EUROMOD WORKING PAPER SERIES

EM 16/20

Trapped in Inactivity? The Austrian Social Assistance Reform in 2019 and its Impact on Labour Supply

Michael Christl and Silvia De Poli

September 2020

Trapped in inactivity? The Austrian social assistance reform in 2019 and its impact on labour supply *

Michael Christl [a]

Silvia De Poli [a]

[a] European Commission, Joint Research Centre, Edificio Expo, Calle Inca Garcilaso, 3, 41092 Sevilla, Spain

Abstract

Financial incentives affect the labour supply decisions of households, but typically the impact of such incentives varies significantly across household types. While there is a substantial literature on the labour supply effects of tax reforms and in-work benefits, the impact of changes in social assistance benefits has received less attention. This paper analyses the impact of the Austrian reform proposal 'Neue Sozialhilfe' ("New Social Assistance"), which was introduced in 2019 and substantially cut social assistance benefits for migrants and families with children. We show that the labour supply effects of these changes in social assistance differ substantially across household types. While women exhibit higher labour supply elasticities in our estimates, the overall effects of the reform are especially strong for men and migrants. Couples with children and migrants, i.e. the groups which were hit the hardest by the reform's social assistance reductions, show the strongest labour supply reactions to the 'New Social Assistance'. Furthermore, we show that overall the reform has a positive, but small, effect on the intensive margin of labour supply.

JEL: H53, J22

Keywords: social assistance, reform, labour supply, discrete choice, microsimulation, EUROMOD

Corresponding author:

Silvia De Poli

silvia.de-poli@ec.europa.eu

* The results presented here are based on EUROMOD version I1.66+. EUROMOD is maintained, developed and managed jointly by the Institute for Social and Economic Research (ISER) at the University of Essex and the Joint Research Centre of the European Commission, in collaboration with national teams from the EU member states. We are indebted to the many people who have contributed to the development of EUROMOD. The process of extending and updating EUROMOD is financially supported by the European Union Programme for Employment and Social Innovation 'Easi' (2014-2020). We make use of the national EU-SILC PDB data for Austria made available the national statistical office. The results and their interpretation are the authors' responsibility.

1. Introduction

It has often been argued that there is a strong link between the generosity of transfer and welfare programs on the one hand and labour market outcomes on the other. A lot of research in this field has highlighted out the importance of taking incentive effects into account when designing or reforming policies. Therefore, understanding labour market behaviour is crucial for policy design. While numerous studies have analysed the impact of certain tax and (in-work) benefit reforms on labour supply, studies on the impact of social assistance reforms have been scant. One reason for that is that social assistance reforms are less frequent than other benefit or tax reforms. Additionally, labour supply effects are not expected to be large, since only a small sub-group of the population is typically influenced.

In 2019 the Austrian government decided to reform the social assistance scheme which is based on a minimum income benefit that can be taken-up in case of an income below the defined guaranteed minimum level. The Austrian system is based on minimum standards, depending on the household type. The main goal of the reform proposal was to reduce the amount granted to large families, leading to an inactivity-trap for large households. Additionally, the social assistance for migrants with low language skills was reduced to 65%.

The analysis of the Austrian policy proposal is of special interest for a number of reasons. First, it substantially reduces the (relatively high) levels of social assistance for households with children. Households with children usually do not react strongly to changes in wages, but it is not clear what happens in the case of reduced social assistance. Second, to the best of our knowledge, linking social assistance to literacy skills is a unique reform proposal with no precedent in any other country. Given the current political discussions about the welfare impact of migration, such reforms could potentially increasingly discussed by policy makers. Therefore, a careful evaluation of such policies is needed.

Even though the Austrian Constitutional Court (VfGh) declared both the reduction in social assistance for children and linking social assistance to language skills unconstitutional, the analysis carried out in this paper is of special interest. More specifically, the reduction in the minimum income benefit for families with children led to a political debate on the negative work incentives of the current social system, because for benefit-dependent families with children, participating in the labour market could potentially lead to a substantial loss of income. Additionally, analysing the reform in detail could help to overcome unintended side-effects and problems that might have not been taken into consideration by policy-makers in the reform proposals.

The aim of this paper is to estimate not only the fiscal and inequality impacts of the reform proposal, but also its potential labour market implications. Nowadays, many different tax and benefit reforms are seen as a useful tool for labour market policies. For example, in-work benefits or tax-credits are often used to incentivise work, but other reforms such as the one considered here are also likely to have an impact on individual choices on the labour market.

Additionally, and as argued by Bargain and Doorley (2011),), the evidence on partici-

pation elasticities of childless individuals is generally limited. In many European countries, such as Germany or France, but also Austria, singles are the core group of social assistance recipients. Therefore, we also estimate the potential labour supply reactions of singles, males as well as females, to changes in social assistance benefit. We combine EUROMOD, the tax-benefit microsimulation model for the European Union, with a discrete-choice behavioural model of household labour supply. This allows us not only to evaluate the overnight effects of the reform on social assistance, but also to see the impacts on labour supply of specific subgroups.

The paper is organised as follows: Section 2 describes the literature on social assistance and labour supply, Section 3 gives an overview of the Austrian social assistance scheme, and Section 4 describes the data and the methodology used. In Section 5, results on the fiscal, distributional impact and on labour supply are presented. Section 6 summarises and concludes.

2. Literature overview

Strong welfare systems have often been blamed for contributing to persistent unemployment, especially in Western European countries[3]. There is a very large body of literature on the work incentives of transfer programs, especially on in-work benefits. Moffitt (2002) provides an overview on the literature for the US, suggesting that welfare programs have an impact on labour supply.

Focusing on the effects of social assistance on labour supply, there have been several ex-post analyses, which have either used changes in social assistance benefits, or discontinuities in existing social assistance schemes. Lemieux and Milligan (2008) analysed a sharp discontinuity in the Canadian social assistance scheme, where recipients below 30 and without children received 60% lower benefits than those with children. They found strong evidence that more generous social assistance led to substantial reduction in employment, especially for less-educated males without children. In the case of Canada, the social assistance increase led to a decrease in the employment rate in this group by 3pp to 5pp. Similarly, Bargain and Doorley (2011) exploit a discontinuity in the French social assistance scheme, where childless men below 25 are not eligible for social assistance. They find that social assistance in France reduces employment by 7 to 10%.

Ex-ante evaluation of policy reforms is typically based on standard labour supply models. Several papers describe ex-ante analyses of reform impacts using a similar approach to the one used in our paper to calculate labour supply responses, but most of them focus on tax reforms or in-work benefits. Blundell et al. (2000), for example, analysed the labour effects of the so called Working Families' Tax Credit (WFTC), an in-work benefit for families introduced in the UK. Using a similar labour supply model, Labeaga et al. (2008) analysed the impact of changes in the Spanish tax system. They found only minor labour supply effects related to the changes studied. Ayala and Paniagua (2019) measured

[3]see e.g. Laroque and Salanié (2002)

the behavioural impacts of a hypothetical reform of in-work benefits (IWB) in Spain. The existing Working Mother Tax Credit (WMTC) was replaced by the US-style Earned Income Tax Credit (EITC). They showed that the introduction of such an IWB generates a substantial increase in labour supply at the extensive margin, but also a non-negligible reduction at the intensive margin.

Peichl and Siegloch (2013) studied the labour supply (and demand) effects of a hypothetical reform introducing the workfare concept for Germany. Steiner and Wrohlich (2005)) analysed the work incentives and labour supply effects of the German mini-jobs reform that introduced social security deductions for low income earners. They showed that the small employment effects are outweighed by negative effects on hours worked among those already working. Mastrogiacomo et al. (2017) uses a discrete choice model to analyse heterogeneity of labour supply effects across households in the Netherlands. They found large differences in labour supply elasticities between households with and without children, and the authors argue that these differences are much bigger than suggested by previous literature.

More closely related to our paper, Franz et al. (2012) analysed the employment effects of a reform of the German system, where unemployment assistance and social assistance were unified to create a single benefit ("Arbeitslosengeld II"). From a technical point of view, this paper is most closely linked to ours, although the authors estimate general equilibrium effects, accounting additionally for labour demand[4].

For Sweden, Flood et al. (2004) analysed a policy proposal that intended to increase labour supply incentives for low income families. They show that reducing social assistance in combination with increased tax deductions generates substantial positive welfare effects. However, the authors find only minor increases in labour supply and decreases in welfare participation. In general, they found that labour supply among two-parent families in Sweden was quite inelastic.

3. The Austrian social assistance system

The Austrian social assistance system is based on a minimum income benefit that can be taken up if the person has no income, or their income is below the defined guaranteed minimum level. The social goal of this scheme is to provide people who cannot meet their daily living costs with sufficient resources to do so. Standard rates and means tests of the social assistance benefit have been to a great extent harmonised on the national level, but are still some differences between Federal States. Federal States can, for example, increase State-wide minimum standards [5].

[4]Clauss and Schnabel (2008) use a similar approach with a similar framework, only estimating labour supply effects.

[5]The model we use for our analysis (EUROMOD) always refers to the regulations in Vienna, since first, most of recipients of the social assistance are in Vienna, and second, the regional component cannot be modelled with our data.

The Austrian system is characterised by substantial non take-up of social assistance, as has been shown by e.g. Fuchs et al. (2019). The authors analysed the development of non-uptake over time and found that in 2015, the non-uptake rate of the Austrian social assistance benefit was about 30%, as measured both in terms of number of households and expenditure. According to the literature, the reasons for non-uptake can be manifold. Typically, non-uptake is attributed to several factors, such as information costs, administrative costs, asymmetric information and social and psychological costs.

Most social assistance recipients in 2018 in Austria were located in Vienna, as Table 1 shows. Of a total of 289,646 recipients, almost 58 percent were located in Vienna (about 167,000). At the household level, around 63 percent of recipient households are located in Vienna. Investigating the household structure in more detail, the largest beneficiary group is composed of single households (around 73,000, households or 63%), followed by couples with children (around 17,400, or 15.1%) and single parents (around 17,000, or 14.6%). The total cost of social assistance in Austria in 2018 was around 941 million Euros, of which 621 million Euros can be attributed to the federal state of Vienna, followed by Styria with costs of 67.4 million Euros.

Most of the social assistance receivers of 2018 in Austria were located in Vienna, as Table 1 reveals. Of a total of 289,646 recipients, almost 58 percent were located in Vienna (about 167,000). Looking at the household level, about 63 percent of receiving households are located in Vienna. Investigating the household structure in more detail, the largest beneficiary group are the single-households (about 73,000 households or 63%), followed by couples with children (about 17,400 or 15.1%) and single-parents (about 17,000 or 14.6%). The total cost of social assistance in Austria in 2018 was about 941 Mio. Euro, of which 621 Mio. Euro can be attributed to the federal state of Vienna, followed by Styria with costs of 67.4 Mio. Euro.

Table 1: Social assistance receivers and expenditures 2018 by federal state

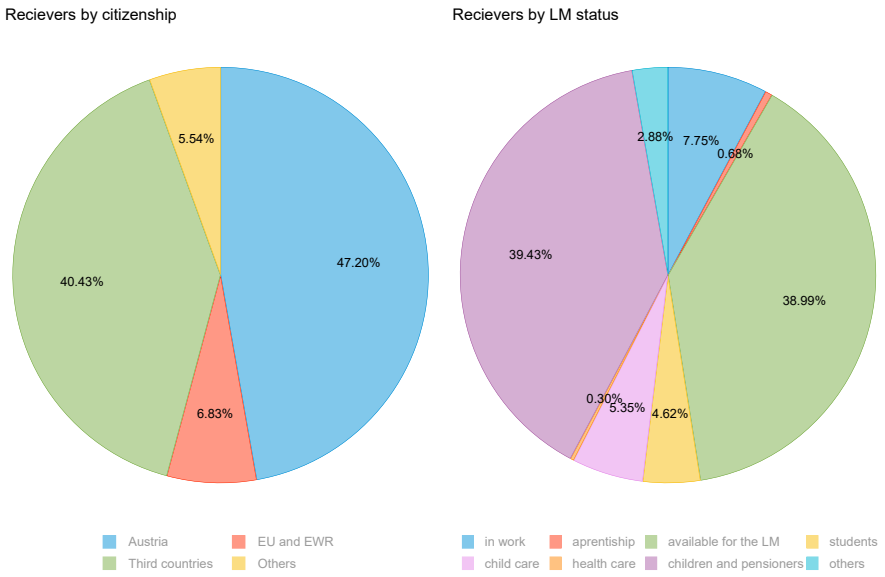
federal state	individuals (number)	households (number)	expenditures (Mio. Euro)
Burgenland	3,257	1,835	8.4
Carinthia	6,711	4,176	16.0
Lower Austria	25,620	12,200	67.1
Upper Austria	18,941	10,530	42.2
Salzburg	12,967	7,599	34.2
Styria	25,455	13,128	67.4
Tyrol	16,232	9,102	53.1
Vorarlberg	13,180	5,751	31.3
Vienna	167,283	108,126	621.4
Total	289,646	172,447	941.0

Source: Statistics Austria

Taking a closer look at the recipients, we can see that most of social assistance recipients are Austrian citizens, as highlighted in Figure 1. Of all recipients, around 47% are

Austrians, and 40% are third country citizens, meaning citizens from outside the EU, EEA and Switzerland, and only around 7% of social assistance recipients are migrants with EU or EEA citizenship.

Regarding the labour market status of recipients, the results are quite diverse. About 39.4% of recipients are either children or people above the retirement age, 4.6% are students, and 5.4% are people with child care obligations. About 7.8% are in work but earn below the minimum standards, so called "Aufstocker" and around 39.0% are available for the labour market but are not working.



Source: Statistics Austria
Note: Third countries are citizens outside of the EU, EWR and Switzerland. EU and EWR includes Switzerland.

Figure 1: Recipients of social assistance in 2018, by citizenship and LM status

3.1. The current system

Persons eligible for social assistance under the current law are those with authorisation for permanent residency: Austrian citizens, persons entitled to be granted asylum, EU citizens and their relatives, permanent residents (and their relatives), and persons with a settlement certificate. The income test for the benefit depends on the person's own income, their own assets and the income of other family members. Every type of net income reduces assistance accordingly, but there are some exceptions (see e.g. Fuchs and Premrov (2019)). Assets of up to 4427.35 Euros are disregarded in the wealth test for social assistance. Additionally, cars, as well as other things necessary for work can be exempted. Home-owners can receive social assistance for at least 6 months before the State can enter it in the land register as an income.

Table 2: Minimum standards of social assistance 2019, including housing needs

household type	Minimum standards (monthly in Euros)
Singles and lone parents	885.47
Adults in non-single households (no family allowance)	664.10
Full age children (entitled to family allowance)	442.74
Minor children in non-single households (entitled to family allowance)	239.08

Note: For persons below 60/65(F/M) and capable of work, social assistance is paid 12 times a year. For persons above 59/64(F/M) or not capable of work social assistance is paid 14 times a year.

Table 2 highlights the current minimum standards that are applicable in the current Austrian system. These numbers include the basic amounts for covering housing needs. A single or lone-parent receives 885.47 Euros, in case of capable of working, paid 12 times a year. The existence of a second adult in the household will increase the minimum standards by 664.10 Euros. A dependent child increases the minimum standards by 442.74 or 239.06 Euros, depending on the age of the child (full-aged or minor).

Considering the current social assistance system, Figure A.5 in the appendix gives an overview of the disposable income of 4 different household types eligible for social assistance in the current system: a single-household, a lone parent household with two children below 14, a single earner household (two adults) with three children below 14, and a single earner household (two adults) with five children below 14. The calculations take the whole tax-benefit system of Austria into account, where social-assistance falls under means-tested (non-pension) benefits. Depending on income, social security contributions, as well as direct taxes have to be paid. In addition, house- holds receive other non-means-tested (non-pension) benefits, which are not accounted for in the income test for social assistance. Therefore, these benefits are accounted for in addition to social assistance.

3.2. The reform scenario

As early as 2018, a political discussion on two aspects of social assistance was ongoing. Firstly, the migrants' access to social assistance driven by a strong inflow of migrants during 2015 and 2016 was criticised by the right wing parties. Secondly, a broad discussion about potential inactivity traps in the current system, driven by high social assistance benefits especially for households with (many) children, was started by the Austrian Public Employment Office.

As of the first of June 2019, the centre-right government introduced a new federal law in Austria, the 'Neue Sozialhilfe' ("New Social Assistance"), to replace the 'Mindestsicherung' ("Minimum Income Benefit"). The new framework law introduced limits for social assistance, so that especially families with children, persons entitled to asylum but not prepared for the labour market due to insufficient German language skills, and persons eligible for

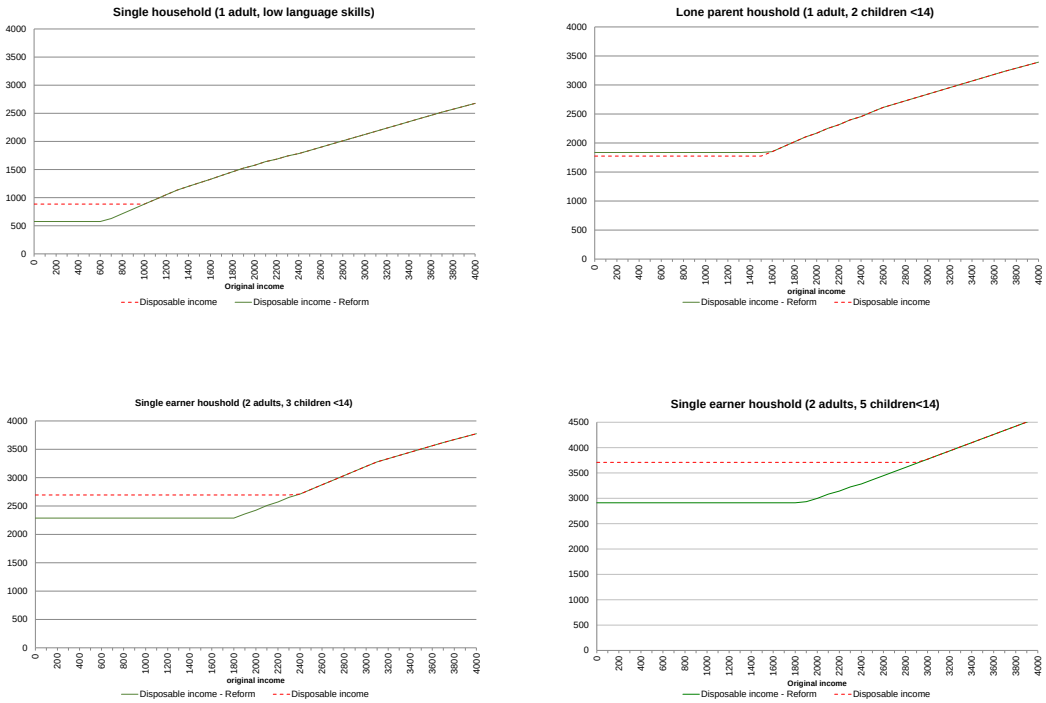
subsidiary protection, are expected to receive lower benefits. The Federal States were called to pass implementation laws by the end of 2019.

Regarding language skills, the new law stipulates that claimants must have sufficient language skills - at least level B1 in German or C1 in English - in order to be eligible for social assistance benefits. This has to be proven by producing school-leaving certificates, other certificates or linguistic skills classification statements, or by means of a face-to-face interview with the authorities. Linking social assistance to language skills is a unique policy that, to the best of our knowledge, has never been analysed before. Limiting social assistance for migrants with low language skills may have an impact on fiscal and distributional outcomes and might also influence (labour market) integration.

The main aspects of the new social assistance law were as follows. First, monthly social assistance is linked to the minimum pension and amounts to 885.47 Euros for a single person. This is not changed by the reform. Second, a couple receives two times 70% of the single person amount i.e., 1239 Euros. Including the housing need of the second person will lead to 1405 Euros, which is a reduction in the benefit amount. Thirdly, social assistance was staggered for families with children: 25% of the maximum amount for the first child (221.25 Euros), 15% for the second child (132.75 Euros) and 5% from the third child (44.25 Euros). This will lead to a substantial decrease in benefits for families with children, since in the current system, each child receives the same amount (239.08 Euros). Fourth, single parents will receive a bonus: 12% of the maximum amount for one child, 21% for two children and 27% for three children, and additional 3% for any additional child. This will increase social assistance for lone parents in the reform scenario. Fourth, disabled persons will receive a bonus of 18% of the maximum amount. Fifth, migrants with insufficient German language skills (level B1 in German, or C1 in English) shall receive only 65% of the maximum amount. Obviously, this reduces the benefit amount for migrants with low language skills substantially. Sixth, people with subsidiary protection will only receive 325 Euros per month under the basic scheme. In some regions (e.g. Vienna), people with subsidiary protection currently fall under the minimum income scheme.

We illustrate the impact of the reform for hypothetical households, namely the four households described in the previous chapter, and compare the disposable income of those households by income level. Figure 2 shows that for families with children eligible for social assistance, disposable income is substantially reduced by the reform, e.g. for a lone-earner household with 5 children, the maximum social assistance is reduced from 3695 to 2865 Euros. One should note that this includes not only social assistance, but also other family benefits. Also, for a single person with low language skills, the reform reduces disposable income from 885 Euros to 575 Euros. In the case of a couple's household with many children (five children below 14), disposable income is substantially reduced, from around 3710 Euros in the old system to around 2912 Euros as a result of the reform that lowers benefits related to children. On the other hand, a lone-parent household with two children will receive more in the reform scenario: instead of 1775 Euros in the current system, disposable income will be increased to 1836 Euros due to the reform (bonus for single parents).

The policy itself went through the parliament and was implemented, but at the end of



Note: Calculations based on EUROMOD HHoT, see Hufkens et al. (2019).

Figure 2: Hypothetical households receiving social assistance by income level

2019, the Austrian Constitutional Court (VfGh) declared both the reduction for children and linking social assistance to language skills for migrants unconstitutional, meaning that the government has to come up with a new reform proposal. In light of this, our paper is of special interest, since it analyses the expected effects of this reform, not only on inequality and poverty, but also on labour supply. The reduction of the minimum income benefit for families with children was discussed on a political level in light of negative work incentives in the current social system. Additionally, analysing the reform in detail could help to overcome unintended side-effects and problems that might have not been taken into consideration by policy- makers in the reform proposals.

4. Data and Methodology

We combined EUROMOD, the tax-benefit microsimulation model for the European Union, with a labour supply model. This allows us to not only evaluate the overnight effects of the reform on social assistance, but also to see the impacts on labour supply. We first evaluated the distributional impact in a static microsimulation model, and used the reform scenario to estimate potential labour supply effects. In this section, we briefly discuss the models we used to analyse the reform.

4.1. Microsimulation

4.1.1. Using EUROMOD for policy simulations

To evaluate the first-round fiscal and distributional effects of the reform, we use EUROMOD, the tax-benefit microsimulation model for the European Union (see e.g. Sutherland and Figari (2013) or Sutherland (2007)). EUROMOD relies on micro-data representative of the household population of Austria and each other EU member state. EUROMOD is not only a unique tool for international comparative research on the effects of taxes and benefits, but also a tool to simulate fiscal and redistributional effects of certain reforms within a country.

Our simulations are based on the EUROMOD 2019 tax-benefit system, using individual and household data from the European Union Survey of Income and Living Conditions (EU-SILC) 2017. The policies are implemented according to the new legislation passed through the government. As already mentioned, the standard rates and means tests for the social assistance benefit have been to a great extent harmonised on the national level, but there are still some Federal State-specific differences. Since our microdata does not allow us to distinguish between Federal States, the differences between States are not too big, and most recipients of social assistance are in Vienna, EUROMOD used the social assistance regulations of the federal state of Vienna for our analysis.

EUROMOD replicated the eligibility conditions for social assistance, and informs us of households that are eligible for social assistance. As already mentioned, there is substantial non take-up in the Austrian system. Therefore we assume that only those households reporting social assistance in the EU-SILC data have taken up the benefit[6].

[6]This differs from the EUROMOD baseline, since there, full take-up is assumed. There could of course

4.1.2. Adding information on literacy skills

The part concerning literacy skills is an important part of the reform. To simulate this reform aspect of EUROMOD, we used additional data from the PIAAC data set, the Programme for the International Assessment of Adult Competencies (PIAAC). The major survey conducted as part of PIAAC is the Survey of Adult Skills. The Survey measures adults' proficiency in key information-processing skills - literacy, numeracy and problem solving - and gathers information and data on how adults use their skills at home, at work and in the wider community.

Literacy is the ability to understand and use information from written texts in a variety of contexts to achieve goals and develop knowledge and potential. This is a core requirement for developing higher-order skills and for positive economic and social outcomes. Previous studies have shown reading literacy to be closely linked to positive outcomes at work, to social participation and to lifelong learning.

Unlike previous assessments of literacy, PIAAC evaluates adults' ability to read digital texts (e.g. texts containing hypertext and navigation features, such as scrolling or clicking on links) as well as traditional print-based texts. To provide more detailed information about adults with poor literacy skills, the literacy assessment in this survey is complemented by a test of "reading component" skills. These are the basic set of decoding skills that enable individuals to extract meaning from written texts: knowledge of vocabulary, ability to process meaning at the level of the sentence, and fluency in reading passages of text.

Similarly to the standard Reference levels that are typically used for language skills (A1, A2, B1, B2, C1, C2), PIAAC has also 6 categories that are similar to those of the common reference levels. The table at the end of the document gives an overview of the literacy levels in PIAAC. Figure 3 shows the distribution of literacy skills across natives and migrants.

We consider those people with a lower Level than 2 (less than 225 points) as those with low literacy skills. This holds true for around 25 percent of the migrants in the PIAAC sample. For those not participating in the labour market (unemployed or out of the labour force), this number is even higher. Therefore, we decided to use different assumptions for the population of migrants with low literacy skills. First, we assumed as a baseline that around 25 percent of the migrants do not have sufficient language skills. To see the impact of this assumption, we additionally add scenarios with 20 and 30 percent of migrants with low literacy skills.

4.1.3. The reform scenarios in detail

We consider two reform scenarios that we compare to our baseline system (the current system):

- **Baseline:** The simulation according to the EUROMOD 2019 tax-benefit system,

be an under-reporting due to social stigma and so on, when we only take those into account. Our numbers can therefore be seen as a lower bound on the fiscal impact.

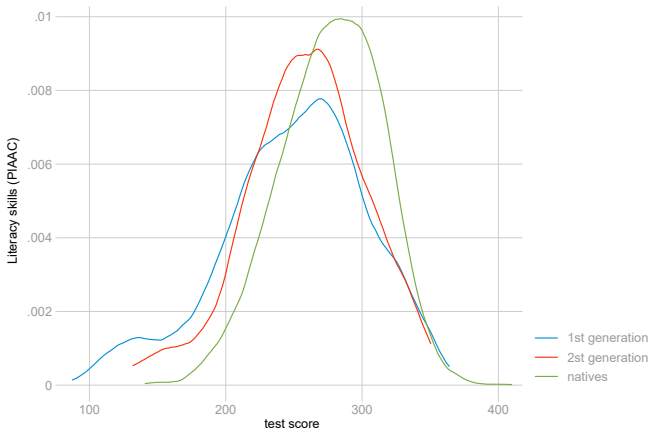


Figure 3: Literacy skills by migration status

assuming that only those reporting social assistance are taking it up.

- **Reform 1 (No lang):** This reform scenario assumes the full reform, except the deduction of social assistance for migrants with low literacy skills.
- **Reform 2 (25%):** This reform scenario assumes, in addition to reform 1 (No lang) that 25 percent of those receiving social assistance do not have sufficient language skills and therefore receive less social assistance. Migrants with low literacy skills are chosen randomly within the migrant households receiving social assistance. (To see the fiscal impact in more detail, we vary in the fiscal part the values between 20% and 30%)

4.2. Labour supply modelling

Our labour supply modelling approach is based on the methodology of Bargain et al. (2014), who introduced a flexible discrete choice model as also used by e.g. Brewer et al. (2006) and Blundell et al. (2000) to evaluate the impacts of tax reforms in the UK. This approach is based on the Random Utility model, first introduced by McFadden et al. (1973). The core assumption is that households maximise their utility function under the restriction of choosing between consumption (income) and leisure. These preferences are defined by a quadratic utility function with fixed costs. Household utility has a deterministic part and an error term that reflects optimisation errors in the household. We allow for heterogeneity in household preferences by adding household characteristics in the utility function. A household's labour supply decisions is reduced to the choice between a discrete set of working hours. In our model we use 7 choice sets of hours worked: 0 hours, 1-10 hours, 11-20 hours, 21-30 hours, 31-40 hours, 41-50 hours, 51-60 hours.

In general, we distinguish between three household types: single females, single males and couple households[7]. The deterministic utility of a single male or female household

[7]Please note that we treat couple households with non-flexible partner as single household in the utility

depends only on their own wage, while for couple households, the utility depends also on the hours worked and the wage of their partner. Formalising the model, the utility of a couple i at each discrete choice j can be written a:

$$\begin{aligned} U_{ij} = a_{ci}C_{ij} + a_{cc}C_{ij}^2 + a_{h_f i}H_{ij}^f + a_{h_m i}H_{ij}^m + a_{h_{ff} i}(H_{ij}^f)^2 + a_{h_{mm} i}(H_{ij}^m)^2 + \\ a_{ch_f}C_{ij}H_{ij}^f + a_{ch_m}C_{ij}H_{ij}^m - n_j^f 1(10 < H_{ij}^f < 40) - n_j^m 1(10 < H_{ij}^m < 40) \end{aligned} \tag{1}$$

where household consumption is C_{ij} and spouses working hours are H_{ij}^f and H_{ij}^m.[8] Taste-shifters are introduced in the model by allowing consumption as well as hours worked to vary by age, age squared, the presence of children and their age and education:

$$\begin{aligned} a_{ci} &= a_c^0 + Z_C^i a_C + u_i \\ a_{h_f i} &= a_{h_f}^0 + Z_i^f a_{h_f} \\ a_{h_m i} &= a_{h_m}^0 + Z_i^m a_{h_m} \end{aligned} \tag{2}$$

We capture the unobserved heterogeneity by adding an error term u_i. and assume it to be normally distributed. As mentioned before, we take fixed costs to start working (n_j^k) into account, to improve the model. We allow those fixed costs to differ by gender k. The only model restriction we have to introduce is on increasing monotonicity of consumption, which is the minimum requirement for meaningful interpretation of the model and is directly introduced into the likelihood maximisation.

As already stated, in our model each individual faces a discrete number of alternatives in their choice of hours worked. For each labour supply choice, we calculate the consumption C_{ij}(which is equal to income) as a function of female earnings ($w_i^f H_{ij}^f$) and male earnings ($w_i^m H_{ij}^m$), as well as non-labour income (y) and specific household characteristics (X_i):

$$C_{ij} = f(w_i^f H_{ij}^f, w_i^m H_{ij}^m, y_i, X_i) \tag{3}$$

where f is the tax benefit function used. For each discrete choice j, disposable income (consumption) C_{ij} is obtained by aggregating all sources of household income and simulating all benefits received as well as taxes and social security contributions paid. These simulations are carried out by using the microsimulation model EUROMOD, together with specific information on household characteristics (e.g. family composition).

We do not observe wage for those who are not working in the EU-SILC data. Therefore we have to estimate those wages according to a standard Heckman-correction wage

function.

[8]Please note that for singles, there will be only one hour term denoting the discrete choice set of this individual

equation. The estimation results of the wage equations are reported in Table A.13 in the Appendix. To minimise the division bias, we used the estimated wages both for non-workers and workers.

Using the information on wages, our discrete choice framework allows us to estimate the structural parameters of the underlying utility function. As in Müllbacher and Nagl (2017) and Bargain et al. (2014), a multinominal logit model is used to estimate those parameters. Additionally, the stochastic specification of the labour supply model will include an i.d.d. error term e_i that represents possible optimisation errors:

$$V_{ij} = U_{ij} + e_i \tag{4}$$

Under the assumption that the error terms follows an extreme value distribution, we calculate the probability for each household i of choosing a labour supply choice j. We restrict our sample to couples, single men and single women, who are aged between 18 and 59, available for the labour market (not disabled, retired or in education) and additionally we exclude farmers and the self-employed.

Our approach has some shortcomings. Firstly, we had to assume full uptake in the labour supply model. Therefore, our employment effects should be seen as an upper bound on our estimates, since take-up might be influenced by the reform. Second, labour demand responses are not modelled at all in this paper, meaning that the employment effects have to be interpreted as only supply factors, ignoring the labour demand side completely.

5. Results

5.1. The fiscal and distributional impact of the reform

Depending on the scenario we use, we can see that the fiscal impact of the reform is a reduction in the total expenditure for social assistance. In the case of not reducing the social assistance for people with low language skills (No Lang, the overall expenditures for social assistance are expected to be around 56 million Euros lower compared to the baseline scenario. Depending on the amount of migrants with insufficient literacy skills (20, 25, or 30 percent), the expenditures for social assistance are expected to decrease further to between 102 and 128 million Euros. The part of the reform related to literacy skills therefore reduces the costs of social assistance further by between 46 and 72 million Euros, depending on the truth in the assumption that migrants will tend to have low literacy skills.

Three forces drive the fiscal impact. Firstly, reduced social assistance for children reduces the benefits of having bigger families, leading to less expenditure on social assistance. Secondly, the additional bonuses for disabled and lone-parent households will introduce some additional expenditure on social assistance. The net effect of both is the reduction of around 65 million Euros, meaning that the first effect outweighs the second. Additionally, the reduction for migrants leads to an even lower expenditure.

The reform impact is especially high for low income deciles (when equivalised disposable household income is considered as income variable). The impact of both reforms substantially reduces the income of the first two deciles. The reform also affects households in the

Table 3: Fiscal impact of the reform (in Mio. Euro)

		Total				Diff. w.r.t. Baseline			
Concept	Baseline	No Lang	20%	25%	30%	No Lang	20%	25%	30%
Total taxes	34,322	34,322	34,322	34,322	34,322	0	0	0	0
Total SIC	56,855	56,855	56,855	56,855	56,855	0	0	0	0
Total pensions	50,384	50,384	50,384	50,384	50,384	0	0	0	0
MT benefits	4,203	4,147	4,100	4,087	4,075	-56	-102	-116	-128
- Social assistance	719	663	616	602	591	-56	-102	-116	-128
Non-MT benefits	10,857	10,857	10,857	10,857	10,857	0	0	0	0
Net budgetary	25,733	25,789	25,836	25,850	25,862	56	102	116	128

Note: MT...means tested; Non-MT... Non means tested

Table 4: Impact on equivalised disposable income

	Total			Diff. w.r.t. Baseline	
Decile	Baseline	No lang	25%	No lang	25%
1	10,210	10,144	10,087	-66	-123
2	15,928	15,847	15,804	-81	-123
3	19,167	19,165	19,165	-1	-1
4	21,875	21,878	21,878	3	3
5	24,591	24,591	24,591	0	0
6	27,176	27,176	27,176	0	0
7	30,217	30,217	30,217	0	0
8	34,141	34,141	34,141	0	0
9	39,891	39,891	39,891	0	0
10	62,531	62,531	62,531	0	0
All	28,543	28,528	28,519	-15	-24

3rd and 4th decile, but the impact is minute, and not statistically significant. As expected, including the reduction for migrants with low literacy skills leads to further income losses in those deciles. While the average loss in the first decile was 66 Euros in the first scenario (No lang), also adding a cut in social assistance due to low language skills increases the loss up to 123 Euros.

As mentioned earlier, some households profit from the reform (one adult households with children), and others lose (households receiving social assistance with a lot of children, and households with low language skills). Taking a closer look at the distribution of winners and losers, we can see that most people who lose as a result of the reform can be found in the first decile, while the winners are equally distributed between the first and the second decile. Overall, around 38,400 households are losing due to the reform, while around 21,000 are winning. If we were to not consider the reductions for migrants with low literacy skills, the number of losers would be substantially lower.

Typically, the Gini coefficient is used for measuring the inequality impacts of reforms; however, in our case it might not be the best indicator, since we only expect an impact in the lower tail of the Gini coefficient. Therefore, we also look at the S80/S20 indicator (income quintile share ratio). As we would already expected from the reduction of disposable income, inequality increases according to both indicators. While the reform increases the

Gini from 0.2653 to 0.2659, the reduction for people with low literacy skills further increases the Gini to 0.2663. The same holds true for other inequality measures such as the income quintile share ratio (S80/S20).

Table 5: Impact on inequality

	Value			Diff. w.r.t. Baseline	
	Baseline	No lang	25%	No lang	25%
Gini coefficient	0.2653	0.2659	0.2663	0.0006	0.0010
Income quintile share ratio (S80/S20)	3.9153	3.9374	3.9525	0.0222	0.0373

Looking at the impact on the AROP rates (see Table 6), we can see that, depending on the types of household, they might be either increasing or decreasing. Due to the increase in social assistance for single-households with children, the AROP rate is decreasing from 34.7 to 33.9 percent. Due to the reduction in social assistance for households with more children (three or more), the AROP rate of this households increases substantially (from 15.7 to 17.3). The overall effect on the AROP rate is negligible, because the group influenced by the reform is simply too small to really have an impact there. Additionally, many of those households were already below the poverty line before the reform.

Table 6: Impact on At-risk-of-poverty rates (in %)

Household type	AROP rate			Diff. w.r.t. Baseline	
	Baseline	No lang	25%	No lang	25%
1 adult <65, no children	27.9	27.6	27.6	-0.3	-0.3
1 adult older 65, no children	23.3	23.3	23.3	0.0	0.0
1 adult with children	34.7	33.6	33.9	-1.1	-0.8
2 adults <65, no children	10.7	10.6	10.6	-0.1	-0.1
2 adults, 1 or 2 older 65, no children	9.5	9.5	9.5	0.0	0.0
2 adults with 1 child	12.1	12.1	12.1	0.0	0.0
2 adults with 2 children	13.1	13.1	13.1	0.0	0.0
2 adults with 3 or more children	15.7	17.3	17.3	1.6	1.6
3 or more adults, no children	3.9	3.9	3.9	0.0	0.0
3 or more adults with children	12.9	12.5	12.5	-0.3	-0.3
All	13.7	13.7	13.7	0.0	0.0

Note: Poverty line is 15,495.20 Euros (60% of median equivalised annual disposable income)

5.2. Labour supply responses

This section reports the labour supply responses to the changes in social assistance suggested by the discrete choice labour supply model described in subsection (4.2.). The discrete choice framework allows us to estimate the structural parameters of the underlying utility function. The results of the multinominal logit model are listed Table A.14 in the Appendix for all three household types. All estimations show the expected signs for the main parameters and most are highly significant. As already discussed, we control for several of taste-shifting parameters such as age, children and level of education.

For couple households male and female, leisure increases the household's utility with a diminishing effect as the level of leisure increases (squared term). We find no statistical

evidence, that partners like to spend time together since the interaction effect between male and female leisure is insignificant. As indicated by the interaction term of leisure and children, there are substantial gender differences in the assessment of leisure in the case of children. For males, the results are insignificant and sometimes even negative while for women they are always positive and significant and especially strong in the case of young children.

Singles (male and female) behave similar to their married counterparts. Leisure in the model for male or female single leads to a higher utility, with a decreasing effect as the level of leisure increases (squared term). The individual models suggest increasing utility with consumption even though the parameter for income (consumption) is not significant for males, and here too differences can be found in the presence of children.

5.2.1. Labour supply elasticities

To get an initial idea of the possible reaction to the reform, we estimate wage elasticities for males and females. In general, we derive labour supply elasticities by numerical simulations. Intensive margin refers to the expected change in the number of hours worked for people already working in the original dataset, while the extensive margin refers to the expected change from people not participating in the labour market.

The Austrian reform changes the amount of social assistance, which can potentially have an impact on the labour supply reaction of households. This is what our analysis will focus on, especially labour supply responses of specific household types, since the reform impacted different household types in a different way. Firstly, we focus on labour supply elasticities for changes in social assistance. Therefore, we model a 1% increase in social assistance, which is reflected in our estimate in an increase in the basic amount of the minimum standards of social assistance by 1%[9]. Note that this concept is different to the traditional gross wage elasticities that are typically found in the literature, which we report only to validate the labour supply model in the Appendix in figure A.6[10].

Table 7 reveals the expected changes by household type and gender[11]. A 1% increase in social assistance leads to a 0.03% decrease in the average weekly working hours for males, while they are reduced by 0.07% for women, indicating that females respond more strongly to an increase in social assistance on the intensive margin. We find weaker gender differences for the participation effect. A 1% increase in social assistance is expected to decrease participation of males by 0.03%, and of females by 0.04%.

Looking in detail on the labour supply reaction of several household types, we can see that the reaction in couple households is quite similar across genders, and that the presence of children does not really have an impact on labour supply elasticity, on either the intensive or the extensive margin. The elasticities lie at around 0.02% and 0.04%.

[9]The underlying wage equations can be found in Table A.13 in the Appendix.

[10]The elasticities are in line with the findings of other studies, e.g. Bargain et al. (2014) and Christl et al. (2019), but slightly higher than the results derived by Müllbacher and Nagl (2017).

[11]Note that the average hours worked are more or less in line with external statistics from the OECD for 2017 that suggest average weekly working hours of around 39.7 for men and 31.4 for women.

Table 7: Labour supply reaction to changes in social assistance

		average working hours			participation		
household type	sex	baseline	reform	diff	baseline	reform	diff
total	male	39.77	39.76	-0.03%	1,600,302	1,599,825	-0.03%
	female	30.17	30.15	-0.07%	1,449,807	1,449,239	-0.04%
couple with child	male	40.90	40.89	-0.03%	626562	626385	-0.03%
	female	26.26	26.25	-0.04%	496,487	496,402	-0.02%
couple w/o child	male	39.93	39.92	-0.02%	631413	631296	-0.02%
	female	31.32	31.31	-0.03%	641,419	641,306	-0.02%
single with child	male	40.04	39.86	-0.44%	5765	5758	-0.13%
	female	31.73	31.64	-0.27%	61,222	61,153	-0.11%
single w/o child	male	37.47	37.45	-0.06%	336,562	336,381	-0.05%
	female	34.55	34.49	-0.18%	250,680	250,400	-0.11%

Looking at the elasticities for singles, we find a stronger impact on both the intensive as well as on the extensive margin, with especially high elasticities for singles with children. Notably, the elasticities are higher for male singles with children than for female singles with children, while the opposite holds true for singles without children.

5.2.2. General labour supply reactions to the reform

The impact of the reform on labour supply is not clear when considering only the elasticities of social assistance. The reform did increase social assistance for some households, especially for lone-parents, and they seem to react more strongly to changes in social assistance. On the other hand, couples (with many children) and migrant households are eligible for lower social assistance in the reform scenario, but it seems that the reaction to social assistance changes is lower. The overall effect is therefore ambiguous.

Therefore, we analysed the impact of the reform within the discrete choice framework of our labour supply model. We predicted that the reform would have a positive effect, especially on the extensive margin. In numbers, this would translate to an additional 3,400 males and 1,100 females who are willing to participate in the labour market due to the reform. Males would like to increase weekly hours on average from 39.77 to 39.87 and women from 30.17 to 30.21. On aggregate, a small change from part-time to full-time is visible

Figure 4 suggests that participation is increased by around 0.21% for males and 0.08% for females. The higher impact for males might be driven by the fact that the negative participation effect due to the higher social assistance for single parent households is more likely to affect women than men.

The intensive margin is only slightly impacted. This is most likely driven by so-called "Aufstocker", who are not able to receive additional social assistance to supplement their earnings due to the reform (e.g. one-earner households with a lot of children). In general, we can see a shift from part-time to full-time, which is stronger for males than for females. Overall, the reduction in social assistance for couples, for households with many children and migrants with low language skills seem to outweigh the effect of the higher social assistance for lone parents, leading to a small but positive effect on labour supply.

Table 8: Labour supply effects of the reform

	gender	base	reform	difference	
weekly hours	male	39.77	39.87	0.10	0.24%
	female	30.17	30.21	0.04	0.13%
Full-time equivalent	male	1,628,984	1,632,926	3,942	0.24%
	female	1,119,873	1,121,322	1,449	0.13%
Participation	male	1,600,302	1,603,696	3,394	0.21%
	female	1,449,807	1,450,936	1,129	0.08%
Short part-time	male	36,985	36,423	-562	-1.52%
	female	280,361	279,751	-610	-0.22%
Long part-time	male	206,280	206,701	421	0.20%
	female	467,010	467,777	767	0.16%
Full-time	male	713,229	715,088	1858	0.26%
	female	502,049	502,797	748	0.15%
Over-time	male	643,807	645,485	1677	0.26%
	female	200,387	200,611	224	0.11%

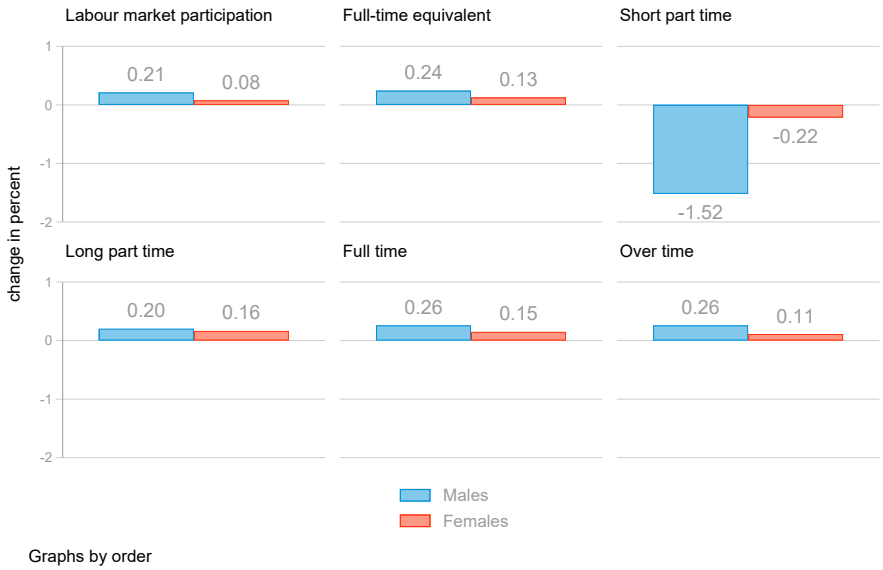


Figure 4: Labour supply impact of the reform

5.2.3. Digging further: labour supply reactions for specific household groups

While the overall assessment of the reform's effects on the labour supply suggests a positive impact on labour market participation, the key drivers of this increase in labour supply are not yet clear. Therefore, we not only looked more closely at the household types, we also split our sample into natives and migrants, because there was a substantial decrease in social assistance for migrants with low language skills.

Taking a closer look on the household types that are summarized in Table 9,we can see that couple households with children, which are those households facing substantial losses in social assistance due to the reform, react by increasing their participation. This is the group with a stronger reaction both on the intensive and extensive margin. Overall, 0.34%

Table 9: Labour supply reactions by household type - total sample

	change in hours		change in participation			
	male	female	male	female	male	female
Couple no children	0.18%	0.15%	1085	699	0.17%	0.11%
Couple with children	0.40%	0.21%	2111	449	0.34%	0.09%
Single with children	-0.19%	-1.17%	-10	-431	-0.17%	-0.70%
Single no children	0.07%	0.25%	208	413	0.06%	0.16%
Total			3394	1129		

of males and 0.09% of females of the households with children would like to participate more in the labour market under the new social assistance scheme. The effect on the labour supply is also positive for couples and singles without children. This is mainly driven by migrants with low language skills, who suffer substantial losses in social assistance as well. On the other hand, we can see that single people with children, which are the only households gaining from the reform, would react by decreasing their labour supply. The effect would be stronger for females, who would reduce their participation by 0.7% and the number of hours worked by 1.17%.

Focusing more on the reduction in social assistance for people with low language skills, we divided our sample by migration status: migrants (by citizenship) and natives. Only looking at native households (see Table 10), we can see no reaction by singles without children to the reform, either in terms of hours worked, or participation. This is in line with our expectations, since single households without children are not influenced by the reform.

On the other hand, the reaction of singles with children is relatively strong. The reform would decrease participation by 0.83% for females (in absolute terms by 413 persons). This reaction is expected, since those households were the only financial winners from the reform, due to the bonus introduced for single parents. Looking at couple households, the reaction is especially strong for men, who seem to react more strongly to the decrease in social assistance than the women in couple households. This result might be surprising, since the labour supply elasticity is higher for females than males (see Figure A.6). However, it is worth remembering that the reform affects a specific subgroup of the population (i.e. low-income households), that usually have higher elasticities (see Bargain et al. (2014)). Looking at the utility function of couple households (see TableA.14 in the Appendix), we observe a higher utility for female leisure than male leisure, especially in the presence of children. This could be explained by social norms regarding gender roles[12], in fact the utility for female leisure is higher in the presence of children between 0 and 2 years old, and decreases with the age of the children. Additionally, at couple level, the utility might be higher if males increase the number of hours at work, because it would probably correspond to a higher expected wage.

The labour supply reactions of migrants are more complex to understand, given that

[12]See e.g. Ichino et al. (2019)

Table 10: Labour supply reactions by household type - native sample

	change in hours		change in participation			
	male	female	male	female	male	female
Couple no children	0.15%	0.12%	729	459	0.14%	0.09%
Couple with children	0.28%	0.11%	1126	184	0.24%	0.05%
Single with children	-0.21%	-1.32%	-8	-413	-0.20%	-0.83%
Single no children	0.00%	0.00%	0	0	0.00%	0.00%
Total			1847	230		

Table 11: Labour supply reactions by household type - migrant sample

	change in hours		change in participation			
	male	female	male	female	male	female
Couple no children	0.29%	0.28%	356	239	0.29%	0.19%
Couple with children	0.75%	0.52%	985	265	0.61%	0.21%
Singles	0.45%	1.20%	208	413	0.43%	1.10%
Total			1549	917		

they are not only influenced by changes in social assistance due to household type, but also due to the reductions in social benefits for migrants with low language skills. Therefore, their reactions could potentially differ from those of natives. Table 11 highlights the results for the migrant population, assuming that some migrants receive social assistance cuts due to their low language skills. We can see that in relative terms, the positive impact on hours worked as well as on the participation is stronger for migrants than for natives. The relative effect is especially strong for singles and couples with children, indicating that the social assistance cuts are more decisive for the labour market decisions of those household types.

Additionally, Table 12 shows that the participation effect of the reform is mainly driven by migrant households. Even though they are the smaller part of social assistance recipients compared to natives, the participation increases more strongly than for natives, even in absolute terms. Migrants increase their labour supply by 2465, while only 2078 native households will start participating in the labour market due to the reform. The results are mainly driven by males, who seem to be more strongly affected by the reform. This is also driven by the fact that single parents will decrease their labour market participation.

Table 12: Participation effect of the reform

	male	female	total
natives	1847	230	2078
migrants	1549	917	2465
total	3394	1129	4523

6. Conclusion

Austria's social assistance benefits reform was based on two political goals. First, the abolishment of potential inactivity traps for families with (many) children. In the pre-reform system, such families had been eligible for social assistance benefits that frequently exceeded the potential income offered in the labour market. Second, the centre-right government wanted to reduce the benefits available to migrants with poor language skills. This was meant to increase migrants' incentives to learn German,(the native language in Austria), or English. Knowledge of one of these languages was seen as a necessity for successfully integrating migrants into successful labour market integration. The political merits of both of these aspects of the reform were heavily debated. Eventually, however, the entire reform was judged to be unconstitutional by the Austrian Constitutional Court. Using the data from the Programme for the International Assessment of Adult Competencies (PIAAC), we are able to determine a key variable for the proper analysis of this reform: the number of migrants with low literacy skills. We show that around 25 percent of migrants in the PIAAC sample appear not to possess the B1 level of language skills that was required for receiving the full amount of social assistance benefits under the Neue Sozialhilfe. This proportion is even higher among migrants not participating in the labour market (unemployed or out of the labour force).

Our in-depth analysis of the Neue Sozialhilfe reform not only sheds light on whether the reform would meet its stated goals, but can also help inform potential future reforms of Austria's social assistance scheme. Currently, the cost of social assistance benefits in Austria is around 900 million Euros, a small part of total social expenditures. Our model suggests that the Neue Sozialhilfe reform would reduce those costs by between 102 and 128 million Euros, depending on the number of migrants with low literacy skills. Not surprisingly, the policy would also increase inequality and poverty, especially for households with three or more children. On the other hand, poverty for single parents would decrease because the reform included a special bonus payment for them. Using a discrete choice labour supply model, we analysed labour supply elasticities in response to changes in social assistance by household type and show that elasticities are especially high for single people, compared with elasticities for households comprised of couples. However, the impact of the reform on singles is very low and driven exclusively by its impact on migrants.

According to our estimates, the Austrian social assistance reform would lead to a small increase in labour market participation. Even though women exhibit higher labour supply elasticities, the overall effects of the reform would be especially strong for men and migrants. This result is driven by the fact that the reform involves comparatively higher reductions in social assistance benefits for migrants with low language skills and for households with children. According to our estimates, for the latter group the household utility is higher if men rather than women increase their labour supply in response to the reform.

As a takeaway for possible future reforms, our model suggests that the labour supply effect of the Neue Sozialhilfe reform is greatest for families with children. We argue that this outcome is driven by the big financial impact of the reform on the income of those households, because those kinds of households typically show lower labour supply

elasticities. Our analysis additionally highlights the importance of taking particular care when evaluating both benefit cuts and increases for single parents. Single households, and especially single parents, exhibit particularly high labour supply elasticities in response to changes in social assistance. Increasing their benefits might make such households better off when not working. This could potentially decrease their labour market participation, even if they have access to childcare. On the other hand, decreasing their benefits, without providing sufficient childcare facilities—lack of which is a common problem in Austria, especially outside of Vienna — would leave single parents financially worse off, especially if they have very low incomes and are unable to find jobs. As a takeaway for policy-making, linking bonus payments for single parents to the availability of public childcare services could be a potential option to both support single parents who do not have access to public child care, and avoid creating negative incentives for single parents to leave the labour market or to stay out of the labour market.

Additionally, our analysis shows that the largest group of social assistance recipients, namely native singles, without children, were not affected by the New Social Assistance reform at all. Since single people are the group that reacts most strongly to changes in social assistance benefits, a policy that intends to increase labour supply incentives should probably not overlook this group. Additionally, the impact of the unequal treatment of migrants with low language skills has an effect on the labour supply side, but this group typically has less chance of finding work in the labour market (demand-side bias). Therefore, the reform's differential treatment of natives and migrants might counteract the idea of closing a potential inactivity trap. Furthermore, these cuts in social assistance risk leaving people with insufficient income, especially if they are unable to find a job on the labour market.

References

L. Ayala, M. Paniagua, The impact of tax benefits on female labor supply and income distribution in spain. Review of Economics of the Household **17**(3), 1025–1048 (2019)

O. Bargain, K. Doorley, Caught in the trap? welfare's disincentive and the labor supply of single men. Journal of Public Economics **95**(9-10), 1096–1110 (2011)

O. Bargain, K. Orsini, A. Peichl, Comparing labor supply elasticities in Europe and the United States new results. Journal of Human Resources **49**(3), 723–838 (2014)

R. Blundell, A. Duncan, J. McCrae, C. Meghir, The labour market impact of the working families' tax credit. Fiscal studies **21**(1), 75–104 (2000)

M. Brewer, A. Duncan, A. Shephard, M.J. Suarez, Did working families' tax credit work? The impact of in-work support on labour supply in Great Britain. Labour economics **13**(6), 699–720 (2006)

M. Christl, S. De Poli, J. Varga, Reducing the income tax burden for households with children: An assessment of the child tax credit reform in austria. JRC Working Papers on Taxation and Structural Reforms (2019)

M. Clauss, R. Schnabel, Distributional and behavioural effects of the german labour market reform. ZEW-Centre for European Economic Research Discussion Paper (2008)

L. Flood, J. Hansen, R. Wahlberg, Household labor supply and welfare participation in sweden. Journal of Human Resources **39**(4), 1008–1032 (2004)

W. Franz, N. Guertzgen, S. Schubert, M. Clauss, Assessing the employment effects of the german welfare reform–an integrated cge-microsimulation approach. Applied Economics **44**(19), 2403–2421 (2012)

M. Fuchs, T. Premrov, *EUROMOD country report: Austria, 2016–2019* (University of Essex, Institute for Social and Economic Research (ISER), 2019)

M. Fuchs, K. Hollan, K. Gasior, T. Premrov, A. Scoppetta, et al., Falling through the social safety net? Analysing non-take-up of minimum income benefit and monetary social assistance in Austria, Technical report, EUROMOD at the Institute for Social and Economic Research, 2019

T. Hufkens, T. Goedemé, K. Gasior, C. Leventi, K. Manios, O. Rastrigina, P. Recchia, H. Sutherland, N. Van Mechelen, G. Verbist, The Hypothetical Household Tool (HHoT) in EUROMOD: a new instrument for comparative research on tax-benefit policies in Europe, Technical report, JRC Working Papers on Taxation and Structural Reforms, 2019

A. Ichino, M. Olsson, B. Petrongolo, P. Skogman Thoursie, Economic incentives, home production and gender identity norms (2019)

J.M. Labeaga, X. Oliver, A. Spadaro, Discrete choice models of labour supply, behavioural microsimulation and the spanish tax reforms. The Journal of Economic Inequality **6**(3), 247–273 (2008)

G. Laroque, B. Salanié, Labour market institutions and employment in france. Journal of Applied Econometrics **17**(1), 25–48 (2002)

T. Lemieux, K. Milligan, Incentive effects of social assistance: A regression discontinuity approach. Journal of Econometrics **142**(2), 807–828 (2008)

M. Mastrogiacomo, N.M. Bosch, M.D. Gielen, E.L. Jongen, Heterogeneity in labour supply responses: Evidence from a major tax reform. Oxford Bulletin of Economics and Statistics **79**(5), 769–796 (2017)

D. McFadden, et al., Conditional logit analysis of qualitative choice behavior (1973)

R. Moffitt, Welfare programs and labor supply, Technical report, National Bureau of Economic Research, 2002

S. Müllbacher, W. Nagl, Labour supply in Austria: an assessment of recent developments and the effects of a tax reform. Empirica **44**(3), 465–486 (2017)

A. Peichl, S. Siegloch, Linking labour demand and labour supply on the micro level for germany. Labour Economics **19**(1), 129–138 (2013)

V. Steiner, K. Wrohlich, Work incentives and labor supply effects of the 'mini-jobs reform'in germany. Empirica **32**(1), 91–116 (2005)

H. Sutherland, Model 10: EUROMOD—The Tax-Benefit Microsimulation Model for the European Union, in *Modelling Our Future: population ageing, health and aged care* (Emerald Group Publishing Limited, ???, 2007), pp. 483–488

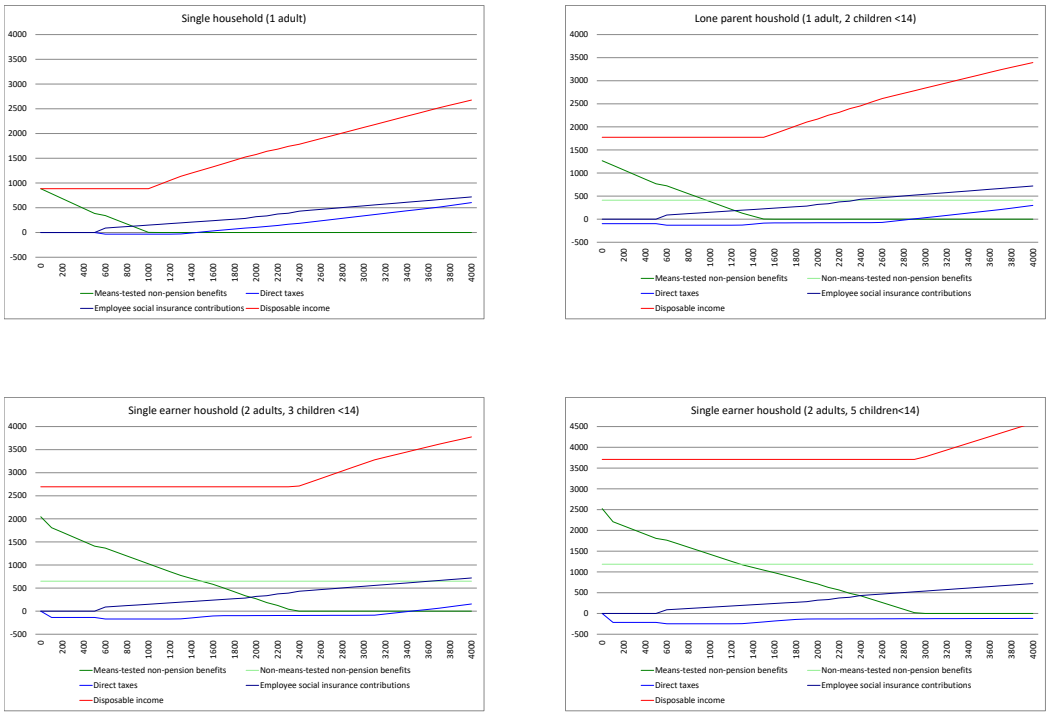
H. Sutherland, F. Figari, EUROMOD: the European Union tax-benefit microsimulation model. International Journal of Microsimulation **6**(1), 4–26 (2013)

Acknowledgements

The authors are grateful to Salvador Barrios as well as the the participants at the Annual Conference of the Austrian Economic Association (NOeG) for helpful suggestions and comments.

Appendix A. Additional Graphs and Tables

Figure A.5: Hypothetical households receiving social assistance by income level



Note: Calculations based on EUROMOD HHoT, see Hufkens et al. (2019).

Figure A.6: Labour supply elasticities (wage)

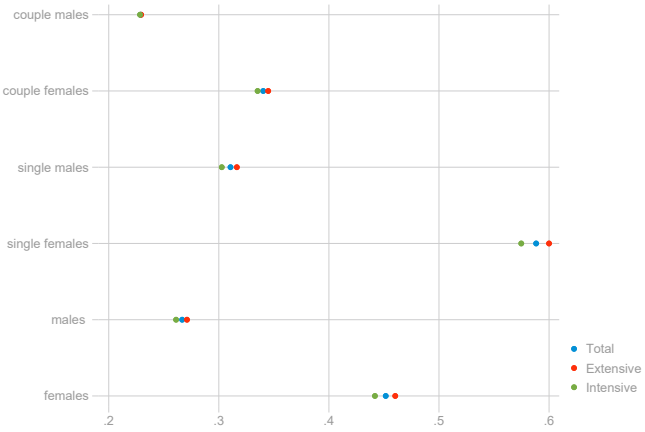


Table A.13: Wage equations - male and female

	Males	Female
	(1)	(2)
ln_hourly_wage		
age	.07571***	.04095***
	9.024	3.46
age squared	-.07225***	-.02753
	-6.666	-1.795
secondary education	.2487***	.1414*
	4.588	2.405
tertiary education	.5176***	.3939***
	9.065	6.409
married	-.008694	.02454
	-.2675	.6923
Constant	3.18***	3.612***
	20.53	16.14
selection		
children 0-2	-.1261	-.5462*
	-.6793	-2.288
children 3-6	-.04465	-.2044
	-.3091	-1.063
children 7-12	-.06113	-.1115
	-.5492	-.7803
children 13-17	-.09429	-.3651**
	-.8685	-2.994
children above 17	.08123	-.08778
	.3743	-.5131
age youngest child	-.01307	-.01047
	-1.078	-.7316
age	.01005	.07881
	.2471	1.923
age squared	.003318	-.08584
	.06092	-1.542
secondary education	.5555***	.5588***
	3.501	3.891
tertiary education	.6337**	.6936***
	3.201	4.166
older than 70 in HH	-.1209	.01626
	-.5942	.08729
married	.4009**	.1968
	3.188	1.708
other hh income	-.01662	.01902
	-1.011	1.506
wealth	.004556***	.001732
	3.448	1.582
Constant	.4587	-.6585
	.6231	-.8334
athrho	-1.145***	-1.153***
	-9.2	-10.68
lnsigma	-.7203***	-.5216***
	-33.98	-23.62
Observations	1412	1334

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table A.14: Estimates of the individual and household model

	Couples	Single male	Single female
choice			
$In-work\ male$	-4.556***	-3.038***	
	-6.376	-6.039	
$part-time\ male$	.1376	.01855	
	.3745	.06034	
$full-time\ male$	.7591	.9877*	
	1.529	2.331	
$over-time\ male$	.4095	.9626	
	.7031	1.894	
$in-work\ female$	1.583***		-.6677*
	4.687		-2.365
$part-time\ female$	.05689		.2266
	.4114		1.19
$full-time\ female$	.4319		.9513***
	1.918		3.455
$over-time\ female$	.2334		.5888
	.6363		1.499
$leisure\ male$	.3377**	.3211***	
	2.965	4.493	
$leisure\ male^2$	-.004212***	-.003477***	
	-7.118	-6.668	
$leisure\ male * age$	-.001075	.001779	
	-.3492	.8166	
$leisure\ male * age^2$	.002214	-.0005769	
	.6245	-.2292	
$leisure\ male * children$	-.006227	-.008789	
	-.8035	-1.395	
$leisure\ male * children(0-2)$	-.00257	.001758	
	-.2124	.2308	
$leisure\ male * children(3-6)$	.0003432	.005192	
	.04762	.6031	
$leisure\ female$	.383***		.3696***
	3.923		6.053
$leisure\ female^2$	-.003646***		-.003098***
	-8.929		-8.192
$leisure\ female * age$	-.00252		.0009701
	-.9002		.439
$leisure\ female * age^2$	.00675*		.002554
	2.008		.9793
$leisure\ female * children$ f	.02541***		-.01162
	3.605		-1.881
$leisure\ female * children(0-2)$	.06247***		.01254
	5.634		.858
$leisure\ female * children(3-6)$	.03056***		.02729**
	4.737		2.97
$leisure\ female * leisure\ male$	.0004845		
	.7649		
$consumption$	-.001383	.004662	.01619***
	-.175	1.05	4.907
$consumption^2$	2.70e-06	8.04e-07	4.39e-07
	1.527	.5194	.4162
$consumption * hhsize$	-.0002463	-.0000336	-.002381***
	-.4488	-.09617	-5.405
$consumption * leisure\ male$	.0000678	3.33e-06	
	1.367	.07435	
$consumption * leisure\ female$	.0000196		9.06e-07
	.4773		.03235
Observations	63504	7546	7518

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$