Peering into the black box: Using microsimulation methods to evaluate the gendered impact of taxes and transfers

Silvia Avram and Daria Popova

Abstract

Unitary models of household behaviour and decision-making remain the mainstream of academic research and official statistics of income and living standards, despite extensive evidence contradicting their assumptions. The main difficulty in moving beyond unitary models in empirical analysis has been how to deal with intra-household allocation issues satisfactorily. We show here how microsimulation models are a tool to go beyond assumptions of complete pooling and equal sharing when examining the gendered effects of tax/benefit policies. We discuss the principles and assumptions behind microsimulation models and highlight their strengths and weaknesses in dealing with intra-household allocation issues. After reviewing the limited literature using microsimulation to examine gender and/or intra-household inequality, we show how these models can be improved by combining them with information on income pooling from surveys to create more realistic scenarios of partial pooling in particular. We conclude by reviewing possible policy applications and suggesting future directions for research.

Key words: intra-household inequality, gender inequality, income pooling, microsimulation, tax/benefit policies, gender mainstreaming

1. Introduction

Research on income distribution and living standards measured by income usually focuses on household rather than individual income. Similarly, official indicators used for policy purposes (e.g. the at-risk-of-poverty indicators in the European Union (EU) or Households Below Average Income statistics in the UK) are constructed based on household incomes, adjusted for household size. As noted in the introduction to this volume, this choice has been justified theoretically by assuming that households constitute a single decision-making unit, as in the unitary model (Becker, 1974). While this assumption has the advantage of simplicity, it entirely obscures any intra-household dynamics, treating the household instead as a 'black box' (see Maruyama, this volume).

The inadequacy of the unitary household model has been recognized for some time. Empirical studies have found the assumptions of complete pooling and equal sharing to be generally unsupported and theoretical alternatives such as bargaining and collective models have been proposed (for an overview, see Ponthieux and Meurs (2015) and Woolley, this volume). Some studies have used an assumption of minimal income pooling to derive alternative (individual-level) measures of disposable income and poverty (Jenkins, 1991; Sutherland, 1997; Fritzell, 1999; Davies and Joshi, 2009; Meulders and O'Dorchai, 2010); yet this approach has not become mainstream in income distribution analysis.

Practical limitations in household surveys or register data[1] have constrained the use of individual disposable income measures. Unlike earnings, data on many non-labour forms of income are not collected at individual level. This is particularly so for transfers targeted at families/households rather than individuals, such as family or housing benefits, but also for individual non-labour incomes collected, for convenience, at the household level (e.g. property income or private transfers). Information on who receives non-individual incomes is usually lacking and these incomes generally can only be allocated at the individual level based on assumptions. Even if relatively accurate measures of individual income can be constructed, measuring the intra-household allocation of resources requires information about income pooling and sharing. Such information cannot be retrieved from income registers and is typically also lacking in surveys of income and living conditions.

Although not without limitations, tax/benefit microsimulation models can make an important contribution to research on intra-household distribution by addressing some of the existing data challenges. Microsimulation describes a technique whereby a set of rules is consistently applied to a collection of individual units to simulate changes in their state or behaviour (Figari et al., 2015). Tax/benefit models are a class of microsimulation models using individual and household microdata together with detailed information on fiscal legislation to simulate tax liabilities and benefit entitlements at the individual/family/assessment unit[2] level. This chapter

[1] Register data refers to data that is collected and maintained by official government agencies or other organizations in order to track various aspects of social life. Register data is typically considered to be more accurate and reliable than self-reported data in surveys, as it is collected directly from official records rather than relying on individuals to report their own information.

[2] An assessment unit is a group of individuals that together are jointly entitled to a cash transfer (benefit unit) or liable for a tax payment (tax unit).

explains how tax/benefit microsimulation models can be applied to analyze intra-household income inequality.

2. What is microsimulation and how can it be used to research the intra-household distribution of resources?

Tax/benefit microsimulation has a long history in income distribution analysis. Its development was motivated primarily by the need to evaluate policy reforms before implementation, both for their distributional consequences - to achieve a better understanding about winners and losers - and to obtain more accurate forecasts of their budgetary impact. Today, the uses of tax/benefit microsimulation extend well beyond ex ante policy evaluation (for a recent review of the many ways in which microsimulation has been used in both academic research and policy analysis, see Figari et al. (2015)). Yet to date their potential in tackling the existing limitations in intra-household distribution research has not been fully exploited.

Tax/benefit microsimulation models are a tool to apply tax liability and benefit entitlement rules to a household sample to understand how taxes and benefits affect household disposable income (i.e. income after payment of direct taxes and receipt of all benefits). To accurately simulate fiscal liabilities and benefit entitlements, these models require comprehensive information about individual and household characteristics driving these entitlements and liabilities, including but not limited to household size and composition, market incomes, history of paying social insurance contributions, labour market status, disability status etc. Based on this information and on legislative rules, such tax/benefit models can then simulate the amount of fiscal liabilities and benefit entitlements at the assessment unit level. (See below about benefit take-up.)

2.1 Why use tax/benefit microsimulation models?

In the context of intra-household distribution, tax/benefit microsimulation models have several advantages. First, they can improve the accuracy of income information in surveys. Several studies have shown that means-tested benefits tend to be under-reported in surveys, at least in developed countries (Meyer and Sullivan, 2003; Brewer et al., 2017). By simulating means-tested benefit entitlements, such microsimulation models can improve the accuracy of income measures at the bottom of the distribution. They can also be used to impute benefit entitlements and tax liabilities at the individual/assessment unit level whenever information is only collected at the household level in surveys. For example, the EU Survey of Income and Living Conditions (EU-SILC), the primary data source for income distribution analysis in many European countries, only collects information about taxes paid at the household level, even when tax liabilities are individual. Tax/benefit microsimulation models can be used to reconstruct tax liabilities at the individual level, subject to the relevant characteristics being captured in the microdata. Finally, microsimulation models can be used to construct measures of fiscal/tax advantages not directly observable in survey data, such as tax allowances or tax credits.

A second advantage of tax/benefit microsimulation models, of relevance to this volume in particular, is they can facilitate the construction of individualized measures of income based on transparent assumptions. Whilst they cannot provide information about who is receiving and/or controlling an income source within the household beyond what is collected directly in surveys, they can use assumptions about how non-individual level incomes are shared and distributed among household members to draw conclusions about individual income levels and living standards. They can also vary these assumptions and test how sensitive the results are in relation to income pooling and sharing. Finally, if information on actual income pooling and sharing patterns is available in a survey, tax/benefit models can be combined with this information to arrive at individual income measures that more accurately reflect the living standards of individuals within the household. We present an example in section 4.

Tax/benefit microsimulation models can be particularly useful in the evaluation of gender mainstreaming, i.e. in the assessment of the impact of a policy measure from a gender perspective (EIGE, 2016). Most policy evaluation studies struggle to fully capture gender differences in the effects of policies. Such assessment is only straightforward for single women and men. When measures of living standards, poverty or inequality are based on household incomes, women and men living in the same household are, by definition, assumed to have the same (equivalent) living standard. If household members do not fully share their incomes in practice, the living standards of women, who typically have lower labour incomes and assets, may be overestimated and those of men underestimated. Tax/benefit microsimulation models can help capture the gender dimension of proposed policy reforms by enabling the construction of accurate individual income measures.

2.2 The importance of individual income

Disposable income (income after direct taxes and transfers) is probably the most widely used measure of economic resources in both scholarly work and policy analysis. In rich, and most middle-income, countries inequality and poverty measures are primarily computed on this basis. Disposable income measured at individual level is particularly salient in the context of intra-household research.

First, individual income represents a measure of economic independence or autonomy, seen as important in its own right (Pahl, 2005; Dema-Moreno and Díaz-Martínez, 2010; Bennett and Sutherland, 2011), especially with rising family instability. Adults who contribute few or no economic resources are vulnerable as withdrawal of financial support from their partner can leave them economically deprived, as attested by the significant negative economic consequences of union dissolution for some women (Brewer and Nandi, 2014; Popova and Navicke, 2019).[3] Second, individual income is often correlated with other measures of economic resources. Several studies have shown that women's consumption and living standards are related to their share of earnings or income within the household (Cantillon, 2013; Himmelweit et al., 2013; Bonke, 2015; Guio and Van den Bosch, 2020). It should be noted, though, that individual disposable income measures do not capture non-monetary aspects of

[3] Though note that such studies tend to assume complete income sharing in the partnership pre-dissolution.

intra-household inequality – for instance, gender inequalities in time use and unpaid work. Second, individual disposable income measures on their own do not capture differences between receiving, controlling and benefiting from income. For instance, a certain level of intra-household inequality in individual incomes received does not necessarily imply the same level of consumption inequality, as transfers between partners can occur without explicit income pooling; on the other hand, the person receiving an income does not necessarily control how it is spent or benefit from it directly.

2.3 Limitations of using tax/benefit microsimulation models

Tax/benefit microsimulation models therefore have tremendous potential in income distribution analysis; but they also have some limitations. First, the accuracy and reliability of simulations depend on the information in the underlying microdata. When pieces of information are not available (e.g. long social insurance contribution histories, details on disability status, detailed expenditure etc.), assumptions must be made to enable the simulations to be run (Figari et al., 2015). Aggregate results also depend on the underlying microdata being representative - for example, the inability of surveys to adequately capture high-income earners leads to underestimation of tax revenues (Sutherland, 2018). For intra-household research, results may be biased if lack of accurate information affects some household members more than others - for example, assumptions about social insurance contribution histories may be more realistic for men, who are more likely to be in stable employment, than for women, who are more likely to have interrupted labour market careers.

A model's restricted scope can also be a limitation. The existing tax-benefit models have been used primarily to produce accurate measures of cash benefit entitlements and direct tax liabilities to assess the impact of these on disposable incomes. Some attempts have been made to extend these models to cover wealth and wealth taxes (Kuypers et al., 2019), indirect taxes (De Agostini et al., 2017) and non-cash benefits (Figari and Paulus, 2015; Hufkens et al., 2020). Traditionally, however, these have not been part of tax-benefit models, although it is possible to incorporate them.

Existing tax/benefit microsimulation models differ in how they account for behavioural responses to policy rule changes (Bourguignon and Sparado, 2006). Static or arithmetic models are perfectly adequate to evaluate the first-round effects of policy changes and, under certain conditions, might be a good approximation of a final policy effect. Studying the medium- or long-term effects, however, requires static microsimulation models to be linked with behavioural models, for instance to model labour supply changes following policy reforms.

Another relevant issue is the sensitivity of microsimulation analysis to assumptions about benefit non-take-up and tax non-compliance. These are behavioural aspects that cannot be internally captured by tax/benefit microsimulation models. Instead, simulations can be calibrated to correspond to a non-take-up benchmark based on external information; and/or researchers may run sensitivity analyses to account for possible non-take-up scenarios. In addition to the direct underestimation or overestimation of incomes of entitled/liable households, non-take-up and non-compliance are important because they are likely to relate to

intra-household dynamics. Non-take-up may be more or less likely depending on which household member is entitled to the benefit. Similarly, tax compliance/non-compliance may depend on intra-household dynamics and how household members manage and control money.

3. Overview of existing research on intra-household resources using tax/benefit microsimulation models

To overcome the conceptual and methodological problems posed by measuring income at household level, several studies have used tax/benefit microsimulation models to explore how the distributional outcomes for women and men would change depending on assumptions about pooling and sharing of common resources (Sutherland, 1997; Bennett and Sutherland, 2011; Figari et al., 2011; Avram et al., 2016; Doorley and Keane, 2020; Fuenmayor et al., 2020; Avram and Popova, 2022a Avram and Popova, 2022b). All the studies relied on some modifications of the *minimal income pooling* assumption to derive individual measures of disposable income and poverty. In each case, it was assumed that individual incomes (e.g. earnings, individual benefits) are retained by their recipients, while household incomes (e.g. family benefits, housing allowances) are distributed among household members following some sharing rules, and the costs of children are split between their parents or assigned to one parent (e.g. the mother).

Sutherland (1997) pioneered this approach in a UK study in which she showed that this kind of simulation resulted in women being disproportionately represented in the bottom quantiles of the individual income distribution. Bennett and Sutherland (2011) simulated a hypothetical reform abolishing all non-means-tested earnings replacement benefits for working-aged people in the UK and let the means-tested system fill some of the gap. Assuming equal sharing of means-tested incomes within the couple, the reform resulted in women in couples 'losing' less in absolute terms than men; but as a proportion of individual incomes women in couples lost more than men. These findings highlight the importance of non-means-tested benefits for the financial independence of women living in couples.

Several microsimulation studies carried out comparative analyses for a range of European countries using EUROMOD, the tax-benefit model for the EU (Figari et al., 2011; Avram et al., 2016; Doorley and Keane, 2020; Fuenmayor et al., 2020; Avram and Popova, 2022a). EUROMOD is a tax/benefit model simulating benefit entitlements and tax liabilities for all EU Member States, from the mid-2000s to the present day, using some common assumptions (Sutherland and Figari, 2013). All the EUROMOD-based studies showed that women's individual disposable incomes are consistently lower than men's. However, the gender gap in earnings appears to be higher, suggesting an equalizing effect of taxes and transfers on disposable incomes. All studies find significant cross-country variation in the redistributive effect of policies and the resulting ratio of female to male disposable incomes (the latter ranging from Germany's 60 per cent to Finland's 84 per cent). Old-age pensions and survivor benefits have the largest equalizing effect among older people, whilst personal income taxes are most important for the working-aged population.

Avram et al. (2016) and Avram and Popova (2022a) have tested the sensitivity of gender income ratios to various assumptions about splitting non-individual income components. In

particular, they assigned them to the primary earner, the secondary earner, and split them equally among the adults in the assessment unit. Overall, the choice of scenario made little difference to the calculation of gender income ratios because of the small share of collective income components (such as family benefits, social assistance and housing benefits) in disposable income, yet it was important for one-earner couples and couples with children, who are more likely to be eligible for these types of benefits.

Avram and Popova (2022b) used EUROMOD to reconstruct measures of individual income prior to separation and to create a counterfactual scenario by splitting all heterosexual couples in the data and simulating all benefits and taxes each individual would be entitled to if living in separate households. They find that, assuming complete income pooling during the partnership, replacement rates after separation (i.e. the ratio of post-separation to pre-separation disposable income) appear to be lower for working-aged women than for working-aged men. If minimum income pooling is assumed, women have higher replacement rates after separation compared to men.

Apart from point-in-time analyses, tax/benefit microsimulation models have also been used to assess the distributional impact of policy changes over time. Doorley et al. (2021) assessed the gendered impacts of COVID-19 on earnings and disposable incomes using the Irish component of EUROMOD, finding that the redistributive effect of the Irish tax/benefit system on the gender gap in income doubled during the pandemic. A study by EIGE (forthcoming) used EUROMOD to assess the pandemic's impact on gender income inequality in all EU Member States. It finds that the labour market shock in 2020 affected women's individual incomes less compared to men's incomes. The effects of EU governments' discretionary policies to counteract the adverse impacts of the pandemic on disposable incomes (i.e. furlough schemes and benefit top-ups and/or tax reductions) were positive for both women and men of working age in almost all EU countries, and more favourable for women. This has resulted in a reduction in gender income inequality for the working-aged population in 14 EU Member States, compared to the pre-COVID-19 scenario.

It should be noted that existing tax/benefit microsimulation research on intra-household inequality is generally limited to rich countries such as EU Member States and the UK, due to the absence of quality microsimulation models in the global south until recently. With the development of tax-benefit microsimulation models by the CEQ,[4] SOUTHMOD[5] and LATINMOD,[6] the lack of tax/benefit models for many low- and middle-income countries is no longer a constraint.

[4] Commitment to Equity (CEQ) – a database of studies of the impact of taxation and social spending on inequality and poverty for low- and middle-income countries developed by the CEQ Institute. See: www.commitmentoequity.org

[5] SOUTHMOD – a multi-country tax/benefit microsimulation model for the global south developed by UNU-WIDER, the EUROMOD team at the University of Essex, and Southern African Social Policy Research Institute (SASPRI). See: https://www.wider.unu.edu/project/southmod-simulating-tax-and-benefit-policiesdevelopment

[6] LATINMOD - a multi-country tax/benefit microsimulation model for six Latin American countries sponsored by Centro Estratégico Latinoamericano de Geopolítica (CELAG), Quito, Ecuador, with the collaboration of

4. Using microsimulation to examine the effect of income pooling on the gender income gap

In this section, we use our own research to show how microsimulation can be combined with survey information about household income pooling to measure individual income.

In 2010, the EU Survey of Income and Living Conditions (EU-SILC) implemented an ad hoc module on intra-household sharing of resources (for a review and analysis of the data see Ponthieux, 2013). Information collected included the system of managing finances used by the household, based on the classification originally developed by Pahl (Pahl, 1983; Vogler and Pahl, 1994), and the share of personal income kept separate by the respondent. Ponthieux (2017) used the latter piece of information to derive partial income pooling measures for a selection of European countries. We follow her approach here, but in addition we combine the survey information with the tax/benefit microsimulation model EUROMOD to derive gender income ratios under complete income pooling, minimal pooling and partial pooling. Microsimulation allows us to compute accurate measures of personal income, as well as to better identify and allocate collective income sources. EUROMOD uses the cross-sectional version of the EU-SILC as its underlying data, allowing us to merge information from the 2010 ad hoc module on intra-household sharing into the data.

Using EUROMOD and EU-SILC, we derive three income measures. The first assumes complete income pooling and equal sharing and corresponds to income measures traditionally used in distributional analyses, as well as for policy reporting purposes, as explained in the introduction. It is derived by pooling all the income of all household members and then dividing the total household income by the household equivalent size, calculated based on the 'modified OECD' scale (the scale assigns a weight of 1 to the first adult, a weight of 0.5 to subsequent adults and a weight of 0.3 to children, defined as individuals aged under 14). Because it assumes that all household income is pooled and shared among all household members, this measure cannot capture any intra-household income inequalities.

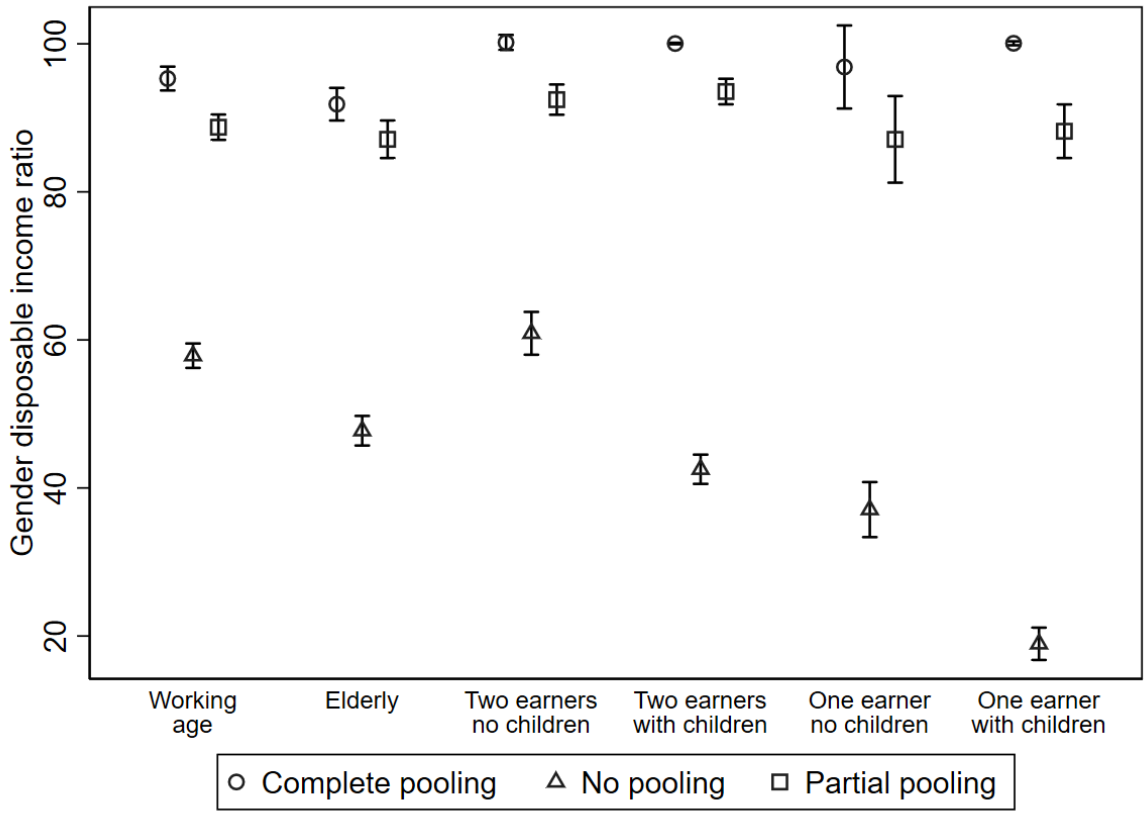
The second measure we derive assumes minimal income pooling, in line with the studies based on EUROMOD reviewed in section 3 above. All adults are assumed to keep all income received in a personal capacity (earnings and individual benefits, including income replacement benefits and other benefits based on an individual's own status) and pay individual taxes, and only incomes received in common (typically means-tested benefits and benefits targeted at children) are split equally between the adult members of the unit receiving those incomes. We use EUROMOD to calculate personal income components not captured individually in EU-SILC, notably parental leave benefits, taxes and social insurance contributions, as well as to assign common benefits (social assistance, housing benefits, family benefits etc.) to individuals entitled to receive them (i.e. only those household members who are part of the assessment unit for that benefit). We then use a special equivalisation strategy to maintain comparability with

EUROMOD. See: https://www.celag.org/latinmod-un-simulador-integrado-de-politicas-fiscales-en-america-latina/

the first income measure; for a detailed description of the methodology, see Avram and Popova (2022a). While not necessarily capturing exactly the total income available to spend for each household member, this individualised income measure can be used to examine inequality in economic resources among members of the same household. It also arguably reflects aspects of well-being such as economic independence and autonomy that are not captured by focusing on consumption.

Finally, our third measure combines the two previous approaches. Neither complete nor minimal pooling is a realistic assumption for most households. Previous research has shown that household members do often pool their incomes, especially when relationships are long term and/or there are children (Bonke, 2015; Präg et al., 2019). We use information on the share of personal income kept separate to calculate a measure of individual incomes under partial pooling. We calculate personal income as the sum of all incomes received in a personal capacity, as in the minimal income pooling scenario above. We then split this personal income into a part kept separate, and a part shared (equally) with the other household members. We do not have information on the exact share of income that is kept separate (and not pooled) by the respondent. Instead, EU-SILC allows respondents to select one from the following four options: all income, more than half, about half, less than half, none. We translated these answers into the following percentages: 100, 75, 50, 25 and 0. We continue to split all common benefits equally among members of the recipient unit.

Figure 1: Gender income ratios in Germany under various pooling assumptions, 2015



Note: Authors' calculations based on EUROMOD I4.0+ and EU-SILC 2010 ad-hoc module. The vertical bars show 95% confidence intervals.

Finally, we compute gender income ratios, defined as average female disposable income divided by average male disposable income for working-aged individuals (defined as aged 18-64 years), older people (aged 65+ years) and four household types. Figure 1 above presents these income ratios for Germany; but the same analysis could be performed in any country with valid data on personal income sharing.

Results show that, as expected, gender income ratios are much lower (and hence gender income inequality higher) when we assume minimal pooling (shown as triangles in Figure 1). In the case of working-aged individuals, the income ratio falls from 93 per cent assuming complete pooling (shown as circles in Figure 1) to 56 per cent assuming minimal pooling. The difference reflects women's significantly lower earnings. Similarly, gender differences in pensions are reflected in even lower gender income ratios among older people assuming minimal pooling. Similar results are obtained for one- and two-earner couples, with or without children. The difference between gender income ratios based on complete and minimal pooling is higher for couples with children, especially for one-earner couples.

Assuming partial pooling (squares in Figure 1) generates income ratios that are between the other two scenarios but much closer to complete pooling than minimal pooling, suggesting that most respondents declare that they pool most of their personal income. One-earner couples have the lowest income ratios when assuming partial pooling: 81 and 84 per cent respectively for those with and without children. Of course, pooled income may not benefit all members of the household equally. Unfortunately, we do not have sufficient information on how income is spent to be able to examine this more closely. Nonetheless, our analysis demonstrates how pooling assumptions affect measured gender income inequality. It also shows how microsimulation models can be combined with information about income pooling and sharing to generate more accurate measures of individual income.

5. Conclusions and some suggestions for future research

Treating households as single units does not provide an accurate picture of the economic well-being of women and men and can be particularly misleading when we try to understand the gendered impacts of public policies on individuals and/or their behaviour. In this chapter we have argued that tax/benefit microsimulation models offer a powerful tool for peering inside the 'black box' of the household, by allowing us to construct more accurate measures of individual/personal incomes and by enabling the estimation of gender specific policy effects (to assess gender mainstreaming).

Further improvement of the measurement of individual incomes requires better data collection, primarily on who receives (and thus may be more likely to control) each income source, on the actual income pooling and sharing practices in a household, and on income sources that cannot be simulated but can be very important for some groups (such as income from capital). Future research could explore how new survey instruments can be embedded in existing studies in

order to address these challenges and/or how accurate income information can be added from administrative registers to supplement information collected via surveys.

Whilst gender mainstreaming is now widely endorsed by international organisations such as the EU and the United Nations (United Nations, 2002; EIGE, 2016), in practice a gender dimension is yet to be routinely included in policy evaluation exercises. Scholars could exploit the full potential of tax/benefit microsimulation models to capture the gender impacts of fiscal policies, including their effect on individual disposable incomes and work incentives. In addition to gender, researchers could also explore how tax/benefit microsimulation models can shed light on other dimensions of inequality within the household, such as redistribution across generations, and where necessary incorporate intersectionality (EIGE, forthcoming).

An accurate understanding of how welfare state policies affect women and men requires the scope of simulations to be enlarged to cover the impact of wealth taxes, indirect taxes and public services. Public services may be especially important to women who in their absence may be faced with restricted labour market choices and/or increased demands on their time. Future scholarship should examine how the provision of public services contributes to or mitigates existing gender economic inequalities.

Finally, a fruitful direction for future research will be to exploit the new microsimulation models for the global south in the study of gender inequality within the household in order to research intra-household management and distribution of resources in a wider range of countries.

References:

Avram, S. and Popova, D. (2022a). 'Do taxes and transfers reduce gender income inequality? Evidence from eight European welfare states.' *Social Science Research* 102: 102644.

Avram, S. and Popova, D. (2022b). Intrahousehold income inequality and the gender income gap after union dissolution: a comparative study of European countries. RC28 Spring Conference 2022, London School of Economics.

Avram, S., Popova, D. and Rastrigina, O. (2016). 'Accounting for gender differences in the distributional effects of tax and benefit policy changes.' *Research note 3/2015*, Luxembourg: Directorate-General for Employment, Social Affairs and Inclusion, European Commission.

Becker, G.S. (1974). 'A Theory of Social Interactions.' *Journal of Political Economy* 82(6): 1063-1093.

Bennett, F. and Sutherland, H. (2011). 'The importance of independent income: understanding the role of non-means-tested earnings replacement benefits.' I*SER Working Paper No. 2011-09*. Colchester: Institute for Social and Economic Research, University of Essex.

Bonke, J. (2015). 'Pooling of income and sharing of consumption within households.' *Review of Economics of the Household* 13(1): 73-93.

Bourguignon, F. and Sparado, A. (2006). 'Microsimulation as a tool for evaluating redistribution policies.' *Journal of Economic Inequality* 4(1): 77-106.

Brewer, M., Etheridge, B. and O'Dea, C. (2017). 'Why are households that report the lowest incomes so well-off?' *The Economic Journal* 127(605): 24-49.

Brewer, M. and Nandi, A. (2014). 'Partnership dissolution: how does it affect income, employment and well-being?' *ISER Working Paper No. 2014-30*. Colchester: Institute for Social and Economic Research, University of Essex.

Cantillon, S. (2013). 'Measuring differences in living standards within households.' *Journal of Marriage and Family* 75(3): 598-610.

Davies, H. and Joshi, H. (2009). 'Sex, sharing and the distribution of income.' *Journal of Social Policy* 23(3): 301-340.

De Agostini, P., Capéau, B., Decoster, A., Figari, F., Kneeshaw, J., Leventi, C., Manios, K., Paulus, A., Sutherland, H. and Vanheukelom, T. (2017). 'EUROMOD extension to indirect taxation: final report.' *EUROMOD Technical Note No.EMTN/3.0.* Colchester: Institute for Social and Economic Research, University of Essex.

Dema-Moreno, S. and Díaz-Martínez, C. (2010). 'Gender inequalities and the role of money in Spanish dual-income couples.' *European Societies* 12(1): 65-84.

Doorley, K. and Keane, C. (2020). 'Tax-benefit systems and the gender gap in income.' *IZA Discussion Papers, No. 13786*. Bonn: Institute of Labor Economics (IZA).

Doorley, K., O'Donoghue, C. and Sologon, D. (2021). 'The gender gap in income and the COVID-19 pandemic.' *IZA Discussion Paper No. 14360*. Bonn: The IZA Institute of Labor Economics.

EIGE (European Institute for Gender Equality) (2016). *Gender impact assessment: Gender mainstreaming toolkit*. Vilnius: European Institute for Gender Equality.

EIGE (forthcoming). 'Gender equality and gender mainstreaming in national recovery and resilience plans.' Vilnius: European Institute for Gender Equality.

Figari, F., Immervoll, H., Levy, H. and Sutherland, H. (2011). 'Inequalities within couples: Market income and the role of taxes and benefits in Europe.' *Eastern Economic Journal* 37: 344–366.

Figari, F. and Paulus, A. (2015). 'The distributional effects of taxes and transfers under alternative income concepts: The importance of three "I"s.' *Public Finance Review* 43(3): 347-372.

Figari, F., Paulus, A. and Sutherland, H. (2015). 'Microsimulation and policy analysis.' In A.B. Atkinson and F. Bourguignon (eds.), *Handbook of Income Distribution*. Amsterdam: Elsevier: 2141 - 2221.

Fritzell, J. (1999). 'Incorporating gender inequality into income distribution research.' *International Journal of Social Welfare* 8(1): 56-66.

Fuenmayor, A., Granell, R. and Savall Morera, T. (2020). 'Tax-benefit systems and gender gap: An across-Europe study.' *Hacienda Pública Española / Review of Public Economics* 235(4): 87-118.

Guio, A.-C. and Van den Bosch, K. (2020). 'Deprivation of women and men living in a couple: Sharing or unequal division?' *Review of Income and Wealth* 66: 958-984.

Himmelweit, S., Santos, C., Sevilla, A. and Sofer, C. (2013). 'Sharing of resources within the family and the economics of household decision making.' *Journal of Marriage and Family* 75(3): 625-639.

Hufkens, T., Figari, F., Vandelannoote, D. and Verbist, G. (2020). 'Investing in subsidized childcare to reduce poverty.' *Journal of European Social Policy* 30(3): 306-319.

Jenkins, S.P. (1991). 'Poverty measurement and the within-household distribution: Agenda for action.' *Journal of Social Policy* 20(4): 457-483.

Kuypers, S., Figari, F. and Verbist, G. (2019). 'Redistribution in a joint income–wealth perspective: A cross-country comparison.' *Socio-Economic Review* 19(3): 929-952.

Meulders, D. and O'Dorchai, S.P. (2010). 'Revisiting poverty measures towards individualisation.' *DULBEA Working Papers 10-03.* Bruxelles: Universite Libre de Bruxelles.

Meyer, B.D. and Sullivan, J.X. (2003). 'Measuring the well-being of the poor using income and consumption.' *Journal of Human Resources* 38: 1180–1220.

Pahl, J. (1983). 'The allocation of money and the structuring of inequality within marriage.' *The Sociological Review* 31(2): 237-262.

Pahl, J. (2005). 'Individualisation of couple finances: Who pays for the children?' *Social Policy and Society* 4(4): 381-391.

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.* Luxembourg: Publications Office of the European Union.

Ponthieux, S. (2017). 'Intra-household pooling and sharing of resources: a tentative "modified" equivalised income.' In A.B. Atkinson, A.-C. Guio and E. Marlier (eds.) *Monitoring Social Inclusion in Europe*. Luxembourg: Eurostat: 175-189.

Ponthieux, S. and Meurs, D. (2015). 'Gender inequality.' In A.B. Atkinson and F. Bourguignon (eds.) *Handbook of Income Distribution*. Amsterdam: Elsevier: 981-1146

Popova, D. and Navicke, J. (2019). 'The probability of poverty for mothers after childbirth and divorce in Europe: the role of social stratification and tax-benefit policies.' *Social Science Research* 78: 57 -70.

Präg, P., Begall, K. and Treas, J. (2019). 'Understanding the Marriage–cohabitation Gap in Income Pooling: Evidence from 29 European Countries.' (Pre-print.) *SocArXiv*.

Sutherland, H. (1997). 'Women, Men and the Redistribution of Income.' *Fiscal Studies* 18(1): 1-22.

Sutherland, H. (2018). 'Quality assessment of microsimulation models. The case of EUROMOD.' *International Journal of Microsimulation* 11(1): 198-223

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

United Nations (2002). 'Gender mainstreaming: An overview.' New York, United Nations.

Vogler, C. and Pahl, J. (1994). 'Money, power and inequality within marriage.' *The Sociological Review* 42(2): 263-288.