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Olivier Bargain
Marco Caliendo
Peter Haan
Kristian Orsini

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IMPRESSUM

DIW Berlin
German Institute for Economic Research
Königin-Luise-Str. 5
14195 Berlin
Tel. +49 (30) 897 89-0
Fax +49 (30) 897 89-200
www.diw.de

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'Making Work Pay' in a Rationed Labour Market: the Mini-Job Reform in Germany*

Olivier Bargain†, Marco Caliendo‡, Peter Haan§ and Kristian Orsini¶

†*IZA, Bonn*

‡*DIW Berlin, IZA Bonn, IAB Nuremberg*

§*DIW Berlin, FU Berlin*

¶*KU Leuven*

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Abstract

To tackle mass unemployment and increase participation rates, the German government over recent years has mainly focused on supply side strategies, including 'making work pay' policies. The 2003 Mini-Job reform introduced an extended subsidy of social security contributions for low wage workers. In this paper, we evaluate the employment effects of this reform using a behavioural tax-benefit microsimulation model. Ex-ante micro policy evaluations based on labour supply models usually ignore involuntary unemployment. This leads to biased estimates of labour supply elasticities and erroneous predictions of the effects of the measure. This aspect is all the more important in a country like Germany, characterized by high unemployment. In this analysis we evaluate the employment effects of the Mini-Job reform by controlling for involuntary unemployment through a double-hurdle model. When focusing on the main labour force, we show that the Mini-Job reform has only a small positive effect on the extensive margin, which is outweighed by a reduction of working hours at the intensive margin.

Keywords: Tax-benefit Systems – Microsimulation – Household Labour Supply – Multinomial Logit – Involuntary Unemployment.

JEL Classification: C25, C52, H31, J22.

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†Olivier Bargain is Research Associate at the IZA, Bonn, e-mail: bargain@iza.org.

‡Marco Caliendo is Research Associate at the German Institute for Economic Research (DIW) in Berlin and Research Fellow of the IZA, Bonn and the IAB, Nuremberg, e-mail: mcaliendo@diw.de.

§Peter Haan is Research Associate at the DIW, Berlin, e-mail: phaan@diw.de.

¶Kristian Orsini is ph.d. student at KU Leuven, e-mail: Kristian.Orsini@econ.kuleuven.be.

1 Introduction

The Mini-Job reform was introduced in Germany in 2003 as part of the government's 'making work pay' strategy. The main objective is to provide positive work incentives for people with low earning potential by subsidising social security contributions (SSC). In-work policies targeted at people who face the highest risk of unemployment have been introduced in many OECD countries in recent years. An important body of literature exists evaluating the design and effectiveness of in-work credits, particularly in the US and the UK (see, among others, Eissa and Hoynes (2004) for the US and Blundell (2000) for the UK), while other studies discuss the desirability of these policies by quantifying their potential effects on employment and poverty for other countries including Germany (Bargain and Orsini, 2004). The evaluation of various proposals of social security exemptions in Germany are studied, for example by Steiner (2003) and Bonin, Kempe, and Schneider (2003). The Mini-Job reform that has actually been implemented is evaluated in recent studies by Arntz, Feil, and Spermann (2003) and Steiner and Wrohlich (2005).

Previously mentioned studies make use of tax-benefit microsimulation models connected to micro data and incorporate a structural labour supply model. Relying on usual assumptions concerning household rationality (i.e., static joint utility maximization), this approach allows derivation of both labour supply effects of a reform and its impact on welfare. Yet, these studies ignore involuntary unemployment, treating all individuals supplying zero hours as voluntarily inactive. This assumption leads to biased estimations of preferences for leisure and consumption, hence to biased predictions of the labour supply behaviour of non-rationed workers; in addition, rationed workers are unduly assumed to be able to take up a job in response to incentive reforms. While the bias might not be so important in countries where rationing plays only a minor role (e.g., US or the UK in the recent years), it could seriously amend the conclusions about employment effects of a reform in countries with severe demand-side constraints, as is the case in Germany.

In this paper, we suggest an evaluation of the Mini-Job reform by estimating the risk of involuntary unemployment together with a structural labour supply model (double-hurdle model). The model follows previous work by Blundell, Ham, and Meghir (1987), Bingley and Walker (1997), Duncan and MacCrae (1999), and Hogan (2004), and completes it in several ways. First, a set of questions on job search activity and readiness to take up a work allows us to identify involuntary unemployed workers. Secondly, we make use of the information about desired hours of unemployed workers to estimate consumption-leisure preferences of all potential workers in the sample. Thirdly, unemployment risk is estimated for both men and women separately and identified by demand side variables on the regional level and individual characteristics such as education and employment history.

While the Mini-Job reform may have had substantial effects on students and the retired, as well as moonlighting effects, we focus in our analysis on the main labour force and on workers with a single activity. In this group, the policy appears not to be effective to foster work incentives of people with low earnings capacity.

The paper is structured as follows. In the following section we will describe the 2003 Mini-Job

reform. Section 3 will discuss data selection and identification strategy. Section 4 will introduce the labour supply model, and Section 5 will discuss the results. Conclusions are drawn in Section 6.

2 The Mini-Job Reform

In this section we present a brief summary of the legislation for low-paid employment in Germany and the most recent Mini-Job reform from 2003. In contrast to an earlier reform in 1999, which was mainly intended to increase the social coverage of employees and to reduce malpractice in this sector, the 2003 reform was intended to boost employment in the low-wage-sector.

Before the recent reform, Mini-Jobs were defined as employment activity up to a maximum of 15 hours per week and 325 Euro of monthly gross earnings. A Mini-Job was characterized by full exemption of employees' social security contributions (SSC). Below the income threshold, earnings were also exempt from taxation if the employee had no other income. Those with other sources of income were given the choice between a 20% flat-rate tax and taxation according to the progressive income tax code. Above the threshold, taxation sets in and earnings were subject to the normal rate of SSC (about 21%). Given joint taxation, this created a strong discontinuity in the budget curves of married Mini-Job holders and strong incentives to remain at a low level of activity (see Fig. 1).[1]

Following the reform, the maximum hours restriction was abolished and the range of earnings ('Geringfügigkeitsgrenze') exempted from SSC was expanded up to 400 Euro. To avoid high marginal tax rates immediately above this threshold, a sliding pay scale ('Gleitzone') was introduced: between 401 and 800 Euro, earnings are now subject to a modified SSC scheme, starting at 4% and increasing linearly to 21%. Employees are covered by health insurance, but do not acquire any pension rights unless they voluntary add up to the normal SSC rate (Steiner and Wrohlich, 2005). Income tax below the exemption earnings level is limited to a flat rate of 2%, while at 401 Euro the standard taxation sets in. In contrast to the pre-reform regulations, income up to 400 Euro from a Mini-Job held as a secondary activity does not cumulate with the primary income for tax purposes.[2] Table 1 summarises the most relevant changes.

The impact of the Mini-Job reform on the work incentives of households can be described best by looking at budget lines of specific households. Figures 1 and 2 show how net monthly income for two household types - a single person and a couple working at the median wage rate - varies with weekly working hours before and after the reform. For a couple household where the

[1] Between the reforms of 1999 and 2003 further legislation was temporarily introduced for low-paid employment. Based on the 'Mainzer model', individuals with low income could get subsidies to their SSC (up to 67 Euros for singles) and an increased children's allowance (up to 77 Euros) from March 2002 to March 2003. A single person earning 325 Euros per month was fully exempted from SSC receiving the full subsidy. The subsidy declined linearly beyond this amount to exhaust at an earning of 810 Euros. For couples or singles with children the income range was from 325 to 1620 Euros. Moreover, for people in these jobs, social assistance was not withdrawn at a full rate. A maximum of 15 hours per week was required in order to be qualified.

[2] This may explain the apparent relevant success of Mini-Jobs as 'moonlight' work, a feature not captured in our analysis. Modeling multiple activities is indeed often difficult, as it requires information not usually covered by income surveys.

primary earner works 40 hours per week, it can be seen that net household income increases for the range between 5 and 15 weekly working hours. Before the reform, the setting-in of standard joint taxation and, hence, of the splitting mechanism created a drop in disposable income as soon as the secondary earner had gross earnings above the threshold level. After the reform, the kink in the budget line does not disappear, but simply moves further to the right. The sliding pay-scale notwithstanding, net household income still declines when secondary income reaches 400 euro. That implies that the Mini-Job reform leads to a positive incentive to take up work for married secondary earners, most often married women. The positive incentive on participation is, however, offset by a negative effect on the intensive margin (the number of working hours). Even after the reform, there is a clear incentive to reduce gross earnings to the threshold level.

For a single household the picture is slightly different. Again, when supplying more than 5 hours of work per week, the household is better off after the reform. Yet even after the reform, the Mini-Job holder is still in the social assistance range, which partially neutralises the benefits from increased labour market participation. Indeed, most of the means-tested social assistance benefits are withdrawn as earnings increase, making the budget line much flatter than in the case of a secondary earner. For people receiving unemployment benefits, the reform is of even less interest.

3 Data Selection and Identification of Rationing

3.1 Data Selection

Our empirical assessment is based on the 2003 wave of the German Socio-Economic-Panel (GSOEP), a sample gathering socio-demographic and financial information about 12,000 representative households for the year 2002.[3] For the estimation we restrict our sample to households where the head adults are aged between 20 and 65, neither self employed, retired, disabled, on maternity leave nor in full-time education. If only one spouse falls into this group, his or her labour supply is assumed to be fixed to the observed level, while the partner can flexibly adjust his/her labour supply. In other words, labour supply of these couples is modeled according to the male or female chauvinist framework. Labour supply of single males and single females is also modeled separately. In the empirical analysis and in estimates, we therefore distinguish between five groups: single women (1,022 observations), single men (783), couples where both spouses have a flexible labour supply (3,822), couples where the male labour supply is fixed (970), and couples where the female labour supply is fixed (562). Table 2 contains some descriptive statistics of the relevant variables.

3.2 Identification of Involuntary Unemployment

Two questions are used to distinguish between voluntary and involuntary unemployment. Each potential worker is asked (i) whether he/she has actively searched for a job within the last four weeks and (ii) whether he/she is ready to take up a job within the next two weeks. We follow the ILO definition and treat as rationed those unemployed workers who answer in the affirmative

[3] For a detailed description of the data set, see Haisken De-New and Frick (2003).

to these two questions. Table 2 shows that around 6% of the individuals living in couples and around 10% of the singles are involuntarily unemployed according to this definition. Note that by construction these figures differ from unemployment rates. They refer to the share of involuntary unemployed in the working age population. Unemployment rates would be higher since they are the ratio of the unemployed to the economically active population, including employees, self employed and job seekers.[4]

The estimation of the probability of being rationed must be identified from preferences and requires some information on demand-side factors. In this respect, we use county information to describe the situation on the local labour market. The 181 labour office districts have been classified by Blien et al. (2004) into twelve types with similar labour market conditions that can themselves be summarised into five clusters. The classification is built upon several labour market characteristics, the most important criteria being the underemployment ratio and the corrected population density.[5] We assign each individual (based on his/her place of residence) to one of the five clusters and compute for each cluster the rate of involuntary unemployment as defined above.[6] Table 3 contains a short description of each cluster, each of which is ordered decreasingly with the level of tension on the labour market according to Blien et al.'s criteria above. Male and female unemployment rates vary consistently with the ranking of local labour markets. In particular, counties in Cluster V, who have the best labour market situation, present the lowest rate of involuntary unemployment (3.1% for females and 2.4% for males), while Cluster I (consisting of nearly all of East Germany) shows the most depressed labour market (12.4% for females and 11.7% for males). Overall, we think that the clustering provides a good approximation of the differences in the local labour market situation, allowing us to adequately capture demand-side constraints in later estimates. In addition, we exploit the panel dimension of the GSOEP to integrate current information on past employment records.

4 Labour Supply Models

4.1 Unconstrained Model

Discrete choice models of labour supply are based on the assumption that a household i can choose among a finite number *j=1,...,J+1* of working hours (non-participation denoted by $j = 0$

[4] Even when transforming the share of unemployed population in 'true' unemployment rates, our figures do not match with official unemployment rates. The difference is due to the fact that we focus on household heads and spouses only in the age group 20 to 65.

[5] The underemployment ratio is defined as the relation of the number of unemployed individuals and participants in several active labour market programmes to the number of all employed persons plus these programmes' participants. The corrected population density is used to improve the comparability of rural labour office districts with metropolitan and city areas. In addition, the vacancy quota, describing the relation of all reported vacancies at the labour office to the number of employed persons, and the placement quota, which contains the number of placements in relation to the number of employed persons, are used. Finally, an indicator for the tertiarisation level built on the number of employed persons in agricultural occupations and an indicator for the seasonal unemployment are considered.

[6] Since the clusters refer to labour office districts and the individuals' place of residence is on county level, we have to do some readjustments. We follow a rather simplistic approach and assign counties belonging to more than one labour office district to the one where the majority of inhabitants are located.

and J positive hours); C_{ij} denotes disposable income for household i, making the discrete choice of working j hours. Table 4 shows the average disposable income as a function of the different choices of labour supply of single females and single males. For couples, the choice set of working hours and corresponding average disposable income are summarized in Tables 5 and 6. The approach has become standard practice as it provides a straightforward way to account for the nonlinear and nonconvex budget sets of complex tax and benefit systems when modeling individual and joint labour supplies of spouses. Choices *j=0,...,J* in a couple correspond simply to all combinations of the spouses' discrete hours; see, for instance, van Soest (1995). The utility V_{ij} derived by household i from making choice j is assumed to depend on a function U of spouses' leisures Lf_{ij}, Lm_{ij}, disposable income C_{ij} (equivalent to aggregate household consumption in a static framework), household characteristics Z_i, and on a random term ϵ_{ij}, interpretable as an optimisation error:

$$V_{ij} = U(Lf_{ij}, Lm_{ij}, C_{ij}, Z_i) + \epsilon_{ij}. \tag{1}$$

If the error term ϵ_{ij} is assumed to be identically and independently distributed across alternatives and households according to an extreme-value type I distribution ($EV - I$), the probability that alternative k is chosen by household i is given by (McFadden, 1974):

$$P_{ik} = \Pr(V_{ik} \geq V_{ij}, \forall j = 0, ..., J) = \frac{\exp U(Lf_{ik}, Lf_{ik}, C_{ik}, Z_i)}{\sum_{j=0}^{J} \exp U(Lf_{ij}, Lf_{ij}, C_{ij}, Z_i)}.$$

The likelihood for a sample of observed choices can be derived from that expression and maximised to estimate the parameters of the function U. When actual working hours are used, the econometrician assumes that individuals choose freely their working hours and face no demand-side constraints. The approach is that of a pure - *unconstrained* - labour supply model.

In the following, we assume a quadratic specification of the utility function as in Blundell, Duncan, McCrae, and Meghir (2000). Hence, the utility function of a couples household has the following form:

$$\begin{aligned} U_{ij} = \alpha_c C_{ij} + \alpha_{cc} C_{ij}^2 + \alpha_{lf} Lf_{ij} + \alpha_{lm} Lm_{ij} + \alpha_{lf^2} Lf_{ij}^2 + \alpha_{lm^2} Lm_{ij}^2 \\ + \alpha_{clf} C_{ij} Lf_{ij} + \alpha_{clm} C_{ij} Lm_{ij} + \alpha_{lmf} Lf_{ij} Lm_{ij}. \end{aligned} \tag{2}$$

We assume that preferences vary across households through taste-shifters on income and leisure coefficients:

$$\begin{aligned} \alpha_c &= \alpha_{c0} + \alpha_{c1} X_1 \\ \alpha_{lf} &= \alpha_{lf0} + \alpha_{lf1} X_2 \\ \alpha_{lm} &= \alpha_{lm0} + \alpha_{lm1} X_3. \end{aligned} \tag{3}$$

where X_1, X_2, and X_3 are vectors including age, number and age of children, and region of residence. We follow van Soest (1995) and introduce dummy variables for the part-time categories

in order to capture the (dis)utility of flexible arrangements. In the estimation we do not consider potential effects of unobserved heterogeneity, which implies that the independence of irrelevant alternatives (IIA) property holds. However, Haan (2006) has shown that labour supply elasticties, estimated on the same data as in the present study, do not differ significantly when unobserved heterogeneity is introduced.

The utility function and the choice probability of a single individual are derived in the same way as above, yet only contain the leisure term of this individual.

4.2 Constrained Model

Several studies have previously accounted for involuntary unemployment in labour supply estimations, using an interesting variety of approaches. Blundell, Ham, and Meghir (1987) extend the binomial model of female participation by introducing a probability of rationing that results in a double-hurdle model. Hogan (2004) extends the approach to a panel structure, relaxing the IIA hypothesis through nested logit modeling. Bingley and Walker (1997) combine a latent model for the probability of involuntary unemployment with a discrete-choice multinomial probit model for the labour supply of lone mothers. Duncan and MacCrae (1999) proceed in a similar way for women in couples by using a conditional logit framework. However, they assume unemployment of men to be completely voluntary. Laroque and Salanie (2002) model the labour supply of French women by introducing classical unemployment due to the censorship of the minimum wage; other involuntary unemployment is a residual category gathering all other explanations (frictional or business cycle unemployment). Finally, Euwals and van Soest (1999) suggest using information about desired versus actual working hours of single men and women in the Netherlands to disentangle preferences and demand-side rationing.

The *constrained* model we suggest is close to Duncan and MacCrae (1999) but differs in two aspects. First, we model involuntary unemployment for both men and women in couples. This is important, as the share of involuntary unemployed is particulary high for men (see table 2). Second, we use information on desired working hours (part-time or full-time) of unemployed workers; this way, preferences are estimated more precisely than if we simply model the probability of desired participation.

We combine the labour supply model previously described with a rationing risk model. For a single i, or spouse i in a couple, we specify a latent equation of involuntary unemployment:

$$I_i^* = \beta X_i + \eta_i \tag{4}$$

where I_i^* is the latent variable and X_i a vector of personal and local labour market characteristics thought to influence the probability of getting a job. Under the assumption of standard normality of the random term η_i, the risk of rationing is modeled as a standard probit, i.e.,

$$P_i^R = \Phi(\beta X_i) \tag{5}$$

where Φ is the cumulative distribution of a standard normal density function. As stressed by Blundell, Ham, and Meghir (1987), this framework allows the introduction of demand-side regional

variables together with individual characteristics (mainly education and past employment records) X_i, as described previously.

The model we are estimating can be seen as a double hurdle representation. The first hurdle is the decision to be voluntarily inactive or to participate to the labour market, working either part-time, full-time or overtime; the second hurdle describes the probability of being involuntarily unemployed for those who decide to participate in the first stage. Denoting d as the desired hours and p as a dummy equal to 1 if the individual is not rationed (i.e. participates when he/she desires to do so), we can summarise the situation of a single individual with three possible states: to be voluntarily inactive ($Pr(d = 0)$), to be rationed ($Pr(d > 0, p = 0)$), and to participate without being rationed ($Pr(d > 0, p = 1)$). In the present set-up, these probabilities are written as follows:

$$P_i^{VOL} = \Pr(d_i = 0) = \frac{\exp U(L_{i0}, C_{i0}, Z_i)}{\sum_{j=0}^{J} \exp U(Li_j, C_{ij}, Z_i)} \tag{6}$$

$$P_i^{INVOL} = \Pr(d_i > 0, p_i = 0) = \sum_{k=1}^{J} \left(\frac{\exp U(L_{ik}, C_{ik}, Z_i)}{\sum_{j=0}^{J} \exp U(L_{ij}, C_{ij}, Z_i)} [\Phi(\beta X_i)] \right) \tag{7}$$

$$P_i^{EMP} = \Pr(d_i > 0, p_i = 1) = \sum_{k=1}^{J} \left(\frac{\exp U(L_{ik}, C_{ik}, Z_i)}{\sum_{j=0}^{J} \exp U(L_{ij}, C_{ij}, Z_i)} [1 - \Phi(\beta X_i)] \right). \tag{8}$$

The probability of being employed in the standard model is hence multiplied by the probit model in (4) to account for second hurdle. Notice that probabilities P_i^{INVOL} and P_i^{EMP} above correspond to the sum over all possible positive hours, $J > 0$, while individual contributions to the likelihood function correspond to the probability of a given choice conditional to the rationing risk. Optimal labour supply is either recovered from observed hours (for employees) or from declared desired hours (for the involuntary unemployed).[7] For the involuntary unemployed we make use of the information in the data about which type of contract they are looking for, whether part-time (21-34 hours) or full-time (35-40 hours).

The treatment of couples where one spouse is fixed at his/her observed status is similar to the case of single individuals. However, for couples where both spouses are assumed to have flexible labour supply behaviour, each of them has six probabilities, hence a total of 36 combinations for the couple. In other words, the model is specified as before but accounts for joint labour supply choices and for one rationing probability per spouse. As in Duncan and MacCrae (1999), we assume that the error terms of the labour supply model and the probit of rationing are independent, which allows us to estimate the unemployment risk separately.[8] We do so by pooling single and married individuals and by estimating men and women separately.

[7] We assume that desired hours of employed individuals coincide with actual observed hours. This is a reasonable assumption since for over 85% of the working population, desired hours coincide exactly with observed hours (means are respectively 21.2 and 21.9 hours per week when including non-participants.

[8] More flexible specifications capturing the influence of unobserved heterogeneity on both the desired hours of work and the probability of being restricted are left for future work.

The ex-ante analysis of the reform could have been valuably complemented by an ex-post analysis had the 2004 data already been available. A first analysis would consist of a rough comparison of employment rates for the different population sub-groups (couples and singles). Such an analysis could be refined by a difference in differences evaluation. In this case, however, it could be hard to define a suitable control group (i.e., a group not affected by the tax reform, but otherwise showing similar characteristics). A third alternative would have been to estimate a labour supply model based on the new data after the reform has been implemented and to simulate the withdrawal of the Mini-Job reform.

5 Estimation Results

5.1 Unemployment Risk Estimates

We first start with the estimation of the probability of rationing, presented in Table 7. In the estimation we account for the problem of matching micro data with aggregate information as in Moulton (1990). We allow for correlation within a region and derive therefore consistent standard errors for the regional variables. The coefficients of the regional indicators, introduced in reference to the first cluster, where risks of rationing are highest, are all highly significant. They are ranked according to expectation, except for the third cluster in the case of women. The education variables show that higher degrees provide higher protection against unemployment. The risk of involuntary unemployment is affected by previous working history. Dummies representing employment in October of the previous three years show significant state dependency with respect to the two last years.

5.2 Labour Supply Estimates

We now turn to the estimates of the *constrained* and *unconstrained* labour supply model. Results are presented in Table 8 for single individuals and in Tables 9 and 10 for couples. In both the unconstrained and the constrained model, and for all household groups (single women, single men, flexible couples, couples with fixed husbands and couples with fixed wife), almost all households fulfill monotonicity and concavity of the utility function with respect to the various choice variables. Most importantly, utility increases with disposable income for almost all households, as shown in the bottom parts of Table 8, 9 and 10; this is the minimum requirement for the consistency of tax reform simulations hereafter. The derivatives with respect to leisure show that for a small share of the population positive monotonicity in leisure is not respected. As stressed by Euwals and van Soest (1999), there is no necessity to restrict preferences relative to the taste for leisure.

The marginal utility of income and leisure depends on individual- and household-specific variables. As expected, the presence of young children significantly increases preference for leisure of women in all groups. In line with previous studies, East German women prefer to work more. Taste shifters related to age are not always significant and do not display clear patterns.

5.3 Predicted Elasticities

In the present non-linear model labour supply elasticities cannot be derived analytically, but it is still possible to simulate numerically the impact of a marginal increase in gross hourly wages on hours of work and participation. Instead of the 'aggregated frequencies´ technique, that is aggregating over the whole sample the expected individual hour supply, we follow the calibration method, which is consistent with the probabilistic nature of the model at the individual level (Creedy and Duncan, 2002). It consists of drawing for each household a set of $J + 1$ random terms from the *EV-I* distribution until a vector of random terms is found that generates a perfect match between predicted and observed hour supply. In a second step, the draws are used for predicting labour supply responses to a shock on wages or a tax reform, and averaging them over a large number of draws provides robust transition matrices.

Before turning to a comparison with elasticities of the *constrained* model, it is necessary to stress the conceptual difference between both types of elasticities. Notice first that both constrained and unconstrained elasticities are computed using the whole selected population of potential workers (either constrained or unconstrained, working or not working). In the *constrained* model, the baseline corresponds to desired hours of both constrained and unconstrained individuals, so that transitions due to a wage shock concern (predicted) changes in desired hours – we will refer to these as *pure* labour supply elasticities in the following. In contrast, in the *unconstrained model*, it is mistakenly assumed that constrained workers voluntarily choose inactivity.

Table 11 presents mean elasticities, i.e. the ratio of aggregated change in labour supply to total labour supply, standardized by the 1% increase in gross wage. Elasticities from the *unconstrained* model are similar to those found in recent studies on Germany, such as Haan and Steiner (2005) or Steiner and Wrohlich (2005); more generally, they are in line with the labour supply literature (Blundell and MaCurdy, 1999). For all groups the elasticities are relatively modest, the highest values concerning women in couples. Single males and males in couples where both partners have a flexible labour supply have similar labour supply elasticities. Men in couples where the women have fixed labour supplies have the lowest elasticities. In this subsample a relatively high share of women are on maternity leave (and thus have a fixed labour supply), while the labour supply of men with small children is known to be rather inelastic. As is often the case, elasticities of single women are smaller than those of women in couples.

Not considering involuntary unemployment in the estimations leads to biased estimates and elasticities for several reasons, some acting in opposite directions. Therefore, the sign of the overall bias is not clear a priori. We suggest a breakdown of these effects. First, the *unconstrained model* leads to a clear upward bias of the labour supply elasticities, since it unduly allows participation effects from constrained workers whose desired hours are positive. In the *constrained model*, those workers have positive desired hours in the baseline and contribute to the aggregate elasticities as much as the working population, that is moderately. In other words, the *constrained model* leads to smaller participation elasticities and a larger proportion of the responses occurring at the intensive margin. Let us call this the 'participation bias'. A second source of discrepancies

is the 'preference bias' stressed by Ham (1982), which works in the opposite direction. In effect, the *unconstrained model* treats involuntarily unemployed workers as voluntarily inactive so that overall preference estimates must overstate the taste for leisure, leading to understated elasticities. Finally, a 'specification bias' must affect estimates in a way which is *a priori* uncertain. The *unconstrained model* is indeed misspecified, since individual characteristics are not only required to explain consumption-leisure preferences but also account implicitly for demand-side constraints. This effect appears clearly in the labour supply estimates of Tables 8, 9, and 10 - the *constrained model* is more precisely estimated. In particular, some taste-shifters come out more significantly, while for males the dummy for East Germany looses all its significance in affecting preference for leisure. Lower employment rates of males appear therefore to be associated with a stronger rationing effect in East Germany, and not with a difference in the taste for leisure, as the *unconstrained model* would suggest. On the other hand, for females the dummy for East Germany is significant in both models. The latter suggests that for females there is a higher preference for leisure (or rather, non-market time) in West Germany than in East Germany.

Comparing constrained and unconstrained elasticities, it turns out that the upward bias dominates. Average unconstrained elasticities of working hours are indeed between 13% and 105% larger than constrained elasticities depending on the group we consider. This large overstatement is clearly driven by the 'participation bias', since elasticities of participation are between 20% and 213% larger with the *unconstrained model*. The bias is the largest for single individuals, in particular for men, who more frequently experience involuntary unemployment, and smallest for married women, who due to family constraints more often choose non-participation on a voluntary basis than any other group.[9]

In order to provide a better understanding of the differences, we have decomposed the effects into three groups (voluntary inactive, involuntary unemployed, employed), as shown in Table 12. Instead of elasticities, we present the absolute changes in participation rates and total hours of work of each group, given a 1% uniform increase in gross wages. Looking at the involuntary unemployed in each household group, the 'participation bias' becomes obvious: with the *unconstrained model*, involuntary unemployed workers markedly increase hours due to a large participation effect; this effect vanishes in the *constrained model*. The differences for the employed and the voluntary inactive are in general very small and go in both directions. The overstatement of the taste for leisure, or 'preference bias', in the *unconstrained model* dominates for women in couples (the effect on labour supply is larger with the *constrained model*). Results are less clear-cut for the other groups, due to the interplay of 'preference' and 'specification' bias.

5.4 Employment Effects of the Mini-Job Reform

The concept of *pure* labour supply elasticities derived from the *constrained model* is insightful to explain potential working behaviour of households and to understand how the tax-benefit system affects potential work incentives. Yet, this concept is based on desired hours and cannot provide

[9] Previous findings confirm that elasticities of hours for single workers are around twice as small when accounting for demand constraints (Euwals and van Soest, 1999).

information about the true employment effects of a reform, which is the relevant information for policymakers. Therefore, when analysing the Mini-Job reform, we take account of rationing for part of the labour force in order to derive employment effects.

Since our modeling of the rationing risk is a reduced form equation, we cannot assess the impact of the reform on demand-side variables, through, for example, wage rate adjustments or changes in vacancy rates simultaneous to labour supply responses. In this respect, our analysis is partial, since we must assume that the individual probability of employment rationing is not affected:[10] constrained workers remain in their situation after the reform. This implies that those who are rationed ex-ante cannot affect the total working hours. Overall, the employment effects are concentrated only on those voluntarily inactive and those already working.[11]

We calculate total employment effects for the relevant population, i.e. the main labour force (about 30 million individuals). Table 13 reports the total participation effects, the total hours effect, the hours effects of those individuals that enter the labour market (extensive margin), and the hours effects of those who had been in employment before the reform (intensive margin). As stressed above, only those individuals that have been identified as being voluntarily inactive can enter the labour market, but the probability of working positive hours will be weighted with the probability of not being rationed. In order to provide insights about the rationing effects, we present the participation and working hours effect of the voluntarily inactive, assuming no demand side constraints (Column 5 and 6). Thus, the difference between the participation and hours effects with and without rationing risk (Columns 1 and 5, and 2 and 6, respectively) provide information about the size of the demand-side rationing.

On the extensive margin (Columns 1 and 3), the Mini-Job reform induces a positive participation effect for all groups, which is in line with the government's goal of 'making work pay'. In total, labour market participation is increasing by about 43,600 individuals. This effect is mainly borne by women living in couples. The participation effects for singles and, in particular, for men are negligible. As discussed above, the Mini-Job reform had by far the highest work incentives for secondary earners. In contrast, the budget set of singles is hardly affected by the reform. For men, the Mini-Job regulation is not relevant, as they tend to work full-time or overtime.

The positive participation effect induced by the Mini-Job reform is, however, counteracted by a negative effect on the intensive margin for people already at work, especially for part-timers.[12] Women in couples have the highest negative effect on this margin. Over the whole population, the model suggests a reduction of about 1.2 million working hours per week (this corresponds to

[10] The reform has, indeed, only a small direct effect on labour cost of Mini-Jobs. Firms, however, may adjust labour demand in different ways to respond to changes in legislation (e.g., by splitting previous full-time jobs into several Mini-Jobs). Other possible feedback effects may lead to changes in the equilibrium gross wages (here assumed to be constant). These effects are very difficult to account for without a more comprehensive framework (e.g., CGE models).

[11] A distinction must be made. The population already employed may freely choose to change working hours or to withdraw from the labour market, as they are deterministically not rationed. The voluntarily inactive may decide to enter the labour market following the reform, but their expected labour supply is weighted by their individual rationing risk, which can be predicted ex-ante.

[12] This is a general problem of policies targeted at low-income people (Blundell, Duncan, McCrae, and Meghir, 2000).

an equivalent decrease of around 30,000 full-time positions). This negative effect outweighs the positive working hours effect of the individuals entering the labour market. In total, the weekly working hours are reduced by about 460,000 hours (translating to 11,500 full-time positions). However, considering that the amount of weekly working hours is about 1 billion, this reduction is certainly negligible. Our estimation results suggest that demand-side restrictions prevent about 7,500 persons supplying about 100,000 weekly working hours from entering the labour market. Thus the labour market constraints prevent about 20% of the inactive from taking up work.

Comparing our results to the evaluation results of previous studies that do not consider the labour demand restriction, such as in Arntz, Feil, and Spermann (2003) and Steiner and Wrohlich (2005), a very similar picture emerges. They find a slightly higher participation effect, while the hours effect is negligible as well. Despite significantly lower elasticities with the *constrained model*, results are very similar since the Mini-Job reform has only a very moderate impact and focuses on people with low incomes. Also, it affects essentially the labour supply behaviour of females in couples, a group for which the share of involuntary unemployment is indeed small, as compared to the share of the voluntarily unemployed.

The estimates are considerably lower than the figures published by the Federal Employment Agency (FEA). Based on FEA calculations, the number of Mini-Jobs increased by 523,000 between March 2003 and March 2004 (Bundesagentur für Arbeit, 2004). Such a discrepancy is easily explained by the fact that we focus here on additionally created employment. In contrast, the FEA numbers include around 241,000 persons who were employed with an income between 326 and 400 Euros before the reform and who are now categorised as 'Mini-Jobbers'. Additionally, 196,000 of the Mini-Jobbers were employed before the reform at an income higher than 400 Euros. Subtracting these two groups leaves us with an effect of around 86,000. Furthermore, it should be kept in mind that we concentrate on the main labour force, excluding students and pensioners from our analysis. Assuming that these groups account for about a third of the total effect, the FEA number is further reduced down to around 50,000.

6 Conclusions

In this paper, we argue that it is necessary to account for involuntary unemployment when evaluating the labour supply and employment effects of a reform of the tax and benefits system. To do so we apply a double hurdle model that combines a model for the unemployment risk with a structural labour supply model. Our findings show that not considering demand side constraints that drive involuntary unemployment leads to biased labour supply elasticities for several reasons. We suggest that the 'participation bias' outweighs the 'preference bias' and the 'specification bias', resulting in lower labour supply elasticities in a model accounting for involuntary unemployment. Depending on the group, this bias can be severe, causing differences of over 100%. This is in particular true for groups with a high share of involuntary unemployed amongst the non-working, such as singles or men in couples. For women in couples the bias is less important, as most of the women are voluntary inactive. Therefore, a standard labour supply model without demand side

constraints captures the labour supply behaviour relatively well.

The model with demand-side constraints allows analysis of the 'employment' effects of a given reform. The reform of interest for our analysis is the Mini-Job reform, implemented in Germany as part of the government´s 'making work pay' strategy. We focus on the main labour force, so we do not capture potential labour market effects of students and the retired nor so-called 'moonlighting jobs'. Our results suggest that the Mini-Job reform was not an effective policy to increase employment of the main labour force. The positive participation effect is outweighed by a negative effect on the intensive margin. Further, we show that demand-side constraints prevent about 20% of the inactive population from entering the labour market. These findings are in strong contrast with official statistics, which portray the Mini-Job reform as incredibly successful. Our study, however, only focuses on the main labour force, excluding the pensioners and students who are most likely to benefit from the reform. Many jobs in the shadow economy are also likely to have emerged after the reform. At the same time, there is increased evidence that many Mini-Jobs are taken up as 'moonlight' work, a possibility not accounted for by our modeling strategy.

Our findings do not differ from results of previous scientific evaluations of the Mini-Job reform that do not consider labour market constraints. Although we argue that these evaluations are misspecified in the sense that they are based on the assumption that all inactivity is voluntarily chosen, these studies conclude that the Mini-Job reform did not lead to positive employment effects as well. Given the small incentives the Mini-Job provided for people in the main labour force, this result is not surprising. We argue that when evaluating a more pronounced reform of the tax and benefits system, such as the introduction of an in-work credit like the WFTC in Germany, it is necessary to account for demand-side constraints causing involuntary unemployment. Hence, an obvious area for further research is a simulation of such a reform in the German context and comparing the results for the constrained and unconstrained model.

A Tables and Figures

Tab. 1: Relevant changes due to the Mini-Job reform of 2003

	Pre-reform	Post-reform
Mini-Job Definition:		
Maximum hours restriction	15 h per week	None
Income restriction	325 Euros	400 Euros
Taxes:		
Income tax sets in at	326 Euros	401 Euros
Income from one Mini-Job held as a secondary job is summed up to primary income	Yes	No
Social security contributions (SSC):		
Full SSC set in at	326 Euros	801 Euros

Tab. 2: Some descriptive statistics for the estimation sample*

	Singles		Couples					
			Both spouses flexible		Male flexible		Female flexible	
	Fem.	Mal.	Fem.	Mal.	Fem.	Mal.	Fem.	Mal.
Individual Information								
Age	41.87	41.77	42.15	44.71	40.89	43.65	47.33	50.64
Hours per week	34.86	39.72	28.05	41.25	29.99	40.93	28.71	46.33
No degree	0.15	0.11	0.17	0.10	0.13	0.08	0.15	0.09
Education = 0: No degree	0.02	0.02	0.02	0.03	0.01	0.01	0.02	0.02
Education = 1: Low degree[2]	0.71	0.69	0.74	0.70	0.61	0.60	0.75	0.67
Education = 2: High degree[3]	0.27	0.28	0.23	0.28	0.36	0.39	0.23	0.30
Hourly wage (cond. on working)	14.55	17.16	13.92	19.31	13.85	20.46	13.93	16.77
Hourly wage (cond. on not working)[4]	9.63	11.09	9.92	13.19	10.40	12.74	10.05	11.59
Children from 0-3 years	0.04	0.00	0.13		0.23		0.08	
Children from 3-6 years	0.07	0.00	0.14		0.12		0.11	
Children over 6 years	0.45	0.07	0.86		0.74		0.64	
German	0.95	0.94	0.90		0.93		0.94	
East Germany	0.16	0.21	0.17		0.21		0.17	
Employment Status[5]								
Involuntarily Unemployed	0.11	0.10	0.06	0.06	-	0.06	0.06	-
Voluntarily Unemployed	0.12	0.09	0.26	0.06	-	0.07	0.30	-
Employed	0.78	0.81	0.69	0.88	-	0.87	0.64	-
No. of observations	1022	783	3822	3822	562	562	970	970

* We distinguish between singles, couples where both spouses have a flexible labour supply, and couples where either the man or the woman has a flexible labour supply while the labour supply of the other partner is fixed.

[1] To distinguish between voluntary and involuntary unemployment, we make use of the search activity within the last four weeks and the readiness to take up a job within the next two weeks.

[2] Secondary general school ('Hauptschule'), intermediate school ('Realschule') or other degree.

[3] Upper secondary school ('Gymnasium')

[4] Imputation through a standard Heckman 2-step equation.

[5] The employment status of males (females) in couples where only one spouse has a flexible labour supply is mostly retired, self-employed, on maternity or parental leave, or disabled.

Tab. 3: Involuntary unemployment and description of the strategic types of labour office districts

Cluster	Description	No. of districts	Involuntary Unemployment Females	Males
I	East German labour office districts (excluding Dresden)	38	0.124	0.117
II	Labour office districts dominated by large cities	22	0.065	0.070
III	West German labour office districts with rural elements, medium-sized industry, and average unemployment	63	0.047	0.054
IV	West German centers with good labour market prospects	10	0.049	0.049
V	West German labour office districts with the best labour market prospects	48	0.031	0.024

Source: Blien *et al.* (2004)

Tab. 4: Hours and mean income for singles

Alternative	Hours per week		Share in %		Net Income	
	Men	Women	Men	Women	Men	Women
0	0	0	16.71	20.89	735.02	844.37
1	6.9	7.5	1.13	3.95	1016.49	1103.04
2	17.3	18.2	1.38	6.45	1088.29	1199.70
3	27.7	28.2	3.27	14.63	1421.32	1468.71
4	38.5	38.8	50.25	39.75	1773.62	1753.14
5	49	46.4	27.26	14.34	2115.14	1958.05

The following hours classifications are used: 0, [0,12],]12,20],]20,34],]34,40], >40.

Tab. 5: Hours and mean income for couples where only one spouse is flexible

Alternative	F-Couples			M-Couples		
	Hours per week	Share in %	Net Income	Hours per week	Share in %	Net Income
0	0	13.74	1943.68	0	34.22	2905.91
1	6.9	1.57	2289.79	8.5	7.94	3198.88
2	17.7	1.39	2591.20	18	12.63	3439.52
3	28.2	2.09	3034.72	27.5	15.07	3700.04
4	38.5	41.04	3446.78	38.5	21.28	3976.86
5	47.7	40.17	3847.14	47.7	8.86	4208.99

F-Couples are couples where the female has a fixed labour supply, and M-couples are couples where the male has a fixed labour supply. The following hours classifications are used: 0, [0,12],]12,20],]20,34],]34,40], >40.

Tab. 6: Hours and mean income for couples where both spouses have a flexible labour supply

Alt.	Hours per week		Share in %	Net Income	Alt.	Hours per week		Share in %	Net Income
	Men	Women				Men	Women		
1	0	0	4.63	1282.91	19	28.2	0	0.64	2202.31
2	0	8.5	0.69	1568.82	20	29.3	7.2	0.15	2493.10
3	0	17.6	0.95	1699.02	21	27.7	17.4	0.36	2614.93
4	0	27.7	1.10	1927.59	22	29	26.5	0.49	2909.05
5	0	38.4	2.71	2160.00	23	28.6	38.8	0.56	3212.00
6	0	48.5	0.79	2398.13	24	26.2	50.6	0.18	3426.15
7	6.4	0	0.20	1595.45	25	38.6	0	13.62	2594.63
8	6.4	6.8	0.08	1843.40	26	38.4	8.4	5.20	2859.30
9	5.7	17.5	0.03	1972.82	27	38.5	18	7.17	3064.02
10	8	26.7	0.15	2252.12	28	38.7	27	9.06	3303.84
11	7.7	37.7	0.15	2472.35	29	38.5	38.3	12.77	3567.52
12	7.1	50.6	0.13	2754.81	30	39	45.6	2.94	3768.26
13	16.5	0	0.23	1753.40	31	49.5	0	9.60	3036.37
14	15.7	6.8	0.05	1956.40	32	49.5	7.8	3.51	3299.39
15	17.2	17	0.08	2186.29	33	50	18	4.74	3537.61
16	17.3	27.9	0.08	2487.95	34	50	27.2	6.25	3764.40
17	16.7	38.8	0.28	2756.73	35	48.6	38.5	7.01	3970.93
18	18.1	46.6	0.03	3018.19	36	51	48.8	3.40	4311.98

The following hours classifications are used: 0, [0,12],]12,20],]20,34],]34,40], >40.

Tab. 7: Estimation results for the unemployment probabilities

	Women[1]		Men[1]	
	Coef.	s.e.	Coef.	s.e.
Constant	*-1.176*	0.487	**-0.963**	0.304
Regional Information				
Cluster 1	Reference		Reference	
Cluster 2	**-0.352**	0.016	**-0.451**	0.019
Cluster 3	**-0.477**	0.021	**-0.598**	0.013
Cluster 4	**-0.379**	0.018	**-0.631**	0.014
Cluster 5	**-0.578**	0.036	**-0.831**	0.015
Age	*5.374*	2.731	**5.651**	1.260
Age-Squared	*-6.521*	3.177	**-6.490**	1.290
Educational Degree				
No degree	Reference		Reference	
Medium degree	**-0.519**	0.130	**-0.557**	0.106
High degree	**-0.934**	0.154	**-1.128**	0.152
No vocational degree	**0.358**	0.128	**0.368**	0.056
Employment Status in[2]				
October 1998	-0.099	0.065	-0.029	0.089
October 1999	<u>-0.213</u>	0.115	<u>-0.364</u>	0.204
October 2000	**-0.604**	0.124	**-0.510**	0.100
Observations		4451		4859
Pseudolikelihood		-972.04		-1044.53

Bold letters indicate significance at the 1%-level, *italic* letters refer to the 5%-level, and <u>underlined</u> letters to the 10%-level. Standard errors were estimated according to Moulton (1990).

[1] The unemployment probability has been estimated for all women (single + married) and men (single + married).

[2] Dummies equal 1 if regular full-time employment at indicated dates, 0 otherwise.

Tab. 8: Estimation results for singles: rationed and unrationed models

	Unrationed Model				Rationed Model			
	Women		Men		Women		Men	
	Coeff.	s.e.	Coeff.	s.e.	Coeff.	s.e.	Coeff.	s.e.
Consumption								
Age	4.181	13.528	-10.070	11.055	23.219	14.484	-18.627	12.777
Age-Squared	-7.505	14.519	12.230	12.029	-25.685	15.581	21.108	13.594
Constant	4.130	3.076	*4.843*	2.544	-1.802	3.294	*6.866*	2.995
Leisure								
Age	-0.022	0.288	-0.277	0.285	0.194	0.330	-0.599	0.353
Age-Squared	0.208	0.323	0.487	0.324	0.094	0.366	*0.893*	0.392
Child 0-3	**0.128**	0.018			**0.128**	0.015		
Child 3-6	**0.068**	0.009			**0.075**	0.009		
German	*0.020*	0.009	-0.014	0.009	0.020	0.010	-0.009	0.011
East Germany	0.001	0.005	**0.015**	0.005	-0.012	0.007	-0.003	0.007
Constant	**0.478**	0.074	**0.411**	0.072	**0.455**	0.082	**0.569**	0.086
Consumption^2	**-0.471**	0.113	**-0.119**	0.026	**-0.365**	0.120	**-0.118**	0.027
Leisure^2	**-0.004**	0.000	**-0.003**	0.000	**-0.005**	0.000	**-0.004**	0.000
Consumption×Leisure	**-0.021**	0.008	**-0.028**	0.006	-0.014	0.009	**-0.033**	0.007
Part-time category 1	**-2.734**	0.184	**-3.855**	0.416	**-2.492**	0.187	**-3.369**	0.422
Part-time category 2	**-2.585**	0.176	**-3.875**	0.347	**-2.699**	0.174	**-3.851**	0.348
Part-time category 3	**-1.744**	0.138	**-2.966**	0.214	**-1.866**	0.132	**-3.143**	0.213
Observations		1022		783		1022		783
Wald chi2		2.85		1.58		2.79		2.78
Log-Likelihhod		-1448.25		-873.81		-1394.53		-778.49
Derivatives (in percent)								
$U_c > 0$		99%		100%		99%		100%
$U_{lf} > 0$		74%				79%		
$U_{lm} > 0$				79%				89%

Bold letters indicate significance at the 1%-level, *italic* letters refer to the 5%-level, and underlined letters to the 10%-level.

Tab. 9: Estimation results for couples where only one spouse is flexible: rationed and unrationed models

	Unrationed Model				Rationed Model			
	Women		Men		Women		Men	
	Coeff.	s.e.	Coeff.	s.e.	Coeff.	s.e.	Coeff.	s.e.
Consumption								
Age	8.507	13.735	17.691	12.495	7.270	14.277	8.851	16.286
Age-Squared	-10.932	14.997	-16.938	13.496	-9.417	15.564	-7.771	17.262
Constant	0.325	2.986	-3.097	2.692	0.445	3.106	-1.016	3.620
Leisure								
Age	-0.271	0.373	-0.035	0.391	-0.428	0.390	-0.133	0.528
Age-Squared	0.537	0.419	0.204	0.438	0.745	0.436	0.373	0.580
Children 0-3	**0.061**	0.010			**0.070**	0.010		
Children 3-6	**0.040**	0.008			**0.039**	0.008		
German	-0.010	0.009	-0.009	0.010	-0.010	0.009	-0.006	0.013
East Germany	**-0.031**	0.005	0.012	0.006	**-0.047**	0.006	-0.001	0.008
Constant	**0.324**	0.088	0.122	0.086	**0.407**	0.091	*0.251*	0.118
Consumption^2	**-0.058**	0.022	*-0.039*	0.018	*-0.056*	0.023	-0.040	0.022
Leisure^2	**-0.002**	0.000	**-0.001**	0.000	*-0.003*	0.000	**-0.002**	0.000
Consumption×Leisure	*-0.002*	0.001	*-0.007*	0.003	-0.002	0.001	**-0.013**	0.004
Part-Time category 1	**-1.857**	0.151	**-3.201**	0.458	**-1.896**	0.150	**-2.777**	0.466
Part-Time category 2	**-1.408**	0.167	**-3.357**	0.426	**-1.557**	0.163	**-3.367**	0.426
Part-Time category 3	**-1.020**	0.156	**-2.888**	0.310	**-1.132**	0.150	**-3.086**	0.308
Observations		970		562		970		562
Wald Chi^2		1.3		3.97		0.97		1.07
Log-Likelihood		-1479.65		-634.92		-1472.32		-576.81
Derivatives								
$U_c > 0$		99%		88%		99%		95%
$U_{lf} > 0$		70%				64%		
$U_{lm} > 0$				80%				82%

Bold letters indicate significance at the 1%-level, *italic* letters refer to the 5%-level, and underlined letters to the 10%-level.

Tab. 10: Estimation results for couples where both spouses are flexible: rationed and unrationed models

	Unrationed Model		Rationed Model	
	Coef.	Std.	Coef.	Std.
Consumption				
Age - Man	-5.887	4.921	-7.588	5.389
Age-Squared - Man	4.513	5.245	6.514	5.726
Age- Woman	**12.136**	4.242	*11.728*	5.055
Age-Squared - Woman	**-13.203**	4.675	*-12.973*	5.514
Constant	1.883	1.088	2.178	1.249
Consumption-Squared	**-0.097**	0.013	**-0.089**	0.014
Leisure Man				
Age - Man	-0.191	0.154	**-0.590**	0.184
Age-Squared - Man	0.321	0.169	**0.832**	0.201
Constant	**0.334**	0.037	**0.441**	0.044
Leisure Man-Squared	**-0.002**	0.000	**-0.003**	0.000
Leisure Woman				
Age- Woman	0.266	0.136	0.231	0.153
Age-Squared - Woman	-0.169	0.154	-0.111	0.172
Child 0-3	**0.076**	0.005	**0.082**	0.005
Child 3-6	**0.042**	0.004	**0.041**	0.004
German	-0.008	0.004	*-0.008*	0.004
East Germany	**-0.035**	0.003	**-0.047**	0.003
Constant	**0.296**	0.036	**0.348**	0.040
Leisure Woman-Squared	**-0.003**	0.000	**-0.003**	0.000
Consumption*Leisure Man	**-0.014**	0.002	**-0.012**	0.002
Consumption*Leisure Woman	**-0.003**	0.001	-0.001	0.001
Leisure Man*Leisure Woman	0.000	0.000	0.000	0.000
Part-time category 1 - Women	**-1.659**	0.073	**-1.677**	0.074
Part-time category 2 - Women	**-1.430**	0.087	**-1.578**	0.086
Part-time category 3 - Women	**-0.995**	0.080	**-1.086**	0.078
Part-time category 1 - Men	**-3.418**	0.190	**-3.000**	0.193
Part-time category 2 - Men	**-3.911**	0.197	**-3.753**	0.198
Part-time category 3 - Men	**-3.049**	0.112	**-3.091**	0.112
Observations		3822		3822
Wald Chi^2		16.42		12.18
Log-Likelihood		-9991.60		-9583.59
Derivatives				
$U_c > 0$		100%		100%
$U_{lf} > 0$		71%		69%
$U_{lm} > 0$		88%		92%

Bold letters indicate significance at the 1%-level, *italic* letters refer to the 5%-level, and underlined letters to the 10%-level.

Tab. 11: Labour supply elasticities in the constrained and unconstrained models

Model	Couples: both spouses flexible		Couples: only one spouse flexible		Singles	
	Women	Men	Women	Men	Women	Men
	Change in the participation rate					
Unconstrained	0.158	0.171	0.166	0.113	0.200	0.200
	(0.155-0.199)	(0.143-0.183)	(0.157-0.256)	(0.035-0.139)	(0.152-0.241)	(0.124-0.251)
Constrained	0.146	0.072	0.146	0.051	0.087	0.069
	Change in total hours worked					
Unconstrained	0.333	0.243	0.28	0.138	0.277	0.273
	(0.298-0.369)	(0.199-0.245)	(0.252-0 .412)	(0.046-0.176)	(0.208-0.332)	(0.183-0.332)
Constrained	0.309	0.139	0.227	0.078	0.130	0.136

Elasticities are computed by averaging simulated transitions over the whole sample; the figures in brackets give the bootstrapped 90% confidence interval obtained by drawing 100 independent draws of the parameters from the estimated asymptotic distribution of their estimator and computing elasticities for each draw.

Tab. 12: Labour supply effects by employment status

		Women			**Men**		
Employment Status and Group		Share of obs.	Unconstr. Model	Constr. Model	Share of obs.	Unconstr. Model	Constr. Model
Couples where both spouses are flexible							
Voluntary UE	Part.	0.25	3.60	4.50	0.05	2.73	2.61
	Work. Hours	0.25	113.84	142.30	0.05	116.76	110.84
Involuntary UE	Part.	0.05	1.11	0.00	0.06	3.08	0.00
	Work. Hours	0.05	37.70	1.25	0.06	134.49	3.38
Employed	Work. Hours	0.71	105.06	113.71	0.89	97.55	96.38
Couples where only one spouse is flexible							
Voluntary UE	Part.	0.31	0.89	1.02	0.07	0.32	0.27
	Work. Hours	0.31	27.18	31.20	0.07	13.60	11.66
Involuntary UE	Part.	0.04	0.22	0.00	0.07	0.19	0.00
	Work. Hours	0.04	7.78	0.20	0.07	8.01	0.18
Employed	Work. Hours	0.66	17.90	14.46	0.86	6.02	5.30
Singles							
Voluntary UE	Part.	0.13	0.82	0.80	0.08	0.40	0.51
	Work. Hours	0.13	29.95	28.34	0.08	0.83	21.42
Involuntary UE	Part.	0.08	0.80	0.00	0.09	0.06	0.00
	Work. Hours	0.08	30.55	0.47	0.09	19.30	0.95
Employed	Work. Hours	0.79	17.76	11.94	0.83	21.42	17.66

The absolute change in participation (number of participants) and hours worked (weekly hours) is disaggregated by employment status.

Tab. 13: Employment effects (Figures in 1000s)

		Participation effect (1)	Total hours effect (2)	Hours effect (new participants) (3)	Hours effect (working population) (4)	No rationing: Participation effect (5)	No rationing: Hours effect (new participants) (6)
Couples[1]	Women	36.62	-258.29	475.16	-733.43	43.19	569.00
		s.e					
	Men	0.18	-109.07	168.70	-277.77	0.94	196.54
		s.e					
Couples[2]	Women	5.16	-27.49	63.16	-90.65	5.84	71.82
		s.e					
	Men	0.29	15.94	15.49	-0.45	0.37	18.91
		s.e					
Singles	Women	1.37	-78.92	29.97	-108.89	1.81	37.90
		s.e					
	Men	-0.02	-3.65	0.00	-3.65	-0.02	0.00
		s.e					
Total		43.60	-461.48	752.47	-1214.84	52.13	894.18
		s.e					

Employment effects are computed by averaging simulated transitions over the whole sample; the figures in brackets give the bootstrapped 90% confidence interval obtained by drawing 100 independent draws of the parameters from the estimated asymptotic distribution of their estimator. Working hours are weekly working hours.

[1] Couples in which both partners having a flexible labour supply.

[2] Couples in which only one partner has a flexible labour supply.

Fig. 1: Couple Household[1]

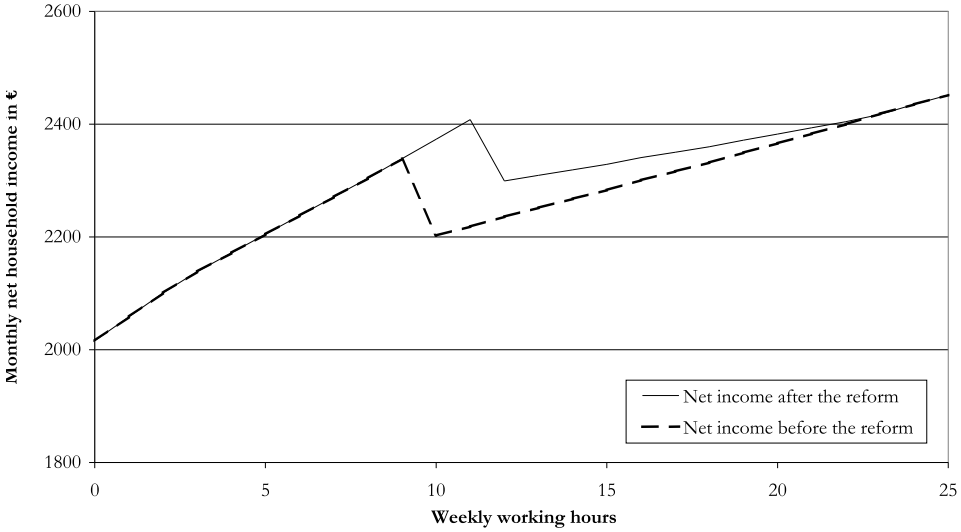
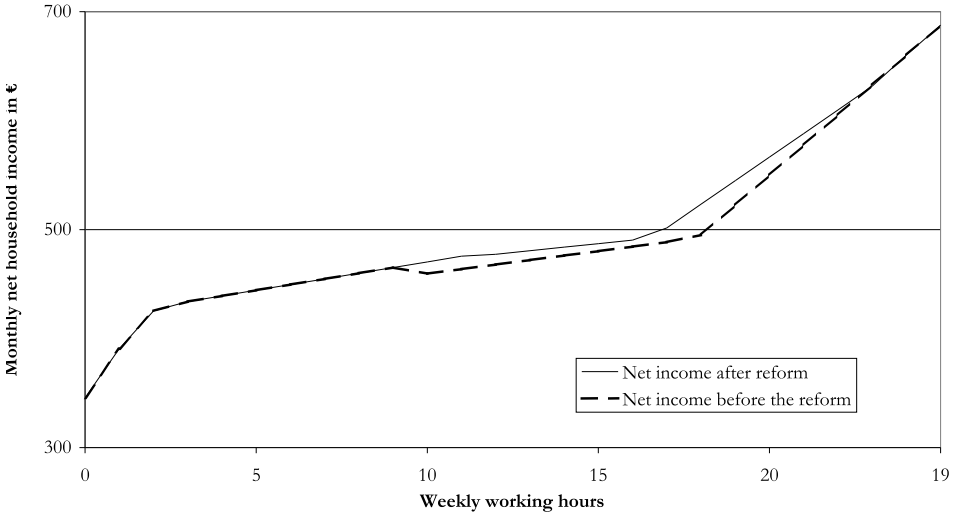


Fig. 2: Single Household[2]



[1] Remark: No kids, primary earner working 40 hours (median wage: 16.67 Euro per hour), secondary earner: median wage: 12.72 Euro per hour.

[2] Remark: Single person female, no kids, receiving social assistance, no housing benefits, median wage: 12.72 Euro per hour.

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