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Do taxes and transfers reduce gender income inequality? Evidence from eight European welfare states

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ABSTRACT

We examine how taxes and transfers affect the incomes of men and women. Using micro-simulation and intra-household income splitting rules, we measure the differences in the level and composition of individual disposable income by gender in eight European countries covering various welfare regime types. We quantify the extent to which taxes and transfers can counter-balance the gender gap in earnings, as well as which policy instruments contribute most to reducing the gender income gap. We find that with the exception of old-age public pensions, all taxes and transfers significantly reduce gender income inequality but cannot compensate for high gender earnings gaps. Our findings suggest that gender income equality is more likely to be achieved by promoting the universal/dual breadwinner model, whereby women's labour force participation and wages are on a par with men. To achieve this, men will likely need to work less and care more.

1. ıntroduction

A large body of scholarly work has examined the links between the modern welfare state and gender inequality. Nelson (1990) highlighted how the welfare state differentiated between care/unpaid work and paid work when establishing social entitlements, benefit levels, and the political legitimacy of social rights, in practice dualizing provision for men and women. Lister (1994) coined the term 'defamilisation', the extent to which the welfare state lessens individuals' reliance on the family and promotes their economic autonomy. Two alternative strategies to 'defamilise' have been proposed (Fraser 1994; Sainsbury, 1999): the universal/dual breadwinner where women's labour force participation and wages are on a par with men and care work is externalized or partly shifted to men, and the caregiver parity model where women are financially supported by the state to provide care. Saraceno and Keck (2010) examined the opposite of defamilisation, 'familialism', which can be created either by the lack of state provision of services and financial support ('familialism by default') or by active state support of individuals with care responsibilities ('supported familialism'). In practice, welfare states may pursue a mix.

The studies above focused on institutional indicators which have the advantage of examining welfare state policies directly. However, they also have some limitations. First, the same policies may have different effects depending on context. For example, the effect of long parental leaves may depend on how well women are integrated into the labour force and on the gender division of unpaid work. Second, the same set of policies may affect women with different characteristics differently. For example, public support for privately provided day care via the tax system will be advantageous for high earners but of little help to low paid women. Finally,

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welfare states are not homogeneous and serve many purposes other than gender equity. As such, welfare policies cannot be expected to be entirely coherent with regard to 'defamilisation'. Some policies may support women's independence while others will hinder it. While scholars of the institutional approach generally recognize this, in practice they rely on a limited set of policy indicators for their empirical analyses. Subsequent findings may be dependent on the specific indicators one happens to choose and studies using different indicators may arrive at different conclusions (see Lohmann and Zagel (2016) for a review of defamilisation studies).

A different methodological approach – the one adopted in this paper – is to examine actual outcomes from a gender perspective and to assess the extent to which these outcomes can be attributed to various welfare state tax-transfer policies. While legally tax and benefit rules are no longer allowed to be discriminatory in relation to gender, in practice, they affect women and men differently as a result of gender differences in characteristics relevant to tax liabilities and benefit entitlements, especially earnings and care responsibilities. We examine gender inequality in earnings and disposable income across European countries with different welfare regimes and quantify the extent to which separate policy instruments (direct taxes and social transfers) reduce the gender gap in earnings. We use measures of disposable income before housing and childcare costs. Our approach and data do not allow us to account for the effects of in-kind services that are particularly important from a gender equity perspective (childcare and social care) in the same way that we do for direct transfers and taxes. We only have indirect evidence about the generosity of these services from the gender gap in earnings. Neither are we able to account for the gendered impacts of indirect taxation.

We make two methodological contributions. First, we propose a way of measuring the disposable income of individuals within couples/multi-person households. This allows us to include men and women living in couples in our analysis in a meaningful way. Second, we use the tax-benefit microsimulation model EUROMOD to improve on existing survey measures of income. This is especially true of income taxes and social insurance contributions which tend to be either missing from survey microdata or, as in our dataset, measured very imprecisely. We are also able to disaggregate benefits that are measured only at the household level in the original data and to attribute them to their actual recipients either at the individual level or at the level of a benefit unit (which typically is smaller than the household).

Our study contributes to the literature on gender income inequality by testing several hypotheses related to the gendered impacts of the welfare state policies. We do not find evidence in favour of a dualization of the welfare state along gender lines. With the exception of public pensions, all transfers reduce gender income gaps. However, the average impact of taxes and benefits is limited relative to earnings. Our findings suggest that achieving gender income equality requires primarily closing the gender gap in hours and wages through the provision of public services and reducing the unpaid work done by women at home, as suggested by the universal/dual breadwinner model. This implies that care work needs to be partly externalized and/or partly shifted to men, who in turn may need to work fewer hours and earn lower wages. The caregiver parity model, while theoretically appealing, has not been fully implemented anywhere in practice.

The rest of the paper proceeds as follows. We first review the literature on gender income inequality and welfare states and discuss a methodological issue that restricted the scope of previous studies, i.e. the issue of intra-household allocation of income. We then discuss our methodology and the data. Finally, we present and discuss our results before concluding.

2. Gender income inequality and the welfare state

Welfare state taxes and benefits have a range of functions, including vertical and horizontal redistribution. While gender equality may not be among the stated objectives of welfare state policies, it certainly is greatly influenced by them. There are at least three ways in which the welfare state can affect women's incomes relative to men's.

First, the key role of social transfers in closing the gender gap in poverty, especially for lone mothers and lone elderly women, was highlighted in multiple studies (Christopher et al., 2002; Bastos et al., 2009; Brady and Burroway 2012). Short term, generous benefits in the immediate aftermath of childbirth and child allowances were shown to significantly reduce female poverty (Misra et al., 2007). In contrast, benefits requiring a long, uninterrupted contribution history tend to disadvantage women. This is the case with the welfare state's most prominent transfer – old-age pensions. Bettio, Tinios et al. (2013) found the average gender pension gap in Europe was twice as high as the average gender gap in earnings. Higher wages result in higher direct taxes and social contributions for men, especially under progressive tax regimes (Jaumotte 2004). Consumption taxes can also directly affect the distribution of income between men and women due to gendered differences in consumption patterns (Grown and Valodia 2010).

Second, it is well documented that the arrival of children has dissimilar consequences for men and women's wages even when their human capital characteristics are similar. Mothers are more likely to experience career interruptions, reductions in their working hours and they are more likely to have low-paying jobs, as compared to non-mothers, and men (Sigle-Rushton and Waldfogel 2007). By providing affordable childcare and generous parental leave, the state can enable women to more easily combine paid work with motherhood.

Third, the welfare state is important for gender income inequality because it incentivizes certain types of behaviour. Social tax expenditures have been used extensively across Europe as part of activation reforms that seek to make work pay and to subsidize certain types of expenditures, for instance, childcare (Morel et al., 2018). High marginal effective tax rates, due to progressive joint taxation or means-testing, undermine women's incentives to undertake paid work, work more hours or at a higher wage rate (Sainsbury 1999; Jaumotte 2004; Figari et al., 2007; Thomas and O'Reilly 2016). Too short or too long paid parental leave may discourage maternal employment (Misra et al., 2007; Dotti Sani 2015). Consumption taxes on services such as childcare make it more attractive to produce these services at home rather than buying them on the market, especially for low-income households. This further decreases the (predominantly female) second-earner labour supply (Grown and Valodia 2010).

In this study, we focus on the first channel through which the welfare state affects welfare gender income inequality, i.e. the direct

impact of taxes and benefits on individual incomes. There are few studies addressing this question explicitly. Previous work has mostly relied on comparing men's and women's earnings, old-age pensions, time spent in unpaid work, or disposable incomes of single men and women, such as lone parents. Below we explain to the difficulties in identifying the impact of government policies on the disposable incomes of men and women.

3. Individual vs household level measures of income: the problem of intra-household allocation decisions

Unlike earnings or pensions which are measured at the individual level, disposable income is measured at the household level. The assumptions are that all household members pool all their incomes and share them equally. These assumptions are rooted in the unitary model of household behaviour which treats the household as if it were a single individual (Becker 1974). While suitable in certain contexts, they can lead to substantial bias in assessing income inequality between men and women (Ponthieux and Meurs 2015). First, although couples do pool their income (Bonke and Uldall-Poulsen 2007; Bonke 2015), the assumption of complete income pooling is unrealistic. Early on, studies of financial decision making and financial management within couples have pointed to a variety of arrangements, only a few of them egalitarian (Pahl 1983; Vogler and Pahl 1994). Moreover, work on trends in money management documents a shift towards individualized financial arrangements (Pahl, 2005; Kan and Laurie 2014). The analysis of a special EU-SILC module on intra-household sharing of resources suggests that at least 47% of adults in the EU are living in multi-adult households where at least part of income is not fully shared (Ponthieux 2013). Second, because poverty/incomes are measured at the household level, results are driven by the characteristics of single men and single women (with or without children) and their share in the population. Men and women living in couples have by definition the same incomes and as such cannot contribute to any gender disparity in income or poverty measures. Third, even if a household were to pool all its income resources and grant all adult members equal access, control over money entering the household is likely to be retained by the individual contributing it. Adults who contribute few or no economic resources are in a vulnerable position as withdrawal of financial support can leave them economically deprived, as attested by the large negative economic consequences that union dissolution can have for some women (Andreβ et al., 2006; Aassve et al., 2007).

To overcome these conceptual and methodological problems, we construct a measure of individual/personal income assuming '*minimum income pooling*' (details are provided in the Methodology section). We are aware that lack of income pooling within the household does not necessarily imply the same level of consumption inequality, as transfers between partners can take place without any explicit income pooling. Ideally, we would base our income splitting strategy on household level information about how income is shared (e.g see Ponthieux (2017) using the EU-SILC, 2010 ad-hoc module on intrahousehold distribution of income). Such information is absent in EUROMOD and the datasets we use for this analysis. Instead, we follow a number of studies that employed various modifications of the minimum income pooling assumption (Jenkins 1991; Sutherland 1997; Fritzell 1999; Figari et al., 2007; Davies and Joshi 2009; Meulders and O'Dorchai 2010). Generally, we assume individuals retain all income received in a personal capacity, including earnings and all individual level benefits. We believe the assumption of no or minimal pooling is justified in our case based on three considerations. First, a consistent finding of the empirical literature on intra-household allocation is that the woman's consumption/living standard in the household is strongly correlated with her share of earnings (Bennet 2013; Bonke 2015) or, more broadly, her share of income (Pahl 1983; Cantillon 2013; Himmelweit et al., 2013). Second, our assumption is consistent with non-unitary models of household decision making. In these models, decisions over the allocation of consumption are taken by negotiating partners whose bargaining power depends on the resources they command when the relationship breaks down (i.e. 'the threat point') (Lundberg and Pollak 1996; Himmelweit et al., 2013). Our approach can be thought of as mirroring the '*separate spheres bargaining*' model developed by Lundberg and Pollak (1996) where the threat point is determined by income received/controlled within the marriage. Because divorce can be a high-cost, traumatic event, the threat of withdrawing cooperation within the marriage/union is more plausible in the context of day-to-day bargaining. Third, by examining individual income, we capture not only gender inequality in consumption but also in other dimensions that are important to individual well-being such as status, personal autonomy and control over one's life (Pahl 2005). Our counterfactual income measure assuming minimum income pooling also contributes to a better understanding of how successful various tax-benefit systems are in terms of defamilisation, i.e. providing economic independence from the family.

4. Data and methodology

4.1. Country selection

Eight countries were chosen to maximize the institutional variety of European welfare regimes (Esping-Andersen 1990, 2009; Bonoli 1997; Arts and Gellissen 2002; Hacker 2009). We relied on the feminist literature on welfare regimes (Orloff 1993; Sainsbury 1999; Pascall and Lewis 2004; Saraceno and Keck 2010) and on a meta-analysis of different studies providing quantitative measures of defamilisation by Lohmann and Zagel (2016).

Finland is a representative of the socio-democratic welfare state, considered to approximate most closely the '*dual breadwinner*' model. It has high female employment rate and lower than average part-time female employment rate. It typically ranks top on defamilisation indices due to high formal childcare coverage. Partly due to their pronatalist goals, the corporatist regimes of France and Belgium have an extensive system of family related transfers and childcare provision/subsidies, and consequently, also score high on defamilisation measures. The female employment rate and part-time employment rate are around average in the EU. The corporatist welfare regimes of Germany and Spain most closely approximate the traditional '*male breadwinner*' model where public childcare

provision is limited and women are expected to be primarily carers for their family. Germany has a higher female employment rate with 47 percent of women employed part-time, while Spain has low female employment rate overall. Both countries typically score low on defamilisation measures, yet Germany leans towards 'supported familialism' with significantly higher generosity and coverage of cash transfers compared to Spain which practices 'familialism by default'. The UK is a representative of the liberal regime where public support for families is largely means-tested and while female labour market participation is high, women tend to have part-time, lower-paid jobs. The UK tends to have the lowest scores on defamilisation measures, together with Czechia and Romania. These three countries have the lowest formal childcare coverage rates for children under 3 in the sample. Czechia leans towards the corporatist and 'supported familialism' model with average female employment rate, whereas Romania has reduced public support for families with the exception of generous childbirth related transfers and has low female employment rate similar to Spain. The characteristics of the selected countries in terms of social spending on families and related outcomes are presented in Table A1 of the Supplementary Material.

4.2. Income definition and measurement

We construct a measure of individual disposable income in a series of steps (a detailed description is given in Table A2 in the Supplementary Material). We restrict our sample to individuals aged 18 and older. First, we assume that all earnings and benefits where entitlement is at the individual level (such as pensions, unemployment benefits or parental leave benefits) are retained by the individual receiving them. We lack individual measures of some types of income in our data. To attribute these incomes to individuals, we apply sharing assumptions, aiming to come as close to actual sharing practices as possible. There are both theoretical and empirical reasons to apply different splitting rules to different types of non-individualized income, such as asset income, taxes and benefits.

In line with the life-cycle hypothesis (Modigliani 1966) we assume that wealth requires long periods to accumulate and increases over the lifetime up to retirement. Therefore we split investment and property income between the members of the oldest couple (or attribute it to the oldest person) in the household. Non-individual income from other sources (e.g. private transfers) is split equally among all household members. These are strong assumptions, as previous studies found a sizable gender gap in wealth holdings in European countries (Sierminska and Girshina 2017). However, for the vast majority of households, these types of income represent only a small fraction of overall income. As a result, our results are unaffected by asset income splitting rules.

One of the main advantages of using EUROMOD is that we are able to accurately simulate taxes and social insurance contributions in all countries at the taxpayer unit level. This is usually the individual. In countries with joint taxation, we allocate taxes to individuals in proportion to their taxable income. For instance, if the woman's earnings constitute 30% of the joint taxable income, her share of the joint tax will be equal to 30%, while 70% is allocated to her partner. Our choice is motivated by the fact taxes are primarily related to 'ability to pay', so higher taxes (in absolute terms) should be paid by the partner with the higher income. Essentially this choice comes down to applying the same average tax rate to both partners and in this sense treats both partners 'equally'. Note that joint taxation may affect the earnings split between partners in couples by creating high marginal tax rates for the second earner, but this is out of scope of the current study where we only look at the direct effects of taxes on gender income inequality.

Finally, some benefits such as social assistance, household benefits and child related transfers are initially recorded in surveys only at the household level. Using EUROMOD, we are able to identify the benefit entitlement unit, which usually is smaller than the household. We then allocate the benefit among the adults of the entitled unit, assuming each adult receives an equal share. From a theoretical/normative point of view, common benefits are meant to benefit all members of the benefit unit, and presumably to benefit them equally. From a practical perspective, unlike in the case of joint taxes, where a 'natural' answer exists, i.e. taxable income, there is no clear indicator of 'need' that would allow us to split the benefits proportionally. However, we test the sensitivity of our results by building two additional scenarios (see Table A2, Supplementary material).

In the first sensitivity scenario, we assume the primary earner takes advantage of his/her bargaining power to retain all common benefits (e.g. family benefits, social assistance benefits, etc.). The primary earner is defined as the person with the highest earnings within the benefit unit (or the highest market/replacement income if earnings alone cannot determine a unique primary earner). Note that there is no explicit gender dimension in the definition of the primary earner. In the second sensitivity scenario, we assume that all common benefits are assigned to the secondary earner. The secondary earner is defined as the partner of the primary earner; or as the person with the second highest earnings or market/replacement income if the primary earner has no partner.

To account for economies of scale in consumption and be able to compare individuals living in households with different sizes and/or compositions, we adapt the 'modified OECD' scale for use with individual incomes. The 'modified OECD' scale assigns a weight of 1 to the first adult, 0.5 to subsequent adults, and 0.3 to children. We modify this scale in two steps. First, we add the weights of adults living in the same household and divide them by the number of adults present. Second, we take into account the cost of having children by attributing the weight of children to their parents. When both parents are present, we assume that the costs of their children are split equally. Children are defined as individuals below 18 years, unless they live in single-person households. Note that we do not use equivalisation as a means of addressing intra-household allocation of resources. We do not have separate data on consumption in our datasets. As such, we are not able to model intra-household differences in consumption. In this context, equivalisation is used solely to account for economies of scale and to enable comparisons between individuals living in households of different size.

4.3. Data and tools

We use EUROMOD (Version H1.0), the tax-benefit microsimulation model for the EU-28 (see: https://www.euromod.ac.uk/). It simulates all components of disposable income, including cash benefits, social insurance contributions and personal direct taxes.

Income elements that cannot be (fully) simulated are market incomes and benefits which depend on the previous contribution history (e.g. pensions) or on some unobserved characteristics (e.g. disability benefits). These are taken from the microdata. The input data for EUROMOD are derived from the European Union Statistics on Income and Living Conditions (EU-SILC) dataset. As part of deriving the input dataset, EUROMOD imputes all missing values in EU-SILC, including non-simulated income information. This is necessary for the simulations to run. Detailed information on EUROMOD and its applications can be found in Figari and Sutherland (2013). Our analysis refers to 2014 (the most recent year for which the data was available at the time of writing).

Using EUROMOD has a number of advantages over using the original EU-SILC data. First, it allows us to generate accurate and individualized measures of both direct income taxes and social insurance contributions which are lacking in EU-SILC. Second, while all family benefits are generally measured at the household level in EU-SILC, EUROMOD enables us to simulate individual benefits such as, for instance, parental leave benefits, and allocate them to their actual recipients. Third, EUROMOD allows us to accurately determine which individuals belong to a unit entitled to receive non-individual transfers such as housing benefits or social assistance. In turn, this allows us to allocate incomes only among entitled individuals rather than among all adults present in the household. This may be especially important in the case of child related transfers if the parents are living together with other adults. Fourth, using EUROMOD we obtain potentially more accurate measures of some types of income transfers that are known to be poorly captured by surveys (such as, for example, means-tested benefits).

4.4. Measuring the impact of taxes and social transfers

We first document the gender inequality in incomes by showing ratios of average female to average male incomes. Our indicator is a direct counterpart to measures used in the literature on the gender wage gap and the gender poverty gap making our results easy to compare with these studies. A higher gender gap is associated with a lower income ratio and vice versa. We obtain a first impression of the impact of transfers and taxes linked to the welfare state by comparing earnings ratios to disposable income ratios. We then calculate the proportion of income that comes from market incomes, benefits (including public pensions) and taxes (including social insurance contributions), for men and women separately. We also decompose cash transfers by function (disability and sickness, old-age, survivor, family, social and housing assistance, unemployment).

These calculations enable us to assess if the tax-benefit system overall and specific types of policies are more beneficial for women or for men. A social transfer is considered equalizing across the genders if its share relative to market income is higher for women than for men. Vice versa, a tax is considered equalizing if its share relative to market income is lower for women than for men.

We hypothesize that progressive taxes and means-tested benefits are more likely to benefit women due to their on average lower earnings. In contrast, benefits strongly linked to previous earnings and to contribution histories are likely to disadvantage them. More generally, policy instruments that benefit poorer sections of the population are also likely to benefit women more than men and thus to reduce gender income inequality.

It should be noted that static microsimulation is only suitable for analysing the first-round distributional impacts of direct taxes and cash transfers. It is not sufficient for establishing a causal effect of policies on income inequality. Although we recognize the availability of social care services, childcare in particular, is crucial to enable women to combine paid employment with their family and care responsibilities, we are not able to account for the effects of childcare benefits and costs in the same way that we do for direct transfers and taxes.

European welfare states traditionally had different programs in place for the working age and the elderly. We thus study these two groups separately. Although the definitions of the working age and the actual retirement age differs across countries, for comparability reasons we use the same cut-offs to define working age individuals (18–64 years) and the elderly (65+ years). Contributory public pensions, the main source of income for the elderly, can be treated either as a direct transfer or as deferred income (see, for instance, Mahler and Jesuit (2010)). We follow the conventional approach that treats them as social transfers, while treating private pensions as market income. This assumption might have implications for the assessment of public pensions in countries where private pensions are more common (such as the UK) as they are more likely to be skewed towards men.

We have also examined households with particular demographic characteristics: single persons, lone parents, one earner couples with and without children and two earner couples with and without children. In this paper, we focus on two earner couples of working age with and without children, firstly, because two-earner couples are the most prevalent type of households in all countries under study, and secondly, because comparing dual earner couples with and without children is illustrative of how well the welfare state mitigates the income penalty associated with motherhood. Other results are available from the authors upon request. The results presented below must be considered with the caveat that the demographic characteristics we use are fairly crude and our simulations are essentially static and only show the direct effects of taxes and social transfers on the distribution of income between men and women.

5. Results

5.1. The gender gap in incomes

Fig. 1 shows the gender gap in earnings and disposable incomes among working age individuals and those aged 65 and over. Among the working age, the largest earnings gaps are found in Czechia, Germany and Romania (ratios of less than 60%), and the smallest one in Finland (77%). The disposable income gap is largest in Germany (ratio of 60%) and the smallest in Finland (ratio of 84%). Gender gaps in earnings are higher in all eight countries, suggesting that taxes and transfers have an equalizing effect. The difference they

make however varies from 13 pp in Czechia to less than 2pp in Spain.

Among the elderly, the highest income gaps are found in Germany and Spain (ratios of 45% and 49% respectively) and the lowest in Czechia (ratio of 80%) and Finland (73%). Note also that the gender income gap in disposable incomes is usually higher among the elderly than the working age. This is especially so in Germany and Finland.

Gender income gaps for two earner couples are shown in Fig. 2. When couples have no dependent children, taxes and benefits matter little for the income gap with the exception of France, Finland and Belgium where they have an equalizing effect (the income ratios increase by 6–7 pp). Taxes and benefits become more important when couples have children. They reduce the gender income gap by between 4 pp (Spain) and 9 pp (Finland).

Consistent with previous studies, we find that the arrival of children increases gender income inequality in most countries. Earnings gaps increase significantly in some countries and while taxes and transfers have an important mitigating role, they do not make up for the fall in the earnings ratios. As a consequence, couples with children experience higher gender income inequality compared to couples without children. In Germany, gender income gaps are higher among two earner couples with children by 17 pp and this is largely due to an increase in the earnings gap (22 pp). Other countries where having children increases the gender income gap among two earner couples considerably are Czechia, the UK and Finland. In contrast, increases are much smaller (between 0–4 pp) in Romania, Spain, France and Belgium.

The choice of scenario (see Fig A4-A7 in the Supplementary Material) makes little difference to the calculation of gender income ratios, except in two earner households with children. Income gaps are largest in the scenario where common benefit income is attributed to the primary earner (Sensitivity 1) and smallest in the scenario where common benefit income is attributed to the secondary earner (Sensitivity 2), while our main individualized income scenario lies in-between. However, differences are small. For completeness, we also show disposable income ratios using conventional assumptions of complete pooling and equal sharing used in the income inequality literature. As expected, gender gaps are much smaller in this case. Because it assumes that men and women living in the same household have the same incomes, this approach significantly underestimates the gender income gap.

5.2. The decomposition of incomes received by men and women by source

Next, we examine the levels and composition of men and women's incomes. To facilitate cross-national comparisons, we divide incomes by the national median disposable income which we use as an indicator of the national living standard. Our results show the level of incomes of men and women (from different sources) relative to the national median. To avoid any possible bias stemming from our methodological choices, we use the median equivalised disposable income calculated in the 'standard' way, i.e. pooling all incomes within a household, equivalising it (using the 'modified OECD' scale) and attributing it to all members of the household. We focus on the extent to which taxes and transfers disproportionately benefit one gender and on their size.

Fig. 3 shows the level and composition of incomes of men and women. We distinguish between market incomes (earnings plus private pensions and capital income), benefits (including public pensions) and taxes (including social insurance contributions). In absolute terms, men have significantly higher market incomes and pay more in taxes than women in all countries. The benefit income gap is smaller and in some countries women receive more than men. For the working age, benefits are more equalizing than taxes in Czechia, Romania and the UK. In their absence, the gender income ratio would increase by between 8 and 11 pp. In the remaining

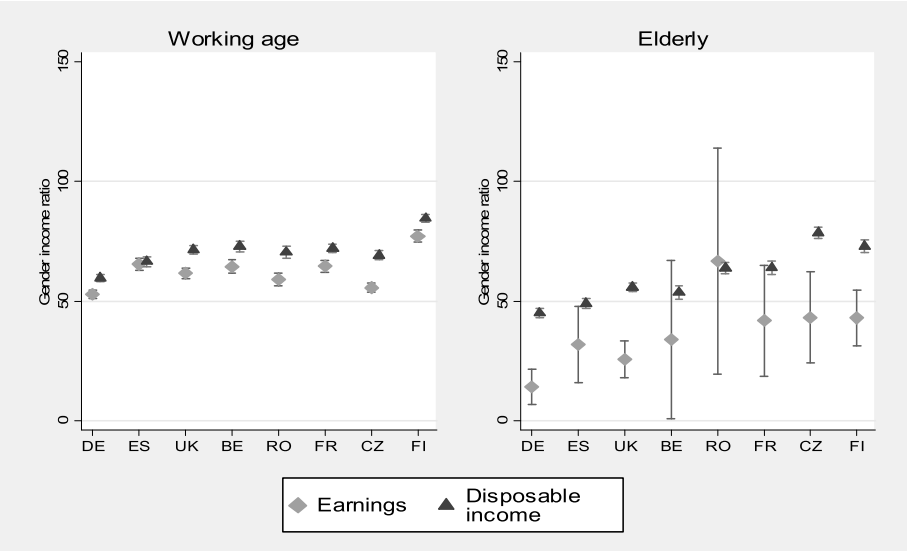

Fig. 1. Earnings and disposable income gender ratios for the working age (18–64) and the elderly (65+). Note: Countries are ordered in ascending order of their gender income ratios for the total population. The vertical bars show 95% confidence intervals. The underlying data can be found in Table A3 of the Supplementary Material. The same information grouped by country is presented in Figure A1 of the Supplementary Material.

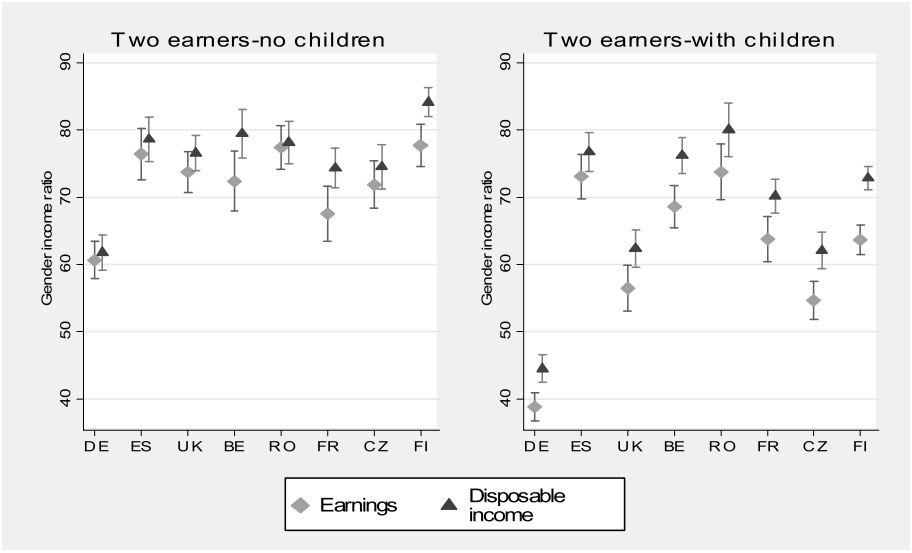

Fig. 2. Earnings and disposable income gender ratios among two earner couples of working age with and without children Note: Countries are ordered in ascending order of their gender income ratios for the total population. The vertical bars show 95% confidence intervals. The underlying data can be found in Table A3 of the Supplementary Material. The same information grouped by country is presented in Figure A1 of the Supplementary Material.

countries, the impact of both benefits and taxes is less than 5 pp.

Fig. 3 shows that with the exception of the UK and France, market incomes are a relatively minor income source for the elderly. In all countries, elderly men receive more benefit income compared to elderly women. Disparities are particularly large in Germany, Spain, Belgium and France, all conservative welfare states with strong links between previous earnings and benefits. In contrast, benefit income is much more equally distributed across the two genders in Czechia, the UK and Finland. In these countries, public pension systems have a sizeable flat-rate component that tends to equalize the distribution of pension incomes. Taxes have a clear equalizing role only in Finland where they reduce the income gap by around 6 pp. In the other countries, taxes are more or less proportional and so affect the income gap very little.

The composition and level of incomes of men and women in two earner couples are shown in Fig. 4. Two earner couples without children receive little in benefit incomes and so unsurprisingly benefits have virtually no impact on the gender income gap. Taxes are

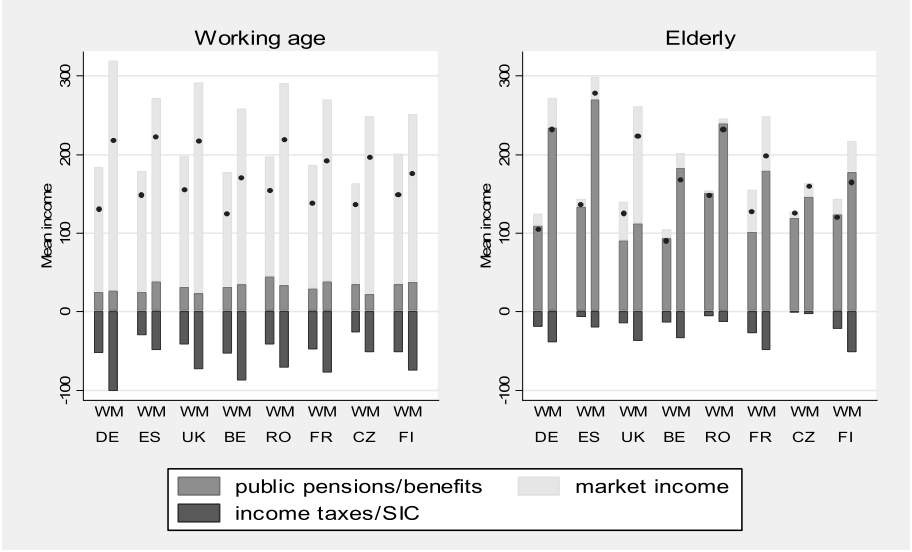

Fig. 3. Decomposition of average disposable incomes received by men and women by source and age (incomes are shown as percentage of median equivalised disposable income). Note: W = women, M = men. Countries are ordered in ascending order of their gender income ratios for the total population. The underlying data can be found in Table A4 of the Supplementary Material. The same information grouped by country is presented in Figure A2 of the Supplementary Material.

redistributive but their effect is rather limited. They reduce the income gap most (by around 5 pp) in France, Finland and Belgium. Taxes are more redistributive among two earner couples with children. They reduce the income gap by around 10 pp in Finland and by 5–8 pp in the other countries. Benefit income is strongly equalizing across gender lines in two earner couples with children. With the exception of France, women receive more benefit income than men in absolute terms. Even in France, benefits are much more equally distributed across genders than other types of income. However, due to their small size, the overall redistributive effect of benefits is rather small. It is strongest in Czechia and the UK where the gender gap is reduced by approximately 5–6 pp.

5.3. *The decomposition of social benefits received by men and women by benefit function*

We now look more closely at cash transfers and decompose them by benefit function. Fig. 5 shows average benefit amounts for the working age population and the elderly as a percentage of the national median equivalised disposable income. Among working age individuals, total benefit income received by men is significantly higher than that received by women in all but three countries, i.e. Czechia, Romania and the UK.

Which type of benefit constitutes the most important income source varies by country but it is clear that public pensions play a prominent role, especially in Romania, France and Czechia. The extent to which public pensions equalize the incomes of working age men and women varies dramatically by country. In Czechia and Romania, the pension income of working age women is particularly high due to higher male mortality and low pensionable age for women in the past. In contrast, in Spain, public pension income among working age individuals is strongly skewed towards men.

A mixed picture is found in the case of unemployment benefits. While men generally receive higher amounts of unemployment benefits in absolute terms, they receive less than their share of market incomes except in the UK, Belgium, Spain and France. Survivor benefits are important in Germany, Spain and Belgium and they overwhelmingly benefit women. Similarly, women receive on average higher amounts of family benefits while receiving proportionately more from disability/sickness and social/housing assistance benefits. All these benefits redistribute incomes across genders.

Unsurprisingly, public old-age pensions are the predominant benefit income received by the elderly in all countries. Public pension income is generally skewed towards men. The disparities are particularly large in Belgium, Spain and Germany where female public pension income is only 30–40 percent of male pension income. The most egalitarian distribution is found in the UK and in Czechia where women's public pensions are on average a quarter lower than men's. The UK result is partly a consequence of the role played by private pension provision. Private pension income is strongly skewed towards men but in this analysis, it is treated as part of market income. Survivor benefits are important in Spain, Belgium, Romania and Germany where they are received mostly by women.

As shown in Fig. 6, the benefit income of two earner households without children is mainly made up of unemployment, disability/sickness and old-age benefits. Unemployment and disability/sickness benefits are generally more equally distributed than earnings and so they reduce gender income inequality. However, the amounts involved are often very small and so the effect is very limited. The distribution of public pension income across genders varies enormously among countries, but effects are small due to their small weight in the incomes of this group.

Benefit income is slightly larger when two earner couples have children. Family benefits are the most important type of benefit

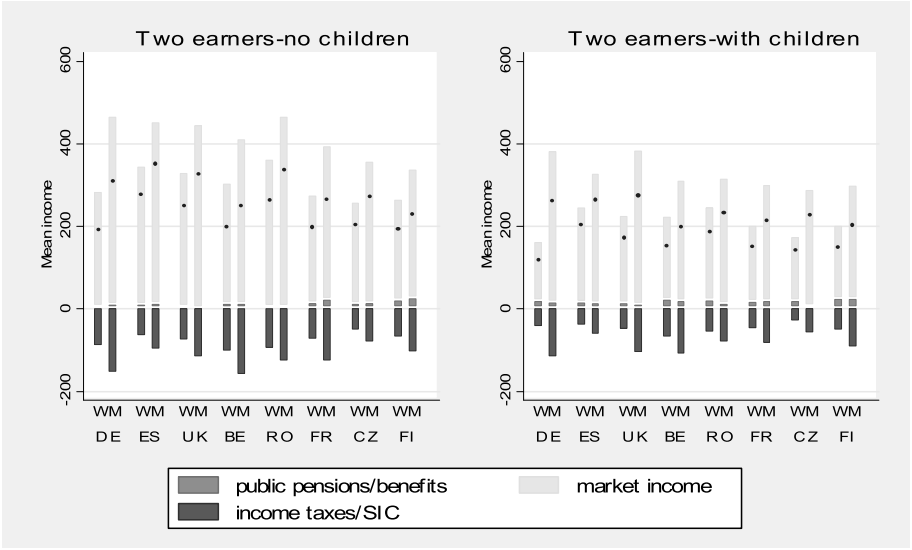

Fig. 4. Decomposition of average disposable incomes received by men and women in two earner couples of working age by source and having children (incomes are shown as percentage of median equivalised disposable income) Note: W = women, M = men. Countries are ordered in ascending order of their gender income ratios for the total population. The underlying data can be found in Table A4 of the Supplementary Material. The same information grouped by country is presented in Figure A2 of the Supplementary Material.

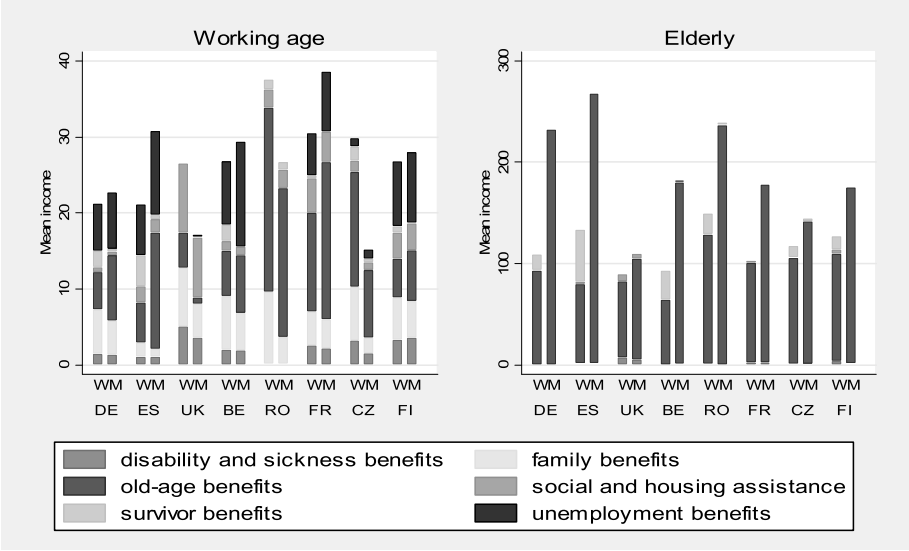

Fig. 5. Decomposition of average social benefits received by men and women by function and age (incomes are shown as percentage of median equivalised disposable income). Note: W = women, M = men. Countries are ordered in ascending order of their gender income ratios for the total population. The underlying can be found in Table A4 of the Supplementary Material. The same information grouped by country is presented in Figure A3 of the Supplementary Material.

received by these families, together with unemployment benefit in some countries. Family benefits are strongly equalizing in all countries and reduce the gender income gap significantly especially in Belgium, Czechia, Germany and Romania.

6. Discussion

Our analysis points to the tax-benefit systems reducing gender income inequality in all countries. The size of the effect varies significantly both across countries and across groups with different demographic characteristics. There is no evidence to suggest that the initial gender gap in earnings is associated with higher redistribution though taxes and transfers. The correlation coefficient between the gender earnings gap and the inequality reduction generated by taxes and benefits is −0.3 for the working age and close to

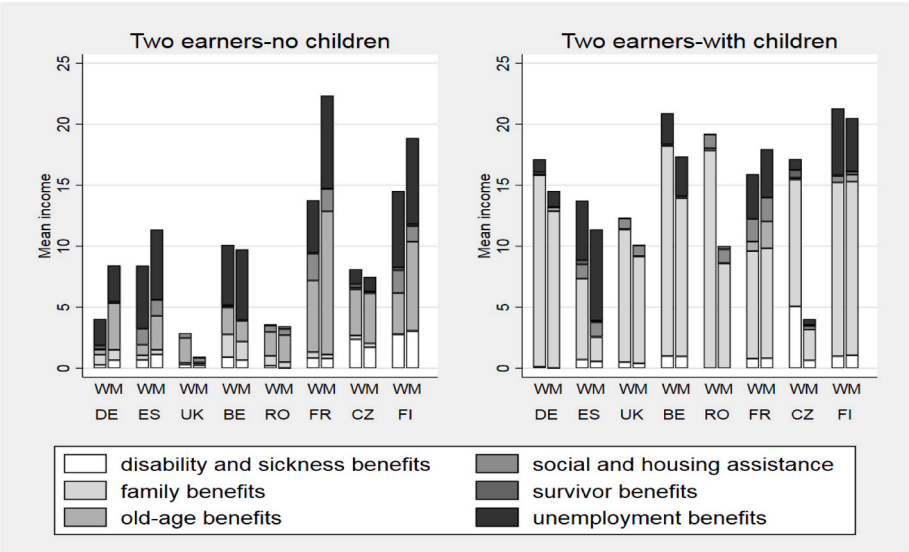

Fig. 6. Decomposition of average social benefits received by men and women in two earner couples of working age by function and having children (incomes are shown as percentage of median equivalised disposable income). Note: W = women, M = men. Countries are ordered in ascending order of their gender income ratios for the total population. The underlying data can be found in Table A4 of the Supplementary Material. The same information grouped by country is presented in Figure A3 of the Supplementary Material.

zero for two earner couples. These results are in line with the general redistribution literature that does not find an unambiguous relationship between the level of market income inequality and redistribution (see, for instance, Guillaud et al. (2019)).

Both benefits and taxes have a limited impact on the gender income inequality among the working age, with the exception of Czechia, Romania and the UK where benefits reduce the gender income gap by between 7 and 11 pp. In all these countries women receive higher income from social transfers than men do, mostly due to the design of public pension systems. The results for the UK are also driven by the importance of means-tested benefits, which in our simulations are allocated equally between women and men. In addition, our analysis reflects the situation as of 2014, just before the (further) significant cuts in benefits occurred in the UK. Our analysis of two earner couples suggests that large motherhood earnings penalties cannot be compensated by the tax-benefit system anywhere, with Germany being a clear outlier in terms of the size of a motherhood penalty.

Generally, we find that gender income inequality among the working age is driven by earnings. The tax-benefit system, on its own, cannot be relied on to deliver gender income equality. In our sample of eight countries, the correlation coefficient between the gender gap in earnings and the gap in disposable income for the working age population is 0.87 (and over 0.9 for dual-earner couples of working age). Similar correlation levels have been found in the literature between general market income inequality and disposable income inequality (Bozio et al., 2018; Guillaud et al., 2019). These findings suggest the European welfare states are more likely to achieve higher gender equality by promoting the universal/dual breadwinner model, whereby women's labour force participation and wages are on a par with men. This implies that care work needs to be partly externalized and/or partly shifted to men, who in turn may need to do less paid work.

We do not find evidence in favour of a dualization of the welfare state along gender lines. With the exception of public pensions, all transfers reduce gender income gaps. Women benefit more from mostly non-contributory benefits such as family benefits and social assistance but even contributory ones such as unemployment or disability benefits reduce the gender income gap. The average impact is limited in any case due to the small size of these benefits relative to earnings and pensions.

Public pensions are the most important factor driving gender income inequality among the elderly, and they are heavily skewed towards men. As a result of public pension income being more unequally distributed than earnings, gender income gaps are higher among the elderly than among the working age. This result contrasts with the considerable redistributive impact of pensions in Europe when looking at inequality reduction in general (Guillaud et al., 2019). Differences are especially large in the conservative cluster where benefits are closely linked to previous earnings. The East European countries and the UK are exceptions. These countries have public pension systems with strong redistributive elements such as flat-rate components or relatively low caps on pensionable earnings resulting in a more equal distribution of pension income. In Czechia and Romania, the higher pension income of women is also explained by higher male mortality and low retirement age for women in the past. The results for the UK may be affected by the fact that private pensions which are more skewed towards men, are treated as part of market income. Obviously, the large current income gaps among the elderly partly reflect historically low female labour market participation and our results do not necessarily apply to future cohorts of retirees.

Finally, we also found that country rankings differ substantially across groups with different demographic characteristics. For example, Romania's gender ratios in earnings and disposable incomes are lower than those in Finland when looking at all working age individuals but become substantially higher when examining two earner couples with children. This pattern suggests that there is considerable heterogeneity in women's outcomes and their experience of the welfare state depends on their characteristics.

7. conclusions

Our results confirm that gender disparities in earnings and disposable incomes vary considerably across the eight European countries we study. A share of the observed variation in gender income gaps can be attributed to the impact of welfare state taxes and transfers, confirming the results of previous studies using a multi-country design (e.g. see Gornick (2004); Budig et al. (2016) for reviews). Yet, the main factor driving gender income inequality is the disparity in earnings. While taxes and benefits can partly counterbalance the gender earnings gap, they cannot make up for the absence of/or for low earnings. Overall, our results reinforce conclusions from the feminist welfare state literature (Nelson 1990; Orloff 1993; Sainsbury 1999) suggesting that welfare states cannot rely on taxes and transfers alone to tackle gender income inequality, but must support women's employment through the provision of public services and reducing the unpaid work done by women at home.

Whereas previous scholarly work in the area of gender inequality has focused mostly on the transfer side of the welfare state, we find that taxes and social insurance contributions also equalize the incomes of men and women. In fact, they are the most consistent policy instrument in reducing the gender income gap among the working age population. Contrarily, the equalizing effect of transfers strongly depends on the characteristics of women themselves and the households they live in. This result points to considerable heterogeneity in the way welfare state policies treat women with different characteristics within the same country, potentially explaining why institutional studies sometimes disagree about classifying certain countries.

Better understanding of the contribution of tax and benefit policies to gender income inequality is important for advancing the gender equality agenda but is hindered by the lack of statistical information about intra-household redistribution of income in surveys. Many social transfers and tax credits are targeted at households and without individual-level data it is difficult to assess precisely how they affect men and women living in the same households. In addition, household level measures of income are becoming increasingly problematic in a context of household instability generated by growing rates of cohabitation and divorce. While changing the conventional framework of income measurement in household surveys may be difficult, this paper offers a practical solution to this issue by applying a state-of-the-art methodology of approximating individual disposable income using microsimulation techniques in combination with survey data.

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Declaration of competing interest

None.

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Appendix A. Supplementary data

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References

Aassve, A., Betti, G., Mazzuco, S., Mencarini, L., 2007. Marital disruption and economic well-being: a comparative analysis. J. Roy. Stat. Soc. 170 (3), 781–799.
Andreß, H.-J., Borgloh, B., Bröckel, M., Giesselmann, M., Hummelsheim, D., 2006. The economic consequences of partnership dissolution - a comparative analysis of panel studies from Belgium, Germany, Great Britain, Italy, and Sweden. Eur. Socio Rev. 22 (5), 533–560.
Arts, W., Gellissen, J., 2002. Three worlds of welfare capitalism or more? J. Eur. Soc. Pol. 12 (2), 137–158.
Bastos, A., Casaca, S.F., Nunes, F., Pereirinha, J., 2009. Women and poverty: a gender-sensitive approach. J. Soc. Econ. 38 (5), 764–778.
Becker, G.S., 1974. A theory of social interactions. J. Polit. Econ. 82 (6), 1063–1093.
Bennet, F., 2013. Researching within-household distribution: overview, developments, debates, and methodological challenges. J. Marriage Fam. 75 (3), 582–597.
Bettio, F., Tinios, P., Betti, G., 2013. The Gender Gap in Pensions in the EU. European Commission – Directorate-General for Justice. Luxembourg Publications Office of the European Union.
Bonke, J., 2015. Pooling of income and sharing of consumption within households. Rev. Econ. Househ. 13 (1), 73–93.
Bonke, J., Uldall-Poulsen, H., 2007. Why do families actually pool their income? Evidence from Denmark. Rev. Econ. Househ. 5 (2), 113–128.
Bonoli, G., 1997. Classifying welfare state: a two dimensional approach. J. Soc. Pol. 26 (3), 351–372.
Bozio, A., Garbinti, B., Goupille-Lebret, J., Guillot, M., Piketty, T., 2018. Inequality and Redistribution in France, 1990-2018: Evidence from Post-Tax Distributional National Accounts (DINA). WID.World Working Paper Series No 2018/10.
Brady, D., Burroway, R., 2012. Targeting, universalism, and single-mother poverty: a multilevel analysis across 18 affluent democracies. Demography 49 (2), 719–746.
Budig, M.J., Misra, J., Boeckmann, I., 2016. Work–family policy trade-offs for mothers? Unpacking the cross-national variation in motherhood earnings penalties. Work Occup. 43 (2), 119–177.
Cantillon, S., 2013. Measuring differences in living standards within households. J. Marriage Fam. 75 (3), 598–610.
Christopher, K., England, P., Smeeding, T.M., Ross Phillips, K., 2002. The gender gap in poverty in modern nations: single motherhood, the market, and the state. Socio. Perspect. 45 (3), 219–242.
Davies, H., Joshi, H., 2009. Sex, sharing and the distribution of income. J. Soc. Pol. 23 (3), 301–340.
Dotti Sani, G.M., 2015. Within-couple inequality in earnings and the relative motherhood penalty. A cross-national study of European countries. Eur. Socio Rev. 31 (6), 667–682.
Esping-Andersen, G., 1990. The Three Worlds of Welfare Capitalism. Polity Press, Cambridge.
Esping-Andersen, G., 2009. The Incomplete Revolution: Adapting to Women's New Roles. Polity Press, Cambridge.
Figari, F., Immervoll, H., Levy, H., Sutherland, H., 2007. Inequalities within couples: market incomes and the role of taxes and benefits in Europe. EUROMOD Working Paper Series EM6/07.
Figari, F., Sutherland, H., 2013. EUROMOD: the European Union tax-benefit microsimulation model. International Journal of Microsimulation 6 (1), 4–26.
Fraser, N., 1994. After the family wage. Gender equity and the welfare state. Polit. Theor. 22 (4), 591–618.
Fritzell, J., 1999. Incorporating gender inequality into income distribution research. Int. J. Soc. Welfare 8 (1), 56–66.
Gornick, J.C., 2004. Women's economic outcomes, gender inequality and public policy: findings from the Luxembourg Income Study. Soc. Econ. Rev. 2 (2), 213–238.
Grown, C., Valodia, I., 2010. Taxation and Gender Equity: A Comparative Analysis of Direct and Indirect Taxes in Developing and Developed Countries. Routledge.
Guillaud, E., Olckers, M., Zemmour, M., 2019. Four levers of redistribution: the impact of tax and transfer systems on inequality reduction. Review of Income and Wealth **n/a**(n/a).
Hacker, B., 2009. Hybridization instead of clustering: transformation processes of welfare policies in Central and Eastern Europe. Soc. Pol. Adm. 43 (2), 152–169.
Himmelweit, S., Santos, C., Sevilla, A., Sofer, C., 2013. Sharing of resources within the family and the economics of household decision making. J. Marriage Fam. 75 (3), 625–639.
Jaumotte, F., 2004. Female labour force participation: past trends and main determinants in OECD countries. OECD Economics Department Working Papers No 376 Paris. Organisation for Economic Co-operation and Development.
Jenkins, S.P., 1991. Poverty measurement and the within-household distribution: agenda for action. J. Soc. Pol. 20 (4), 457–483.
Kan, M.Y., Laurie, H., 2014. Changing patterns in the allocation of savings, investments and debts within couple relationships. Socio. Rev. 62 (2), 335–358.
Lister, R., Baldwin, S., Harlow, J. Falkingham, 1994. She has other duties: women citizenship and social security. Social Security and Social Change. Pearson Education Limited.
Lohmann, H., Zagel, H., 2016. Family policy in comparative perspective: the concepts and measurement of familization and defamilization. J. Eur. Soc. Pol. 26 (1), 48–65.

Lundberg, S., Pollak, R.A., 1996. Bargaining and distribution in marriage. J. Econ. Perspect. 10 (4), 139–158.
Mahler, V.A., Jesuit, D.K., 2010. Comparing government redistribution across countries: the problem of second-order effects. Soc. Sci. Q. 91 (5), 1390–1404.
Meulders, D., O'Dorchai, S.P., 2010. Revisiting poverty measures towards individualisation. DULBEA Working Papers 10-03 (Bruxelles, Universite Libre de Bruxelles).
Misra, J., Moller, S., Budig, M.J., 2007. Work-family policies and poverty for partnered and single women in Europe and North America. Gend. Soc. 21 (6), 804–827.
Modigliani, F., 1966. The life cycle hypothesis of savings, the demand for wealth, and the supply of capital. Soc. Res. 33, 160–217.
Morel, N., Touzet, C., Zemmour, M., 2018. Fiscal welfare in Europe: why should we care and what do we know so far? J. Eur. Soc. Pol. 28 (5), 549–560.
Nelson, B., Gordon, L., 1990. The Origins of the Two-Channel Welfare State: Workmen's Compensation and Mothers' Aid. Women, the State and Welfare. University of Wisconsin Press, Madison, WI, pp. 123–151.
Orloff, A.S., 1993. Gender and the social rights of citizenship: the comparative analysis of gender relations and welfare states. Am. Socio. Rev. 58 (3), 303–328.
Pahl, J., 1983. The allocation of money and the structuring of inequality within marriage. Socio. Rev. 31 (2), 237–262.
Pahl, J., 2005. Individualisation in couple finances: who pays for the children? Soc. Pol. Soc. 4 (4), 381–391.
Pascall, G., Lewis, J., 2004. Emerging gender regimes and policies for gender equality in a wider Europe. J. Soc. Pol. 33 (3), 373–394.
Ponthieux, S., 2013. Income pooling and equal sharing within the household - what can we learn from the 2010 EU-SILC module? Eurostat Methodologies and Working Papers. Publications Office of the European Union, Luxembourg.
Ponthieux, S., Atkinson, A.B., Guio, A.-C., Marlier, E., 2017. Intra-household pooling and sharing of resources: a tentative "modified" equivalised income. Monitoring Social Inclusion in Europe, pp. 175–189. Luxembourg, Eurostat.
Ponthieux, S., Meurs, D., Atkinson, A.B., Bourguignon, F., 2015. Gender Inequality. Handbook of Income Distribution. Elsevier. **2A**.
Sainsbury, D. (Ed.), 1999. Gender and Welfare State Regimes. Oxford University Press, Oxford.
Saraceno, C., Keck, W., 2010. Can we identify intergenerationla policy regimes in Europe? Eur. Soc. 12 (5), 675–696.
Sierminska, E., Girshina, A., 2017. Wealth and Gender in Europe. European Commission - Directorate-General for Justice, Luxembourg.
Sigle-Rushton, W., Waldfogel, J., 2007. Motherhood and women's earnings in Anglo-American, continental European and Nordic countries. Fem. Econ. 13 (2), 55–91.
Sutherland, H., 1997. Women, men and the redistribution of income. Fisc. Stud. 18 (1), 1–22.
Thomas, A., O'Reilly, P., 2016. The impact of tax and benefit systems on the workforce participation incentives of women. OECD Taxation Working Paper No. 29. Organisation for Economic Cooperation and Development, Paris.
Vogler, C., Pahl, J., 1994. Money, power and inequality within marriage. Socio. Rev. 42 (2), 263–288.