastructure (child care) are of paramount importance. The reconciliation of work and family life not only affects every individual, but is also an economic and societal policy challenge. The well-being of the child must thereby be of central concern. The aim is the creation of a child and family friendly work environment and to provide families with developmental possibilities. Men today perceive their roles differently than fathers of previous generations. Austria wishes to support an active fatherhood and encourage a modern role perception between fathers and mothers."

Federal Ministry of Economy, Family and Youth, 2012 [A]

"...the equality of women and men is taken into consideration as an across-the-board objective in all areas of politics..."

Federal Ministry of Labour,
Social Affairs and Consumer Protection, 2012 [B]

0.1. Female Labour Force Participation

Female labour force participation is a main concern of Austrian politics. Various policy instruments promote women for the labour market. For instance, Austria has extended public child care places in order to enable women with children to return to their jobs. A child care allowance has been introduced which allows prolonged entitlement if both parents claim it. A woman with a baby should therefore be encouraged to take up her job while her partner stays home. Furthermore, the tax system favors working parents by tax grants: child care costs will reduce the assessment base for parents and a child tax exempt will be higher if two earning parents claim the tax grant.
The major instrument of family policy which targets a higher female labour force participation is the extension of public child care places. In Austria public child care is

quite inexpensive, but the availability is poor.[1] In 2010, 6 percent of children younger than 3 years were cared for externally (1 up to 29 hours per week). Within EU-15 only Greece and Portugal show lower shares, Italy 6 percent as well and Germany 7 percent; the average of EU-15 is 14 percent. (Eurostat, 2012[C]) Although Austria still ranks behind, public child care places have increased. From 2008 to 2010 Austria invested 45 million Euro towards the expansion of child-care services; the goal until 2014 is to create 5000 additional child-care places per year. (Federal Ministry of Economy, Family and Youth, 2012[D]) The number of small children was decreasing from 2001 to 2011, the number of children at a kindergarten or nursery was increasing though (see table 0.1). Within this 10 year framework most 0-4 year-old children were present with 398.959 in 2002 and the fewest with 392.803 in 2010. Thus, the number of children at a kindergarten has decreased, however, the kindergarten places have increased from 4,553 to 4,694. Nursery places have increased from 641 to 1,208, as well as the number of children at a nursery from 11,545 to 25,321. Furthermore, the share of working mothers whose children are at a kindergarten has increased from 34 to 44 percent and the share of working mothers whose children are at a nursery increased from 56 to 59 percent.[2]

Austrian parents receive child care allowance the first years after birth. There are different variants which differ in the amount and time of entitlement (see details in the appendix A.2.1). If both parents claim child care allowance, the time of entitlement will be prolonged by 2 up to 6 months (depending on the variant) so that especially fathers are encouraged to take off for child care. The statistics show, however, that women are still the main providers of child care: Among 147,546 receivers of child care allowance 140,833 are women and 6,713 are men in 2010 (Statistik Austria, 2011[E]).

In 2010 Austria has introduced an income dependent variant of child care allowance which grants monthly 80 percent of the last income (usually maternity allowance), up to 2000 Euro monthly, for 12 (+2) months. This reform should incentivize women who earn above a certain amount per year (about 19,000 Euro) to make use of this income-dependent variant and to return to their jobs after one year. Despite monetary incentives, only 8 percent chose this variant in contrast to 64 percent of parents who chose the longest variant with 30(+6) months, 22 percent who chose the variant 20(+4) months and 6 percent who chose 15(+3) or 12(+2) months (status quo: May 2012) (Federal Ministry of Economy, Family and Youth, 2012[F]).

Austria has introduced an increased child tax exemption in 2009 if both parents claim it to increase female labour force participation. One earning parent can deduct 220 Euro and two earning parents can deduct 132 Euro each per child. Furthermore, ex-

[1] The quality of public child care is probably as well an influence for the decision of labour force participation, but it is hard to quantify. It is worth mentioning, however, that in politics and media are recent discussions and critiques about the education of pedagogues as well as the number of children per pedagogue.

[2] Day nannies are additionally supported by the state which is not depicted here.

ternal child care costs up to 2300 Euro (for children younger than 10 years) reduce the assessment base for the income tax of one parent (or 1150 of two earning parents) since 2009. Both reforms clearly are constructed in a way which should encourage both parents (instead of one parent) to work. However, the availment and therefore the effect of these instruments are low and their abolitions (or replacements) are discussed already.

How effective have those reforms been in regard with the activization of female labour force participation? Accordingly, recent employment rates of women have been increasing. 1.635 Mio women were employed or self-employed in 2001 and 1.916 Mio women were employed in 2011. However, the increase of employment has been mostly due to an increase of part-time employment. The number of part-time employed women has been increasing annually from about 562,000 in 2001 to 843,000 in 2011. Full-time employment was sometimes decreasing, sometimes increasing from year to year and is at about the same absolute level in 2011 as in 2001. (Statistik Austria, 2012[G])

Among 843,000 part-time working women, 624,000 women are between 25 and 50 years old. 49 percent of women of that age indicate to work part-time because of child (or adult) care responsibilities. Especially women between 40 and 60 years work part-time simply because they want to. 7 percent of all women work part-time because they cannot find a full-time job and 8 percent do not work full-time because they do any (advanced) education, who are in particular women younger than 30 years. Among 199,000 part-time working men 24 percent indicate to work part-time due to (advanced) educational reasons, 22 percent because they want to work part-time, 16 percent because of personal or family reasons, 13 percent because they did not find any other job, 3 percent because of child (or adult) care needs and the rest due to other reasons. (Statistik Austria, 2011[H])

These statistics show that Austrian women mainly choose to work part-time in order to use the rest of the time for child care. Austrian men, however, who mostly work full-time, rarely choose to work part-time due to caring responsibilities.

The unpaid household and care work are thus assigned mainly to women. The same conclusion can be drawn according to the Austrian Generation and Gender Survey (GGS) of 2008/09. The study shows on the one hand that any child care responsibilities (covering the dressing, bringing the children to bed, caring if the children are sick, playing, helping with homework and transporting) are mostly done by *women on their own*, followed by *mother and father together* or by *others*; the least is done by *men on their own*. Nevertheless, 65 percent of the 1057 surveyed mothers and 76 percent of the 608 surveyed fathers are very satisfied with this division of caring responsibilities. (Buber & Neuwirth, 2009, p.18)

In line with the GGS survey the Austrian Time Use study 2008/09 reveals that women

do two thirds and men one third of unpaid household and care work; in contrast, men do two thirds and women do one third of paid labour work. (Lamei & Skina-Tabue, 2011, p.1207)

Table 0.1.: Austrian Child Care Places and Share of Working Mothers 2001-2011

		kindergarten			nursery		
year	0-4 year-olds	# children	# places	% working mother	# children	# places	% working mother
2001/02	398,959	210,133	4,553	33.8	11,545	641	56.0
2002/03	396,212	206,909	4,538	34.5	11,843	686	55.4
2003/04	396,336	199,756	4,472	35.5	12,789	734	58.5
2004/05	397,817	194,914	4,407	35.5	13,429	773	56.5
2005/06	398,679	195,176	4,482	36.2	16,037	889	55.8
2006/07	398,049	195,049	4,505	40.7	16,551	928	56.8
2007/08	396,483	195,801	4,555	37.0	17,017	956	57.6
2008/09	394,503	208,449	4,863	39.5	18,389	1,026	59.0
2009/10	392,803	209,001	4,887	43.9	20,767	1,117	56.9
2010/11	393,533	208,483	4,694	44.3	25,321	1,208	58.7

Source: Statistik Austria, 2012 [I] [J]

0.2. The *One-and-Half-Earner Model*

In the prevailing type of arrangement of the family in Austria, the men work full-time in paid work while the women work part-time in paid work and do most of household and care duties. Lewis (2001) calls this arrangement the "*One-and-Half-Earner model*". It replaced the former dominating family arrangement which used to be the "*Male-Breadwinner model*". There are three types of the "*Dual-Breadwinner model*": In model 1 the man works full-time, the woman works short part-time; in model 2 the man works full-time and the woman works long part-time; in model 3 the man and the woman work part-time. In a "*Dual-Career model*" both man and woman work full-time and outsource child care. (p.157)

One of the goals of Austrian policy makers is to increase female labour force participation as it was shown. Different instruments, which might have been influencing factors for the increasing female labour supply in recent years, have therefore been implemented. However, the rise in female labour supply is only due to a rise in part-time and not full-time employment. Part-time employment is favourable for women who are the ones mostly responsible for the unpaid household and care work. Men at the opposite are the full-time earners and involved in household and care work only

little. According to the Austrian Generation and Gender Survey of 2008/09, more than two thirds of women and men are very satisfied with this kind of labour division. Some conflict of policy makers and individuals can thereby already be seen. While on the individual level most people seem to be satisfied with their family arrangement, the One-and-Half-Earner model involves long-run negative effects on women which might not be considered by individuals at the time of the questionnaire.
Firstly, the disadvantages (besides the advantages) of part-time work are discussed to reveal the problems of the current prevailing family arrangement. Secondly, the link of the gender wage gap together with intra-household labour decisions are analysed, so that, thirdly, the impact of the One-and-Half-Earner model on gender equality in general can be derived in this chapter.

In the OECD (2010) employment outlook one chapter analyses *"How Good is Part-Time Work?"* within OECD countries. The study shows that part-time workers earn on average lower hourly wages, face less promotion prospects and participate less likely in training compared to full-time employees despite controlling for observable differences in personal characteristics (such as age, education, job experience, etc.) and job characteristics (such as occupation, industry, firm size, contract type with different wages and promotion and training prospects). In Austria part-time working men earn about 15 percent, part-time working women about 10 percent lower hourly wages compared to full-time working men and women in 2007. Furthermore, part-time working men and women have 15 and 40 percent less promotions respectively compared to full-time workers. (OECD, 2010, p.222, Fig.4.3) In contrast to other OECD countries in Austria also part-time employees have quite as many permanent contracts and feel as secure in their jobs as full-time employees. While, however, in most OECD countries the *part-time premium* is a better control of working time, this is not the case for Austrian part-time employed women: They work on Sundays and at night almost as often as full-time employees.
Finally, one of the results is that part-time working women are as satisfied with their jobs as full-time working women or full-time working women are as satisfied with their jobs as part-time working women. Part-time working men, however, are less satisfied with their jobs than full-time working men. This might be the case as men in contrast to women do not use part-time work to balance work and child-care responsibilities and therefore the *part-time penalties* are not compensated by having more time for other activities (such as child care).

Thus, on the one hand, many part-time working women might compensate the *part-time penalties* with gains in work-family-balance in regard to job satisfaction. On the other hand, it turns out that for many part-time employees the earnings are too low to have an income above the risk-of-poverty threshold. Part-time working women are

often identified as "working poor" which means that they have less than 60 percent of the Austrian median equalized household income despite working. (Till-Tentschert et al., 2011, p.47)

In view of the Austrian divorce rate (nearly every second marriage becomes divorced) it is not rare that women end up alone with their children in a household. The risk-of-poverty-rate among single parents with their children is then 28 percent. In comparison, a one-child-family's risk-of-poverty rate yields 7 percent, a two-childen-family's risk-of-poverty rate yields 11 percent and a family's risk-of-poverty rate with more than 3 children yields 18 percent. Whether a family is at-risk-of-poverty depends most of all on the woman's employment status. (Till-Tentschert et al., 2011, p.53) Social benefits, family transfers (which are quite generous in Austria) and the men's earning income together often cannot compensate the lost earning income of the women. Therefore, labour force participation of married women, as well as of single mothers are crucial to avoid the risk-of-poverty.
When women end up living alone before or during their retirement, they form a group who are also at-risk-of-poverty above-average (Till-Tentschert et al., 2011, p.68). The current retired women often did not work at all since they belonged to the generation when the Male-Bread-Winner-Model was dominating. Nevertheless, women of the next generation who are characterized by a part-time employment history will suffer similarly. The part-time penalties do not only lead to lower life-time earnings and career prospects, but also lower social benefits when needed, like unemployment or pension income, since they have contributed less according to their lower incomes of the past.
Thus, it might be the case that part-time work seems to be appealing for women by offering the possibility to balance work and family. In case, however, women end up living without their partner, they might suffer from those part-time penalties. Therefore it is not only a question of how satisfied women are with their current part-time job arrangement and the division of child-care responsibilities with their partners. The main question is what is the alternative to balance work and family without missing earning, career, advancement and training prospects for the future, no matter if the woman becomes divorced, widowed or stays happily married.

It was shown before that the main reason for women to work part-time is child-care responsibilities while for men this is the least frequent reason to work part-time. It also was shown that women do two thirds of the household work. Why do women feel so much more responsible for the children and the household than men? And what are the influencing factors how a couple decides on the division of unpaid household and paid labour work?
Couples might base their decision about labour division on their comparative advan-

tages in different tasks. The wage should thereby represent the productivity in the job. If the man earns a higher hourly wage than the woman, the man is said to have a comparative advantage in the labour market and thus the woman has a comparative advantage in doing the household duties.

On average, men earn more than women in Austria and have therefore more often the comparative advantage in the paid job. More precisely, men earn on average 25.5 percent more than women. This so-called gender pay gap is wider in Austria than most other EU member states (Biffl, 2010, p.195). Looking at full-time white- and blue-collar workers only, women earn even a third less than men (Statistik Austria, 2011.[K]). Some wage differences can be explained by personal or job characteristics, similarly to the part-time penalty. However, even after taking account for different characteristics (for instance, job experience, education, industry, etc.) a gender pay gap remains within all industries (Biffl, 2010, p.203).

In other words, wages are a bad proxy for labour productivity as they are biased by gender discrimination. Thus, when couples decide about labour division based on their comparative advantages, women are usually in the inferior position. In most cases women earn less than their partners, often simply because of their sex, and decide on these grounds to specialize in care and household production.

Women committing less to their career and earning lower wages than men could also be consequences of evolution and tradition. The psychologists Buss and Barnes (1986) show in their study about human mate selection that women more than men prefer a partner with a *good earning capacity* ($p < 0.0001$) and *college graduates* ($p < 0.004$) and men more than women prefer a *physically attractive* partner ($p < 0.0001$). One hypothesis for this comes from evolutionary considerations in terms of *reproductive investment*.[3]

Accordingly, the fact that men more than women favor paid work instead of unpaid household work might trace back to evolution, which then has led to a traditional role allocation within a society. As a consequence, women themselves as well as men often believe because of traditions that women are more qualified to do care and household tasks. As a result, the gender pay gap as well as social attitudes about gender role allocation will hardly change as long as more women than men stay home to take care of their children and the household.

In Austria, traditional gender role allocation and associated gender inequity become apparent in the female attribution to care and household duties as well as in the gender pay gap in the labour market. What follows is that women often choose to work part-time in the paid job while men choose to work full-time. As a consequence, women

[3] In particular, past selection has favored men who preferred beauty since beauty implicated health. For women the men's attractiveness and age was not as relevant, however, past selection has favored women who favored the access to resources.

are hurt additionally to a *gender pay gap* by a *part-time penalty*. Women therefore often depend financially on their partners. Furthermore, women pay lower social security contributions. Part-time employment thus does not only affect the later job career, but also affects them if they become in the need of unemployment allowances or retirement. Especially, if the relationship or marriage becomes separated, women - in particular women with children and retired women - will face then a high risk of poverty.

What can be concluded is that the prevailing *One-and-Half-Earner* variant does not contribute enough to secure women's own independence and to gender equity. Therefore, on the one hand, it might seem advantageous to encourage women to participate full-time in the labour market. Different policy instruments, in particular the extension of child care places, have already been implemented to achieve a higher female labour force participation. If children are present, household and care work will increase, and so, on the other hand, it might not be optimal for a family that only the woman increases her working time in paid work and outsources the care work.
Thus, perhaps a *Dual-Breadwinner model* in which both work part-time should be encouraged. Fathers should be encouraged to reduce working hours in the wage job so that their partners can increase their working hours in the wage job. Both might not work full-time, but both should work sufficiently to secure oneself. None of the couple should sacrifice more work experience and career opportunities than the other. Both should face equal opportunities in their wage jobs. Both should be equally involved in child-care and household work. Furthermore, the intra-household labour decisions should not be based on traditional gender role allocation.

1. Introduction

In the recent years the Austrian family policy focused on increasing women's participation in the labour market as well as increasing their working hours. Some examples for such policies are the extension of public child care places and the introduction of increased child deductibles if both parents claim them. There exists also prolonged entitlement for child care allowance the first year(s) after birth if the allowance is claimed by both parents; especially fathers should thus be encouraged to stay home while the mothers are encouraged to go back to work. The policy reforms have maybe contributed to increasing employment rates of women. At the same time, however, the share of part-time working women has been increasing as well. In particular, in families with small children mothers often choose to work part-time whereas fathers choose to work full-time. The unpaid household and care work are thus assigned mainly to women. Lewis (2001) calls this arrangement the "*One-and-Half-Earner model*". It replaced the former dominating family arrangement which used to be the "*Male-Breadwinner model*". In the prevailing *One-and-Half-Earner* variant women mostly do not participate enough to secure their own independence. As a consequence, especially non- or part-time working women are at high risk of poverty if they become divorced or widowed. One of the barriers that mothers of children with caring needs do not work as much as their partners in wage jobs is the difference in wages between genders. On average, men earn more than women in Austria; the Austrian *gender pay gap* accounts for 25.5 percent (Biffl, 2010, p.195). Some wage differences can be explained by personal or job characteristics, however, even after taking account for different characteristics (for instance, job experience, education, industry, etc.) a gender pay gap remains within all industries (Biffl, 2010, p.203). Therefore husbands have more often the comparative advantage in the paid job. Hence, wages are a bad proxy for labour productivity as they are biased by gender discrimination. Thus, when couples decide about labour divison based on their comparative advantages, women are usually in the inferior position. In most cases women earn less than their partners, often simply because of their sex, and decide on these grounds to specialize in care and household production. In the case women choose to work part-time in the labour market they are gaining less work experience and sacrifice career opportunities. Furthermore, part-time workers depend financially mostly on their partners. If the relationship or marriage becomes divorced, women and in particular women with children will face the risk of poverty.

Because of low part-time incomes, women do not contribute enough to their social security. Marginally occupied workers are not covered by social security at all. Part-time workers often do not contribute enough for sufficient unemployment benefits and for future pension income. Since in particular women have not contributed enough or long enough to the pension system, a considerable part of female elderly belong to the group who are catogorized as *at-the-risk-of-poverty*. At present times when social security contributions are needed due to demographic changes, it is worthwile to encourage everyone to fully cover oneself.
For these reasons it seems advantageous to encourage women to participate full-time in the labour market. However, if children are present, household and care work will increase. It might not be optimal for a family that both parents work full-time in paid work and outsource all of their household and care work. What maybe should be encouraged then is that fathers reduce working hours. Suppose full-time working men reduce their working hours, then their non-working or marginally working partners can increase their working hours since their time needed for the household work is done by their husbands. The idea is to make men choose more likely household work and make women choose more likely market work. Both will not work full-time, but both will work sufficiently to secure oneself. None sacrifices more work experience and career opportunities than the other. Both face equal labour division and equal income.

Until now, policy instruments mainly targeted women. Policy instruments have tried to incentivize mothers to participate in the labour market or increase their working hours. Except for the prolonged child care allowance, fathers have not been given much attention. Now, I want to find an instrument which not only activates women for the labour market, but also activates men for care and household work. In order to increase women's and decreases men's comparative advantages in the labour market, wages must be equalized between genders. This has lead me to the idea of a differential tax structure for women and men. A *Gender-Based Tax System* which favors women could provide not only incentives for women to work more, but also incentives for men to work less in the paid job. I assume that women will thus work less and men will work more in care and household work.
The paper starts with the theory and its implications which are behind a gender-based tax system and summarizes the related literature on that topic. Second, the labour supply model by the Institute for Advanced Studies is introduced with which the reform is simulated. For this, the theoretical framework and the data set of the model are described as well as the technical procedure of how an estimate of the Austrian labour supply function is derived. Next, the work goes into the simulation of a gender-based tax reform: the reform and its static impacts are explained on specific households, on households in total and on the state; in the final step the employment effects of such a reform are evaluated using the behavioural part of the model.

2. Theory and Implications

According to neoclassical microeconomics, see for instance Gravelle and Rees (2004), the model which deals with consumers' allocation of time spent at work assumes the following: The consumer's utility function is determined by consumption goods and leisure. More leisure is preferred, hence, the marginal utility of leisure is positive. An increase in labour supply, i.e. less leisure, must be compensated by an increase in consumption goods, i.e. an increase in real income, to keep utility constant. The consumers want to maximize utility facing the constraint that they cannot spend more than their income and time is constrained by 24 hours. Labour income is determined by working hours and the wage rate; the price of leisure is equal to the wage rate.
Changes in the wage rate have an effect on labour supply, which can be divided into an income and a substitution effect. The change in labour supply due to the wage change, with consumption level or real income held constant, is the *substitution effect*. The change due to the change in real income, with relative prices held constant, is the *income effect*. It is assumed that leisure is a normal good, in other words, leisure rises as income rises, with relative prices held constant (the *income effect*). An increase in the wage rate, with real income held constant, always leads to an increase in labour supply, i.e. decrease in leisure (the *substitution effect*). More formally, the first derivative of the labour supply function is negative with respect to income and positive with respect to the wage rate. The slope of the labour supply function could be positive or negative if leisure is a normal good. If the income effect exceeds the substitution effect in magnitude, labour supply will decrease after a wage rise. If, however, the substitution effect exceeds the income effect in magnitude, labour supply will increase after a wage rise. It is plausible that the labour supply curve is backward sloping, which means that a wage rise for low wage levels leads to an increase of labour supply. For high wage levels, leisure might be analogous to a Giffen good, so that labour supply decreases as the wage rate increases.

If a progressive wage tax was introduced, labour supply could thus increase or decrease. This tax is called *distortionary*. A distortionary tax is *inefficient* since the revenues could be increased by a lump-sum tax whereby the substition effect could be avoided. However, tax policy is not only concerned about efficiency, but also about equity and the welfare of society. While efficiency of a tax reform is measured by the net benefits of different groups, equity can be measured, for instance, by the gains and

losses of income deciles. In addition, the social value of the gain of one group could outweigh the social value of the loss of another group. For example, a tax reform which exempts young job beginners might bring about lower tax revenues and does not contribute to more equity within the population, but the gain of this group might be socially valuable.

The elasticity of labour supply is the percentage change in working hours as a result of a one percent change in wage. Stiglitz (2000) summarizes widespread agreements about estimated labour supply elasticities that among married and single individuals, married men are least responsive and married women are most responsive to changes in the wage rate.
The distortion of a tax (the deadweight loss or the excess burden of the tax) is larger the more responsive the labour supply. Hence, if a married woman is more responsive to a wage decrease than a married man, the deadweight loss by a married woman will be larger than by a married man.

Now, I want to suggest a gender-based tax system. The tax reform lowers the marginal tax rate for women and increases the marginal tax rate for men. The net wage of a woman thus increases and the net wage of a man decreases. The household income of a married couple can therefore increase or decrease depending on the couple's wage rates and hours worked.

Prediction I:
a) A married working woman whose household income increases due to the reform will want to work less due to the income effect and work more due to the substitution effect. Her substitution effect outweighs the income effect, make her work more and stay home less hours. A married working man whose household income increases will want to work less since the income effect and the substitution effect point to the same negative direction.
b) A married working woman whose household income decreases due to the reform will want to work more since the income effect and the substitution effect point to the same direction. A married working man whose household income decreases will want to work more due to the income effect but work less due to the substitution effect. His substitution effect outweighs the income effect, make him work less and stay home more.

Prediction II:
A single working woman's household income increases. She will want to work less due to the income effect and work more due to the substitution effect. Some single women want to work more, some want to work less after the reform.

Prediction III:
A single working man's household income decreases. He will want to work more due to the income effect and work less due to the substitution effect. Some single men want to work more, some want to work less after the reform.

Prediction IV:
The new tax system is more efficient. Since, empirically, men have lower labour supply elasticities than women, tax revenues will increase after considering labour supply adjustments. Therefore, even if the gender-based tax reform is constructed revenue-neutrally in the non-behavioural scenario, the reform leads to a rise in tax revenues after accounting for behavioural adjustments.

Prediction V:
A gender-based tax system does not increase equity with regard to income distribution within society. The idea of this tax reform is to redistribute money from men to women. However, couples where the wage difference between the woman and the man is large will be worse off since the woman is not able to compensate the husband's loss. Single women, who are often single mothers and placed in lower income quantiles, will gain though; single men are clearly the losers of this reform.

Prediction VI:
A gender-based tax system contributes to more gender equality in society. Men's and women's net wages will converge whereby a couple's decision of deviding paid work and unpaid household work should be more balanced. Women will participate more and work more hours in the labour market. As a consequence, women will be less dependent on their partners. The social value of the gain in gender equality outweighs the losses induced by this reform.

3. Related Literature

In this context, Alesina, Ichino, and Karabarbounis (2011) propose gender-based taxation. Based on individualistic utilities, they set up a collective household model in which different elasticities of labour supply between genders arise endogenously. Couples Nash-bargain about working time and goods and either because of wage differences or because women are assigned to household work due to cultural reasons, different labour supply elasticities for men and women emerge. They find out that if men face a higher marginal tax rate than women, the intra-household bargaining solution will change. Furthermore, they conclude that under gender-based taxation the division of unpaid and paid work will be more balanced between genders; women will commit themselves to higher wage careers so that in the long-run elasticities of labour supply will start to converge.

The first model of gender-based taxation goes back to Boskin and Sheshinski (1979). They do not only show that income splitting is non-optimal, but marginal tax rates of the secondary earner (the one with higher labour supply elasticity - usually the woman) should be about half of that on the primary earner in order to minimize the deadweight loss from the tax system.

Apps and Rees (2007) oppose the model by Boskin and Sheshinski (1979). They set up a household production model in order to capture utility possibilities not only determined by household income, but, additionally, by household production. Considering different productivities in household production between households, they conclude that it might be optimal to tax women higher than men.

Marcassa and Colonna (2011) investigate alternative tax systems for Italy - among them gender-based taxation. Within a two-stage model of female labour supply, a woman decides first whether to participate or not in the labour market and, second, she will choose the amount of working hours which maximizes her utility. They define a utility function, determined by leisure, disposable household income and demographic characteristics. After the specification of a logit model for entering the labour market or not, and given the observations from the data of EU-SILC 2007-2008, they are able to compute the log-liklihood function for the coefficients of the utility function for married and unmarried women. Thereafter, they simulate a 50 percent reduction in female tax rates, financed by a decrease in tax credits for dependent spouse and a decrease in a universal cash transfer. They indicate an increase in the female participation rate, in particular, among skilled and higher educated women.

Bastani (2012) explores the optimal tax implications resulting from the model by Alesina et al. (2011). For this, he performs numerical simulations using parameters from available empirical estimates (Swedish data from 2005) and calibrated parameters. The results vary according to parameters of bargaining power and the wage gap between genders. He concludes that in the case the wage gap between genders is large, the optimal tax rate for women should be lower than for men. However, one can interpret the lower tax rate for women as subsidizing day care expenditures which will rise the net wage rate for women.

Guner, Kaygusuz, and Ventura (2012) study the aggregate effects of a gender-based tax system in the US by the use of a macroeconomic life-cycle model. They implement five scenarios, varying in the tax rates for married women and the ones who finance the reform.[1] They suggest that a proportional income tax achieves higher welfare effects than gender-based tax rates. Low educated women are activated more for the labour market by all reforms. Still, low type couples are the losers of a gender-based tax schedule due to the loss of the husbands' income. Couples with high skilled women are the winners.

Immervoll, Kleven, Kreiner, and Verdelin (2009) study the welfare gains by taxing secondary earners at a lower rate among 15 EU countries with the microsimulation model EUROMOD. They define the primary earner as the one with higher earnings and the secondary earner as the one with lower earnings; in the following, they compute the participation tax rate for each.[2] By the use of the data and tax schedule of 1998, they find the average participation tax rate of 0.63 for Austrian primary earners and 0.36 for Austrian secondary earners.[3] Since women are mostly the secondary earners, the difference in the participation tax rate can be viewed as differential tax rates for men and women. Furthermore, they simulate a reform whereby secondary earners are taxed at lower rates, financed by one-earner couple households. For different participation elasticity scenarios they calculate then the trade-off between the loss of a one-earner and the gain of a two-earner couple household. They conclude that reduced tax rates for secondary earners would bring in welfare gains for all countries.[4]

[1] First, they replace the US tax system by a proportional tax system with a tax rate of 10.2 percent. In the second (third) scenario the tax rate for married women is 8 (4) percent and the tax rate for married men and singles is 10.95 (12.10) percent. In the fourth (fifth) scenario the tax rate for married women is 8 (4) percent again and the tax rate for married men is 11.5 (13.45); singles' tax rate remains 10.2 percent.

[2] The participation tax rate for the primary earner is the change in family tax liability if he or she takes up his or her job - given the secondary earner does not work - as a share of the primary earner's income. The participation tax rate for the secondary earner is the change in family tax liability if he or she takes up his or her job - given the primary earner works - as a share of the secondary earner's income. This formula takes into account family-based and means-tested transfers.

[3] Only in the United Kingdom a larger difference between primary and secondary earners' participation tax rate could be discovered.

[4] Besides, Immervoll et al. (2009) analyze the optimal design for the simulation. They searched whether a unitary or collective approach is more convenient and derived that both approaches are similar due to the assumption of pareto efficient intra-household labour decisions.

Van Soest and Stancanelli (2010) are the first who search empirically the impact of income taxation on the time allocation to paid labour work and unpaid household work. They set up a discrete choice model with seven market and seven household work intervals to choose from, designed as a unitary household model and using data from the 1998-1999 French Time Use Survey. One of the results points out a lower marginal utility of housework of a married man compared to a non-married man (with partner). Having children increases the man's time but less than it increases the woman's time for household duties. Furthermore, they simulate a tax reform which not only replaces the French joint tax system by an individual tax system, but also lowers tax rates for women by 10 percent. Market hours of women would increase by 9.8 percent and their housework would decrease by 6.4 percent; market hours of men would decrease by 2.3 percent and their housework would increase by 1.3 percent. Thus, they conclude that gender-based taxation directs to a more balanced division of paid and unpaid work between couples.

For another contribution to gender-based taxation, I propose gender-based taxation for Austria. I am going to use the labour supply model by the Institute for Advanced Studies to simulate a gender-based tax system for Austria.

4. The Labour Supply Model

This section introduces the analytic which is behind the labour supply model by the Institute for Advanced Studies (ILSA). In general, the goal of labour supply modelling is to find out the behaviour process which is behind the choice of certain working hours by an individual. The concept of the model ILSA follows the approach by Van Soest (1995) and is based on three main suppositions.
First, the model is set up in a neoclassical framework where agents maximize their utility by trading between leisure and consumption. Utility is represented by a utility function. Second, the model is a discrete choice model. It is assumed that people face a discrete set of working hour categories. In contrast to the continuous model, the discrete model deals better with discontinuous budget constraints (for example discontinuity due to unemployment assistance) and simplifies the complexity of the calculation. Furthermore, the discrete approach makes the model more realistic as in real life people generally face a discrete supply of working hour options such as full-time, part-time or marginal occupation. Third, the model is conceived as a unitary household model where households with a couple face a unitary utility function. It is assumed that couples optimize together utility by choosing a household income and individual leisure.[1]

The labour supply model by the Institute for Advanced Studies is divided into an estimation and simulation part, which are both programmed in STATA. The first part estimates the labour supply function. The second part simulates policy reforms by the use of the estimation results from the first part.

4.1. The Utility Function

The following descriptions of the model are based on Creedy and Kalb (2005).
A utility function is defined for each household containing singles or couples. The level of utility is determined by the amount of personal income or household income and each individual's leisure; it is increasing in income and leisure and bound by time and budget constraints. The time constraint is 24 hours per day, the budget constraint

[1] Comparable labour supply models are for instance *izamod* (Peichl, Schneider, & Siegloch, 2010), *stsm* (Steiner, Wrohlich, Haan, & Geyer, 2008) or *attm* (Steiner & Wakolbinger, 2009)

is an individual's hourly wage times the maximum working hours.

Utility for an individual $i = 1,...,N$ is defined by an observed part V_i and an unobserved part ε_i.

$$U_i = V_i + \varepsilon_i \tag{4.1}$$

Observed utility is calculated from observed data such as the working hour category $j = 1,...,J$ and the associated income y, male leisure time m and female leisure time f, as well as personal or household characteristics Z, which might influence the choice of a working hour category of the household $i = 1,...,N$.

$$V_{ij} = V(y_{ij}, m_{ij}, f_{ij}; Z_i) \tag{4.2}$$

V_{ij} is set up as a quadratic function of the variables (y_{ij}, m_{ij}, f_{ij}) which allows for diminishing returns of income and leisure. Furthermore, interaction terms with income and leisure are included.

$$\begin{aligned} V_{ij} = \bar{\alpha}_y y_{ij} + \bar{\alpha}_m m_{ij} + \bar{\alpha}_f f_{ij} + \beta_y^2 y_{ij}^2 + \beta_m^2 m_{ij}^2 + \beta_f^2 f_{ij}^2 \\ + \beta_{ym} y_{ij} m_{ij} + \beta_{yf} y_{ij} f_{ij} + \beta_{mf} m_{ij} f_{ij} \end{aligned} \tag{4.3}$$

Observed heterogeneity among households is specified through the vectors $\bar{\alpha}_y$, $\bar{\alpha}_m$ and $\bar{\alpha}_f$. Each of these vectors contains a parameter which measures the direct preference for income and leisure β_y, β_m and β_f plus an additional vector of parameters $\bar{\gamma}_y, \bar{\gamma}_m$ or $\bar{\gamma}_f$ which measures the effect for each of the individual or household characteristics Z_i on the preference for the associated variable.

$$\begin{aligned} \bar{\alpha}_y &= \beta_y + Z_i' \bar{\gamma}_y \\ \bar{\alpha}_m &= \beta_m + Z_i' \bar{\gamma}_m \\ \bar{\alpha}_f &= \beta_f + Z_i' \bar{\gamma}_f \end{aligned} \tag{4.4}$$

The unobserved part of the utility function is described by a random error term ε and

subsumes measurement errors, optimization errors, plus errors due to unobserved characteristics (Creedy & Kalb, 2005).

4.2. The Conditional Logit Model

Because of the random error term in the utility function from chapter 4.1, an individual's utility cannot be predicted exactly, but only the probability of that choice can be estimated.

Assuming an individual chooses the working hour category i and not *one* other working hour category denoted by j, then the probability that utility by choosing i is larger than utility by choosing j is given as

$$p_i = P(U_i^* > U_j^*) = P(V_i + \varepsilon_i \geq V_j + \varepsilon_j) = P(\varepsilon_j \leq V_i - V_j + \varepsilon_i) \quad i \neq j \tag{4.5}$$

Assuming now an individual chooses the working hour category i and not *all* other working hour categories denoted by j, then the probability that utility by choosing i is larger than utility by choosing j is given as the joint probability

$$\prod_{i \neq j} P(\varepsilon_j \leq V_i - V_j + \varepsilon_i) \tag{4.6}$$

or

$$\prod_{i \neq j} F(V_i - V_j + \varepsilon_i) \tag{4.7}$$

If ε takes only discrete values from k=1,...K, then denote $F(\varepsilon_k)$ as the proportion of values less or equal to ε_k and $f(\varepsilon_k)$ the proportion of values equal to ε_k.
The probability of working hour i to give the highest utility, denoted as P_i, is thus

$$p_i = \sum_{k=1}^{K} \{[\prod_{i \neq j} F(V_i - V_j + \varepsilon_k)]\} f(\varepsilon_k). \tag{4.8}$$

However, ε is assumed to be a continuous random variable, $f(\varepsilon)$ and $F(\varepsilon)$ are the density and distribution functions of ε and equation 4.8 can be rewritten as

$$p_i = \int_{-\infty}^{+\infty} [\prod_{i \neq j} F(V_i - V_j + \varepsilon_i)] f(\varepsilon_i) \mathrm{d}\varepsilon_i. \tag{4.9}$$

It is assumed that ε_i follows a type I extreme value distribution. The arithmetic mean of this distribution is the Euler's number;
its density function is

$$f(\varepsilon_i) = e^{-\varepsilon_i} e^{-e^{-\varepsilon_i}} \tag{4.10}$$

and the distribution function is

$$F(\varepsilon_i) = e^{-e^{\varepsilon_i}}. \tag{4.11}$$

By substituting $F(\varepsilon_i)$ and $f(\varepsilon_i)$ into equation 4.9, the so-called conditional logit model can be derived as[2]

$$p_i = \frac{e^{U_i}}{\sum_{j=1}^{n} e^{U_j}} \tag{4.12}$$

For all individuals k=1,2,..M the probability that for each the actual working hour category i is chosen is given as the joint probability of equation 4.12.

$$p_{i_1} p_{i_2} \cdots p_{i_M} = \prod_{k=1}^{M} \frac{e^{U_{i_k,k}}}{\sum_{j=1}^{n} e^{U_{j,k}}} \tag{4.13}$$

Utility depends on a vector of coefficients ($\bar{\alpha}_y$, $\bar{\alpha}_m$, $\bar{\alpha}_f$, β_y, β_m, β_f). Hence, the probability in equation 4.13 can be rewritten as a Likelihood Function of unknown vectors of parameters.

[2]For a detailed description of the derivation see Creedy and Kalb (2005)

$$\mathscr{L}(\bar{\alpha}_y, \bar{\alpha}_m, \bar{\alpha}_f, \beta_y, \beta_m, \beta_f) = \prod_{k=1}^{M} \frac{e^{U_{i_k,k}}}{\sum_{j=1}^{n} e^{U_{j,k}}} \tag{4.14}$$

Maximum likelihood estimates for the coefficients are estimated to solve the model; for further details see, for instance, Train (2003).

5. The Data

5.1. Data Set

The data is the EU-SILC: Community Statistics on Income and Living Conditions. The survey is a household survey and obligatory for all EU member states since 2004. The target of EU-SILC is to capture household income in combination with household characteristics and is thus very convenient for tax-benefit-microsimulations and labour supply modelling. The EU-SILC is designed as a cross-sectional and a longitudinal data set. This means that three fourths of the households of the previous year are reinterviewed in the following year, one fourth of the households leaves the sample in the following year and one fourth is interviewed for the first time in the following year. This mechanism is repeated every year. The first Austrian rotational panel of EU-SILC was therefore available in 2007.[1]
Each household in the sample is given a cross-sectional weight. The weights ensure that households with similar socio-economic characteristics in the population are represented well in the data set.[2] The cross sections' dimensions range from 4,500-6,800 households and consist of about 14,000 individuals. The sum of all weights accounts to the size of Austria's population of about 8 million people. In addition each observation has longitudinal weights to ensure the representation of the Austrian population when using the panel data set.

5.2. Model Data

For the *estimation part* of the labour supply model the pooled cross-sections of EU-SILC 2004-2008 are used. Two year panel information of EU-SILC are used to prepare the data set for the model. Since income data of a cross-section relate to information of the previous year, income variables of one year are merged with the same observations in the previous year. Hence, the information about employment status (working time, overtime, occupation, etc.) corresponds with the information about the income (earn-

[1] The method of the survey are described in detail, for instance, in Till-Tentschert et al. (2009).
[2] The weights include further non-response and design weights. For further information see Till-Tentschert et al. (2009)

ing income, transfers, taxes, etc.).[3] The volumes of each cross section before and after the income correction are summarized in table 5.1. The pooled cross sections from 2004 to 2008 consist in total of 42,873 observations. All monetary values are updated with the consumer price index to the value of 2008 in the pooled cross-section as well as in the income corrected EU-SILC 2008.

Furthermore, the sample is restricted to observations who labour supply is going to be modeled for. The *restricted* sample consists of individuals above the age of 15, women younger than 60 and men younger than 65. Observations who are in education, receive a scholarship or are in a job training, observations who are doing military or civilian service, people who are receiving old-age- or invalidity-care allowance or pension income, self-employed and women who are receiving maternity allowance (8 weeks before and after birth) are excluded from the relevant sample. Households without any relevant individual are dropped from the pooled cross section. In the end, the pooled cross sections from 2004 to 2008 contain 30,912 observations.

In the *non-behavioural policy simulations* the corrected cross section of 2008 is used later on with 8,121 observations. Two-year panel weights are used for this sample in order to represent Austria's population after the drop-out of observations which do not occur in 2009. The weighed sample accounts to 7,363,626 individuals. Table **??** in the appendix describes the characteristics of the labour force from the income corrected EU-SILC 2008. Labour force is defined here as everybody above the age of 14 and women younger than 60 and men younger than 65 years. The mean age is 38 (12) among women and 40 (13) among men. 38 percent of women and 42 percent of men are singles. About 88 percent of the labour force are Austrian citizens. Around 15 percent of men and women describe themselves as *slightly handicapped* and 6 percent of women and 7 percent of men as *severely handicapped*. 52 percent of women and 43 percent of men live in a household with children. The share of each Austrian state's residents represent very well the actual shares: most people live in the capital Vienna and in the biggest states Lower and Upper Austria; fewest people live in the smallest states Burgenland and Vorarlberg. Women have on average 17 (10) years and men have on average 22 (10) years work experience. The highest attained school level is compulsory education for 22 percent of women and 17 percent of men, is vocational training (craftsman) for 29 percent of women and 42 percent of men, is a school with lower vocational education for 15 percent of women and 12 percent of men, is a school with higher vocational education for 13 percent of women and 11 percent of men, is a grammar school for 9 percent of women and 7 percent of men, and university for 12 percent of women and 11 percent of men. In total, the educational level seems

[3] Some corrections were required: If one individual of a household has left the sample in the following year even though other household members remained or an individual indicated incorrect statements about gender or year of birth, the whole household was dropped. Hence, household compositions remained unchanged.

representative for the Austrian population. Furthermore, 15 percent of women and 31 percent of men are blue-collar workers, 38 percent of women and 29 percent of men are white-collar workers; about 5 percent are civil servants and 2 percent work in agriculture; 5 percent of women and 8 percent of men are self-employed. About a third of the female labour force and a quarter of the male labour force are not occupied. Men work especially in construction and manufacturing; female jobs are especially within the industries manufacturing of food, health, tourism and education.

In the *behavioural policy simulation* labour supply effects are only computed for the *restricted* sample of 2008. The sample consists of 1,342 women and 1,312 men who represent 2,466,649 Austrians in total. The characteristics of the restricted sample are similar to the total labour force described above. The descriptive statistics are depicted in table **??** in the appendix in detail. Women's and men's mean age is still about 40 years. About a third of the observations are singles, two thirds are married. There are 707 relevant couples and 1,240 relevant individuals who are either single or have an *inflexible* (i.e. irrelevant) partner. About 87 percent of the observations are Austrian citizens. Again, 52 percent of women and 48 percent of men live in a household with children. Individuals have slightly more job experience in the restricted sample; the difference between men and women is still about 5 years. Among the restricted observations, 21 percent of women and 45 percent of men are blue-collar workers, 52 percent of women and 41 percent of men are white-collar workers and 7 percent of women and 9 percent of men are civil servants.[4] 20 percent of women and 5 percent of men are not occupied; the shares are far less compared to the total sample due to the restrictions like, for instance, receiving pension income or being in education. A quarter of male observations work in the construction sector; women still dominate the tourism, education and health sector. The shares of men and women who work in manufacturing is higher in the restricted than in the total sample.

Table 5.1.: Data Volume

	EU-SILC[Year]		EU-SILC[Year]_corrected	
	Unweighed	Weighed	Unweighed	Weighed
2004	11,550	8,048,194	7,306	-
2005	13,043	8,141,317	8,852	-
2006	14,883	8,182,245	10,363	-
2007	16,684	8,214,415	8,231	-
2008	13,631	8,241,548	8,121	7,363,626
pooled	-	-	42,873	-

Source: EU-SILC 2004-2009, ILSA 2012

Note: Income data of a cross-section relate to information of the previous year, therefore, income variables of one year are merged with the same observations in the previous year. Thus, the *corrected* EU-SILC contain fewer observations and two years panel weights are used.

[4]Remember that the restricted sample does not include farmers and self-employed.

6. Estimation of Austria's Labour Supply

The first part of the Labour Supply Model by the Institute for Advanced Studies estimates the labour supply for Austria. It is based on the assumption that households choose from a discrete set of alternatives of working hours. For each working hour category a household's annual *notional* gross income is then computed for each of these working hour categories. Individuals' observed gross wages from the data are used. In case there is no wage information, wages are predicted by a wage regression. The *notional* incomes are computed with the static tax-benefit microsimulation model by the Institute for Advanced Studies (ITABENA[1]).
As an underlying assumption, an individual has maximized his or her utility by choosing the observed working hours. A couple is expected to maximize their household's utility by choosing a combination of working hours. Therefore, the coefficients of the labour supply function are estimated by a conditional logit model. The estimated Austrian labour supply is the result of the first part of the model.

6.1. Preparation

6.1.1. Working Hour Categories

Households with one or two relevant individuals maximize their utility by choosing from a discrete choice of working hours. Six working hour categories for the individuals are defined. For each category the weekly working hours (which later will also be needed for the income computation) are computed as the median of the observed working hours within this category, separately for men and women. The limits and medians are summarized in table 6.1. The set of working hour choices for a household consists then of 36 alternatives, which are the combinations of individual categories.

[1] ITABENA is described in detail in the appendixA.2.

Table 6.1.: Working Hours Categories & Median Working Hours per Year

WOMEN	min	max	2004	2005	2006	2007	2008
Category 1	0	0	0	0	0	0	0
Category 2	1	10	8.5	8	8	8	8
Category 3	11	20	20	20	20	20	20
Category 4	21	30	27	25	25	25	28
Category 5	31	40	40	40	40	39	40
Category 6	41	99	43	42	43	43	48
MEN	min	max	2004	2005	2006	2007	2008
Category 1	0	0	0	0	0	0	0
Category 2	1	10	9	6	5	10	4
Category 3	11	20	20	20	20	20	20
Category 4	21	30	29	26.5	28	28	27.5
Category 5	31	40	40	40	40	40	40
Category 6	41	99	44	44	44	43	50

Source: ILSA 2012

Note: There are 6 working hour categories which individuals can choose from. A category is defined from min to max working hours. The observed median working hours differ between years and gender and will be necessary for notional earning income calculations in ILSA.

6.1.2. Gross Hourly Wages

An individual's notional earned income is relevant for his, her or the household's utility. Therefore the notional income must be computed for all specified labour hour categories. Within a working hour category an individual's notional earning income is calculated with his or her gross hourly wage times the median of working hours of that category.

For employed individuals hourly wages are calculated from (i) observed annual earned income, (ii) months in employment and (iii) weekly working hours (plus over-time) out of the data:

$$Hourly\_Wage = \frac{annual\_earned\_income/months\_in\_employment}{daily\_working\_hours/7 * 30.5 + monthly\_paid\_overtime} \quad (6.1)$$

For some individuals no wages can be observed in the data. The underlying theory claims that for these individuals the offered market wage is below the reservation wage. In other words, wages are often missing for those whose opportunity cost of leisure (including household and care work) is said to be higher than their offered market wage. Indeed, there is no wage information for presumed housewives plus individuals who receive transfers such as child care allowance, unemployment or social

assistance within all surveyed years.
Since the observations without wage information are as relevant for labour supply modelling as observations with wage information, their wages are predicted within a regression analysis.

First, the following model (6.2) is used to predict the wages for the subsample of those who have indicated that they do have a wage

$$w_i = x_i'\beta + \varepsilon_i \tag{6.2}$$

where w stands for the observed wage, the vector x for the explanatory variables and ε for the error term for individual i = 1,...,N. Ordinary least squares are used to estimate the coefficients. The error term ε is assumed to be normally distributed, with a mean of zero and constant variance. The regression function of the subsample is the same as that of the population. However, since the sample is not complete (as the subsample does not include individuals without any observed wages), the estimators of parameters are biased and hence inefficient. A method to eliminate this so-called *sample selection bias* was developed by Heckman (1979). His two-step procedure allows to predict wages for the subsample without wage observations.

In the first step the probability that an individual works (and receives a wage) is predicted by the following probit model

$$z_i = y_i'\gamma + u_i \tag{6.3}$$

where z stands for the probability, the vector y for the explanatory variables and u for the error term for individual i = 1,...,N. u and ε are assumed to be correlated; hence the expected wage given that a wage is observed equates to

$$E(w_i|z>0) = x_i'\beta + E(\varepsilon_i|z>0) \tag{6.4}$$

where the conditional expected value of the error term is not zero, but

$$E(\varepsilon_i|z>0) = corr(\varepsilon_i, u_i) * \sigma_\varepsilon * \lambda_i. \tag{6.5}$$

λ is the inverse Mills ratio, derived from the probit model and the error term's property of being normally distributed

$$\lambda = \frac{\phi(-(y_i'\gamma)/\sigma_u}{1-\Phi(-(y_i'\gamma/\sigma_u)} \tag{6.6}$$

with ϕ representing the density and Φ representing the cumulative density function of the standard normal distribution.

In the second step the wage regression is constructed as in equation 6.2 including the Mills ratio as an additional regressor.

The estimation of wages is done for men and women separately. For identification purposes some explanatory variables of the probit model (wage selection) must differ from the wage regression model. The estimates are shown in the appendix A.1 and an abstract of the results is given in the box below.

Wage Estimates

Within the male sample there are 6,285 observations *with* and 905 observations *without* a wage. The additional variables are the logarithm of other household members' income, dummies for children of different age groups and the Austrian state of residence (Vienna excluded) in the probit model. The sign of the coefficient for other household members' income is positive and significant at the 5 percent level, as well as the dummies for a child younger than 3 years, for a child between 10 and 15 years, and the state Burgenland. Furthermore, job experience, vocational school with higher education, full- and part-time employed months during the present and previous year are significant and positive in sign; coefficients for unemployed months during the present and previous years are significant and negative in sign. The Mills ratio, however, has no significant impact on the wage regression model.

In the male wage regression the constant is 1.8630. Coefficients which are significant and positive in sign are those of job experience (0.0185), any education level higher than compulsory education (increasing with the level), only full-time employed months (0.0404) during the present year but full- (0.0134) and part-time (0.0229) employed months of the previous year. Furthermore the coefficients of various industry groups (see in the estimation output), of the dummy for Austrian citizenship (0.1463) and the year dummies 2006 (0.0358) and 2007 (0.0351) (compared to 2004) are positive in sign and significant. Coefficients which are significant and negative in sign are those of the square of job experience (-0.0003), age (-0.0214), of the dummy for singles (-0.0849) and the dummies of handicap (-0.0458) and severe handicap (-0.1406).

Within the female sample there are 5,055 observations *with* and 2,693 observations *without* a wage. In the probit model the same additional variables are used as for men plus unemployed months and months working in the household during the last two years. Neither the coefficient of other household members' income is significant at the 5 percent level nor the coefficients of the dummies for children of different age groups. Living in Burgenland, Carinthia, Lower or Upper Austria are positive in sign and significant (compared to Vienna). The coefficient of having been a housewife for two years is significant and negative in sign. The Mills ratio yields 0.2718 and is significant at the 5 percent level; therefore the ratio does have significant impact on the female wage regression model.

In the female wage regression the constant is 0.9688. The coefficient for job experience is significant, positive in sign and lower than in the male wage regression (0.0089). Significant, positive and lower are as well the dummies for education levels with A-level or university degree. The impact of having a vocational training (compared to compulsory school only) is higher for women than for men. The impact of present full-time employment (0.0578) is slightly higher for women than for men and in contrast to the male regression the present dummy for part-time employment is significant (0.0447) in the female regression. Full-time employment in the previous year is not significantly increasing the wage among women, however, part-time employment in the previous year is significant and positive in sign. The coefficient of age is negative too (-0.0163), but in contrast to the male regression the coefficient of the square of age is negative in sign (-0.0002). Interestingly, single women have higher wages than married women while among men the opposite was found. The coefficient of the single dummy is 0.0395 and significant at the 5 percent level. The dummies for handicap are very similar between men and women. The dummy for Austrian citizenship is significant, positive in sign and lower (0.1117) than in the male regression. The coefficients of the dummies for Tyrol and Vorarlberg are positive in sign (compared to all other Austrian states) and significant at the 10 and 5 percent level respectively.

After the wages have been identified for each individual, the following steps are conducted:

In the case of individuals *with at least one observed wage* it is assumed that their earning potential is represented by their wage which is constant over time, but measured with error. Therefore the average is computed of all cross section years in which one has indicated his or her wage.
To adjust the standard deviation of observed wages to the standard deviation of predicted wages the lowest and highest percentile of observed wages are dropped. The standard deviation of observed wages is thus adjusted to the standard deviation of predicted wages. Hence, the standard deviation is reduced while the median of observed wages remains unaffected.

In the case of individuals *without any observed wages*, they are assigned their predicted wages (which might differ between cross-sections).
To correct the wage estimation, first the deviation between observed and predicted wage is computed for each individual with at least one observed hourly wage.[2] Second, the error terms are drawn and randomly allocated to predicted wages for individuals without any observed wages.[3]

Individuals are dropped from the sample if they have indicated no annual earned income despite positive weekly or monthly working hours, or no weekly or monthly working hours despite positive earned income or if they have indicated negative weekly working hours.

The wage statistics of *observed* and *predicted* wages for men and women are summarized in table 6.2. Within the pooled cross-sections men's mean *observed* wage is 18.19 (sd 7.26) Euro and their mean *predicted* wage is 16.94 (sd 4.77) Euro; women's mean *observed* wage is 14.94 (sd 6.57) and their mean *predicted* wage is 11.62 (sd 4.93) Euro. The mean wages of the cross-section 2008 is about 1 Euro lower for men as well as for women compared to the pooled cross-sections (note: wages of previous years have been updated with the consumer price index of 2008). In the sample of 2008 the mean gross wage - *observed* and *predicted* - of men is 16.51 (sd 7.18) Euro and the mean gross wage of women is 12.15 (sd 6.17) Euro.

The analysis of wages is needed for labour supply modelling on the one hand. On the other hand, the analysis also identifies striking differences in wages between genders:

[2] The lowest and highest percentile of wage errors are dropped again; hence, the standard deviation is reduced while the median wage error remains unaffected.
[3] If the corrected predicted wage results to be negative, the wage correction will be removed.

First, 34.8 percent of female observations have no indicated wage in the data against only 12.6 percent of male observations. Second, the positive impact of job experience and higher education on a woman's wage is lower than on a man's wage, which was one of the results of the wage regression. And third, a women's gross hourly wage is on average only three fourth of a man's gross hourly wage.

Table 6.2.: Wage Statistics in Euro

Pooled Cross-Section				Weighed Cross-Section 2008			
Women							
#	mean	sd	median	#	mean	sd	median
observed wages				observed wages			
4,914	14.94	6.57	13.41	838,446	13.94	6.15	12.56
predicted wages				predicted wages			
2,382	11.62	4.93	11.42	366,820	11.23	4.61	11.12
gross hourly wages				gross hourly wages			
7,296	12.75	6.62	11.58	1,205,266	12.15	6.17	11.05
Men							
#	mean	sd	median	#	mean	sd	median
observed wages				observed wages			
6,132	18.19	7.26	16.54	1,066,720	17.15	7.39	15.30
predicted wages				predicted wages			
860	16.94	4.77	16.31	194,663	15.70	4.67	15.41
gross hourly wages				gross hourly wages			
6,992	17.84	7.17	16.40	1,261,383	16.51	7.18	15.01

Source: ILSA 2012

Note: The table shows the mean (sd) and median wages of the pooled cross-section EU-SILC 2004-2008 and the weighed cross-section EU-SILC 2008 for women and men separately. First, the *observed wages* are given in the data for a part of the observations. Second, *predicted wages* are predicted for all observations by a wage regression with a selection correction according to Heckman (1979). Third, the *gross hourly wages* are either the observed or, if no wage is given in the data, the predicted wage of an individual.

6.1.3. Calculation of Notional Income

For each cross-section an individual's annual *notional* gross income is then computed for every defined working hour category c = {1,...,6} of cross-section y = {2004,...,2008} as

$$annual\_gross\_income\_c\_y = median\_hours\_c\_y * gross\_wage * 52. \tag{6.7}$$

The deviation of the calculated gross income from the original amounts to 5.4 percent on average for women and 0.5 percent for men with a flexible partner. The deviation of the calculated gross income from the original amounts to 3.8 percent on average for women and 2.1 percent for men without a flexible partner. (Table A.5)

For a household with one relevant individual each individual appears 6 times for as many cross-sections he or she is part of.
For a household with two relevant individuals the notional gross income is calculated for every combination of categories of the couple. Hence, an individual appears 36 times for as many cross-sections he or she is part of.

After the gross income has been determined, the net income is calculated with the tax-benefit microsimulation model by the Institute for Advanced Studies (ITABENA), which contains the Austrian tax and transfer schedule of every year (since 2004). Therefore, based on the gross annual income, which is calculated the way as in equation 6.7, and the household information from the data,[4] the respective income tax, social security contributions and transfers can be simulated with ITABENA. In this way an individual's net income can be derived. The mean earning incomes by working hour categories are listed in table A.5 in the appendix A.2. Table A.6 shows the deviations from original to calculated earning incomes. The mean deviations range from 5.4 percent for women with a flexible partner to 0.5 percent for men with a flexible partner.

ITABENA in detail as well as an overview of the Austrian tax-benefit system are explained in the appendix A.2. For the calculation of the income tax and the social security contributions with the EU-SILC 2008 and the tax system of 2007 (the year of which the income information comes from), ITABENA deviates by 4.1 percent from gross earning income, 3.8 percent in income tax and 4.1 percent in net income compared to data from Statistik Austria (2010); the amount of social security contributions deviate by 2.4 percent compared to data from Hauptverband der österreichischen Sozialversicherung (2007). (Table A.4)

[4] Household information which is relevant for the net income computation such as the number of household members, their ages, their incomes, etc.

The simulated components for ILSA which are needed to get from the gross income to the net income are, in short, summarized in table 6.3, which are the income tax, social security contributions, capital gains tax, family allowance, child care allowance, care allowance, unemployment assistance and social assistance.

Observations within the zero-working-hour-category either receive unemployment assistance or social assistance if they are entitled to it. If an individual was employed the previous year, the notional net income in the zero-working-hour-category would consist of unemployment benefits. Since unemployment benefits are granted for less than one year in the case of most people, not the unemployment benefit but unemployment assistance (Notstandshilfe) is calculated. If, however, an individual was not employed the previous year, the notional net income will consist of social assistance in the zero-working-hour-category.

Table 6.3.: Components of the Household Disposable Income in ILSA

	Income Components	simulated
Income	Gross Income	x
	Capital Income	
	Rent Income	
	Other Income (alimony, child allowance, etc.)	
- Taxes	Income Tax	x
	Social Security Contributions	x
	Capital Gains Tax	x
+ Transfers	Family Allowance and Child Deductible	x
	Child Care Allowance (parental leave)	x
	Care Allowance (e.g. old-age care)	x
	Unemployment Benefits	(x)
	Unemployment Assistance	x
	Social Assistance	x
= Net Income		

Source: Dearing and Lietz (2007); translated by the author

6.2. Estimation of the Utility Function

The coefficients of the utility function are estimated as it has been described in section "The Condtional Logit Model" of chapter 4. The following models were set up by Hanappi and Müllbacher (2012). Basically there are three models: one for men without (flexible) partner, one for women without (flexible) partner and one for households (men and women with flexible partner).

If only one relevant observation is within one household (i.e. a relevant observation without (flexible) partner), this individual maximizes his or her utility. Determinants of utility are own earning income and own leisure as well as their square terms and interaction of income and leisure. Personal characteristics as well as other household members' incomes are treated as interaction terms with own earning income and leisure. Models are estimated in this way separately for men and women. Dummy variables for full- and part-time employment are added to capture fixed costs of working.
If two relevant observations are within one household (i.e. man and woman with a flexible partner), a unitary household model is estimated. Determinants of utility are household income, consisting of both earning incomes of the couple, and male and female leisure as well as their square terms and the interaction of household income with male leisure, the interaction of household income with female leisure and the interaction of male and female leisure. Household characteristics are treated as interaction terms with household income, male leisure and female leisure. Dummy variables for full- and part-time employment are added to capture fixed costs of working.
The estimates are depicted in the appendix in the tables A.7 and A.8 for the individual and household model respectively. The χ^2 test statistics are significant for all models. The pseudo R^2 is highest for the household model and lowest for the female individual model.

The coefficients of income and leisure are positive for the male and female individual models as well as the household model and significant at the 1 percent level. The coefficients of the square terms of leisure and income are negative in all models as expected and also significant at the 1 percent level.
The interaction of income and leisure is again negative as expected and significant at the 1 percent level.
Within the household model the coefficient of the interaction between male and female leisure is negative in sign and significant at the 1 percent level, which shows some substitutability between a couple's leisure. In regard to gender-based taxation this would mean that if a woman works more in the labour market, probably the man will want to work less.

The coefficient of the interaction between income and job experience is positive in sign and significant at the 1 percent level for men and women without (flexible) partner. Within the household model only the woman's job experience together with household income is positive and significant.
The interaction between income and the highest attained education level is positive in sign and significant at the 1 percent level for women, but not for men in the individual model. In the household model, however, the coefficient of the interaction between household income and the male education is positive in sign and significant mostly at the 5 percent level, but not the interaction between household income and female education.
In the female model the interaction between income and the existence of a child younger than 3 years is positive and significant at the 1 percent level.
Interestingly, the coefficient of the interaction between leisure and other household members' income (which is defined as earning income of inflexible household members, plus rents and capital income) is positive in sign and significant at the 1 percent level in the female model, however it is insignificant in the male model. In the household model the coefficient of the interaction between the couple's income and others' income is not significant.
The coefficients of the interaction terms of leisure and age are always positive and significant at the 1 percent level.
In the male individual model the interaction between leisure and the home place in Lower Austria, Tyrol or Vorarlberg are negative in sign and significant at the 1, 10 and 5 percent levels respectively (in contrast to Vienna). Within the household model the coefficient of female leisure and the home place in a village is positive in sign and significant at the 1 percent level.
The coefficient of the interaction between leisure and being a single is negative in sign and significant at the 1 percent level in the female model.
The interactions between female leisure and having a child of any age make a significant contribution to the model in the female individual as well as in the household model.
The coefficients of the dummies for the fixed cost of working full- or part-time are all negative in sign. However, among men (in the individual as well as household model) the coefficients of the fixed cost of working full-time are lower than the coefficients of women; furthermore, the male coefficients are significant at the 5 percent level whereas the female coefficients are significant at the 1 percent level.

6.3. Testing the Utility Function

The theory behind labour supply postulates that individuals try to maximize their utility as it has been explained in chapter 2. In doing so, more leisure as well as more income are preferred, hence, the first derivatives of utility with respect to leisure and income should be positive. The increase in utility should then decrease with increasing leisure and income; consequently, the second derivatives of utility with respect to leisure and income should be negative.
The first derivative of utility with respect to income is negative among 15 men with a partner and 76 men without (flexible) partner as well as 53 women without a (flexible) partner (Table A.11). These households are ignored for the simulation.
The first derivative of utility with respect to leisure is negative among 210 women and 35 men with a partner and 129 women and 19 men without a (flexible) partner (Table A.12). These households are still used for the simulation.

The prediction of working hours is on average quite accurate for the pooled data. Women with a flexible partner work originally a mean of 21 (sd 16.5) hours and predicted a mean of 21.1 (sd 9.8) hours. Men with a flexible partner work originally a mean of 39.2 (sd 10.9) hours and predicted a mean of 39.2 (sd 3.6) hours. Women without a (flexible) partner work originally a mean of 27.4 (sd 16.5) hours and predicted a mean of 27.6 (11.1) hours. Men without a (flexible) partner work originally a mean of 39.9 (sd 9.3) hours and predicted a mean of 38.4 (sd 5.0) hours. (Table A.9)
For the cross-section 2008 the predicted working hours are on average lower than the original. Women with a flexible partner work originally a mean of 22.8 (sd 16.3) hours and predicted a mean of 21.2 (sd 9.9) hours. Men with a flexible partner work originally a mean of 39.6 (sd 10.8) hours and predicted a mean of 39.0 (sd 3.6) hours. Women without a (flexible) partner work originally a mean of 28.4 (sd 16.3) hours and predicted a mean of 27.5 (11.4) hours. Men without a (flexible) partner work originally a mean of 40.2 (sd 8.8) hours and predicted a mean of 37.8 (sd 5.5) hours. (Table A.10)

7. Simulation of Gender-Based Taxation

In the second part, the *simulation part*, a hypothetical policy reform is going to be simulated on the basis of the estimates of the first part. The idea is that a reform not only leads to a change of the net incomes but also may influence labour decisions. Therefore, for every individual the probability of each working hour category is predicted by plugging in the predictor variables into the regression for the base and reform scenario with the estimated parameters of the first part of ILSA. The employment decision is computed as the expected working hours. Employment decisions might differ between before and after the reform due to a change in net incomes. Based on weighed data, the results should give then a hint at potential labour supply effects of the Austrian population.

In the following, the change from the Austrian tax schedule of 2012 to a gender-based tax system is simulated for the cross-section of 2008. First, the reform is announced. The tax liability for different working hours is illustrated for families with a median, first and third quartile wage woman with and without an average wage husband and two children to comprehend the effects of a gender-based tax system. Second, the non-behavioural effects of the switch to a gender-based tax system are generated by means of the microsimulation model ITABENA. Third, the labour supply (*behavioural*) effects of this reform are computed by means of the labour supply model ILSA. The non-behavioural effects on fiscal costs and income distribution give the *first round effects*. Adding up the *behavioural effects* to the *first round effects* gives the *second round effects*.

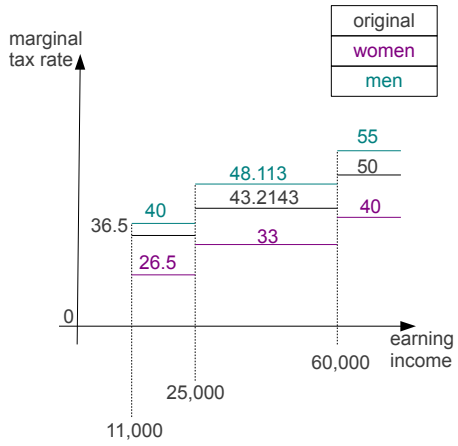
7.1. The Reform

In Austria there is an individual progressive income tax. The assessment base consists basically of 12 months' earnings from employment, from self-employment and pension income less social security contributions. There is no tax for a yearly assessment base below 11,000 Euro. The amount between 11,000 and 25,000 is taxed at a 36.5 percent rate; the amount between 25,000 and 60,000 is taxed at a 43.2143 percent rate

and everything above is taxed at 50 percent. Furthermore, the Austrian income tax schedule incorporates deductibles, which lower the assessment base, and tax credits, which lower the tax liability. The tax system favors families with children by means of a child and child care cost deductible as well as a child and single earner tax credit. A single earning parent can deduct 220 Euro and two earning parents can deduct 132 Euro each per child; external child care costs up to 2,300 Euro (for children younger than 10 years) reduce the assessment base of one parent (or 1,150 of two earning parents). The child tax credit of 58.40 Euro is automatically paid to all families together with family benefits every second month. In addition, parents can claim 494 Euro tax credit for one child, plus 175 for the second child and 220 for the third child if the secondary earner is paid less than 8,200 Euro a year or there is no partner.
If the earning income is below the threshold and tax free, a single parent tax credit can still be claimed in the form of a negative tax. Furthermore, 10 percent of social security contributions (up to 110 Euro) can be claimed in the form of a negative tax if the assessment base is below the taxing threshold.

Now, gender-based tax rates are going to be simulated on the basis of the Austrian tax system. In particular, the thresholds, tax deductibles and tax credits remain, however, the tax rates change differently for women and for men. The reform is related to income from employment, but also to income from self-employment and pension income.
Hence, an assessment base between 11,000 and 25,000 is taxed at 26.5 percent for women and at 40 percent for men. Income between 25,000 and 60,000 is taxed at 33 percent for women and 48.113 percent for men. Any income above 60,000 is taxed at 40 percent for women and 55 percent for men. Hence, the tax rates for women decrease by about 10 percent points, while the lowest tax rate for men increases by 3.5 percent points and the following tax rates by about 5 percent points. I have chosen these tax rates, firstly, since I wanted to keep the system as similar as in the base scenario in regard to progressivity. Secondly, I expected a decrease of 10 percent points for women as a promising, but not too unrealistic, tax cut in order to induce behavioural effects on the working hours. I adjusted then accordingly the men's tax rise so that the reform is cost neutral in the non-behavioural evaluation. Since the income tax revenues are contributed by more men than women in the status quo, the tax rate rise for men emerges obviously to be lower than the tax rate cut for women. The reform is illustrated in figure 7.1.

Figure 7.1.: The Austrian Income Tax: Original and Gender-Based Tax Rates



Source: illustration by the author

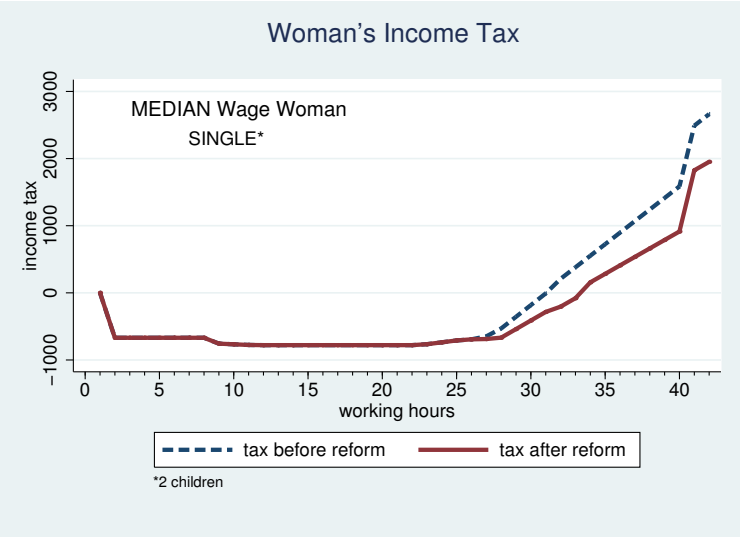
Note: The figure illustrates the Austrian progressive income tax structure of 2012 and the fictive gender-based tax system. The x-axis gives the earning income and the y-axis gives the marginal tax rate.

To get a better idea of what the reform brings about, the figures 7.2 to 7.7 show how the tax liability changes for the following families with 2 children[1]. Figure 7.2 shows a single mother with the median gross wage of 12.56 Euro. Figure 7.3 and figure 7.4 depict the household income tax for the same median woman, however, with a husband who earns an average gross wage of 17.15 Euro and who works full-time and part-time respectively. The following three figures show a woman with the same average husband and two children. In figure 7.5, however, the woman earns only 9.35 Euro per hour (Q_{25}); the wage difference between man and woman is thus larger. In figure 7.7 the woman earns 17.27 Euro (Q_{75}) per hour, which is about the same as her husband's wage.

Figure 7.2 shows the median woman who is a single mother with two children. She can claim a tax credit of 669 Euro as soon as she starts working. When she works 9 hours per week she receives additional 10 percent of social security contributions in the form of a negative tax, which is increasing up to 110 Euro with increasing working hours. With 23 working hours her tax liability is more than the negative tax and hence the negative tax is decreasing. Up to 32 working hours no income tax has to be paid in the base scenario and up to 34 working hours in the reform scenario. Beginning from 27 working hours the woman takes advantage of the reform and the more she works the more she is benefiting from the reform of gender-based taxation.

[1]The children are 11 and 14 years old.

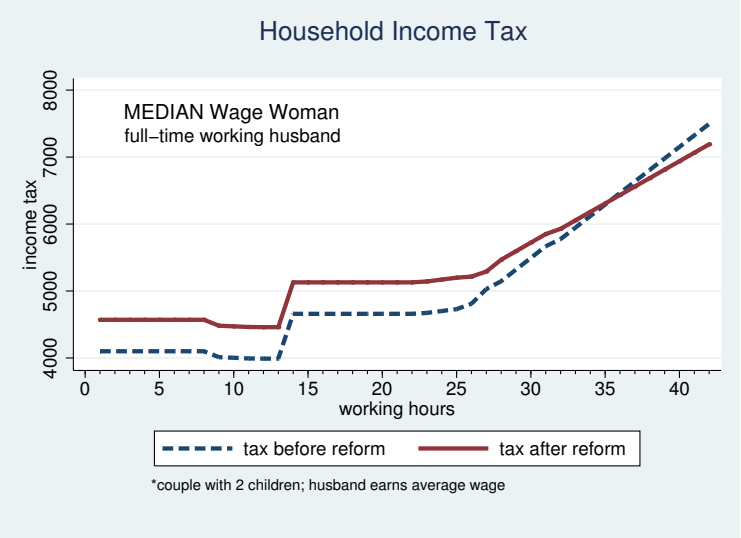
Figure 7.2.: Annual Income Tax. Woman's Working Hours range from 0 to 42. Median Wage and No Husband.



Source: EU-SILC 2008 (income corrected), ITABENA 2012

Note: The figure compares the income tax with and without a gender-based tax system for a woman who earns a gross wage of 12.56 Euro, has a 11 and 14 year-old child and lives without partner. The x-axis shows her working hours, ranging from 0 to 42; the y-axis shows the income tax. The woman takes advantage of a gender-based tax system as soon as she works 27 hours per week.

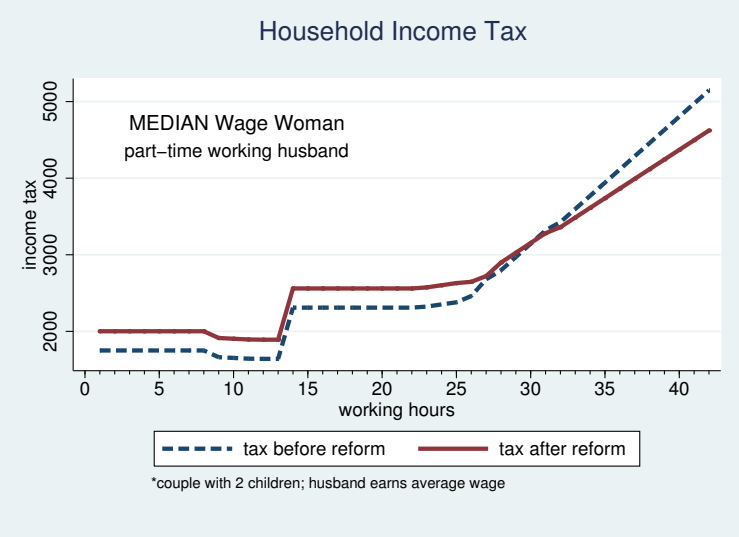
Figure 7.3.: Household's Income Tax. Woman's Working Hours range from 0 to 42. Median Wage and Full-Time Working Husband.



Source: EU-SILC 2008 (income corrected), ITABENA 2012

Note: The figure compares the income tax with and without a gender-based tax system for a household with a woman who earns a gross wage of *12.56 Euro* and a *full-time* working man who earns a gross wage of 17.15 Euro and a 11 and a 14 year-old child. The x-axis shows the woman's working hours, ranging from 0 to 42; the y-axis shows the household's income tax. The household takes advantage of a gender-based tax system as soon as the woman works 35 hours per week.

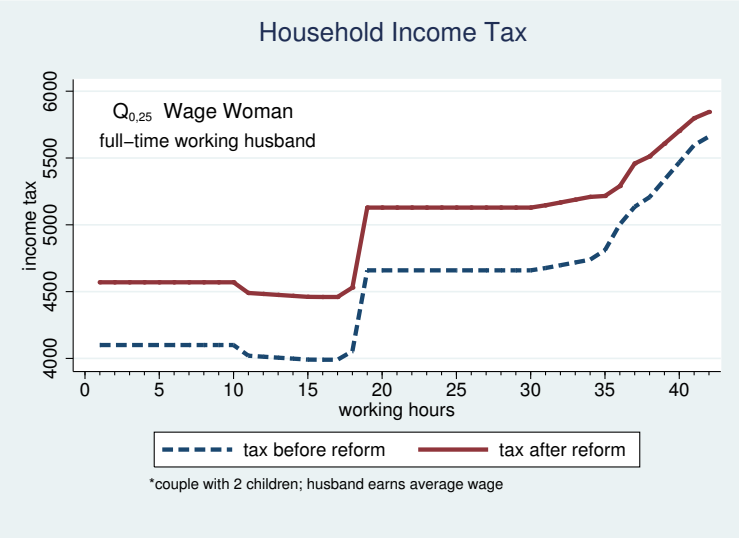
Figure 7.4.: Household's Income Tax. Woman's Working Hours range from 0 to 42. Median Wage and Part-Time Working Husband.



Source: EU-SILC 2008 (income corrected), ITABENA 2012

Note: The figure compares the income tax with and without a gender-based tax system for a household with a woman who earns a gross wage of *12.56 Euro* and a *part-time* working man who earns a gross wage of 17.15 Euro and a 11 and a 14 year-old child. The x-axis shows the woman's working hours, ranging from 0 to 42; the y-axis shows the household's income tax. The household takes advantage of a gender-based tax system as soon as the woman works 31 hours per week.

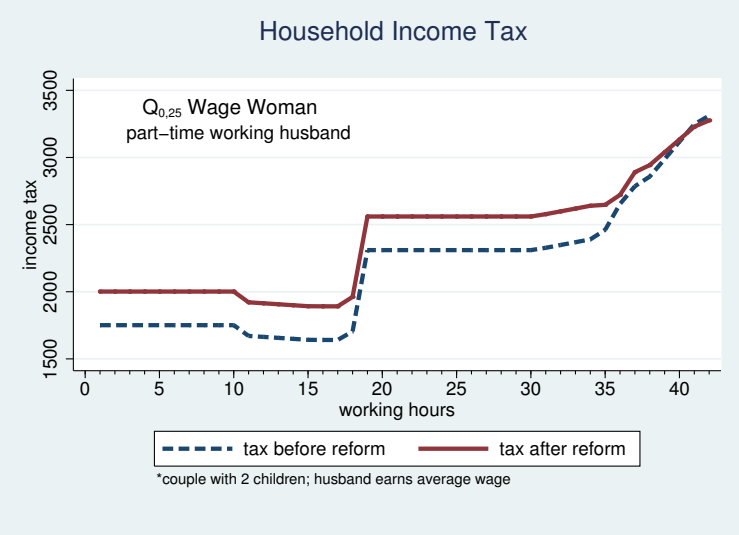
Figure 7.5.: Household's Income Tax. Woman's Working Hours range from 0 to 42. Q_{25} Wage and Full-Time Working Husband.



Source: EU-SILC 2008 (income corrected), ITABENA 2012

Note: The figure compares the income tax with and without a gender-based tax system for a household with a woman who earns a gross wage of *9.35 Euro* and a *full-time* working man who earns a gross wage of 17.15 Euro and a 11 and a 14 year-old child. The x-axis shows the woman's working hours, ranging from 0 to 42; the y-axis shows the household's income tax. The household never takes advantage of a gender-based tax system.

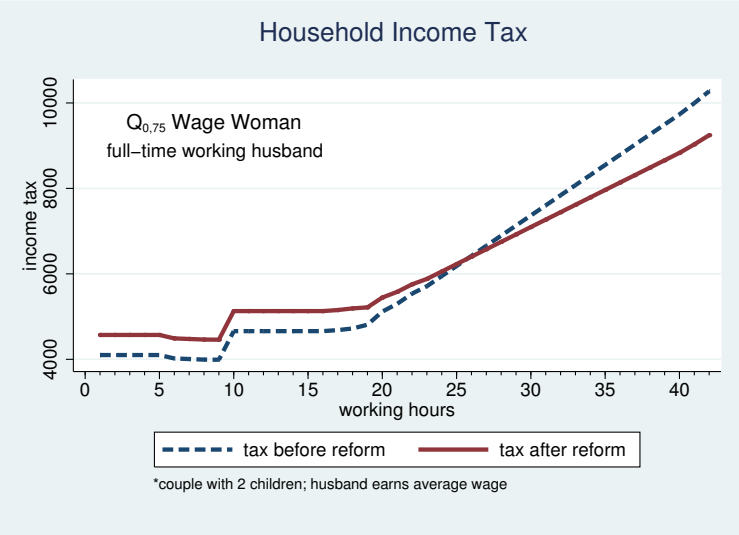
Figure 7.6.: Household's Income Tax. Woman's Working Hours range from 0 to 42. Q_{25} Wage and Part-Time Working Husband.



Source: EU-SILC 2008 (income corrected), ITABENA 2012

Note: The figure compares the income tax with and without a gender-based tax system for a household with a woman who earns a gross wage of *9.35 Euro* and a *part-time* working man who earns a gross wage of 17.15 Euro and a 11 and a 14 year-old child. The x-axis shows the woman's working hours, ranging from 0 to 42; the y-axis shows the household's income tax. The household only takes advantage of a gender-based tax system if the woman works 40 hours or more per week.

Figure 7.7.: Household's Income Tax. Woman's Working Hours range from 0 to 42. Q_{75} Wage and Full-Time Working Husband.



Source: EU-SILC 2008 (income corrected), ITABENA 2012

Note: The figure compares the income tax with and without a gender-based tax system for a household with a woman who earns a gross wage of *17.27 Euro* and a *full-time* working man who earns a gross wage of 17.15 Euro and a 11 and a 14 year-old child. The x-axis shows the woman's working hours, ranging from 0 to 42; the y-axis shows the household's income tax. The household takes advantage of a gender-based tax system as soon as the woman works 26 hours per week.

Figure 7.3 shows the same median woman, however, with a full-time working husband with a yearly gross income of 35,672 Euro. This woman receives a negative tax transfer as soon as she starts working more than 8 hours. From 9 to 14 working hours the household's tax liability is decreasing since the negative tax transfer is increasing up to 110 Euro. As soon as the woman works 14 hours, she earns more than 8,200 Euro and therefore the man does not receive the *single earning parent tax credit* anymore. In the base scenario his tax liability increases from 4,100 to 4,769; in the reform scenario his tax liability increases from 4,569 to 5,238. When the woman is working more than 23 hours per week, her negative tax transfer decreases. As soon as the woman works 27 hours she has to pay income tax in the base scenario; the man's tax liability slightly increases since the child's deductible is then claimed by both parents. With gender-based tax rates, however, the woman starts paying income tax with 28 working hours and the increase in the household's income tax is then smoother compared to the original tax system. This family benefits from the reform when the woman is working at least 35 hours per week.
If the husband (with average wage) is only working 30 hours per week and receiving 26,754 Euro a year, the family already benefits from the reform when the woman is working at least 31 hours per week (figure 7.4).

Figure 7.5 shows the first quartile woman with the same full-time working husband as in the previous two figures. This woman receives a negative tax transfer as soon as she starts working more than 10 hours. From 11 to 16 working hours the household's tax liability is decreasing since the negative tax transfer is increasing up to 110 Euro. As soon as the woman works 17 hours, she earns more than 8,200 Euro and therefore the man does not receive the *single earning parent tax credit* anymore. If the woman works more than 36 hours per week, she will have to pay income tax, accordingly, the household's tax liability will go up. This family in which the wage gap between husband and wife is quite large never benefits from the introduction of gender-based tax rates, not even if the woman worked full-time. Only if the husband worked originally just 30 hours per week, the family would at least not be worse off if the woman worked full-time (figure 7.6).

Figure 7.7 shows the same family, but the woman earns the third quartile wage. This woman receives a negative tax transfer as soon as she starts working more than 6 hours. From 6 to 10 working hours the household's tax liability is slightly decreasing since the negative tax transfer is increasing up to 110 Euro. As soon as the woman works 10 hours, she earns more than 8,200 Euro and therefore the man does not receive the *single earning parent tax credit* anymore. If the woman works more than 19 hours per week, she will have to pay income tax, accordingly, the household's tax liability goes

up. This household in which the woman earns about the same gross wage as her husband benefits from the reform as soon as the woman works 26 hours per week. If the husband (with average wage) is only working 30 hours per week, the family already benefits from the reform when the woman is working at least 22 hours per week.

7.2. First Round Effects

The *first round effects* are the effects induced by gender-based tax rates without behavioural adjustments of the labour supply. The reform is simulated with the model ITABENA. The effect is basically measured by the change in the households' income tax and change in disposable income.[2] In particular, the effects of interest are the change of the mean tax contribution by income deciles and family types.
In table A.14 and table A.15 in the appendix A.4 women' and men's total gross earning income as well as taxes and social security contributions and transfers are depicted for the simulated base scenario (before the reform). The first round effects are then shown in table A.16 for women and in table A.17 for men.

There are 1,289 women whose labour supply is going to be simulated for. The 707 females with a relevant (flexible) partner represent 632,772 Austrians; they earn 10,263 m(illion) Euro gross income and pay 990 m Euro taxes. The 582 females without a relevant (flexible) partner represent 526,723 Austrians; they earn 10,738 m Euro gross income and pay 984 m Euro taxes. The remaining 2,943 females in the sample are excluded from the labour supply simulation. Among them are observations with an earning income (e.g. self-employees or retired women) who are affected by the reform, however, their adjustment of working hours is not simulated in our model (see chapter 5.2). They represent 2,613,697 Austrians who earn in total 31,519 m Euro gross income and pay 3,266 m Euro taxes. In ITABENA's simulation with the corrected data of EU-SILC 2008 (the correction is described in chapter 5) and the tax regulations of 2012, women earn in total 52,521 m Euro gross income and pay 5,241 m Euro taxes. (Table A.14)
There are 692 males with a relevant (flexible) partner who represent 632,575 Austrians; they earn 23,600 m Euro gross income and pay 3,737 m Euro taxes. The 529 males without a relevant (flexible) partner represent 535,067 Austrians; they earn 17,078 m Euro gross income and pay 2,381 m Euro taxes. The remaining 2,668 males in the sample are excluded from the labour supply simulation. They represent 2,422,792 Austrians who earn 50,022 m Euro gross income and pay 7,836 m Euro taxes. In ITABENA's simulation with the data EU-SILC 2008 and the tax regulations of 2012,

[2] Gross income is not affected in the first round.

men earn in total 90,700 m Euro gross income and pay 13,954 m Euro taxes.[3] (Table A.15)

After the first round women pay in total 1,419 m Euro taxes less than before. Women with a flexible partner pay 271 m Euro less, women without a (flexible) partner pay 286 m Euro less and women whose labour supply is not going to be simulated pay 863 m Euro less. (Table A.16)
Men pay in total 1,419 m Euro taxes more after the reform. Men with a flexible partner pay 383 m Euro more, men without a (flexible) partner pay 244 m Euro more and men whose labour supply is not going to be simulated pay 793 m Euro more. (Table A.17)
Table 7.1 shows the mean income changes by income decile. Due to the reform, the first income decile contributes on average 12 (49) Euro more in income tax, the second decile 24 (127) Euro, the third decile 20 (191) Euro, the fourth decile contributes on average 5 (409) Euro less, the sixth decile pays on average 16 (458) Euro more, the seventh 20 (577) Euro more, the eighth 12 (743) Euro more, the ninth pays 50 (1,003) Euro less and the tenth 73 (2,393) Euro less. The standard deviations increase with increasing income deciles which captures the fact that in lower deciles negative tax or zero tax contributions remain unaffected by the reform. In other words, the higher the income deciles the reform affects people more either positively or negatively; the means are similar for all the deciles one to eight, however, the range of losses and gains increases in value with increasing deciles as it is described in table 7.1. The highest two deciles gain on average most by gender-based tax rates. The median change of disposable income is zero for all deciles though.

Table 7.2 presents the mean income changes by family type. People without children and single parents gain on average from gender-based tax rates. All other families, however, pay on average more income tax after the reform. In particular, households without children pay on average 56 (1,089) Euro less, single parents with one child pay on average 168 (650) Euro less, single parents with 2 children pay on average 80 (425) Euro less and single parents with more than 2 children on average 63 (342) Euro less. Parents with 1 child pay on average 71 (741) Euro more, parents with 2 children pay on average 107 (638) Euro more and parents with more then 2 children pay on average 45 (630) Euro more. The gap between losses and gains is the widest for families without children and families with both parents. Furthermore, it can be seen that single parents as well as couple parents with only one child gain more compared to those with more children.

[3] In reality, women earned 56,321 m Euro gross income and payed 6,856 m Euro taxes and men earned 94,858 m Euro gross income and payed 18,893 m Euro taxes in 2008 (with the tax regulations of 2008).Statistik Austria (2011)

Table 7.1.: Mean 1st Round Change of Disposable Income, by Income Decile

Decile	mean	sd	p5	p95
1	-12	49	-113	0
2	-24	127	-290	0
3	-20	191	-374	294
4	-24	264	-478	493
5	5	409	-637	821
6	-16	458	-711	988
7	-20	577	-844	1,238
8	-12	743	-1,132	1,655
9	50	1,003	-1,437	2,097
10	73	2,393	-3,262	3,953

Source: ILSA 2012

Note: The table summarizes the mean (sd) change in annual disposable household income for every income decile *without* behavioural adjustments of the labour supply. The 5th and 95th quantile of the difference in disposable income indicate the range of losses and gains within an income decile (leaving out the outliers). Most households loose on average due to a gender-based tax system. Individuals in low income deciles are often not affected, or negatively affected. High income deciles gain on average, however, the difference between losses and gains increase with increasing income decile.

Table 7.2.: Mean 1st Round Change of Disposable Income, by Family Type

Family Type	mean	sd	p5	p95
no children	56	1,089	-1174	1,831
1 adult, 1 child	168	650	-192	1,496
1 adult, 2 children	80	425	0	606
1 adult, >2 children	63	342	0	0
2 adults, 1 child	-71	741	-1,055	798
2 adults, 2 children	-107	638	-1,063	404
2 adults, >2 children	-45	630	-689	0
3 adults, 1 child	-100	354	-690	197
3 adults, 2 children	-7	319	-472	240
>3 adults, >2 children	1	456	-285	390

Source: ILSA 2012

Note: The table summarizes the mean (sd) change in annual disposable household income for different family types *without* behavioural adjustments of the labour supply. The 5th and 95th quantile of the difference in disposable income indicate the range of losses and gains within one family type (leaving out the outliers). Households with two parents loose on average due to a gender-based tax system; single parents gain on average. Households without children gain on average, but the range of losses and gains is the largest among these.

7.3. Labour Supply Effects

The labour supply effects are the change in working hours induced by the reform to a gender-based tax system. Based on the estimates of the first part of ILSA, now it follows the simulation of gender-based tax rates. Therefore, each individual's working hours are predicted before and after the reform.
For this, the notional net incomes for every relevant observation's working hour category is calculated with ITABENA for the cross-section 2008 as it is described in chapter 6.1.3. First, the calculation is done with the tax-benefit schedule of 2012 (the *base scenario*). Second, the calculation is done with the tax system which incorporates gender-based tax rates (the *reform scenario*).
For the base and the reform scenario the coefficients from the estimation part of ILSA are used for each individual to predict the probabilities for every working hour category.

The labour supply effects are measured by the mean relative change in working hours of women and men with and without a relevant partner. Furthermore the mean relative change of working hours is computed for each income decile since the reform might affect higher income deciles differently than lower income deciles. Another measure is the full time equivalent (FTE) to capture the overall employment effect of the Austrian labour supply. The FTE is computed as the sum of each individual's change of working hours divided by 35 and multiplied by his or her weight.

Before, the predictions I-III of chapter 2 are analyzed in order to check the theory and hence the justification for a creation of a gender-based tax system. The predictions basically claim that women want to work more and men want to work less independent of whether their household income increases or decreases after the reform. For the most cases the implications hold and this is summarized in table A.13 in the appendix. In case the household income of a couple increases due to the reform, the substitution effect outweighs the income effect for 130 female observations, only for 2 females the opposite is true; 46 male observations want to work more despite higher household income and lower wage, 86 want to work less which is in accordance with the theory. In case the household income decreases due to the reform, the substitution effect outweighs the income effect for 470 male observations, for 32 males the opposite is true; 461 female observations want to work more which is in accordance with the theory and 42 want to work less. If the household income of a woman without (flexible) partner increases, the substitution effect will outweigh the income effect for 248 female observations (i.e. wants to work more), for 95 observations the opposite is true. If the household income of a man without (flexible) partner decreases, the substitution effect will outweigh the income effect for 454 male observations (i.e. wants to work less),

for 21 the opposite is true.[4]

The labour supply effects are summarized in table 7.3 for the weighed cross-section 2008. The table shows that women increase on average their working hours by 2.3 (6.2) percent while men on average decrease their working hours by 0.3 (0.8) percent as a consequence of gender-based tax rates.[5] Women with a flexible partner work relatively on average 3.1 (7.9) percent and women without (flexible) partner on average 1.5 (2.7) percent more. Men with a flexible partner work relatively on average 0.2 (0.5) percent and men without (flexible) partner on average 0.5 (1.0) percent less. Women within the lower three deciles increase their working hours on average by less than 2 percent; in contrast, women within higher income deciles increase their working hours on average by more than 2 percent; women of the fifth income decile work on average 3.6 (0.162) percent more. Men of the fifth income decile work on average 0.6 (1.7) percent less; other men between the income deciles 1 to 7 work on average 0.4 percent less; men of the highest three income deciles work on average 0.3 percent less.
Among women with flexible partner, who raise working hours, the relationship between income decile and change in working hours is significantly positive, r =0.35, p<.01. Men with and without (flexible) partner, who decrease their working hours due to the reform, decrease working hours significantly less with increasing income decile (r=0.26 and r=0.19, p<.01). Similarly, the gross hourly wages of women, who have a flexible partner, is significantly related with the change in working hours (and for those who increase their labour supply), r=0.53, p<.01 (table A.18, figure A.1). For women without (flexible) partner the gross hourly wage is significantly negatively related with the change in working hours, r=-0.23, p<.01 (table A.18, figure A.2). The higher the wage for men the smaller is the reduction in working hours; for men with flexible partner the correlation coefficient is 0.18, p<.01 and for men without (flexible) partner the correlation coefficient is 0.62, p<.01 (table A.18, figure A.3 and A.4).

In total, employment increases by approximately 13,000 full time equivalents (FTE), at which women additionally add 17,000 FTEs and men remove 4,000 FTEs. About 11,700 FTEs are added by women with flexible partner and 5,500 FTEs by women without (flexible) partner. About 1,700 FTEs are taken by men with flexible partner and 2,500 FTEs by men without (flexible) partner. The least rise in female FTEs is ascribed to the first income decile and the highest rise is ascribed to the tenth income decile. While the sum of female FTEs is lower in the first three income deciles compared to the others, the sum of FTEs range between 1,600 and 2,400 between the

[4]To check the predictions I-III the gross incomes for the cross-section 2008 are recalculated from the predicted working hours and the predicted wages (from ILSA) for every observation. The difference in household income is computed with ITABENA.

[5]The reaction of males is significantly different from zero, t(1220)=-15.1989, p<.05.

fourth and tenth income deciles without any pattern. The least decline of male FTEs is ascribed to the tenth income decile; the highest decline is ascribed to the fifth income decile, however, among the other income deciles there is no obvious pattern; they range between 300 and 500 FTEs.

Table 7.3.: Simulation's Employment Effects

	Rel.Δ in Working Hours		Δ in FTE	
	women	men	women	men
	mean(sd)	mean(sd)	total	total
overall	0,023 (0.062)	-0,003 (0.008)	17,155	-4,169
with flexible partner	0.031 (0.079)	-0.002 (0.005)	11,683	-1,666
without (flexible) partner	0.015 (0.027)	-0.005 (0.010)	5,472	-2,502
by Income Decile				
1	0.01365 (0.272)	-0.0043 (0.007)	742	-338
2	0.01735 (0.264)	-0.0034 (0.005)	1,021	-307
3	0.01567 (0.022)	-0.0038 (0.007)	1,276	-386
4	0.0208 (0.031)	-0.0035 (0.004)	1,686	-470
5	0.0362 (0.162)	-0.0057 (0.017)	2,099	-657
6	0.0243 (0.026)	-0.0030 (0.004)	2,261	-449
7	0.0257 (0.034)	-0.0040 (0.008)	1,614	-533
8	0.0214 (0.030)	-0.0027 (0.003)	1,849	-436
9	0.0297 (0.029)	-0.0025 (0.006)	2,255	-395
10	0.0272 (0.037)	-0.0019 (0.006)	2,351	-196

Source: ILSA 2012

Note: The middle columns of the table indicate the mean (sd) relative change of working hours after the change from the Austrian tax system 2012 to a gender-based tax system for women and men. Overall, women increase and men decrease their working hours. Furthermore, the table differentiates between women and men with a flexible partner and without (flexible) partner as well as individuals of different income deciles. Women with a partner react on average more than women without (flexible) partner. Women and men of the 5^{th} income decile react most strongly. Women in the three lowest income deciles increase on average their working hours the least among women; men in the highest income decile reduce on average their working hours the least among men. The right two columns show the absolute change in full-time equivalents (FTE) which represent the overall employment effects for Austria. Due to the introduction of a gender-based tax system women add 17,155 FTE and men remove 4,169 FTE.

7.4. Second Round Effects

The *second round effects* are the effects induced by gender-based tax rates with the inclusion of behavioural adjustments of the labour supply. Therefore, in the first step, the effects on incomes which are only due to the adjustment of labour supply are measured. In the second step, these *behavioural effects* are added to the *first round effects*. The behavioural effects are computed by recalculating the annual gross incomes for the cross-section 2008 with the predicted working hours of each relevant observation and the observed or predicted wage (see chapter 6.1.2). Hence, there are two data sets, one with the predicted base working hours and another with the predicted reform working hours. For each data set the net incomes are computed with the model ITABENA once more with the incorporated gender-based tax rates. The result is the difference in incomes only due to behavioural adjustments. Finally, the behavioural effects are added to the *first round effects* (as described in chapter 7.2).

As a result of gender-based taxation, overall, pre-tax 275 m Euro are earned more. The reform is constituted budget-neutral in the first round, however, after considering behavioural adjustments of the labour supply the state earns about 16 m Euro through taxes and 55 m Euro through social security contributions. As a result, the households earn a total of 203 m Euro and the state earns a total of 71 m Euro. Prediction IV is thus approved; a gender-based tax system is more efficient. (Table 7.4)
The gender-based tax system leads though to more income inequality since high income deciles gain on average while low income deciles loose on average.

In particular, women earn about pre-tax 38.4 m Euro more as a consequence of gender-based tax rates. Because of an increase in female employment women pay 44 m Euro taxes and 72 m Euro social security contributions more; in total, however, women contribute 1,400 m Euro less in income taxes (see table A.16 in the appendix). Men earn about pre-tax 110 m Euro less as a consequence of gender-based tax rates. Because of a decline in male employment men pay 27 m Euro taxes and 17 m Euro social security contributions less; in total, however, men contribute 1,400 m Euro more in income taxes (see table A.17 in the appendix).

Table 7.5 shows the mean income changes by income decile. Due to the reform, the first income decile's disposable household income is now on average 9 (138) Euro lower, the second decile's is on average 11 (186) Euro lower, the third decile's is on average 4 (240) Euro lower and the fourth decile's is on average 2 (337) Euro lower. The fifth decile's disposable income increases by the mean of 34 (491) Euro, the sixth decile by the mean of 23 (518) Euro, the seventh decile by the mean of 6 (646) Euro, the eighth decile by the mean of 14 (800) Euro, the ninth decile by the mean of 94

(1,069) Euro and the tenth decile by the mean of 130 (2,452) Euro. The standard deviations still increase with increasing income deciles. Again, the higher the income deciles the reform affects more people and at a higher degree either positively or negatively. After considering behavioural adjustments, the average loss is smaller for the income deciles 1 to 4, the income deciles 6 to 8 gain now on average and for the income deciles 5, 9 and 10 the mean gain rises. The highest two deciles still gain on average most by gender-based tax rates. (For comparison of the first and second round also see table A.20 in the appendix.)

Table 7.6 presents the mean income changes by family type. People without children and single parents gain on average even more from gender-based tax rates after the behavioural adjustment of labour supply is taken into account. For families with two parents and one or two children the loss in disposable income is also lower in the second compared to the first round. In particular, no-child-households' disposable income increases now by the mean of 77 (1,120) Euro, single parents' with 1 child by the mean of 179 (678) Euro, single parents' with 2 children by the mean of 104 (441) Euro and single parents' with more than 2 children by the mean of 68 (344) Euro. Parents with 1 child have on average 25 (831) Euro less in disposable income, parents with 2 children have on average 60 (723) Euro less and parents with more than 2 children have on average 41 (667) Euro less. The gap between losses and gains is still the widest for families without children and families with both parents. (For comparison of the first and second round also see table A.19 in the appendix.)

Table 7.4.: 1st and 2nd Round Aggregate Budget Effects

	1st Round	2nd Round
ΔGross Inc	0	274,744,698
ΔTaxes	-18,186	16,488,983
ΔSSC	0	55,204,268
ΔTransfers	0	0
ΔDisp Inc	18,186	203,069,633
ΔBudget	-18,186	71,675,065

Source: ILSA 2012

Note: The table compares the changes in the households' gross incomes, tax payments, social security contributions, transfers and disposable incomes due to a gender-based tax reform between the 1st round and the 2nd round. The 1st round effects come from the static non-behavioural microsimulation of the reform; the 2nd round effects take into account behavioural adjustments of the labour supply. The loss in taxes of 18,000 in the 1st round can be viewed as budget-neutral. In the 2nd round households in total gain in gross income and disposable income; the state also gains as indicated by ΔBudget.

Table 7.5.: Mean 2nd Round Change of Disposable Income, by Income Decile

Decile	mean	sd	p5	p95
1	-9	138	-156	78
2	-11	186	-329	193
3	-4	240	-410	406
4	-2	337	-546	626
5	34	491	-683	876
6	23	518	-741	1,104
7	6	646	-944	1,374
8	14	800	-1,222	1,644
9	94	1,069	-1,441	2,224
10	130	2,452	-3,262	4,069

Source: ILSA 2012

Note: The table summarizes the mean (sd) change in annual disposable household income for every income decile *with* behavioural adjustments of the labour supply. The 5th and 95th quantile of the difference in disposable income indicate the range of losses and gains within an income decile (leaving out the outliers). Compared to the first round (see table 7.1) the average loss is smaller for the income deciles 1 to 4, the income deciles 6 to 8 gain now on average and for the income deciles 5, 9 and 10 the mean gain rises. The highest two deciles still gain on average most by gender-based tax rates.

Table 7.6.: Mean 2nd Round Change of Disposable Income, by Family Type

Family Type	mean	sd	p5	p95
no children	77	1,120	-1203	1,850
1 adult, 1 child	179	678	-300	1,485
1 adult, 2 children	104	441	-90	865
1 adult, >2 children	68	334	0	111
2 adults, 1 child	-25	831	-1,108	1,301
2 adults, 2 children	-60	723	-1,097	795
2 adults, >2 children	-41	677	-761	171
3 adults, 1 child	-93	439	-1,196	681
3 adults, 2 children	2	473	-472	634
>3 adults, >2 children	0	457	-285	390

Source: ILSA 2012

Note: The table summarizes the mean (sd) change in annual disposable household income for different family types *with* behavioural adjustments of the labour supply. The 5th and 95th quantile of the difference in disposable income indicate the range of losses and gains within one family type (leaving out the outliers). By taking into account behavioural adjustments of the labour supply all family types are better off than without (see table 7.2). 2-parent-households, however, are on average still worse off after the reform. The gap between losses and gains is still the widest for families without children and families with both parents.

8. Conclusion

In this paper I simulate a *Gender-Based Tax System* for Austria. The optimal taxation of couples is a broad topic in public economics. While more literature focuses on primary and secondary earners, Alesina et al. (2011) are the first who speak directly about *gender-based taxation*. For the simulation I use the labour supply model by the Institute for Advanced Studies with the data of the EU-SILC 2008. I lower the marginal tax rates for women by about 10 percent points on the basis of the Austrian tax system of 2012. The men's tax rates are accordingly adjusted so that the reform is cost neutral for the state in the static non-behavioural scenario. The reform is simulated with a discrete choice model in a neoclassical framework, where couples are assumed to maximize unitary utility. Thereby, the static behavioural effects are evaluated. It turns out that women with a partner on average increase their working hours by 3.1 percent. Men with a partner on average decrease their working hours by 0.2 percent. It is estimated that about 13,000 full-time-equivalents are gained for the Austrian labour supply through this reform.

Nowadays, a considerable number of Austrian women work part-time while their husbands work full-time. Lower tax rates for women should, first of all, encourage women to work more hours on the labour market. Secondly, higher tax rates should incentivize husbands to participate more in the unpaid care and household work. Hence, women will earn higher incomes which enables them to better secure themselves for the present as well as for the case of separation from their partners or the time in retirement. At the same time, paid and unpaid work should be divided more equally between genders. The results of the static simulation give the right signs in behavioural adjustments. Most of all, the reform reveals female labour potential, which depends inter alia on the tax system. The gains, especially for families with children, could turn out more promising if long-run adjustments were considered. Whether such a reform leads to more dual career arrangements of Austrian families can only be evaluated in the long run. The prediction stating that a gender-based tax system is more efficient turns out to be positive. In my simulation the state earns additional 16 m Euro in taxes and 55 m Euro in social security contributions. The prediction stating that a gender-based tax system leads to more income inequity also holds. High income deciles gain on average by the reform while low income deciles loose on average. The reason for this is that low income women are not affected; in low income deciles, therefore, often

men only are taxed higher. In higher income deciles, however, women gain by the reform and are able to compensate the husband's losses. A gender-based tax system could be designed the way which would lead to more income equity if, for instance, thresholds, tax credits or deductibles were modified. As it is illustrated in chapter 7.1, the single earner tax credit strikingly incentivizes the secondary earner - mostly the woman - to work less. Instead of a gender-based tax system, a tax credit could be introduced for the secondary earner after exceeding a certain amount of working hours. Furthermore, future research about a gender-based tax system for Austria can be extended by including household work decisions following the work by Van Soest and Stancanelli (2010). This work indicates a decline of full-time workers through gender-based tax rates, however, leaves out the labour demand side. For further research it will be important to include the question of how flexible are employers in regard with working hours and what are the benefits and disadvantages for hiring more female but less full-time employees.

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A. Appendix A

A.1. Wage Estimates

Table A.1.: Male Wage Estimates

Number of obs: 7190
Censored obs: 905
Uncensored obs: 6285
Wald $chi^2(29) = 2212.76$
Prob > $chi^2 = 0.0000$

	Wage Regression			Wage Selection		
variable	coefficient	sd	p-value	coefficient	sd	p-value
job exp	0.0185	0.0033	0.000	0.0305	0.0055	0.000
job exp^2	-0.0003	0.0001	0.000	-	-	-
Lehre	0.1127	0.0173	0.000	0.0783	0.0762	0.304
BMS	0.2576	0.0212	0.000	0.1374	0.0984	0.163
AHS	0.3586	0.0224	0.000	0.1890	0.1288	0.142
BHS	0.4344	0.0224	0.000	0.2009	0.0997	0.044
Uni	0.6103	0.0244	0.000	-0.0510	0.1011	0.614
full-time months	0.0404	0.0116	0.000	0.1991	0.0148	0.000
part-time months	0.0208	0.0111	0.061	0.1587	0.0182	0.000
full-time months previous year	0.0134	0.0046	0.004	0.0595	0.0110	0.000
part-time months previous year	0.0229	0.0056	0.000	0.0530	0.0166	0.001
unemployed months last 2 years	-0.0072	0.0050	0.191	-0.0296	0.0119	0.013
household work last 2 years	-0.0116	0.0114	0.308	-0.0796	0.0246	0.001
industry BB	0.0477	0.0183	0.009	-	-	-
industry Bau	0.0781	0.0147	0.000	-	-	-
industry EH	0.0296	0.0126	0.019	-	-	-
industry Tour	-0.0623	0.0208	0.003	-	-	-
industry Fin	0.1568	0.0224	0.000	-	-	-
industry Wiss	0.1661	0.0441	0.000	-	-	-
age	-0.0214	0.0058	0.000	-0.0180	0.0058	0.002
age^2	0.0003	0.0001	0.000	-	-	-
single	-0.0849	0.0124	0.000	0.0088	0.0722	0.903
disabled 1	-0.0458	0.0148	0.002	-0.0638	0.0699	0.362
disabled 2	-0.1406	0.0286	0.000	-0.0979	0.1218	0.422
Austrian	0.1463	0.0179	0.000	-0.1251	0.0810	0.122
year 2005	0.0221	0.0155	0.154	-	-	-
year 2006	0.0358	0.0150	0.017	-	-	-
year 2007	0.0351	0.0161	0.029	-	-	-
year 2008	0.0080	0.0162	0.623	-	-	-
ln(other Income)	-	-	-	0.0245	0.0090	0.006
childage 0-3	-	-	-	0.0220	0.0529	0.677
childage 4-6	-	-	-	-0.0090	0.0627	0.885
childage 7-9	-	-	-	-0.0522	0.0632	0.409
childage 10-15	-	-	-	0.1539	0.0463	0.001
childage 16-18	-	-	-	-0.0110	0.0746	0.883
Burgenland	-	-	-	0.3937	0.1723	0.022
Carinthia	-	-	-	-0.0183	0.1066	0.864
LowerAustria	-	-	-	-0.0506	0.0710	0.526
Upper Austria	-	-	-	0.0137	0.0806	0.865
Salzburg	-	-	-	-0.0968	0.1059	0.361
Styria	-	-	-	-0.0301	0.0825	0.715
Tyrol	-	-	-	0.0715	0.1038	0.491
Vorarlberg	-	-	-	-0.1645	0.1140	0.149
constant	1.8630	0.2030	0.000	-1.6400	0.3179	0.000
λ	0.1142	0.1063	0.283	-	-	-
ρ	0.3017			-	-	-
σ	0.3784			-	-	-

Note: ρ is the correlation coefficient between the unobservables that determine selection into waged employment and the unobservables that determine the wage; σ is the adjusted standard error for the wage equation regression; the selection coefficient $\lambda = \rho * \sigma$

Source: ILSA 2012

Table A.2.: Female Wage Estimates

Number of obs: 7748
Censored obs: 2693
Uncensored obs: 5055
Wald $chi^2(29) = 1623.72$
Prob > $chi^2 = 0.0000$

	Wage Regression				Wage Selection		
variable	coefficient	sd	p-value		coefficient	sd	p-value
job exp	0.0089	0.0012	0.000		0.0072	0.0038	0.055
Lehre	0.1445	0.0120	0.000		-0.0366	0.0660	0.057
BMS	0.2938	0.0226	0.000		0.0432	0.0767	0.573
AHS	0.3340	0.0305	0.000		0.1136	0.1067	0.287
BHS	0.4556	0.0241	0.000		0.1035	0.0838	0.217
Uni	0.7058	0.0256	0.000		0.2306	0.0889	0.009
full-time months	0.0578	0.0137	0.000		0.1694	0.0169	0.000
part-time months	0.0447	0.0136	0.001		0.1655	0.0169	0.000
full-time months previous year	0.0086	0.0049	0.080		0.0796	0.0136	0.000
part-time months previous year	0.0198	0.0050	0.000		0.0862	0.0140	0.000
unemployed months	-0.0028	0.0127	0.826		-0.0698	0.0297	0.019
household work	0.0042	0.0119	0.720		0.0067	0.0253	0.790
unemployed months last 2 years	-	-	-	-	-0.0020	0.0171	0.909
household work last 2 years	-	-	-	-	-0.0358	0.0147	0.015
industry BB	-0.0258	0.0337	0.444		-	-	-
industry Bau	0.0167	0.0317	0.600		-	-	-
industry EH	-0.1113	0.0204	0.000		-	-	-
industry Tour	-0.1663	0.0204	0.000		-	-	-
industry Trans	-0.1223	0.0202	0.000		-	-	-
age	-0.0163	0.0054	0.003		0.0002	0.0039	0.959
age^2	-0.0002	0.0001	0.002		-	-	-
single	0.0395	0.0150	0.008		0.0150	0.0690	0.827
disabled 1	-0.0476	0.0194	0.014		-0.0466	0.0691	0.500
disabled 2	-0.1345	0.0399	0.001		-0.3464	0.1150	0.003
Austrian	0.1117	0.0279	0.000		0.1590	0.0804	0.048
year 2005	-0.0010	0.0204	0.961		-	-	-
year 2006	-0.0062	0.0198	0.756		-	-	-
year 2007	0.0134	0.0210	0.522		-	-	-
year 2008	-0.0248	0.0214	0.246		-	-	-
ln(other Income)	-	-	-		0.0038	0.0114	0.739
childage 0-3	-	-	-		0.1207	0.0648	0.062
childage 4-6	-	-	-		-0.0889	0.0589	0.131
childage 7-9	-	-	-		-0.0028	0.0594	0.963
childage 10-15	-	-	-		0.0438	0.0385	0.255
childage 16-18	-	-	-		-0.0163	0.0630	0.796
Burgenland	-	-	-		0.5150	0.1438	0.000
Carinthia	-	-	-		0.3117	0.1070	0.004
LowerAustria	-	-	-		0.1953	0.0763	0.010
Upper Austria	-	-	-		0.1652	0.0767	0.031
Salzburg	-	-	-		0.1323	0.1012	0.191
Styria	-	-	-		0.1369	0.0808	0.090
Tyrol	0.0458	0.0238	0.055		0.0524	0.0936	0.576
Vorarlberg	0.1130	0.0320	0.000		-0.0065	0.1134	0.954
constant	0.9688	0.2370	0.000		-1.9483	0.2972	0.000
λ	0.2718	0.0946	0.004	-	-	-	
ρ	0.5931			-	-	-	
σ	0.4582			-	-	-	

Note: ρ is the correlation coefficient between the unobservables that determine selection into waged employment and the unobservables that determine the wage; σ is the adjusted standard error for the wage equation regression; the selection coefficient $\lambda = \rho * \sigma$

Source: ILSA 2012

A.2. ITABENA
IHS Tax-Benefit Microsimulation Model of Austria

ITABENA is a tax-benefit microsimulation model, developed in 2003 by Helmut Hofer, Reinhard Koman and Ulrich Schuh in the Institute for Advanced Studies. It incorporates the Austrian tax-, transfer- and social security-schedule of a given year. It uses information about gross earning incomes and household characteristics of the data EU-SILC. Data information and the given schedule allow the model to compute a household's tax burden, social security contributions and transfers. Furthermore, policy reforms can be simulated. Policy reforms may lead to a vertical or horizontal redistribution of income. The former redistributes income between households with different incomes whereas the latter redistributes income within households of different characteristics (e.g. households with and without children). These effects on disposable household income and income distribution by policy reforms can be evaluated by the use of the model.
The set-up of the model is programmed in STATA. The computation is done within do-files of the programme and the parameters are written in text-files so that they can easily be changed for yearly changing tax-transfer schedules or reform simulations. For a detailed description of the model see Dearing and Lietz (2007).

A.2.1. The Austrian Tax and Transfer System within ITABENA

The focus of ITABENA is the disposable income of a household. Table A.3 shows the components of a household's disposable income which is partly out of the data and partly simulated.[1]

Income Tax

The assessment base for current earnings (CAB) consists of earnings from 12 months employment, earnings from self-employment and renting and pension income (12 months) less social security contributions on current earnings.[2] The assessment base for special payments (SAB) consists of 13th and 14th monthly income from employment and pension less social security contributions on special earnings.

[1] Note: Pension Income cannot be calculated due to missing data. Unemployment benefits as well as unemployment and social assistance can be approximated only due to missing or inexact data.

[2] Earnings from self-employment and renting are adjusted by the factor of 2/3 which captures the fact that not all earnings from self-employment are declared as income.

Table A.3.: Components of the Household Disposable Income in ITABENA

	Income Components	simulated
Income	Income from Self-Employment	
	Income from Employment	
	Capital Income	
	Rent Income	
	Other Income (alimony, child allowance, etc.)	
- Taxes	Income Tax	x
	Social Security Contributions	x
	Capital Gains Tax	x
+ Transfers	Pension Income	
	Family Allowance and Child Deductible	x
	Child Care Allowance (parental leave)	x
	Care Allowance (e.g. old-age care)	x
	Unemployment Benefits	(x)
	Unemployment Assistance	(x)
	Social Assistance	(x)
	Other Transfers (e.g.scholarships)	
= Net Income		

Source: Dearing and Lietz (2007); translated by the author

Tax deductibles lower the current assessment base. Four types of deductibles are considered in ITABENA:

1) *"Werbe"* Deductible: In the years 2004 to 2012, 132 Euro, which take account for expenditures resulting from employment, are subtracted automatically from an employee's annual current earnings.

2) *Special Expenditures* Deductible: For expenditures like voluntary pension insurance contributions, church membership contributions, housing refurbishment costs, etc. exemptions can be claimed. In ITABENA only the lump-sum of special expenditure exemption is considered, which accounts for 60 Euro in the years from 2004 to 2012.[3]

3) *Child* Deductible: Since 2009 a single earning parent can deduct 220 Euro and two earning parents can deduct 132 Euro each per child.

4) *Child Care Costs* Deductible: Since 2009 external child care costs up to 2300 Euro (for children younger than 10 years) reduce the CAB of one parent (or 1150 of two

[3]For CAB's between 36400 and 60000 Euro the exemption decreases to (60000-CAB)/23600; (before 2010 the maximum CAB was 50900).

earning parents).[4]

The total tax liability consists of taxes on current as well as special income.
Since 2009 the Austrian progressive tax schedule excepts a CAB (plus unemployment benefits and assistance[5]) below 11000 Euro from taxes. The amount between 11000 and 25000 is taxed with 36.5 percent; the amount between 25000 and 60000 is taxed with 43.2143 percent and everything above is taxed with 50 percent.[6]
The special assessment base (13th and 14th monthly income) is tax free up to 620 Euro in the years from 2004 to 2012. SAB above is taxed with 6 percent, if the sixth of annual income[7] is larger than 2100 Euro and tax free otherwise.[8] Everything above is taxed with the normal tax rates. In ITABENA the tax liability on special payments is approximated by leaving out the normal tax schedule for income above the *annual sixth*.

The tax liability can be reduced if tax credits can be claimed. ITABENA incorporates five tax credits:

1) *Single Parent or Single Earning Parent* Tax Credit: In the years 2004 until 2012 a single (earning) parent can deduct 494 Euro from annual tax liability for one child, plus 175 for the second child and 220 for the third child if the partner earns less than 8200 Euro a year. Since 2011 it has been abolished that couples without children can deduct 364 Euro if only one partner is working (or the partner earns less than 2000 per year). However, as a tax credit is claimed retrospectively and only disposable in the following year, the tax credit for single earners without children remains in ITABENA for 2012.

2) *Pension* Tax Credit: From a pension assessment base below 17000 Euro 400 Euro can be deducted from tax liability since 2005 (before up to 16715 Euro). A pension deductible loops-in up to an income of 25000 Euro (before 2005 up to 21800). In the course of the abolition of the deductible for single earners without children, the pen-

[4] Parents can choose whether the exemptions for children and child care costs are claimed by one or by both parents.

[5] Unemployment income and assistance is actually tax exempt, however, increases the average tax rate of a person and is therefore included in the tax calculation. People who receive unemployment benefits besides other income pay then the tax which results from the average tax rate with unemployment income included: average tax rate = tax liability/(CAB + unemployment benefits); tax liability = CAB*average tax rate.

[6] In 2004 a CAB was tax free up to 3640 Euro; the amount between 3640 and 7270 was taxed with 31 percent; CAB between 7270 and 21800 was taxed with 31 percent; CAB between 21800 and 50870 was taxed with 41 percent and any amount above with 50 percent. From 2005 until 2008 a CAB up to 10000 Euro was tax free; CAB between 10000 and 25000 was taxed with 38 percent; the amount between 25000 and 51000 was taxed with 43.596 percent and any CAB above with 50 percent.

[7] Sixth of annual income = Earnings divided by up-to-date-months, times 12, divided by 6

[8] Income is taxed with 6 percent above 1950 Euro in 2004 and 2000 Euro from 2005 until 2008.

sion deductible has been raised to 764 Euro for pensioners with an assessment base below 19930 Euro and a partner with an annual income below 2200 Euro.

3) *Employee* Tax Credit: Every employee's tax liability is automatically reduced by 54 Euro in the years 2004 to 2012.

4) *Transport* Tax Credit: To take account for the transport of an employee to his or her working place, 291 Euro are automatically deducted from the tax liability in the years 2004 to 2012.

5) *Child* Tax Credit: Every second month the child tax credit of 58.40 Euro is automatically paid to families together with family benefits (50.90 Euro before 2009).

6) *Maintenance* Tax Credit: People who are liable to support can deduct 350.4 Euro for the first child, 525.6 for the second child and 700.8 Euro for the third child. In ITABENA the maintenance deductible cannot be computed due to insufficient data of support payments.

If the earning income is below the threshold and tax free the single parent tax credit can still be claimed in the form of a negative tax. Furthermore, 10 percent of social security contributions (up to 110 Euro) can be claimed in the form of a negative tax if the CAB is below the taxing threshold.

Social Security Contribution

Employees, self-employees, farmers, civil servants and pensioners are obliged to pay social security contributions. Different regulations according to one's occupational status are effective and are considered within ITABENA. Social security contributions are allocated to health, pension, unemployment and accident insurance. In addition, a contribution to the chamber of labour, contribution to the family assistance fund, bankruptcy compensation fund and housing subsidies are deducted from current income.
In 2012 blue- and white-collar workers contribute 7.65 percent of their current income to health insurance (3.95 paid by employees and 3.7 by employers among blue-collar workers; 3.82 paid by white-collar employers and employees),[9] 22.8 percent to pension insurance (10.25 paid by employees and 12.55 by employers), 6 percent to unemployment insurance (of which 3 percent are paid by employers) and 1.4 percent to accident insurance (paid by employers). Since 2009 unemployment insurance contributions have been decreased for low incomes: in 2012 the contribution is 1 percent

[9]The rate of contribution to health insurance increased from 7.4 to 7.65 between 2004 and 2012.

if monthly income is between 1186 and 1294 Euro and 2 percent if income is below 1456 Euro.
Monthly income lower than 376.26 Euro is not charged social security contributions (but is not an exempt for higher incomes) and the highest possible assessment base is 4230 Euro in 2012 (316.19 and 3450 Euro in 2004 respectively, increasing each year). Civil servants contribute 7.65 percent of their current income to health insurance (3.83 percent paid by employers, 4.1 paid by civil servants) and 10.25 to pension insurance.[10] Self-employed contribute 7.65 percent of their income to health insurance, 17.50 percent to pension insurance and a monthly lump-sum of 8.25 Euro to accident insurance. If their income is below 537.78 they are exempt of contributions (actually only the first 3 years of self-employment which is not accounted for in ITABENA) and their highest contribution base is 4935 Euro in 2012 (537.78 and 4025 Euro in 2004 respectively). ITABENA does not account for regulations for people who are self-employed and employed at the same time, as well as chamber members and freelancer.
Farmers contribute 7.65 percent to health insurance, 15.50 percent to pension insurance and 1.9 percent to accident insurance.[11]
Pensioners must pay 5.1 percent of their current pension income for health insurance. If a partner is co-insured the contribution rate increases by 3.4 percent.[12]
Blue- and white- collar workers contribute 0.5 percent of their current income to housing subsidies and 0.5 percent to chamber contribution. Their employers pay 4.5 percent to the family assistance fund and 0.55 percent to the bankruptcy compensation fund. Employers of white- and blue-collar workers as well as of civil servants contribute 1.4 percent to accident insurance and 0.5 percent to housing subsidies.

Family Benefits

In Austria a monthly benefit is granted to families with children. The amount depends on the age and number of children: in the years from 2004 until 2012, 105.40 Euro are paid for a child younger than 3 years, 112.70 for a child between 3 and 9 years, 130.90 Euro for a child between 10 and 18 years and 152.70 for a child younger than 26 years if he or she is a student. Since July 2010 family benefits are granted only to students younger than 24.[13] Since 2008 a family is granted additionally 12.80 Euro for

[10] The pension insurance contribution rate of 10.25 is valid only for civil servants born after 1983, implemented in 2005 in the course of the harmonization of the pension system; older age-groups face different regulations which are accounted for in ITABENA.

[11] Health insurance contribution rate has increased from 6.5 to 7.65 percent and pension insurance contribution rate has increased from 14.5 to 15.75 during 2004 and 2012.

[12] The health insurance contribution for pensioners has increased from 4.25 to 5.1 percent during 2004 and 2012.

[13] Exceptionally family benefits are granted to students until the age of 25 if he or she did military or civilian service, has a child before the age of 24, or the course of studies could not be finished within minimum time before the 24th birthday. However, these special regulations are not considered in ITABENA.

the second child, 35 Euro for the third child and 50 Euro for the fourth and following child, independent of the age. Furthermore a family receives a so-called multiple child supplement of 20 Euro for each child from the third (if the yearly family income is not more than 55000 Euro). Before 2008 instead of 35 Euro 25.50 Euro were granted for the third and following child, but the multiple child supplement was 36.4 instead of 20 Euro for each child from the third.
Disabled children receive an extra payment of 138.30 Euro. In 2008 and 2009 family benefits were paid 13 instead of 12 times a year; since 2010 only children between 6 and 15 years receive extra 100 Euro at the beginning of the school year.
Together with family benefits the child deductible (see in chapter A.2.1) is disbursed.

Child Care Allowance

In the years from 2004 to 2012 parents can choose the amount of child care allowance depending on the payment period. The longest variant is 30 months with a daily allowance of 14.53 Euro (436 Euro monthly), the second variant is 20 months with a daily allowance of 20.8 Euro (624 Euro monthly) and the third variant is 15 months with a daily allowance of 26.67 Euro (800 Euro monthly). Since 2010 two more variants have been introduced, both obtainable for a year. One variant grants daily 33.33 Euro (1000 Euro monthly) and the other variant grants monthly 80 percent of one's average monthly net income, up to 2000 Euro monthly. If the second partner stays home to take care of the child as well, the first variant will be prolonged with 6 months, the second variant with 4 months, the third variant with 3 months and the shortest variant with 2 months. For the lump-sum variants the receiver of child care allowance has an earning limit of 16200 Euro or an *individual* earning limit of 60 percent of prior earnings.[14] The income dependent variant allows additional earnings up to yearly 6100 Euro. Parents where receivers earn less than 6200 Euro yearly and partners who earn less than 16200 Euro yearly receive an extra daily allowance of 6.06 (180 Euro monthly) during the first year.
The most frequently taken variant is the longest variant. Since the EU-SILC does not give information about the chosen variant of child care allowance ITABENA is implementing only the longest variant: Households with children under 3 years receive 436 Euro 12 months long, and families with children at the age of 3 receive 436 Euro 6 months long. As a consequence of the approximation, household income might be underestimated for some families with small children.

[14] The *individual* earning limit is calculated with 60 percent of the sum of the monthly assessment base, divided by the payment months of child care allowance, times 12, less the "Werbe"exempt, times the factor 1.3; in ITABENA the *individual* earning limit is not taken into account.

Unemployment Benefits

Only people who were employed 52 weeks during the last 24 months are eligible for unemployment benefits for the first time if they are older than 25. People younger than 25 must have been employed at least 26 weeks during the last 12 months. If unemployment benefits have already been obtained in recent years, one must have been employed at least 28 weeks during the last 12 months.
The basic amount of unemployment benefits are 55 percent of daily net income before unemployment, up to 36.46 Euro daily (1390.8 monthly). A family subsidy is granted for families with children: 0.97 Euro daily per child and partner in the years 2004 until 2012. If the unemployment benefit is below the supplement reference rate (Ausgleichszulagenrichtsatz), the benefit can be up to 60 percent (or 80 percent for families) of the prior net income. The supplement reference rate is increased every year; during 2004 and 2012 it was raised from 653.19 Euro to 814.82 Euro.
People younger than 40 years are permitted unemployment benefits for 20 weeks and 30 weeks if they were employed at least 3 years during the last 5 years. People are eligible for benefits for 39 weeks if they were employed at least 6 years during the last 10 years and if they are older than 39; people older than 49 can receive unemployment benefits up to 1 year if they were employed for at least 9 years during the last 15 years. As there is neither information about the previous duration of employment, the previous net income, nor information about prior unemployment payments in the EU-SILC data, the entitlement for unemployment benefits and the amount of benefits cannot be computed according to the given regulations. In ITABENA the given yearly unemployment benefits from the data can thus be used and the basic benefit and the family supplement can be calculated out of them according to the regulations. Then the calculated monthly payment is granted as many months as indicated in the data.
However, for the purpose of calculating a person's or a household's aggregate income the unemployment benefit is taken usually directly out of the data.

Unemployment Assistance

92 percent of the basic unemployment benefits are granted as so-called unemployment assistance the first 6 months after the unemployment benefit had ended. If the basic unemployment benefit is below the supplement reference rate, 95 percent of the basic unemployment benefit are granted. After 6 months people who were entitled for unemployment benefits for at least 20 weeks receive the supplement reference rate (the so-called *capped* unemployment assistance); people who were entitled for unemployment benefits for at least 30 weeks receive monthly 925 Euro.[15] The same family subsidies are disbursed like for the unemployment benefits. If the unemployed is younger than 50 years, his or her partner is allowed to earn monthly up to 510 Euro (plus 250 Euro

[15] During 2004 and 2012 this limit increased from 762 to 925 Euro.

per child). The income limit for the partner will be doubled, if the unemployed is older than 55 years of age, unemployment benefits were granted for a year before and contributions to unemployment insurance were paid for at least 20 years. The income limit for the partner will be tripled if the unemployed is older than 54 years, unemployment benefits were granted for a year before and contributions to unemployment insurance were paid for at least 15 years during the last 25 years. Someone who receives unemployment assistance is allowed to earn up to 376.26 Euro per month.[16].
As it is the case with unemployment benefits, unemployment assistance is not modeled but taken directly out of the EU-SILC data for a static evaluation within ITABENA. The computation of the unemployment assistance is however relevant for the model ILSA. Within ILSA a proxy for contribution years is job experience (age less educational years) out of the data. A person who worked the previous year (observed in the data) but not this year (notionally in the zero working hour category) receives 12 months the capped unemployment assistance plus family subsidies, taking into account the income limits.[17]

Social Assistance

Social assistance, housing and heating subsidies are granted to all people who cannot pay for their own living due to a given living condition. With the assistance basic needs should be covered and the possibility should be given to join the social and cultural life. The regulations for social assistance are specified by each Austrian state, however, since 2010 it has been tried to conform them by implementing a uniform regulation. In 2012 singles are entitled to 773.25 Euro and couples to 1159.88 Euro per month (with housing subsidies already included).[18] The uniform regulation grants 135.53 Euro per child, however, most states have increased the child assistance. Some states grant lower, some higher payments for the third and following child.
Social assistance is means-tested, taking into account the household income and property. A recipient is not allowed to have savings and assets more than 3866.30 Euro. The own house, household and personal effects and a car are exempt. Within ITABENA social assistance can only be approximated due to missing information about savings and property. For the means-test of social assistance the disposable household income includes any income from employment, self-employment, unemployment and pension, scholarships, maternity allowance, child care allowance, alimonies, family benefits and

[16] During 2004 and 2012 the income limit for partners has increased from 441 to 510 Euro and the increased limit with children has increased from 220.5 to 250 Euro per child. The income limit for the receiver has increased from 316.19 to 376.26 Euro per month.

[17] It is further assumed that every person had received unemployment benefits for the first time, which affects the length of entitlement for unemployment benefits, which in turn affects the amount of capped unemployment assistance.

[18] In Vorarlberg, Tirol and Upper Austria couples receive slightly more. However, these states have lower additional payments for further adults in the household.

capital and renting income. The amount of social assistance is thus used directly out of the data and not modeled for the static evaluation.

Care Allowance

In the data people indicate how many months they receive care allowance and the care level. Using this information the amount of care allowance can be calculated with the specified monthly amount per care level: 154.2 Euro for the first level, 284.3 Euro for the second level, 442.9 Euro for the third level, 664.3 Euro for the fourth level, 902.3 Euro for the fifth level, 1260 Euro for the sixth level and 1655.8 Euro for the seventh level.[19]

Capital Gains Tax

The capital income indicated in the data is assumed to be taxed with 25 percent. It is assumed that the given capital income out of the data is subject to the Austrian final withholding tax (like capital income from internal banks, shares, bonds, etc.). Capital income is thus taxed with 25 percent.

Table A.4.: ITABENA Model Validation with EU-SILC 2008

	Reality 2007		ITABENA		Difference	
	EUR in million	#	EUR in m	#	EUR	#
gross income	144,041	6,428,273	138,178	5,939,105	-4.1%	-7.6%
income tax	23,863	4,971,258	22,961	4,853,331	-3.8%	-2.4%
net income	120,178	6,428,273	115,217	5,939,105	-4.1%	-7.6%
SSC	34,833		33,982		-2.4%	

Source: ITABENA 2012; Statistik Austria (2010);Hauptverband der österreichischen Sozialversicherung (2007)
Note: The table depicts the accurateness of the model ITABENA by computing the tax and social security contributions of the Austrian population on the basis of the EU-SILC 2008 and the regulations of 2007 (which is the year the income variables relate to).

[19] Between 2004 and 2012 the amount increased from 145.4 to 154.2 Euro for the first level, from 268 to 284.3 Euro for the second level, from 413.5 to 442.9 Euro for the third level, from 620.3 to 664.3 Euro for the fourth level, from 842.4 to 902.3 Euro for the fifth level, from 1148.7 to 1260 Euro for the sixth level and from 1531.5 to 1655.8 Euro for the seventh level.

Table A.5.: Notional Mean Gross Earning Income by Working Hour Categories

	with flexible partner		without (flexible) partner	
	women	men	women	men
	mean(sd)	mean(sd)	mean(sd)	mean(sd)
Category 1	0(0)	0(0)	0(0)	0(0)
Category 2	5,108 (2,784)	6,457 (3,466)	5,672 (2,691)	5,805 (3,145)
Category 3	12,6315 (6,884)	19,110 (7,490)	14,020 (6,663)	17,219 (7,091)
Category 4	16,378 (8,948)	26,692 (10,418)	18,110 (8,610)	23,938 (9,874)
Category 5	25,131 (13,701)	38,399 (14,980)	27,884 (13,226)	34,438 (14,182)
Category 6	27,659 (15,126)	43,156 (16,981)	30,553 (14,584)	38,499 (15,971)

Source: ILSA 2012

Note: The table summarizes the mean (sd) annual gross earning incomes of each working hour category. The incomes are computed for each individual for each category. Since the incomes are notional, the table is presented to give an idea of earning potentials for women and men with and without (flexible) partner.

Table A.6.: Deviation of Calculated Income in Original Working Hour from Original Income

	with flexible partner		without (flexible) partner	
	women	men	women	men
	mean(sd)	mean(sd)	mean(sd)	mean(sd)
original	15,327 (17,539)	37,128 (22,882)	20,985 (16,916)	32,610 (20,546)
calculated	16,153 (15,001)	37,331 (17,515)	21,779 (16,037)	33,296 (16,474)
deviation	5.4%	0.5%	3.8%	2.1%

Source: ILSA 2012

Note: The first line shows the mean(sd) original annual gross earning income of women and men of the pooled EU-SILC 2004-2008. The second line gives the mean calculated annual gross income computed from the individual's observed or predicted wage times the median of the individual's observed/actual working hour times 52 weeks. The third line gives the deviation from calculated to original income in percentage.

A.3. Utility Function Estimation Results

Table A.7.: Individual Model: Men & Women without (flexible) Partner

Number of obs: 17490	Number of obs: 19314
log liklihood = -2606	log liklihood = -4043
LR $chi^2(25)$ = 5233.96	LR $chi^2(21)$ = 3448.60
Prob > chi^2 = 0.0000	Prob > chi^2 = 0.0000
pseudo R^2 = 0.5011	pseudo R^2 = 0.2990

	Male Estimates			Female Estimates		
variable	coefficient	sd	p-value	coefficient	sd	p-value
income	0.0021	0.0001	0.000	0.0021	0.0001	0.000
leisure	2.8507	0.1416	0.000	3.5479	0.1244	0.000
$income^2$	-8.7e-09	6.5e-10	0.000	-1.3e-08	7.5e-10	0.000
$leisure^2$	-0.0094	0.0005	0.000	-0.0120	0.0004	0.000
inc*leisure	-1.3e-05	7.6e-07	0.000	-1.2e-05	6.8e-07	0.000
inc*others' inc	9.9e-10	8.8e-10	0.261	5.8e-10	6.5e-10	0.372
inc*others' inc^2	-2.0e-14	1.1e-14	0.063	8.5e-16	7.4e-15	0.909
inc*job exp	1.1e-05	1.8e-06	0.000	5.4e-06	5.21e-07	0.000
inc*job exp^2	-2.04e-07	3.7e-08	0.000	-	-	-
inc*Lehre	-1.9e-05	2.1e-05	0.392	2.8e-05	1.4e-05	0.392
inc*BMS	-4.8e-06	2.7e-05	0.857	5.0e-05	1.5e-05	0.001
inc*AHS	1.9e-05	3.2e-05	0.556	7.8e-05	2.0e-05	0.000
inc*BHS	1.1e-05	2.6e-05	0.694	7.0e-05	1.6e-05	0.000
inc*Uni	3.9e-05	2.8e-05	0.161	9.2e-05	1.6e-05	0.000
inc*children_0_3	-2.8e-05	1.5e-05	0.064	7.4e-05	2.2e-05	0.001
inc*children_4_6	-	-	-	-1.3e-05	1.9e-05	0.492
inc*children_7_18	-	-	-	1.4e-06	8.7e-06	0.871
leis*others' inc	-4.72e-07	3.5e-07	0.180	8.19e-07	2.4e-07	0.001
leis*others' inc^2	2.04e-13	5.3e-12	0.970	-2.8e-12	2.8e-12	0.315
leis*age	0.0014	0.0002	0.000	0.0025	0.0002	0.000
leis*Burgenland	-0.0179	0.0133	0.179	-	-	-
leis*Carinthia	-0.0130	0.0098	0.184	-	-	-
leis*Lower AT	-0.0220	0.0067	0.001	-	-	-
leis*Upper AT	-0.0046	0.0072	0.518	-	-	-
leis*Salzburg	-0.0111	0.0103	0.281	-	-	-
leis*Styria	0.0020	0.0065	0.758	-	-	-
leis*Tyrol	-0.0292	0.0113	0.010	-	-	-
leis*Vorarlberg	-0.0455	0.0151	0.003	-	-	-
leis*single	-	-	-	-0.0287	0.0044	0.000
leis*children_0_3	-	-	-	0.0971	0.0093	0.000
leis*children_4_6	-	-	-	0.0233	0.0089	0.009
leis*children_7_18	-	-	-	0.0133	0.0036	0.000
FC part-time	-5.5872	0.5300	0.000	-5.0390	0.2232	0.000
FC full-time	-1.4366	0.6620	0.030	-1.6527	0.2686	0.000

Source: ILSA 2012

Table A.8.: Household Model: Men & Women with flexible Partner

Number of obs: 146772
log liklihood = -9086
LR $chi^2(25)$ = 11047.50
Prob > chi^2 = 0.0000
pseudo R^2 = 0.3781

variable	coefficient	sd	p-value
income	0.0008	0.0001	0.000
male leisure	2.3707	0.1262	0.000
female leisure	2.8920	0.1160	0.000
$income^2$	-2.4e-09	2.4e-10	0.000
male $leis^2$	-0.0072	0.0005	0.000
female $leis^2$	-0.0092	0.0004	0.000
inc*male leis	-3.6e-06	2.9e-07	0.000
inc*female leis	-7.2e-07	2.3e-07	0.001
male leis*female leis	-0.0019	0.0002	0.000
inc*others' inc	4.6e-10	3.5e-10	0.182
inc*others' inc^2	-7.4e-15	8.8e-15	0.397
inc*male job exp	-2.8e-06	1.6e-06	0.085
inc*male job exp^2	1.36e-08	3.1e-08	0.663
inc*male-Lehre	1.8e-05	1.1e-05	0.120
inc*male-BMS	4.2e-05	1.1e-05	0.002
inc*male-AHS	4.1e-05	1.6e-05	0.013
inc*male-BHS	3.5e-05	1.4e-05	0.012
inc*male-Uni	2.11e-06	1.5e-05	0.885
inc*male-disabled 1	-7-7e-06	8.4e-06	0.362
inc*male-disabled 2	-4.1e-05	1.5e-05	0.008
inc*female job exp	1.4e-05	1.1e-06	0.000
inc*female job exp^2	-2.2e-07	3.1e-08	0.000
inc*female-Lehre	-5.2e-06	9.4e-06	0.579
inc*female-BMS	-9.7e-07	1.4e-05	0.927
inc*female-AHS	-9.2e-06	1.1e-05	0.497
inc*female-BHS	2.7e-05	1.2e-05	0.020
inc*female-Uni	1.2e-05	1.2e-05	0.322
inc*female-disabled 1	-2.4e-05	8.5e-06	0.004
inc*female-disabled 2	-6.4e-05	1.8e-05	0.000
male leis*age	0.0015	0.0003	0.000
male leis*children_0_3	0.0166	0.0044	0.000
female leis*age	0.0022	0.0002	0.000
female leis*children_0_3	0.0624	0.0036	0.000
female leis*children_4_6	0.0366	0.0032	0.000
female leis*children_7_18	0.0105	0.0015	0.000
female leis*small town	0.0100	0.0040	0.017
female leis*village	0.0215	0.0032	0.000
male FC part-time	-11.2702	1.2553	0.000
male FC full-time	-2.9747	1.5520	0.055
female FC part-time	-9.1548	0.3274	0.000
female FC full-time	-3.1922	0.3896	0.000

Source: ILSA 2012

Table A.9.: Deviation of Predicted Working Hours from Original Working Hours. Pooled Data

	with (flexible) partner		without (flexible) partner	
	women	men	women	men
	mean(sd)	mean(sd)	mean(sd)	mean(sd)
original	21.0 (16.5)	39.2 (10.9)	27.4 (16.5)	39.9 (9.3)
predicted	21.1 (9.8)	39.2 (3.6)	27.6 (11.1)	38.4 (5.0)
deviation	0.5%	0.0%	0.9%	-3.6%

Source: ILSA 2012

Note: The first line shows the mean (sd) of the observed wages of the *pooled EU-SILC 2004-2008* for women and men with and without flexible partners. The second line shows the mean of predicted wages which are estimated by a regression with a selection correction according to Heckman (1979). The third line gives the deviation from predicted to observed wage in percentage.

Table A.10.: Deviation of Predicted Working Hours from Original Working Hours. Cross Section 2008

	with (flexible) partner		without (flexible) partner	
	women	men	women	men
	mean(sd)	mean(sd)	mean(sd)	mean(sd)
original	22.8 (16.3)	39.6 (10.8)	28.4 (16.3)	40.2 (8.8)
predicted	21.2 (9.9)	39.0 (3.6)	27.5 (11.4)	37.8 (5.5)
deviation	-7.2%	-1.6%	-3.2%	-6.0%

Source: ILSA 2012

Note: The first line shows the mean (sd) of the observed wages of the *EU-SILC 2008* for women and men with and without flexible partners. The second line shows the mean of predicted wages which are estimated by a regression with a selection correction according to Heckman (1979). The third line gives the deviation from predicted to observed wage in percentage.

Table A.11.: First Derivative of Income. Cross-Section 2008

	with (flexible) partner		without (flexible) partner	
	women	men	women	men
positive	707	692	582	529
negative	0	15	53	76

Source: ILSA 2012

Note: According to the theory, more income is preferred, hence, the first derivative of utility with respect to income should be positive. This is the case for most of the observations; in the case of a negative first derivative, the observation is dropped for policy simulations.

Table A.12.: First Derivative of Leisure. Cross-Section 2008

	with (flexible) partner		without (flexible) partner	
	women	men	women	men
positive	482	675	453	510
negative	210	35	129	19

Source: ILSA 2012

Note: According to the theory, more leisure is preferred, hence, the first derivative of utility with respect to leisure should be positive. For about a third of all women the first derivative with respect to leisure is, however, negative.

A.4. Simulation Results

Table A.13.: Evaluation of Prediction I to III. Unweighed

	WOMEN			MEN		
	work more	wore less	unchanged	work more	work less	unchanged
	n	n	n	n	n	n
Prediction I						
income increases	130	2	0	46	86	0
income decreases	461	42	10	32	470	11
income unchanged	33	5	9	14	24	9
Prediction II						
income increases	248	95	2	-	-	-
income decreases	0	0	0	-	-	-
income unchanged	210	13	14	-	-	-
Prediction III						
income increases	-	-	-	0	0	0
income decreases	-	-	-	21	454	13
income unchanged	-	-	-	3	31	7

Source: ILSA 2012

Note: The prediction I refers to a couple-household, prediction II to a woman without (flexible) partner and prediction III to a man without (flexible) partner. Basically, all predictions claim that women want to work more and men want to work less independent of whether their household income increases or decreases after the reform. The table shows that for the most cases the implications hold.

Table A.14.: Income, Taxes and SSC in the Base Scenario. *WOMEN*

WOMEN	with (flexible) partner	without (flexible) partner	not relevant for LS simulation	total
n unweighed	707	582	2,943	4,232
n weighed	632,772	526,723	2,613,697	3,773,192
Gross Inc	10,263,107,015	10,737,914,438	31,519,903,271	52,520,924,724
Taxes	990,711,733	983,741,909	3,266,471,319	5,240,924,961
SSC	1,688,842,361	1,755,805,980	3,333,583,707	6,778,232,048
Transfers	2,343,987,329	1,212,487,517	3,263,200,049	6,819,674,895
Disp Inc	9,927,540,250	9,210,854,066	28,183,048,295	47,321,442,611

Source: ILSA 2012

Note: The table shows the total (weighed) amount of gross income, taxes, social security contributions and transfers which is earned and payed by *female observations* of the income-corrected EU-SILC 2008 and simulated by ITABENA with the tax regulations of 2012.

Table A.15.: Income, Taxes and SSC in the Base Scenario. *MEN*

MEN	with (flexible) partner	without (flexible) partner	not relevant for LS simulation	total
n unweighed	692	529	2,668	3,889
n weighed	632,575	535,067	2,422,792	3,590,434
Gross Inc	23,600,165,598	17,077,507,253	50,021,871,166	90,699,544,017
Taxes	3,736,590,803	2,380,708,349	7,836,285,514	13,953,584,666
SSC	3,871,581,353	2,885,779,152	5,991,051,549	12,748,412,054
Transfers	473,845,600	342,476,492	1,355,357,784	2,171,679,876
Disp Inc	16,465,839,043	12,153,496,244	37,549,891,886	66,169,227,173

Source: ILSA 2012

Note: The table shows the total (weighed) amount of gross income, taxes, social security contributions and transfers which is earned and payed by *male observations* of the income-corrected EU-SILC 2008 and simulated by ITABENA with the tax regulations of 2012.

Table A.16.: 1st and 2nd Round Aggregate Budget Effects. *Women*

WOMEN	with (flexible) partner	without (flexible) partner	not relevant for LS simulation	total
ΔGross Inc				
1st Round	-	-	-	-
LS effect	307,391,854	77,008,269	-	384,400,123
2nd Round	307,391,854	77,008,269	-	384,400,123
ΔTax				
1st Round	-270,712,507	-286,104,900	-863,139,397	-1,419,956,804
LS effect	42,328,308	1,428,409	-	43,756,717
2nd Round	-228,384,199	-284,676,491	-863,139,397	-1,376,200,087
ΔSSC				
1st Round	-	-	-	-
LS effect	59,221,742	13,273,384	-	72,495,126
2nd Round	59,221,742	13,273,384	-	72,495,126
ΔDisp Inc				
1st Round	270,712,507	286,104,900	863,139,397	1,419,956,804
LS effect	205,841,803	62,306,476	-	268,148,279
2nd Round	476,554,310	348,411,376	863,139,397	1,688,105,083

Source: ILSA 2012

Note: The table shows the total (weighed) difference between base and reform scenario for all the *female observations* in gross income, taxes, social security contributions and disposable income. The 1st round effects arise from the simulation by ITABENA, the labour supply effects from the simulation by ILSA; the total effects are the 2nd round effects.

Table A.17.: 1st and 2nd Round Aggregate Budget Effects. *Men*

MEN	with (flexible) partner	without (flexible) partner	not relevant for LS simulation	total
ΔGross Inc				
1st Round	-	-	-	-
LS effect	-52,135,919	-57,519,507		-109,655,426
2nd Round	-52,135,919	-57,519,507		-109,655,426
ΔTax				
1st Round	382,978,612	244,059,751	792,900,251	1,419,938,614
LS effect	-11,636,070	-15,990,498	358,834	-27,267,734
2nd Round	371,342,542	228,069,253	793,259,085	1,392,670,880
ΔSSC				
1st Round	-	-	-	-
LS effect	-6,939,160	-10,351,699	-	-17,290,859
2nd Round	-6,939,160	-10,351,699	-	-17,290,859
ΔDisp Inc				
1st Round	-382,978,612	-244,059,751	-792,900,251	-1,419,938,614
LS effect	-33,560,688	-31,177,310	-358,834	-65,096,832
2nd Round	-416,539,300	-275,237,061	-793,259,085	-1,485,035,446

Source: ILSA 2012

Note: The table shows the total (weighed) difference between base and reform scenario for all the *male observations* in gross income, taxes, social security contributions and disposable income. The 1st round effects arise from the simulation by ITABENA, the labour supply effects from the simulation by ILSA; the total effects are the 2nd round effects.

Table A.18.: Spearman Correlation Coefficients

	women who work more	men who work less
	r (p-value)	r (p-value)
Δ Working Hours & Gross Wage		
with (flexible) partner	0.5306 (0.0000)	0.1779 (0.0000)
without (flexible) partner	-0.2293 (0.0000)	0.6222 (0.0000)
Δ Working Hours & Household Income Decile		
with (flexible) partner	0.3498 (0.0000)	0.2605 (0.0000)
without (flexible) partner	0.0004 (0.9932)	0.1940 (0.0000)

Source: ILSA 2012

Note: The table shows the Spearman correlation coefficient between the change in working hours and individual gross hourly wage as well as the change in working hours and household income decile. The table illustrates that the higher the wage/income decile for men with and without (flexible) partner, the smaller is the reduction in working hours. Furthermore, the higher the wage/income decile for women with a partner, the more these women increase their working hours, however, women without flexible partner increase their working hours significantly less with increasing wages.

Table A.19.: 1st and 2nd Round Mean Effects on Income, by Family Type

1st Round

	# households	Inc	Taxes	SSC	Disp
no children	2,280,284	0	-56 (1089)	0	56 (1089)
1 adult, 1 child	114,826	0	-168 (650)	0	168 (650)
1 adult, 2 children	43,200	0	-80 (425)	0	80 (425)
1 adult, > 2children	9,256	0	-63 (342)	0	63 (342)
2 adults, 1 child	345,595	0	71 (741)	0	-71 (741)
2 adults,2 children	329,356	0	107 (638)	0	-107 (638)
2 adults, >2 children	119,357	0	45 (630)	0	-45 (630)
3 adults, 1 child	13,692	0	100 (354)	0	-100 (354)
3 adults, 2 children	9,280	0	7 (319)	0	-7 (319)
>3 adults, >2 children	5,335	0	-1 (457)	0	1 (457)

2nd Round

	# households	Inc	Taxes	SSC	Disp
no children	2,280,284	28 (240)	-55 (1083)	6 (51)	77 (1120)
1 adult, 1 child	114,826	13 (304)	-169 (653)	4 (59)	179 (678)
1 adult, 2 children	43,200	30 (153)	-78 (425)	5 (26)	104 (441)
1 adult, > 2children	9,256	5 (75)	-63 (341)	0 (12)	68 (334)
2 adults, 1 child	345,595	64 (332)	77 (724)	12 (66)	-25 (831)
2 adults,2 children	329,356	67 (304)	113 (626)	14 (73)	-60 (723)
2 adults, >2 children	119,357	5 (313)	46 (639)	1 (56)	-41 (677)
3 adults, 1 child	13,692	4 (255)	96 (334)	1 (45)	-93 (439)
3 adults, 2 children	9,280	-6 (405)	-8 (294)	-1 (62)	2 (473)
>3 adults, >2 children	5,335	-2 (8)	-1 (457)	0 (1)	0 (457)

Source: ILSA 2012

Note: The table compares the mean (sd) difference between base and reform scenario in gross household income, taxes, social security contributions and disposable household income for various family types. The upper part is without and the lower part with the inclusion of behavioural adjustments of the labour supply.

Table A.20.: 1st and 2nd Round Mean Effects on Income, by Income Decile

1st Round

Decile	Inc	Tax	SSC	Transfers	Disp. Income
1	0	12 (49)	0	0	-12 (49)
2	0	24 (127)	0	0	-24 (127)
3	0	20 (191)	0	0	-20 (191)
4	0	24 (264)	0	0	-24 (264)
5	0	-5 (409)	0	0	5 (409)
6	0	16 (458)	0	0	-16 (458)
7	0	20 (577)	0	0	-20 (577)
8	0	12 (743)	0	0	-12 (743)
9	0	-50 (1003)	0	0	50 (1003)
10	0	-73 (2393)	0	0	73 (2393)

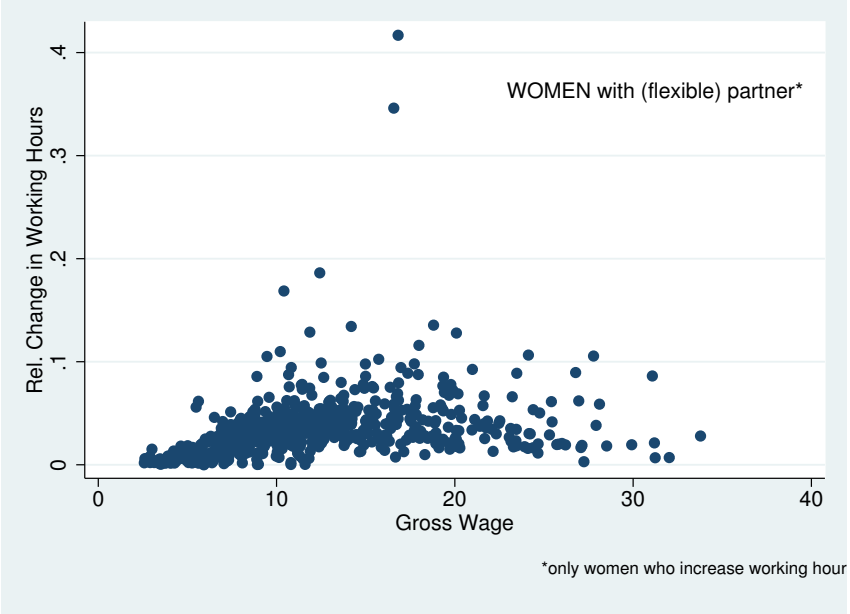
2nd Round

Decile	Gross Income	Taxes	SSC	Transfers	Disp. Income
1	3 (173)	10 (54)	3 (54)	0 (0)	-9 (138)
2	17 (133)	24 (127)	4 (40)	0 (0)	-11 (186)
3	19 (140)	19 (184)	3 (30)	0 (0)	-4 (240)
4	31 (218)	27 (264)	5 (43)	0 (0)	-2 (337)
5	38 (278)	-4 (397)	8 (73)	0 (0)	34 (491)
6	51 (250)	18 (451)	10 (50)	0 (0)	23 (518)
7	30 (303)	19 (569)	6 (60)	0 (0)	6 (646)
8	34 (376)	12 (743)	8 (73)	0 (0)	14 (800)
9	62 (334)	-44 (994)	12 (63)	0 (0)	94 (1069)
10	90 (401)	-58 (2378)	18 (80)	0 (0)	130 (2452)

Source: ILSA 2012

Note: The table compares the mean (sd) difference between base and reform scenario in gross household income, taxes, social security contributions, transfers and disposable household income for the income deciles. The upper part is without and the lower part with the inclusion of behavioural adjustments of the labour supply.

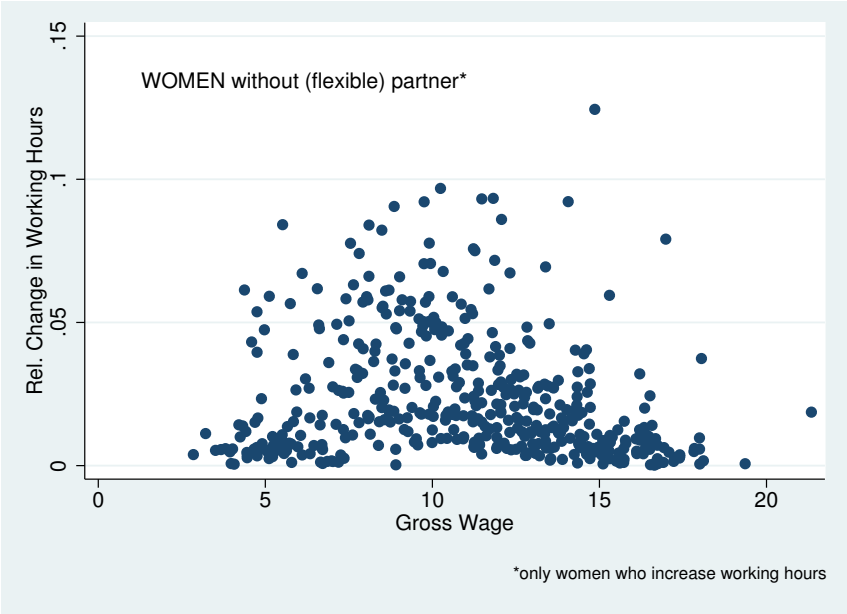
Figure A.1.: Scatter Plot: Relative Change in Working Hours and Gross Wage of Women with flexible Partner



Source: ILSA 2012

Note: The figure illustrates the relationship between the change in working hours and the gross hourly wage for women with flexible partner.

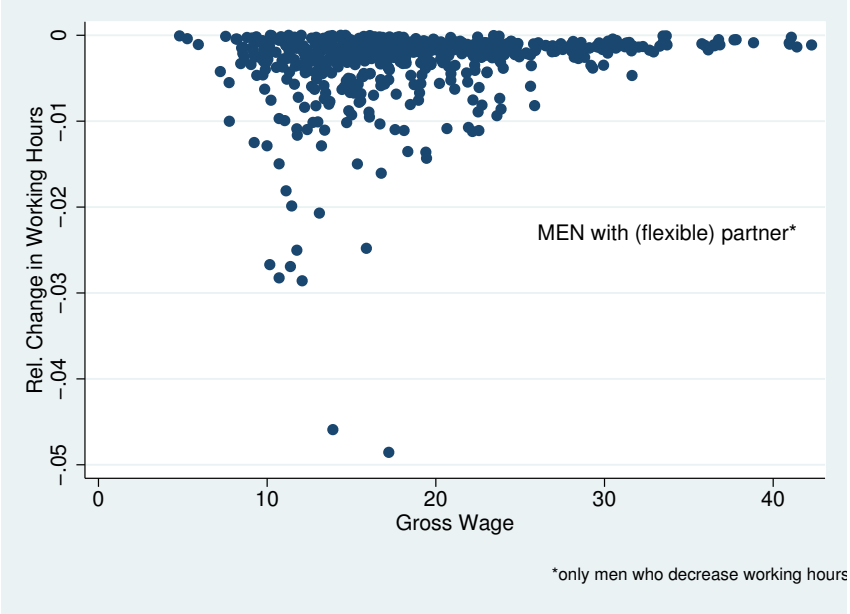
Figure A.2.: Scatter Plot: Relative Change in Working Hours and Gross Wage of Women without (flexible) Partner



Source: ILSA 2012

Note: The figure illustrates the relationship between the change in working hours and the gross hourly wage for women without (flexible) partner.

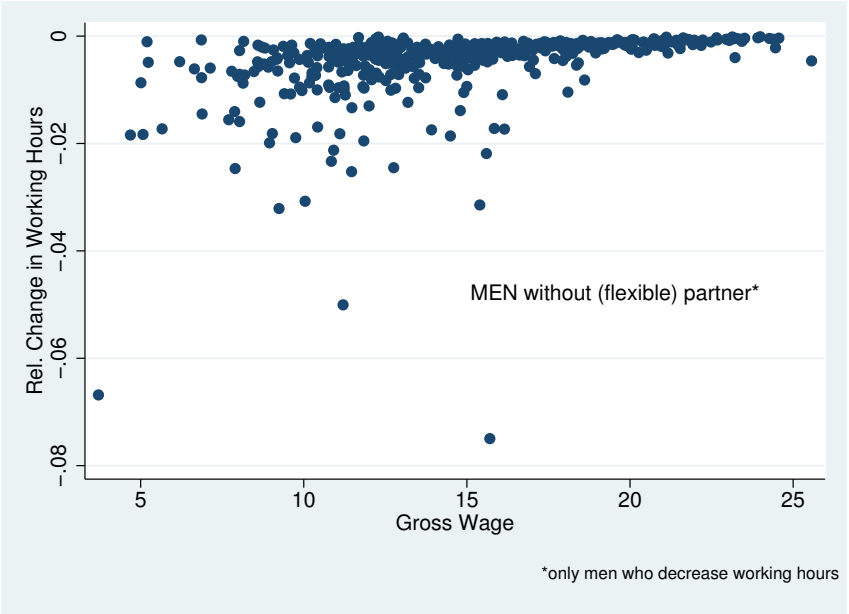
Figure A.3.: Scatter Plot: Relative Change in Working Hours and Gross Wage of Men with flexible Partner



Source: ILSA 2012

Note: The figure illustrates the relationship between the change in working hours and the gross hourly wage for men with flexible partner.

Figure A.4.: Scatter Plot: Relative Change in Working Hours and Gross Wage of Men without (flexible) Partner



Source: ILSA 2012

Note: The figure illustrates the relationship between the change in working hours and the gross hourly wage for men without (flexible) partner.

B. Appendix B

B.1. Abstract

In this paper I simulate a gender-based tax system for Austria using the tax-benefit microsimulation model ITABENA and the labour supply model ILSA by the Institute for Advanced Studies. The idea is to redistribute income from men to women to balance the decision of paid labour and unpaid household work between genders. ITABENA reveals the static non-behavioural effects on the Austrian income distribution. ILSA is a discrete choice model based on ITABENA and the EU-SILC 2004-2010, which indicates the behavioural effects. I use the Austrian progressive tax schedule of 2012 with its thresholds and decrease the tax rates for women and increase the tax rates for men so that the reform is budget-neutral in the static non-behavioural scenario. After accounting for behavioural adjustments, the state earns 16 m Euro in taxes and 55 m Euro in social security contributions. The households earn a total of 203 m Euro. Women increase their working hours by an average of 2.3 percent; men decrease their working hours by an average of 0.3 percent. In total, the reform leads to a change in employment by approximately 17,000 female and 4,000 male full time equivalents (FTE). High income deciles gain on average by the reform while low income deciles loose on average. My results, on the one hand, reveal the female labour potential for the labour market. On the other hand, the comparative advantages in the labour market and household production converge between men and women so that the division of labour within the houesehold becomes less gender-based.

B.2. Zusammenfassung

In dieser Arbeit simuliere ich ein geschlechterbezogenes Steuersystem für Österreich mit dem Steuer-Transfer-Mikrosimulationsmodel ITABENA und dem Arbeitsangebotsmodell ILSA des Instituts für Höhere Studien. Die Absicht hinter dieser Reform ist, Einkommen von Männern zu Frauen umzuverteilen, sodass die Anzahl der Arbeitsstunden für bezahlte Arbeit und unbezahlte Haushaltsarbeit bzw. Kinderbetreuung ausgeglichener zwischen Mann und Frau gewählt werden. Mit ITABENA werden die statischen Effekte der Reform auf die Einkommensverteilung evaluiert. ILSA ist ein diskretes Entscheidungsmodell, mit welchem basierend auf ITABENA und den Daten des EU-SILC 2004-2008 Arbeitsangebotseffekte geschätzt werden. Ausgehend vom österreichischen Steuersystem von 2012 senke ich die Steuersätze der Frauen um 10 Prozentpunkte und erhöhe die Steuersätze der Männer, sodass die Reform im Szenario ohne Arbeitsangebotseffekte budget-neutral ausfällt. In Anbetracht der Arbeitsangebotseffekte verdient jedoch der Staat zusätzlich 16 Mio. Euro an Steuern und 55 Mio. Euro an Sozialversicherungsbeiträgen. Die Haushalte verdienen insgesamt zusätzlich 203 Mio. Euro. Frauen erhöhen ihre Arbeitswochenstunden durchschnittlich um 2,3 Prozent; Männer verringern diese durchschnittlich um 0,3 Prozent. Insgesamt bringt die Reform ein Plus von etwa 17.000 weiblichen und ein Minus von etwa 4.000 männlichen Vollzeitäquivalenten. Im Durchschnitt profitieren die höheren Einkommensdezile, während die unteren Einkommensdezile nach der Reform im Durchschnitt weniger Einkommen beziehen. Zum einen zeigt diese Forschungsarbeit das Arbeitspotenzial von Frauen für den Arbeitsmarkt auf und zum anderen wird eine Möglichkeit dargelegt den komparativen Vorteil für die Haushalts- und Betreuungsarbeit der Männer zu erhöhen.

B.3. Curriculum Vitae

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1993 - 1997	Volksschule Haag
1997 - 2005	Stiftsgymnasium Seitenstetten
August 2005 - September 2006	Au pair in New Jersey
October 2006 - February 2010	BA Economics at the University of Vienna
Februar - Juni 2009	Erasmus Economics at the Universidad Carlos III, Madrid
February 2010 - June 2013	Master Economics at the University of Vienna
April 2010 - May 2012	Scholar at the Institute for Advanced Studies
July 2012 - September 2013	on maternity leave

Assistance and Contributions in the following Publications:

Felderer, B., Berger, J., Fortin, I., Hofer, H., Kraus, M., Müllbacher, S., Reitzinger, S., Röhrling, G., Schuh, U., Strohner, L., Weyerstraß, K. & Bliem, M. (2010). *Bewertung der Budgetkonsolidierung in Österreich, Analyse der damit verbundenen volkswirtschaftlichen Effekte*. Vienna: Institute for Advanced Studies for the Austrian Federal Ministry of Finance.

Fink, M., Pultar, A., Schelepa, S., Wetzel, P., Hanappi, T., Müllbacher, S., Reitzinger, S., Schuh, U. & Schütz, M. (2010). *Armut und sozialer Zusammenhalt: Konzepte, Wahrnehmungen durch Betroffene und Effekte der Wirtschaftskrise*. Vienna: University of Vienna, L & R Sozialforschung & Institute for Advanced Studies for the Austrian Chancellery.

Tibor Hanappi, T., Lichtblau, G., Müllbacher, S., Ortner, R., Plankensteiner, B., Pötscher, F., Reitzinger, S., Schuh, U. & Stix, S. (2012). *Elektromobilität in Österreich. Determinanten für die Kaufentscheidung von alternativ betriebenen Fahrzeugen: Ein diskretes Entscheidungsexperiment*. Vienna: Institute for Advanced Studies & Environment Agency Austria funded by the Climate and Energy Fund.

Hanappi, T., Hofer, H., Müllbacher, S. & Winter-Ebmer, R. (2012). *IREA. IHS microsimulation model for retirement behaviour in Austria*. Vienna: Institute for Advances Studies funded by the European Commission.