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Taxation, cash benefits, or something else? How income-related family policies affect mothers' labor supply in Austria, Germany, and the Netherlands

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Abstract

This paper examines the role income-related family policy measures play for mothers' labor supply decisions in three countries with particularly high shares of female part-time employment: Austria, Germany, and the Netherlands. Structural labor supply simulations and individual calibration techniques are used to calculate the effects of two types of family benefits, namely universal cash benefits and income-dependent tax-reduction measures. We simulate the ex ante behavioral responses from the abolishment of these family policies in two reform scenarios and compare the results between different household types and across countries in order to address individual and country-specific mechanisms driving female labor supply. Our results show that income-related family policies have mixed, but overall very small effects on mothers in couple households and single-parent households entering the labor market or enhancing the number of hours worked in paid work. Cash benefits are associated with small positive and negative responses for mothers in Austria and Germany, but there are no effects in the Netherlands. Tax-reductions mainly influence the labor supply of Austrian mothers in couple households, where the disposable income changes from the reform scenario are the highest. German and Dutch mothers show marginal to no behavioral responses due to changes in income tax instruments, once we correct our estimations for unobserved individual preferences. The findings suggest that income-related family policy measures do not have a significant influence on mothers' decisions whether to work or not, or to effectively change their weekly hours of work. The country comparison further suggests that similar family policy instruments have different effects across varying institutional contexts and that it is individual preferences, rather than income subsidies, that appear to dominate the labor supply decision.

Keywords: Family policy, Child-related cash benefits, Income taxation, Labor supply estimation, Microsimulation

JEL: C15; C53; D04; D10; H20; J22

1 Introduction

Traditional family policies aim to enhance opportunities for households with children, whether by improving the reconciliation of paid work, family life, and leisure for parents, by reducing (economic) inequalities between households with and without children, or by mitigating intra-household dependencies regarding primary caregivers in couple households. The policies take different forms, such as public childcare services and other child-related in-kind benefits (e.g.„ center-based facilities), parental leave policies, or direct financial support. In this study, we are interested in the role of the latter, namely child-related income support measures, since their direct impact on the improvement of a family's economic situation is the main goal of these instruments. Universal cash benefits and targeted benefits through income taxation systems are the most prominent and well-established types of financial support across OECD member states (OECD, 2019). However, the form and extent of these policy measures varies across countries. We are interested in the performance of these cash transfers and income tax-reductions, especially in their ability to reduce inequalities between parents within a household and between single parents and other household types. In this regard, we explore how income-related family policies interact in this field.

Depending on the institutional context in question, the notion of what family policy is and should aim at is answered very differently. Yet, on a more aggregate level, the family can be conceptualized as a social institution, e.g.„ the "traditional" (heteronormative) nuclear family consisting of parents and children, that serves specific social, cultural, and economic functions of providing welfare. Family policy measures in that context aim at enabling or supporting these specific functions, for example because of economic and sociopolitical motives (e.g.„ guaranteeing the economic consumption and production of families or compensating inequalities between families with children and others), or in regard to the child's well-being or women's issues (mothers' disadvantages). Concerning the latter, the gendered distinction of unpaid and paid work constitutes one main focus in analyzing the role of the family and the welfare state. Although this relationship is very complex, family policies aim at reducing the male biases in social policy and increasing mothers' capabilities (Zagel & Lohmann, 2020). Thus, many European social policy and taxation systems incorporate incentives specifically to increase the labor market attachment of mothers, thereby strengthening their economic independence and mitigating gender inequality issues.

To quantify the effectiveness and performance of policy instruments as described above, the use of economic modeling approaches of individual behavioral responses to (simulated) social and family policies have gained importance since the 1990s. Due to improved micro-econometric methods and enhanced structural computation techniques, such as the development of models based on the random utility approach (Aaberge et al., 1995; Creedy & Duncan, 2002; Van Soest, 1995), the analysis of large micro-data sets and the interpretation of complex forms of the utility functions and budget constraints that underlie tax benefit or welfare analyzes of various policies have been made possible (Aaberge & Colombino, 2015). Especially labor supply mechanisms have been at the core of research. Over recent decades the use of these models has intensified in various ex ante policy assessments of potential labor supply responses and the comparison of results across countries (Bargain & Orsini, 2006; Bargain et al., 2014; Blundell & Shephard, 2012; Callan et al., 2009; Christl & De Poli, 2021; Figari & Narazani, 2020; Immervoll et al., 2011; Saez, 2002).

Regarding the application of simulated behavioral response models on policy instruments targeting families with children (Brewer et al., 2006), the role of family tax credits–e.g.„ in-work benefits for parents, targeted mostly at mothers–gained particular popularity, and they continue to be implemented in various taxation systems. The aim of these instruments is typically to increase work incentives, which have given rise to multifaceted debates. Related topics cover intra-household distributional effects and gender equal-

ity issues, reduced risk of poverty, questions of fertility and consumption, or general health aspects of parents and children (Brewer et al., 2009). In countries, where the participation of women, and more so of mothers, is generally low or largely comprises only reduced hours (i.e., part-time work arrangements), the political debates on how to increase female working hours is of great interest. Different policies explicitly target two complementary elements of labor supply to various extents: increasing the working hours per week (intensive margin of labor supply) or influencing the decision to work at all (extensive margin).

The empirical literature on in-work tax credits (i.e., tax credits that only apply to working individuals) finds time, country, and sample-specific effects of those measures on families with children. For instance, Christl et al. (2022) estimate the impact of a new Austrian child tax credit instrument introduced in 2018. They find substantial positive labor supply responses for Austrian parents, especially for married mothers and single parents. Hanappi and Müllbacher (2016) also find that replacing universal child benefits with tax deductibles in Austria would substantially increase labor supply responses, especially in the case of mothers as second earners. Regarding the labor supply responses of women in the Netherlands, it seems to be the case that in general they are more sensitive to changes in the taxation system at the extensive margin, rather than the intensive margin (Bosch & van der Klaauw, 2012). At the same time, results from the analysis of in-work benefits targeted at parents point to the fact that changes in mother's labor supplies are only moderate and more prominent at the intensive margin (Bettendorf et al., 2012). Studies on non-means-tested child benefits are rare, as labor supply changes are not the primary focus of these particular policies. Nevertheless, policymakers expect adverse effects on female labor supply. According to Bruckmeier et al. (2022), increasing non-means-tested child benefits in Germany improves the labor force participation of low-income households (especially among single parents) and decreases working hours for middle and high-income households.

Although the empirical analysis of family policies with regard to country specific child-related (tax) income support measures is large, comparisons of outcomes across nations is sparse. It is oftentimes difficult to draw such comparisions because the policy measures in question are country and instrument-specific. Studies on the UK (Blundell & Shephard, 2012; Brewer et al., 2006), the Netherlands (Bosch & van der Klaauw, 2012), Germany (Bruckmeier et al., 2022), Italy (Luca et al., 2014), Spain (Ayala & Paniagua, 2018), Austria (Christl et al., 2022; Hanappi & Müllbacher, 2016) or cross-national comparisons (Brewer et al., 2009) provide some interesting insights into behavioral responses due to child-related income support policies. Yet, the overall results are inconclusive about the specific effects with respect to family policies that aim at improving labor supply of women (and especially mothers), reducing poverty risks, or intra-household dependencies. The effects differ not only across countries with divergent categorical approaches of family welfare trade-offs, but also over time and the policy measures in question.

In the present comparative family policy analysis framework, we employ a categorical conceptualization of social policies across countries. This means, that we consider countries as case studies that share similarities or are distinguished along qualitative differences, which can be operationalized in the form of typologies. One of the most persistent typologies in gendered comparative family policy research analysis is the dual-earner model for couple households, and more specifically the "one-and-a-half-earner" typology thereof (Zagel & Lohmann, 2020). The latter stresses the role of men's full-time attachment to the labor market, which serves as the primary source of household income. By contrast, women's labor market roles are seen only as secondary sources of income in partner households, because their "responsibilities" are located in the private sphere of the household, i.e., performing unpaid work. For parents in single-adult households, these spheres overlap and their economic and care giving responsibilities are even more difficult to reconcile. In our chosen case study countries (Austria, Germany, and the Netherlands), the dominant typology of work-family arrangements is the "one-and-a-half-earner" model in households with

both parents present (Dulk & Yerkes, 2016; Förster & Königs, 2020; Müller et al., 2018) and a one-earner model in single-parent households. Although the institutional contexts appear to be different in these countries, they experience the highest shares of female part-time employment within the European Union, especially among mothers (Eurostat, 2019b). It is of great interest to which degree income-related policy measures stabilize or influence the work-family arrangements within these countries. Do they compound mothers' traditional gender-specific care responsibilities or increase their opportunities?

We therefore examine the effects of two child-related income support measures on the labor supply decision of mothers in three different countries: Austria, Germany, and the Netherlands. More specifically, we ask how universal cash benefits and income-dependent tax instruments, influence the labor supply decision of mothers, given their country-specific and individual circumstances. We hereby contribute to the existing literature by conducting a comparative study on the impact of two different income support measures for families across three European countries with a particularly high share of part-time working mothers. We add to the recent discussion on the possibilities to increase female labor supply, thus decreasing *inter*- as well as *intra*-household inequalities. Those inequalities might arise from observed and unobserved differences between mothers in one-adult households and in couple households, as well as from (economic) dependencies within a family. We address these topics by simulating the ex ante labor supply responses of two separate reform scenarios, namely the abolishment of existing universal cash benefits and income-dependent tax-reduction measures. Put differently, we assess the extent to which these income-related measures have influenced observable choices of mothers' labor supply. Because particular institutional and individual circumstances matter, we want to compare the behavioral responses of mothers not only between household types, but also across countries that have similar outcomes regarding female labor supply but differ in their social cultures.

We find that the decisions of mothers to work (and how much) depend on the type of household, but that in general, income subsidies alone do not seem to play a very important role in determining the hours of work per week, as suggested by economic theory. Looking at the estimated results of labor supply elasticities, which indicate an individual's responsiveness to working more (paid) hours per week depending on changes in income, we observe only small effects, which are typically found in countries with high percentages of female participation in the labor market. We suspect other factors than income to play a more important role, which we indirectly incorporate in our individual calibration simulations of labor supply preferences. Our model confirms, that income subsidies only play a negligible role in determining mothers' labor supply.

The remaining parts of the paper are structured as follows: In section 2, we introduce the institutional framework and child-related support measures. We present our methodology and data in section 3, which includes a detailed description of the discrete labor supply modeling approach and the individual calibration framework. In section 4 we present the results of our model fit and parameter estimation outcomes after the family policy reforms, conditional on preexisting labor supply preferences. In section 5 we briefly discuss the potential limitations of our model. Finally, we summarize our findings and debate important policy recommendations in the concluding section 6.

2 Institutional framework

The political motivations and aims of different family policies have various reasons that reflect specific institutional circumstances. We take a closer look at three countries with particularly high female part-time employment shares within the European Union (Eurostat, 2019b): Austria (2019: 47% of all working women), Germany (2019: 47%), and the Netherlands (2019: 75%). In addition to their similarities in

the prevailing secondary labor market position for mothers, these countries mostly offer only insufficient opportunities for formal full-time childcare, especially regarding its affordability and quality in rural areas (Kowalewska & Vitali, 2019; Schratzenstaller, 2015).

Furthermore, conservative gender roles regarding the division of paid and unpaid work are still prevalent in Austria and Germany, resulting in mainly women taking up part-time work arrangements (Kowalewska & Vitali, 2019). Although Dutch society is generally deemed more progressive in its perceptions of gender roles, part-time arrangements still prevail to a greater extent among women and mothers. Men's engagement in part-time working arrangements in the Netherlands is significantly higher than the EU-27 average (27.9% vs. 8.4%),[1] but especially for children below school age, Dutch formal childcare facilities largely operate on part-time schedules, which are supported by leave and care arrangements that specifically favour mothers working less than full-time (Schratzenstaller, 2015). In addition, Austria has the most generous paid leave policies for mothers of all three countries, which correlates with the relatively low share of children under three years old in formal childcare arrangements. In 2019, it only amounted to 22.7%, whereas for Germany and the Netherlands it reached almost one and two thirds respectively (DE: 31.3% and NL: 64.8%)(Eurostat, 2019a).

Despite these institutional differences, Austria, Germany, and the Netherlands serve as the most similar comparative case studies for analyzing the outcome of particularly important family policy instruments regarding the financial support of families (European Commission, 2020): universal cash benefits and income taxation relief measures (i.e., tax credits or allowances). All three countries offer such benefits and target them at families with children, although their specific designs differ slightly. They all grant a non-means-tested cash benefit to parents with dependent children in full-time education in order to help with the costs of raising them: the Austrian *Familienbeihilfe* for children younger than 24 years, the German *Kindergeld* for children younger than 25 years and the Dutch *Kinderbijslag* for parents with children younger than 18 years. The base level of the benefit amounts to €114 per month for one child in Austria, €194 in Germany, and €73 in the Netherlands; however, the received overall benefits depend on the age and number of children living in the household. In 2019, this led to quite substantial annual public expenditures of €3 billion in Austria, €30 billion in Germany, and €3.5 billion in the Netherlands. Furthermore, these benefits also change the intra-household distribution of income as only one parent can claim the child benefit in all three countries. In Germany and the Netherlands, parents have to state their preferences when applying for the benefit, whereas in Austria, the *Familienbeihilfe* is automatically assigned to the mother (although it is possible to waive the benefit in favour of the other parent).

In addition, all countries offer different forms of child-related income tax-reductions. Our focus lies on three income-dependent tax instruments: the *Familienbonus Plus* (AT), the *Kinderfreibeitrag* (DE), and the *Kindgebonden budget* (NL). In general, government expenditures for the three tax-reductions are substantially smaller in terms of their overall volume as compared to the cash transfers (€1.8 billion in Austria, €3.2 billion in Germany, and €1.5 billion in the Netherlands), but may be quite substantial for individual beneficiaries. In Austria, the *Familienbonus Plus* (AT) is a tax credit granted to (self-)employed parents with children under 18 years old (€125 per month and child) and under 24 if in full-time education (€42 per month and child). Both parents can claim and split the amount of this tax-reduction in addition to the *Familienbeihilfe* if their taxable income is high enough. Germany offers the possibility of a joint tax assessment for married and cohabiting couples, the so-called *Ehegattensplitting*. This spousal splitting option reinforces traditional working arrangements, since the benefits from the joint taxation (German: *Splittingvorteil*) rise with income differences between spouses (as opposed to the opt-out option of individual taxation) and are highest in single-earner households (Schratzenstaller,

[1] In 2019, the share of part-time working men in Austria and Germany was only around 10% (Eurostat, 2019b).

2015). To mitigate the economic disadvantage of households with children, parents in Germany can either claim the cash benefit *Kindergeld* or the tax allowance *Kinderfreibeitrag*. They cannot receive both relief measures. Only if the received benefit from the tax allowance is higher than that from the *Kindergeld* is it applied.[2] In the Netherlands, parents receive the direct cash benefit *Kinderbijslag* and a so-called child allowance, the *Kindgebonden budget*. The latter functions like a tax credit but is also payable in case of low or no income (i.e., a "negative tax"). The monthly child allowance varies with household income[3] and the age of the child between €137.75 and €447. Single parents are granted an extra amount of €262 per month and child. In addition, spouses with significantly lower incomes than their partners are granted an extra benefit up to a certain income level to encourage second earners to extend their working hours.

In all three case studies, governments adapted existing or introduced new income-related family policy measures in the last decade. In Austria, the introduction of the *Familienbonus Plus* at the expense of the abolishment of another tax allowance (*Kinderfreibetrag*) was implemented in 2018. In Germany, the *Kindergeld* was reformed and increased in 2019. In the Netherlands, the *Kindgebonden budget* was introduced in 2008 to replace a previous tax credit, and extended again during a reform of financial support instruments for families in 2015. This reflects the lively discussion on the effectiveness of these particular family policy instruments that also strongly correlate with the motivation and aims of the respective governments. How these income-related policy measures influence mothers' labor supply, given the specific institutional circumstances, will be analyzed below.

3 Data and method

To estimate outcomes from ex ante policy changes, we employ a discrete labor supply framework in the form of random utility models. As stated before, these types of models are useful to assess behavioral responses of individuals in the context of hypothetical policy reforms, i.e., they ask the question "what *would* happen to Y [e.g., mothers' labor supply], *if* we were to change X [e.g., income-related policies]?" The discrete choices of weekly working hours, rather than (small) continuous adaptions per week, are more relevant for workers since they typically better reflect labor demand, and also imply a less complex computation of the budget set for each individual. First, we compute the individual utility resulting from a finite and small set of discrete working options. Second, we estimate potential changes in the utility resulting from changes in income-related family policy reforms. Third, we also take into account individual preferences for specific choices of weekly working hours that are not explained by observed characteristics. We therefore correct the discrete labor supply model with simulated unobserved preferences.

3.1 Data and sample description

Our analysis is based on the Austrian, German, and Dutch version of the European Union Statistics on Income and Living Conditions (EU-SILC). We use the 2019 wave in order to circumvent biases due to the labor market disruptions of the COVID-19 pandemic. To estimate the labor supply changes, we restrict our sample to those population groups that are considered flexible in terms of labor supply: individuals between 18 and 59 years of age, who are not self-employed, in education, military service, or recipients of old-age or disability benefits. We are particularly interested in the labor supply responses of mothers; however, we know that single mothers and mothers with partners in the household, as well as fathers,

[2] In 2022, this was roughly the case for a couple's pre-tax income above €64,000 and single parents' income above €34,000 a year.

[3] Annual household incomes higher than €20,000 are gradually–according to distinct taxable income brackets–deducted 6.75% of the maximum benefit. The reduction function operates like a progressive tariff.

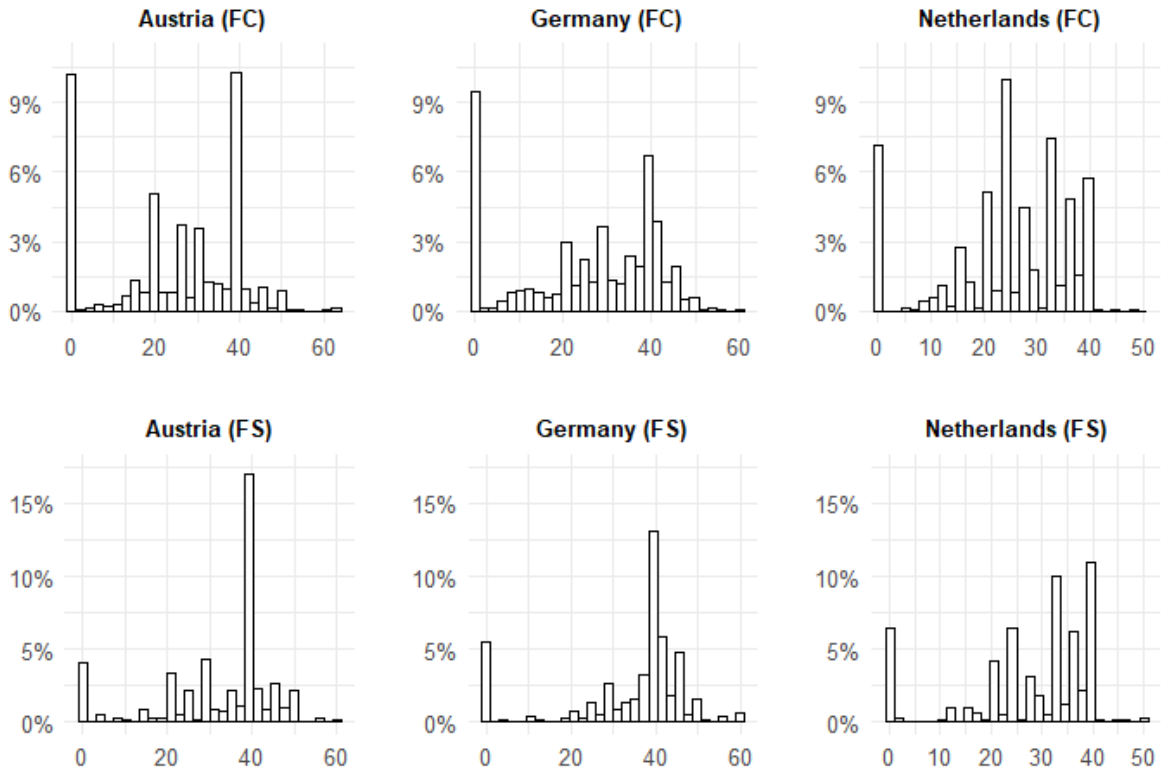

Figure 1: Frequency of weekly working hours of women in couple households (FC) and women in single-adult households (FS)

show very distinct behavioral responses (Bargain et al., 2014). Thus, we distinguish between women in couple households and one-adult households[4] (both with and without children to increase the prediction fit of our model). Due to more complex utility-maximization functions, we do not consider households with more than two adults, except if they are dependent children in full-time education. The resulting country-specific subsets consist of 993 (AT), 844 (DE), and 1,470 (NL) observations of females in couple households and 440 (AT), 452 (DE) and 602 (NL) observations of female one-adult households (see tables 1, 2, and 3 respectively). The weighted sample characteristics of the couple households are very similar for the three countries with regard to female mean working hours (between 24 and 25.5 hours per week)[5], the share of unemployed women (between 2% and 5%), and the share of households with children aged younger than 4 years (between 21% and 23%). However, we find larger differences in the shares of inactive women: in Austria (17%) and Germany (18%) the share of inactive women is significantly larger than in the Netherlands (10%). Also, monthly mean disposable income varies for couple households between roughly €4,360 in Austria, €4,460 in Germany, and €4,700 in the Netherlands and for individual female income around €1,550 (DE), €1,620 (AT), and €1,880 (NL) per month, due to different overall wage levels. Also the one-adult households are quite homogeneous: single women's mean age is between 39 (NL) and 43 years (DE), roughly 5% to 7% are inactive and 3% to 7% are unemployed, resulting in average weekly working hours between 28 (NL), and 34 (DE) and a mean monthly income between €2,098 (DE) and €2,139 (NL). The share of households with children younger than 4 years of age is very similar for Austria and the Netherlands (between 7% and 8%), but significantly lower in Germany (3%).

[4]Women with self-employed spouses are also included in the sample. We follow the approach of the empirical literature and include these women in the sample of female one-adult households. Since their partners are restricted in their flexibility of weekly paid working hours, only the women face a distinct labor supply choice.

[5]The mean weekly working hours of men in couple households amount to 38.1 hours in Austria, 41.1 hours in Germany, and 36.8 hours in the Netherlands in our sample.

In order to choose a suitable discrete choice set, we examine the distribution of weekly working hours of our sample (see figure 1).[6] We find the highest number of observations at the choice of working zero or 40 hours per week, and several part-time options in between. To offer a comparable framework and also account for the differing hour distributions of each country, we use a 7-point discretization for females in single-adult and couple households. The median working hours within the respective alternative are used as reference point, leading to the following choice set: 0 (0h), 7 (1–11h), 15 (12–18h), 20 (19–25 h), 30 (26–32h), 40 (33–40h), and 45 (41–60h) weekly working hours.

[6] A more detailed figure 2 of weekly working hours in households with and without children can be found in the appendix of this paper.

Table 1: Summary statistics (Austria)

	Female in couple household					Female in one-adult household				
Variable	Mean	SD	Median	Max	N	Mean	SD	Median	Max	N
W.hours	24.0	15.8	25.0	63.00	993	32.6	13.6	39.0	60.00	440
W.hours (cat.)	23.8	15.9	20.0	45.00	993	32.6	13.6	40.0	45.00	440
HH-income	4361.2	1933.9	4223.4	15093.70	993	2100.9	1212.3	2066.8	7889.12	440
Female income	1619.9	1152.8	1558.2	7817.10	993	2100.9	1212.3	2066.8	7889.12	440
Age	40.9	9.1	41.0	59	993	40.4	10.2	39.0	59	440
Years of school.	12.9	2.8	12.0	16	993	13.5	2.5	13.0	16	440
D: Higher educ.	3.0	16.0	0.0	1.00	993	5.0	22.0	0.0	1.00	440
D: Unemployed	5.0	21.0	0.0	1.00	993	6.0	23.0	0.0	1.00	440
D: Inactive	17.0	38.0	0.0	1.00	993	3.0	17.0	0.0	1.00	440
D: Employed PT	44.0	50.0	0.0	1.00	993	33.0	47.0	0.0	1.00	440
D: Employed FT	32.0	47.0	0.0	1.00	993	57.0	50.0	1.0	1.00	440
D: Child 0–3	22.0	41.0	0.0	1.00	993	8.0	27.0	0.0	1.00	440
No. children <18	0.9	1.0	1.0	5.00	993	0.3	0.7	0.0	4.00	440

Table 2: Summary statistics (Germany)

	Female in couple household					Female in one-adult household				
Variable	Mean	SD	Median	Max	N	Mean	SD	Median	Max	N
W.hours	25.5	16.1	30.0	60.00	844	34.1	14.6	40	60.00	452
W.hours (cat.)	25.9	16.6	30.0	45.00	844	34.4	14.6	40	45.00	452
HH-income	4458.0	1751.7	4314.6	15661.09	844	2097.8	1313.0	2102	11214.62	452
Female income	1552.6	1333.2	1353.0	11457.54	844	2097.8	1313.0	2102	11214.62	452
Age	39.7	9.5	39.0	59	844	42.6	10.4	44	59	452
Years of school.	14.5	2.9	13.0	18	844	14.5	3.0	13	18	452
D: Higher educ.	3.0	18.0	0.0	1.00	844	4.0	20.0	0	1.00	452
D: Unemployed	2.0	14.0	0.0	1.00	844	7.0	26.0	0	1.00	452
D: Inactive	18.0	38.0	0.0	1.00	844	5.0	21.0	0	1.00	452
D: Employed PT	42.0	49.0	0.0	1.00	844	22.0	42.0	0	1.00	452
D: Employed FT	34.0	47.0	0.0	1.00	844	65.0	48.0	1	1.00	452
D: Child 0–3	23.0	42.0	0.0	1.00	844	3.0	16.0	0	1.00	452
No. children <18	0.9	NA	1.0	4.00	844	0.3	0.6	0	3.00	452

Table 3: Summary statistics (Netherlands)

	Female in couple household					Female in one-adult household				
Variable	Mean	SD	Median	Max	N	Mean	SD	Median	Max	N
W.hours	24.4	11.9	24.0	50.00	1470	27.7	12.3	32.0	50.00	602
W.hours (cat.)	24.0	12.6	20.0	45.00	1470	27.8	13.0	30.0	45.00	602
HH-income	4704.0	1660.8	4492.0	14617.84	1470	2138.7	1119.7	2030.8	15015.84	602
Female income	1883.1	1170.2	1916.9	8682.03	1470	2138.7	1119.7	2030.8	15015.84	602
Age	40.4	9.7	40.0	59	1470	38.5	11.1	38.0	59	602
Years of school.	14.9	3.8	14.0	18	1470	15.2	3.7	14.7	18	602
D: Higher educ.	5.0	22.0	0.0	1.00	1470	9.0	29.0	0.0	1.00	602
D: Unemployed	2.0	15.0	0.0	1.00	1470	4.0	19.0	0.0	1.00	602
D: Inactive	10.0	30.0	0.0	1.00	1470	7.0	26.0	0.0	1.00	602
D: Employed PT	73.0	44.0	1.0	1.00	1470	64.0	48.0	1.0	1.00	602
D: Employed FT	13.0	34.0	0.0	1.00	1470	24.0	43.0	0.0	1.00	602
D: Child 0–3	21.0	41.0	0.0	1.00	1470	7.0	26.0	0.0	1.00	602
No. children <18	1.0	1.1	1.0	5.00	1470	0.5	0.9	0.0	4.00	602

3.2 Simulation of discrete labor supply choices and policy reforms using EUROMOD

We implement the ex ante policy reforms with the static tax benefit microsimulation model EUROMOD (version I4.0+), originally developed by the Institute for Social and Economic Research (ISER) and since 2021 maintained by the Joint Research Centre (JRS) of the European Commission. EUROMOD uses harmonized micro-data from the European Union Statistics on Income and Living Conditions (EU-SILC) and applies the country-specific tax and benefit rules in order to calculate individual and household disposable incomes. Disposable income is defined as the sum of market income and benefits, private transfers minus social security contributions and taxes. This allows users to simulate short-term effects on the disposable income of various changes in the particular tax and benefit system, thus providing the necessary information for the estimation of discrete labor supply models. Our analysis is based on the Dutch, Austrian and German EU-SILC (2019), as well as the policy rules of the year 2019, to simulate the potential labor supply responses to our scenarios. In addition, we estimate wages for unemployed and inactive women using a Heckman selection wage equation (see table 19 in appendix A.0.2). As we are particularly interested in the role of income-related family policies in mothers' labor supply, we analyze it by simulating the impact of already existing measures with the microsimulation model framework EUROMOD. We distinguish between child cash benefits (scenario 1) and income-related tax benefits (scenario 2).

Scenario 1 refers to the *Familienbeihilfe* in Austria, the *Kindergeld* in Germany, and the *Kinderbijslag* in the Netherlands. All three policy measures are simulated as non-means-tested cash benefits aimed at families with dependent children below 18 years (NL), 24 years (AT), and 25 years (DE), if they declared they were in full-time education. In Austria, mothers receive this benefit by default; thus, EUROMOD always assigns the benefit to the mother if she is present in the household. In Germany and the Netherlands, the parents actively choose the recipient of the benefit; thus, EUROMOD assigns it to the parent with the higher income. This results in a smaller (female) sample of beneficiaries in Germany and the Netherlands, due to the partly substantial income gap between mothers and fathers. Since married couples are always better off when they opt for joint taxation in Germany, this case is simulated in all scenarios for spouses in Germany. Approximately 98% of all mothers in couple households and 100% of all single-mothers households in Austria benefit from the *Familienbeihilfe*. In contrast, roughly 39% of mothers in couple households and 88% of single-mothers in Germany receive the *Kindergeld*, and in the Netherlands, only 16% of mothers in couple households and 58% of the single mothers receive the *Kinderbijslag*.

Scenario 2 analyzes the impact of three different child-related tax benefits in Austria, Germany, and the Netherlands on female labor supply: the tax credit *Familienbonus Plus* (AT), the tax allowance *Kinderfreibeitrag* (DE), and the child allowance *Kindgebonden budget* (NL). In EUROMOD, the Austrian tax credit is split between parents, if it does not decrease household income, otherwise the spouse with the higher taxable income receives the tax credit. In Germany and the Netherlands, the parent with the higher taxable income always receives the tax-reduction, again resulting in a very small and specific group of female beneficiaries in couple households. In our sample, 47% of all Austrian mothers in couple households and 63% of single mothers receive a tax credit. In Germany the tax allowance benefits 33% of all married or cohabiting mothers and only 22% of all single mothers. The child allowance affects 2% of mothers in couple households and 50% of single mothers in the Netherlands.

Ex ante policy analyses typically simulate effects from policy instruments that have not yet been introduced. Due to differing institutional factors, income levels, and taxation schemes, rather than increasing

the height of the income-related policy measures by a relative or absolute amount, we simulate changes from the *abolishment* of those family policy measures. Put differently, what would have happened to mothers' labor supply if they had not have received income subsidies? This way, the effects of the policies on labor supply as present in section 4 are clearer to interpret, as the correlation of working time decisions (observed choice is assumed to be optimal) and decreases in disposable income and/or wages is more certain.

3.3 Labor supply modeling and individual calibration

To assess decisions over weekly working hours, we apply a structural discrete choice labor supply model based on a random utility maximization framework proposed and extended by Aaberge et al. (1995), Creedy and Kalb (2005), McFadden (1974), and Van Soest (1995). The analysis is restricted to female individuals f (who have a partner m in the event they live in couple households), since we are particularly interested in the choices of mothers resulting from changes in family policy measures. Thus, we assume that women determine their own optimal hours of paid work per week (but in the case of couple households, they incorporate their partner's income, for instance). Put differently, women allocate their time between a discrete number of hours worked per week and the corresponding level of leisure l (leisure amounts to a maximum of 80 hours a week in the case of not working), which includes time spent on reproductive activities, such as care work, typically assumed in the economic literature. Utility is assumed to increase with more leisure and income and is restricted by the available time and the budget constraint. As stated before, individuals only maximize utility by selecting from a discrete choice set of working hours h_i and leisure L_i. labor supply is estimated with a multinomial logit model framework, which expresses utility in the form of probabilities over a finite set of choices (see appendix A.0.3 for details on the transformation). The utility for each available option i is given by a systemic part $U_i = U(Y_i, L_i, X)$, that includes observed information on choice alternatives (income and leisure) as well as individual characteristics X, and an unobserved part given by a random term ν_i, i.e., including unobserved preferences, which follows an extreme value distribution of type I. The utility of the possible labor supply options available to each female individual f can thus be expressed as:

$$U^*_{i,f} = U(h_{i,f}|X_f) + \nu_i = U_{i,f} + \nu_{i,f} \forall i, f \tag{1}$$

The systemic part of the utility function ($U_{i,f}$) follows a quadratic form with fixed costs of working part-time and interaction terms in order to consider group-specific preferences ("taste shifters"[7]). The observable part of the utility function for individual f at leisure level i can be formalized as:

$$U_{i,f} = \alpha_{(y,f)}Y_{(i,f)} + \alpha_{(y,y)}Y^2_{(i,f)} + \alpha_{(L,f)}L_{(i,f)} + \alpha_{(LL,f)}L^2_{(i,f)} + \alpha_{(L,y)}L_{(i,f)}Y_{(i,f)} + \alpha_{(y,m)}Y_{(i,m)} \tag{2}$$

The utility of females in one-adult households depends on their own disposable income ($Y_{(i,f)}$) and hours of leisure ($L_{(i,f)}$) only, whereas for women in couple households, the income of the partner $Y_{(i,m)}$ plays a role. According to specific household characteristics, the model allows consumption and leisure to vary with age, age squared, mean age of spouses, education, number of children, and presence of young

[7]Taste shifters represent group-specific preferences, e.g., mothers with young children attributing less utility to additional income than mothers with older children or women without children.

children, as introduced by taste shifter Z^f:

$$\alpha_{(y,f)} = \alpha_y + Z_y^f \alpha_y + \nu_i$$
$$\alpha_{(L,f)} = \beta_L + Z_L^f \alpha_L$$

The choice of working and leisure time defines the labor supply of each individual f for whom we simulate a disposable income ($Y_{i,f}$) (which is equal to consumption possibilities) that is defined by wage ($w_{i,f}$) and non-wage income ($y_{i,f}$) and specific sociodemographic characteristics (X_f). The tax benefit functions of disposable income in the form $f()$ is given by:

$$Y_{i,f} = f(w_{i,f} h_{i,f}, y_{i,f}, X_f) \tag{3}$$

After the specification of the model and estimation of the respective preference parameters, we adjust the simulation of labor supply decisions by individual calibration, as suggested by Creedy and Kalb (2005). This is useful, as the average preference parameters that we obtain from the multinomial logit model do not perfectly predict the observed labor supply choices of each individual. This approach allows us to optimize the probability distribution across the sample and distribution of hours worked. In order to correctly assess the results from ex ante changes in policy reform scenarios, we first calibrate the model to predict observed labor supply outcomes for all observations. Therefore, for each observation we draw a set of random error terms (that represent the unobserved preferences) following an extreme value distribution type I[8] and add them to the fitted utility predictions of each individual obtained from the average preference parameters. A draw is accepted if the probability distribution over all possible outcomes results in the observed labor supply decision being the most likely choice of all. If not, we draw another set of error terms. This simulation exercise is repeated until a set of 100 random draws leads to the observed labor supply distribution of the whole sample. This approach enables us to perfectly "predict" individual choices without any policy reform changes and is thus referred to as *individual calibration*. Due to the assumption of static preferences, the obtained set of error terms (unobserved preferences) is then used in the analysis of labor supply changes from reform scenarios. We incorporate the changes from the policy reforms into our labor supply model and estimate the expected modifications in choices of weekly working hours. Knowing that the taste for specific work arrangements varies individually, we take into account the set of random error terms and "correct" the probability distribution over all possible labor supply outcomes accordingly. The final results from this second stage, can be interpreted as the change in labor supply decisions predicted by random utility models after policy reform changes, conditional on the pre-reform preferences of individuals for specific discrete working hour choices.

4 Results

Below, we discuss the results of our discrete labor supply model, for females in couple households (FIC) and one-adult households (SF) separately. First, we focus on the fit of our model by analyzing the results of the multinomial logit regression. In this step, the model is calibrated for all females (with and without children) in couple households, as well as for all females in one-adult households (section 4.1). The results are interpreted as the average outcomes specific to each country and household type. Second, we discuss our main results of the effects of changes in family policy measures, namely scenario 1 and 2 as explained before, on female labor supply in Austria, Germany, and the Netherlands (section 4.2). Only mothers

[8]The extreme value distribution type I is defined in the multinomial logit framework; see more details in appendix A.0.3.

are affected by these policy changes; therefore, effects are simulated solely for them. In addition, we use the individual calibration approach, that takes into account personal unobserved preferences for specific choices of weekly working hours.

4.1 Model estimates and goodness of fit

To assess the fit of our model and compare the results to the existing literature on labor supply estimations, we briefly analyze the estimated preference parameters of the multinomial logit models. The utility functions are estimated for all three countries separately, as well as once for women in couple households and for women in one-adult households (see table 17 and 18 in appendix A). The discrete choice model allows us to estimate the structural parameters and the underlying probability distribution over all available working time alternatives. Overall, the results of the estimated preference parameters are in line with standard economic theory. We find positive and significant coefficients of income for the Netherlands and Austria for single households, as well as highly positive coefficients for leisure and negative estimates of leisure squared. The quadratic term indicates a decreasing effect as the level of leisure increases. The coefficient corresponding to income squared is not negative for all subsets (as would be expected by standard economic theory), but the values are extremely small in all countries. The interaction terms between leisure and income show no significant differences in the assessment of income with increasing leisure for Germany and the Netherlands. We only find significant but very small parameters for women in couple households in Austria, whereas they are slightly negative for Austrian women in one-adult households. It seems that additional hours of leisure with higher incomes is of more utility, or put differently, easier to implement, for females in couple households.

Looking at couple households, we find that the consumption or income of the male partner decreases utility for women in Austria, but increases utility for females in the Netherlands. The preference parameters for fixed costs of working part-time are negative, indicating that working part-time (in our model 7, 15, 20, or 30 hours a week) generally decreases utility for women in all specifications and countries. This could be due to disadvantages and restrictions of part-time options in the labor market (Bargain et al., 2014). However, fixed costs of working part-time are highly significant (with the exception of German women in couple households) and positive for *mothers* in all countries, indicating the additional value of working part-time when there are children in the household. These findings are also confirmed in households with young children: for both single parents and mothers in couple households, the utility of leisure (including care work) increases when there are children up to 3 years old, in some cases also for children who are between 4 and 5 years old. In addition, the estimated preference parameters show that for mothers the number of children also decreases the value of (their own) income and consumption. This effect is negatively significant for all countries and both groups (only the parameter of Austrian single parents is insignificant and close to zero). Furthermore, the value of leisure increases with the age of women in Germany and the Netherlands, whereas the value of female income decreases with the mean age of the spouses in all countries.

Using the obtained preference parameters, we are able to predict the mean weekly working hours and compare them to the observed labor supply decisions. Table 4 shows that the predicted working hours are in line with observed mean hours worked in all countries and among subgroups as the maximum average deviation amounts to 0.4 hours.

Table 4: Observed and predicted mean weekly working hours for females in couple and one-adult households

	Couple household		One-adult household	
Country	Sample	Model fit	Sample	Model fit
AT	24.0	23.8	32.6	32.6
DE	25.5	25.9	34.1	34.4
NL	24.4	24.0	27.7	27.7

4.2 Labor supply changes after family policy reforms

To simulate possible changes in labor supply caused by our reform scenarios, we employ the preference parameters obtained from our discrete labor supply model explained above. While some authors rely on average elasticity changes based solely on these parameters (Van Soest, 1995), we choose to incorporate individual preferences that perfectly explain the actual observed choices. To achieve this, we apply an individual calibration technique proposed by Creedy and Kalb (2005) as discussed in section 3.3. The changes in the optimal choice of hours worked are depicted in labor transition matrices (see tables 5 to 16) and discussed below. In appendix B, we present the uncorrected average elasticity changes resulting from the analyzed reform scenarios for the sake of comparability. In summary, the uncorrected analysis shows that the average elasticity changes differ across countries and household types, with mixed results regarding the magnitude and the direction of the labor supply responses over the hourly wage distribution.

We distinguish between two scenarios, namely those of non-means-tested cash benefits (scenario 1) and tax credits/allowances (scenario 2), as described above. The results are interpreted in line with classic economic theory, which differentiates between the income and substitution effect. In the case of changes in the disposable income due to wage differences, like in-work tax benefits (scenario 2), classic economic theory predicts that the substitution effect dominates the income effect. The substitution effect of a decrease in wage income leads to a decrease in labor supply, because leisure becomes relatively cheaper. The income effect goes in the opposite direction: because wage income has shrunk, more hours of work are needed to maintain a optimal level of utility within the changed budget constraint. More precisely, if losses of wage income are very high, leisure is relatively "cheap" but individuals make efforts to minimize adaptions of the utility level. In the case of changes in the disposable income due to non-wage income differences, such as child-related cash benefits (scenario 1), income effects dominate labor supply responses: if non-wage income decreases, labor supply increases to optimize utility under the restricted budget constraint.[9] This analysis is true only if leisure is a normal good, which is assumed in standard economic theory.[10]

Scenario 1: Cash benefits Simulating the loss of non-means-tested cash transfers as described in section 2, labor supply responses differ across countries and household types. The correction for unobserved individual preferences, which result in optimal choices of working hours in the baseline scenario, reveals that the loss of non-means-tested cash benefits affects mothers in couple households and one-adult

[9]The difference between the two streams of income, wage income changes (scenario 2) and non-wage income changes (scenario 1), is related to a rotation (as in wage income) or a shift (non-wage income) of the budget constraint, which is crucial in this analysis.

[10]Simulating income increases: The substitution effect of an increase in (i) wage income leads to an increase in labor supply, because leisure becomes relatively more expensive compared to the increased hourly wage. The income effect goes in the opposite direction: because wage income has increased, fewer hours of work are needed to maintain an optimal level of utility within the changed budget constraint. In the case of changes in disposable income due to (ii) non-wage income differences, income effects dominate: if non-wage income increases, labor supply decreases to optimize utility under the increased enhanced budget constraint.

households slightly in Austria, but to a lesser extent in Germany and the Netherlands. More specifically, especially Dutch mothers change nothing in their previous allocation of working hours (with a minor increase at the extensive margin for mothers in couple households where the income effect dominates the substitution effect, see table 9). In Germany, mothers are most likely to reduce working hours: roughly 0.4% to 0.5% of all women in one-adult or couple households would reduce their workload by 10 hours or more (tables 7 and 8). Here, the income effect does not prevail: especially mothers who previously worked 40 or 45 hours a week now reduce their working hours to 40 hours or part-time options. This finding is counterintuitive according to economic theory and reflects reactions from mothers, who seem to value less work more if non-wage income decreases, or if income decreases do not need to be compensated as much. Nevertheless, the overall effect is close to zero for all countries, which puts the magnitude of results in perspective. For Austrian mothers in couple households (table 5), the effects are largest and seem to concentrate around the extensive margin, where some mothers increase their initial working hours from 0 hours to most likely 20 hours or more, and others drop out of the labor force (after previously working 20 hours, for instance). We also see increases at the intensive margin from initially working 20 hours to 30 hours or more. Overall, the income effect is more prominent here.

The findings suggest that the effects of abolishing child transfers on mothers' labor supply are relatively small and vary by country, with Dutch mothers changing nothing in their previous allocation of working hours, German mothers and Austrian single parents slightly reducing their working hours, whereas mothers in couple households in Austria tend to slightly increase their labor supply. In summary, not all mothers react as economic theory would predict. However, the results must be considered in the context of the specific institutional circumstances and the composition of our effective household samples. It seems to be the case that Austrian single parents (especially with low wages, see appendix A) have no incentives and/or no opportunity to enter the labor market or increase their hours worked, due to either unobserved labor market restrictions or because of other institutional factors that apply, for example supplementing income (tax) incentives (e.g., *Kindermehrbetrag* or *Kinderabsetzbetrag*). Another explanation might be that in our specific sample it is not (easily) possible to compensate the income loss by an increasing working hours due to single mothers already having high working hours and/or particularly low wages.[11] In contrast, only for Austrian and German mothers in couple households and in lower and medium hourly wage deciles does the income effect dominate (see appendix C). This points to the fact that women in couple households upon a certain wage income potential do not need to compensate the decrease in non-wage income. In the Netherlands, we do not find any labor supply responses, which might stem from (unobserved) reduced income compensation possibilities or other institutional supplementing tax instruments (e.g., due to additional income supplements from the *Kindgebonden budget*). As for women in couple households, this finding might also be driven by the fact that only 16% of all married mothers receive the cash transfer, because of having higher incomes than their partners. It could also be the case that for the specific subgroups, leisure is no normal good, such that non-wage income reductions lead to a decrease rather than an increase in labor supply.

Scenario 2: In-work tax benefits The findings from the tax burden reductions are again somewhat heterogeneous, as the tax instruments in question vary in their design and thus targeted groups across countries. Comparing the results between countries, we see that the share of mothers who receive in-work benefits is highest in Austria, both for mothers in couple and single households, hence also their effects are largest in size. The share of German beneficiaries that receive the tax allowance is only around one third of all married mothers (who also earn high enough incomes), and only one fifth of all single mothers.

[11] This finding is supported by results from the analysis of the at-risk-of-poverty (AROP) rates of mothers in our samples in appendix D where more than 20% of all single mothers across our samples have equalized disposable incomes below the national poverty threshold.

These lower shares are explained by the German joint taxation assessment with the benefit allocation to the partner with the higher income, as well as the tax design that grants the *Kinderfreibetrag* only to individuals with incomes above a certain threshold. In the Netherlands only 2% of mothers in couple households profit from the *Kindgebonden budget*, due to the fact that only one parent (usually the one with higher income) receives the tax-reduction (spouses with low incomes are granted a comparatively small amount). Including an extra amount for all single parents, 50% of all female single parents receive the child allowance. Overall, although all mothers *could theoretically* be targeted, they are practically affected to varying extents by the simulated policy reform.

Looking at the transition matrices, we find that the labor supply decisions of single mothers are not affected, once the correction of individual preferences is applied. This is not the case if we do not correct for individual preferences (see table 22 in appendix B). It seems that–especially for single mothers– other factors matter more in making the decision whether or not–or how much–to work, than purely the variables considered our the model with respect to the changes brought about by the tax reform. For mothers in couple households we observe some minor labor supply changes, especially in Austria: married mothers reduce their working hours once the *Familienbonus Plus* is abolished (see table 11). This finding is in line with standard economic theory, where the substitution effect dominates the income effect. Overall, the effect amounts to 2.3% of all women in couple households in Austria changing their initial hours of work per week (mostly the targeted women working 20 to 40 hours, where the deductible is the highest). In Germany (see table 13) there is no change in weekly working hours once individual preferences are simulated. This might be due to the issues already discussed above. In the Netherlands, women enter the workforce in order to substitute the income loss, as primarily households with low disposable household income are targeted (see table 15). This small particular group has to increase their labor supply to maintain their utility levels, which outweights the substitution effect. Because of the special design of the child allowance, which serves as a (lump-sum) negative tax for low-income parents, it seems as if the tax credit operates as a "non-labor income decrease" rather than a wage-income deduction for these parents (in which case economic theory would assume a higher work intensity). Since fewer than 0.5% of all cohabiting mothers change their working hours in the Netherlands, the overall conclusion again points to the fact that the average changes in labor supply are almost negligible, once the individual preferences observed in the chosen working hours before the reforms are taken into account.

Labor supply changes after abolishing cash benefits

Table 5: Labor transition matrix (Austria, scenario 1, women in couple households)

Working hours	after reform						
before reform	h0	h7	h15	h20	h30	h40	h45
h0	21.7	0	0	0.2	0.1	0.1	0.1
h7	0	2.2	0	0	0	0.1	0
h15	0	0	5.8	0	0.3	0	0
h20	0.1	0	0	20.4	0.1	0.6	0.1
h30	0.3	0	0	0	11.6	0	0
h40	0	0	0	0	0	28.2	0
h45	0	0	0	0	0	0.1	8.0

Table 6: Labor transition matrix (Austria, scenario 1, women in one-adult households)

Working hours	after reform						
before reform	h0	h7	h15	h20	h30	h40	h45
h0	8.5	0	0	0	0	0	0
h7	0	1.8	0	0	0	0	0
h15	0	0	2.7	0	0	0	0
h20	0.5	0	0	12.5	0	0	0
h30	0	0	0	0	11.2	0	0
h40	0	0	0.2	0	0	43.3	0
h45	0.4	0	0	0	0	0	19.0

Table 7: Labor transition matrix (Germany, scenario 1, women in couple households)

Working hours	after reform						
before reform	h0	h7	h15	h20	h30	h40	h45
h0	19.5	0	0	0	0	0	0
h7	0	5.1	0	0	0	0	0
h15	0	0	5.6	0	0	0	0
h20	0	0	0	14.0	0	0	0
h30	0.1	0	0	0	12.8	0	0
h40	0	0.1	0.1	0	0.1	24.9	0
h45	0.1	0	0	0	0	0	17.5

Table 8: Labor transition matrix (Germany, scenario 1, women in one-adult households)

Working hours	after reform						
before reform	h0	h7	h15	h20	h30	h40	h45
h0	11.8	0	0	0	0	0	0
h7	0	1.3	0	0	0	0	0
h15	0	0	0.8	0	0	0	0
h20	0	0	0	5.3	0	0	0
h30	0	0	0	0	8.2	0	0
h40	0.2	0.2	0	0	0	39.4	0
h45	0	0	0	0	0	0	32.8

Table 9: Labor transition matrix (Netherlands, scenario 1, women in couple households)

Working hours	after reform						
before reform	h0	h7	h15	h20	h30	h40	h45
h0	12.3	0	0	0.1	0	0	0
h7	0	2.0	0	0	0	0	0
h15	0	0	9.2	0	0	0	0
h20	0	0	0	27.7	0	0	0
h30	0	0	0	0	25.2	0	0
h40	0	0	0	0	0	22.9	0
h45	0	0	0	0	0	0	0.5

Table 10: Labor transition matrix (Netherlands, scenario 1, women in one-adult households)

Working hours	after reform						
before reform	h0	h7	h15	h20	h30	h40	h45
h0	11.1	0	0	0	0	0	0
h7	0	0.7	0	0	0	0	0
h15	0	0	4.6	0	0	0	0
h20	0	0	0	19.6	0	0	0
h30	0	0	0	0	25.9	0	0
h40	0	0	0	0	0	36.6	0
h45	0	0	0	0	0	0	1.5

Labor supply changes after abolishing in-work tax benefits

Table 11: Labor transition matrix (Austria, scenario 2, women in couple households)

Working hours	after reform						
before reform	h0	h7	h15	h20	h30	h40	h45
h0	22.1	0	0	0	0	0	0
h7	0	2.3	0	0	0	0	0
h15	0	0.1	6.1	0	0	0	0
h20	0.4	0.2	0.4	20.3	0	0	0
h30	0.3	0.2	0.1	0.1	11.0	0	0.1
h40	0.6	0.1	0.5	0.1	0	26.9	0
h45	0.2	0	0	0	0	0	7.9

Table 12: Labor transition matrix (Austria, scenario 2, women in one-adult households)

Working hours	after reform						
before reform	h0	h7	h15	h20	h30	h40	h45
h0	8.5	0	0	0	0	0	0
h7	0	1.8	0	0	0	0	0
h15	0	0	2.7	0	0	0	0
h20	0	0	0	13.0	0	0	0
h30	0	0	0	0	11.2	0	0
h40	0	0	0	0	0	43.5	0
h45	0	0	0	0	0	0	19.4

Table 13: Labor transition matrix (Germany, scenario 2, women in couple households)

Working hours	after reform						
before reform	h0	h7	h15	h20	h30	h40	h45
h0	19.5	0	0	0	0	0	0
h7	0	5.1	0	0	0	0	0
h15	0	0	5.6	0	0	0	0
h20	0	0	0	14.0	0	0	0
h30	0	0	0	0	12.9	0	0
h40	0	0	0	0	0	25.2	0
h45	0	0	0	0	0	0	17.6

Table 14: Labor transition matrix (Germany, scenario 2, women in one-adult households)

Working hours	after reform						
before reform	h0	h7	h15	h20	h30	h40	h45
h0	11.8	0	0	0	0	0	0
h7	0	1.3	0	0	0	0	0
h15	0	0	0.8	0	0	0	0
h20	0	0	0	5.3	0	0	0
h30	0	0	0	0	8.2	0	0
h40	0	0	0	0	0	39.8	0
h45	0	0	0	0	0	0	32.8

Table 15: Labor transition matrix (Netherlands, scenario 2, women in couple households)

Working hours	after reform						
before reform	h0	h7	h15	h20	h30	h40	h45
h0	12.1	0	0	0.3	0	0	0
h7	0	2.0	0	0	0	0	0
h15	0	0	9.2	0	0	0	0
h20	0	0	0	27.7	0	0	0
h30	0	0	0	0	25.2	0	0
h40	0	0	0	0	0	22.9	0
h45	0	0	0	0	0	0	0.5

Table 16: Labor transition matrix (Netherlands, scenario 2, women in one-adult households)

Working hours	after reform						
before reform	h0	h7	h15	h20	h30	h40	h45
h0	11.1	0	0	0	0	0	0
h7	0	0.7	0	0	0	0	0
h15	0	0	4.6	0	0	0	0
h20	0	0	0	19.5	0	0.1	0
h30	0	0	0	0	25.9	0	0
h40	0	0	0	0	0	36.6	0
h45	0	0	0	0	0	0	1.5

5 Limitations

The discrete choice model approach, used in the analysis of child-related income support measures, comprises several assumptions. In its presented form, the model analyzes the optimization of the utility from income and leisure for mothers only, and does not incorporate fathers' (mostly inflexible) work preferences in couple households. Other studies estimate couple preferences (e.g., as suggested by Van Soest (1995)), because they assume that partners jointly decide on the total hours of paid work in the household and their efficient division between household members. Yet, the observed choice of working hours in couple households might not be the outcome of optimal allocation of resources but rather reflect outcomes of intra-household dependencies and power relations. Another factor neglected in the labor supply model discussed here is the role of social assistance and other social security benefits. The observed hours of work might be influenced by the availability and generosity of social security systems, which serve as an insurance against (involuntary) phases of unemployment or sickness, for example. In order to isolate the effect of income changes, unemployment benefits and social assistance payments are not incorporated in the simulation of disposable incomes. The demand-side labor market restrictions, as for instance in the case of individuals' involuntary unemployment, are also not fully taken into account in the simulations presented here. Because the focus lies on the comparison between different child-related income support instruments, the analysis of occupation and industry-specific differences might serve as interesting future research opportunities. This also holds true for the implementation of the costs and availability of childcare in the present framework, which is one of the most influential factors in determining mothers' labor supply, yet is a very complex and difficult factor to implement, e.g., due to data restrictions (Zweimüller et al., 2021). Lastly, ex ante simulations of tax and benefit policy changes rely on specific assumptions, which cannot be interpreted causally, as in quasi-experimental designs. Yet again, they give fruitful insights into possible outcomes that will most likely occur from policy changes, but they need to be interpreted in consideration of the underlying imposed assumptions.

6 Conclusion

As instruments of family policy frameworks, child-related income support measures serve manifold goals. One of them is to increase mothers' labor supply, which serves as a starting point for other related motives. Although classic economic theory implies clear derivations of changes regarding the analyzed income-related instruments for parents' labor supply, one of the major conclusions from the empirical literature–and this comparative study also–is that labor supply decisions do not always react accordingly. By focusing on more specific and thus heterogeneous sociodemographic groups, with different and complex income/leisure preferences and budget constraints, estimated outcomes of potential labor supply reactions vary across countries, household types, and income potential.

We contribute to the existing literature on discrete labor supply estimation and policy evaluation by additionally correcting for the unobserved individual preferences of women in couple and one-adult households using an individual calibration approach (Creedy & Kalb, 2005). We focus on countries with high shares of part-time working mothers and simulate the abolishment of two different forms of already existing family policy measures: cash transfers and income tax-reductions. In doing so, we not only add to the discussion on intra- and inter-household inequalities (individual behavioral choices), but also consider how the effects of comparable policies vary across different institutional and social circumstances.

For *mothers in couple households*, our results indicate that the impact of abolishing child transfers (scenario 1) on mothers' labor supply is very small but differs by institutional context. In Austria, the

income effect seems to prevail, whereas German mothers tend to decrease their working hours in response to a decrease in non-wage income, which goes against the prediction of standard economic theory. One possible explanation could be that mothers in Germany either cannot or do not have to compensate this income loss, whereas Austrian mothers in couple households seem motivated to increase their working hours and thus wage income. In contrast to this, Dutch mothers appear to change nothing in their previous distribution of paid working hours. However, the overall effect sizes (percentage of mothers in couple households that choose other working hour options) are very small, i.e., close to zero. For decreases in the wage income of mothers in couple households due to the abolition tax cuts (scenario 2), we see that in Austria the reduction tends to lead to reduced hours of work. This finding is not confirmed for Germany or the Netherlands, which might stem from the fact that fewer married mothers are able to benefit from the abolished tax-reductions in the first place, or that unobserved labor market restrictions, as well as other aspects of the design of the tax instruments, mitigate the already small incentives to change labor supply.

If *single mothers* were to experience a loss in income due to reform changes that abolish child-related cash benefits (scenario 1), our analysis shows that on average labor supply would not increase, as suggested by classical economic theory. Rather, the opposite is the case: single mothers in Austria and Germany slightly reduce their hours worked, as a result of decreased non-labor income. We conclude that, other than cohabiting mothers, these parents can not or do not have to compensate the loss in disposable income. For changes in wage income, due to the reduction in tax credits and allowances (scenario 2), it appears that mothers in single-adult households are not likely to change their working hours in any of the countries analyzed. These results are particularly interesting, as they show quite different effects of labor supply choices compared to the reactions of mothers living in a partnership. This could be due to the different needs and opportunities of single parents or how they make use of these specific family policies. In addition, our results seem to imply that besides labor and non-labor income changes, other factors appear to be more important in the determination of hours worked, such as conservative gender roles, the availability and quality of formal childcare, or other labor market restrictions, such as involuntary part-time work or unemployment.

What drives mothers' labor supply with respect to child-related income support measures? Our findings suggest that the answer depends on the household type (i.e., couple or single households) and that income changes *alone* do not seem to play the most important role in determining the paid hours of work, as suggested when solely looking at average model simulation outcomes. This is especially true for single mothers in all countries in our analysis. Other important factors appear to be more significant than changes in tax cuts or child benefits at the implemented amounts of public spending of our reform scenarios. The most visible effects of labor supply reactions are observed in Austria, where the scope and design of family policies are most favorable to mothers. Nevertheless, if the sole purpose of these instruments is to effectively increase women's labor supply through income subsidies, our results indicate that these measures are not sufficiently effective. Overall effect sizes are very small at best.

Austria, Germany, and the Netherlands all exhibit high shares of female part-time work. Although their institutional contexts might differ slightly, they all feature similar financial measures to support families with children. The two distinct benefit schemes that we analyzed do not seem to play a major role in explaining the outcomes of observed labor supply choices of mothers in these countries, according to our results. The comparative approach of this study clearly points to the fact, that this finding is not a country-specific phenomenon, but applies to all three case countries. Therefore, if policies aim to increase labor supply, we suggest that income substitution (of the amount and channels simulated in this paper) might not be the most effective way in countries with already high female part-time shares. To

see how income substitution affects the current choices of weekly working hours in paid work, or rather which *other* mechanisms seem to dominate this decision, we need to further analyze institutional factors that might have more explanatory power, such as available opportunities for mothers to increase their time in paid work (legal frameworks, childcare facilities) but also cultural attitudes and norms regarding motherhood, or family values and work. Contrary to the impact of financial incentives, these might well differ greatly by country.

We suggest that future research should incorporate more fully other seemingly relevant factors when analysing the labor supply decision of mothers. Economic theory provides interesting insights into how the supply of labor responds to changes in disposable income or wage income, but the findings of our model revealed limits to their practicality in predicting individual behavior. The observed part-time preferences of women are themselves the outcomes of observable factors (e.g., costs, quality, and availability of childcare, labor market restrictions) as well as unobservable features, i.e., individual preferences or social and cultural norms and value attitudes. Policies that affect parents' labor supply decisions must therefore combine the multiple needs and address the different circumstances of parents. We show this by incorporating the simulation of unobserved preferences in our discrete choice model. The Netherlands are a good example of how, although more progressive in terms of their gender norm perceptions than Austria and Germany, specific gender roles regarding the division of pais and unpaid work prevail with children in the household. At the same time, the country has the highest share of men working part-time of all European countries. Also, other empirical studies show that it is not solely the extension of childcare availability that might sufficiently increase mothers' career opportunities, but its social acceptance or quality are also important (Zweimüller et al., 2021). Additional policy measures to promote a more equal distribution of paid (and unpaid) work between parents could concern parental leave policies, more flexible work arrangements, but also gender-sensitive educational reforms and campaigns. Taxation, cash benefits, or something else? With regard to labor supply decisions, we conclude that, despite playing an important role in the economic consumption opportunities of families with children, income-related family policies should not be further expanded to encourage mothers to work full-time.

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Appendices

A Heckman and multinomial logit model

A.0.1 Labor supply estimation: Multinomial logit regression outcome

Table 17: Results of the multinomial logit estimation (women in couple households)

	Countries		
	AT	DE	NL
Disp. income/100	0.009	0.078	0.309***
	(0.084)	(0.064)	(0.082)
(Disp. income/100)^2/1000	3.042***	1.521***	1.283**
	(0.695)	(0.499)	(0.502)
Leisure	0.755***	0.338***	1.228***
	(0.084)	(0.064)	(0.092)
Leisure^2/1000	-6.106***	-3.570***	-10.165***
	(0.645)	(0.495)	(0.699)
Disp. income partner/100	-0.443***	0.047	0.204***
	(0.156)	(0.054)	(0.040)
Fixed cost of work	-3.017***	-1.177***	-4.402***
	(0.396)	(0.419)	(0.307)
Disp. income/100:Leisure	0.004***	0.0001	0.001
	(0.001)	(0.0005)	(0.001)
Disp. income/100:Mean age spouses	-0.005***	-0.001	-0.005***
	(0.001)	(0.001)	(0.001)
Leisure:Age/100	-0.116*	0.197***	0.061
	(0.062)	(0.055)	(0.072)
Disp. income/100:Number children <18	-0.037***	-0.045***	-0.033***
	(0.008)	(0.006)	(0.004)
Leisure:Child 0-3	0.060***	0.058***	0.034***
	(0.008)	(0.008)	(0.008)
Leisure:Child 4-5	0.014	0.021**	0.018*
	(0.008)	(0.010)	(0.009)
Fixed costs:Number children <18	0.193***	0.106	0.335***
	(0.070)	(0.080)	(0.061)
Fixed costs:Highest education	-0.028	-0.043	0.065***
	(0.026)	(0.027)	(0.016)
Observations	993	844	1,470
Log Likelihood	-1,608.663	-1,401.327	-2,297.970

Note: *p<0.1; **p<0.05; ***p<0.01

Table 18: Results of the multinomial logit estimation (women in one-adult households)

	Countries		
	AT	DE	NL
Disp. income/100	0.220***	0.013	0.171***
	(0.070)	(0.086)	(0.057)
(Disp. income/100)^2/1000	-1.402***	1.923**	-0.671
	(0.497)	(0.981)	(0.438)
Leisure	0.660***	0.201**	1.166***
	(0.103)	(0.090)	(0.097)
Leisure^2/1000	-5.705***	-2.316***	-10.300***
	(0.851)	(0.732)	(0.786)
Fixed cost of work	-1.421**	-2.878***	-4.078***
	(0.640)	(0.739)	(0.477)
Disp. income/100:Leisure	-0.002**	0.001	-0.001
	(0.001)	(0.001)	(0.001)
Leisure:Age/100	0.052	0.162***	0.196***
	(0.038)	(0.043)	(0.034)
Disp. income/100:Number children <18	0.005	-0.059***	-0.024***
	(0.015)	(0.013)	(0.008)
Leisure:Child 0-3	0.062***	0.082***	0.053***
	(0.017)	(0.025)	(0.018)
Leisure:Child 4-5	0.063**	0.008	-0.023
	(0.026)	(0.026)	(0.018)
Fixed costs:Number children <18	0.486***	0.577***	0.403***
	(0.168)	(0.196)	(0.118)
Fixed costs:Highest education	-0.098**	0.027	0.021
	(0.045)	(0.049)	(0.025)
Observations	440	452	602
Log Likelihood	-661.462	-604.519	-934.872

Note: *p<0.1; **p<0.05; ***p<0.01

A.0.2 Wage estimation: Heckman selection models

Table 19: Results of the Heckman model outcome equation

	Dependent variable: log(wage)		
	AT	DE	NL
	(1)	(2)	(3)
Age	0.060***	0.099***	0.096***
	(0.013)	(0.007)	(0.006)
Age^2	-0.0004***	-0.001***	-0.001***
	(0.0002)	(0.0001)	(0.0001)
Work experience	-0.0003*	0.002***	0.002***
	(0.0002)	(0.0001)	(0.0001)
Education: tertiary	0.275***	0.341***	0.300***
	(0.036)	(0.029)	(0.026)
Never married	-0.023	0.084***	-0.029
	(0.045)	(0.028)	(0.027)
Seperated/divorced	-0.044	0.055*	0.050
	(0.050)	(0.028)	(0.031)
Children <4	-0.293***	-0.228***	-0.011
	(0.076)	(0.045)	(0.039)
Constant	1.307***	0.429***	0.716***
	(0.270)	(0.156)	(0.129)
Observations	2,715	4,804	4,763
ρ	-1.046	-1.374	-1.845
Inverse Mills ratio	-1.031***(0.164)	-1.077***(0.191)	-1.969***(0.253)
Note:			*p<0.1; **p<0.05; ***p<0.01

A.0.3 Labor supply modeling: Multinomial logit specification with the extreme value distribution of the error term

Following the explanation in Creedy and Kalb (2005) and Ayala and Paniagua (2018) show how utilities are transformed into probability distributions over a discrete set of working choices within the multinomial logit approach.

The decision for option i over j ($\forall j \neq i$) is true if:

$$\nu_j < \nu_i + U_i - U_j \tag{4}$$

The probability that option i generates the highest utility is given if:

$$\prod_{j \neq i}^{n} P(\nu_j < \nu_i + U_i - U_j) \tag{5}$$

This equals a probability distribution for a special case of the (continuous) error term distribution:

$$p_i = \int_{-\infty}^{+\infty} \left[\prod_{j \neq i}^{n} F(\nu_i + U_i - U_j) \right] f(\nu_i) d\nu_i \tag{6}$$

Which is subject to a specific density function f(ν) and distribution function F(ν) following the extreme value distribution:

$$f(\nu) = e^{-\nu} e^{-e^{-\nu}} = exp(-\nu - e^{-\nu}) \tag{7}$$

$$F(\nu) = e^{-e^{-\nu}} \tag{8}$$

Which can be expressed in a more general form f(y):

$$f(y) = \frac{1}{\beta} exp(-\frac{y-\mu}{\beta}) exp(-e^{\frac{y-\mu}{\beta}}) \tag{9}$$

After transformation of $\mu = 0$ and $\beta = 1$, as well as inserting equation (7) in (6):

$$p_i = P(h = h_i) = \frac{e^{U_i}}{\sum_{j=1}^{n} e^{U_j}} \tag{10}$$

B Own-wage elasticities

Based on the preference parameters of the discrete labor supply model, we estimate how a change in own-wage rates affects the labor supply of females in couple households and one-adult households (Bargain et al., 2014; Bargain & Peichl, 2016; Blundell et al., 2013). To do so, we first simulate a 1% and 10% increase in gross hourly wages[12] and second, analyze how much the estimated average working hours change due to the wage increase. For females in couple households and one-adult households results are shown in table 20.

For married or cohabiting women, an increase in own wages results in a positive change of total hours worked, as indicated by the first column in table 20. This is in line with standard economic theory. In Austria the own-wage elasticity of total hours worked is 0.21%. For Germany and the Netherlands, this finding is marginally larger, resulting in an increase of 0.25% and 0.34%. Generally speaking, these elasticities are very small; nevertheless, it seems that women in Germany and the Netherlands are slightly more flexible than Austrian women in couple households. The displayed results are generally in line with findings from comparative international literature on labor supply elasticities for cohabiting or married women (Bargain et al., 2014). Some deviation might arise from year-specific as well as country-specific features of the sample characteristics or because of methodological specifications (Bargain & Peichl, 2016). Although there is some dispersion of the results on wage elasticities of women in the literature, traditionally countries with higher female labor force participation, seem to have lower wage elasticity levels, i.e., respond less to changes in labor income. These findings are confirmed in our models for Austria, Germany, and the Netherlands. Besides the average change in total hours, the probability of entering or leaving the labor market might also be affected by an increase in wages, which is expressed as the participation elasticity. The results reveal that the changes in the probability of working are roughly the same for Austria and Germany and amount to an increase of 0.4 to 0.5 percentage points, whereas in the Netherlands, the increase exceeds the one percentage point mark. Analyzing changes in hours worked grouped by hourly own-wage deciles (see table 21), elasticities in general tend to rise along the wage distribution. Put differently, women with low hourly wages respond with smaller hour increases (less flexible) than women with high wages (more flexible) on average.

Turning to women in one-adult households, estimations of total hour and participation elasticities are smaller than in couple households. This finding is typical, since their responses are usually less flexible due to single income streams. Again, the labor supply responses to a 1% wage increase are the smallest for Austria (0.11% increase in average hours worked), compared to a 0.22% and 0.19% increase in Germany and the Netherlands. The participation elasticities are higher than the wage elasticities, and even higher than for women in couple households (with the exception of the Netherlands). Splitting female one-adult households into hourly wage decile groups (table 21), we see different effects over all countries: for Austria, total hours elasticities are rather constant between the first and ninth decile of the wage distribution and negative for the top 10% of hourly wage earners. We find a rather increasing pattern for Germany up until the fifth decile, afterward fluctuating around a 0.26% increase. In the Netherlands, elasticities slightly increase in the first part of the wage distribution and decrease again for the top decile. The effects for female single households vary over countries and do so slightly more than when compared to couple households, suggesting that wage increases result in less homogeneous effects in one-adult households. However, the average effect size is relatively small, as female one-adult households are in general less flexible than women in couple households.

[12] Since the results from a 1% wage are roughly linear with a 10% increase, we discuss results from a 1% wage increase only.

Table 20: Total hours and participation elasticities: 1% wage increase (women in couple and one-adult households)

	Couple household		One-adult household	
Country	Total (%)	Participation (%p.)	Total (%)	Participation (%p.)
AT	0.210	0.54	0.113	0.585
DE	0.253	0.41	0.219	0.979
NL	0.342	1.15	0.185	0.842

Table 21: Total hours elasticities grouped by hourly wage deciles: 1% wage increase (women in couple and one-adult households)

	Couple household			One-adult household		
Deciles	AT	DE	NL	AT	DE	NL
D1	0.021	0.023	0.245	0.092	0.072	0.156
D2	0.400	0.102	0.317	0.209	0.146	0.132
D3	0.194	0.160	0.294	0.152	0.230	0.175
D4	0.111	0.112	0.260	0.144	0.217	0.197
D5	0.101	0.214	0.299	0.134	0.270	0.182
D6	0.137	0.251	0.332	0.138	0.263	0.228
D7	0.099	0.296	0.344	0.128	0.252	0.237
D8	0.146	0.351	0.382	0.128	0.287	0.206
D9	0.368	0.510	0.423	0.100	0.180	0.207
D10	0.513	0.506	0.523	-0.094	0.266	0.131

C Average elasticity changes of family policy reforms

For the sake of comparability, we want to analyze the effects of different family policy measures in Austria, Germany, and the Netherlands, using average elasticity changes, following Van Soest (1995).[13].

Scenario 1 Simulating the loss of non-means-tested cash benefits as described in section 2, we find that the average elasticity changes differ across countries and household types. Whereas the loss of disposable income is related to an increase in total hours worked for married and cohabiting women in Austria and the Netherlands, women in Germany respond on average with a decrease in weekly working hours (see table 22). This implies, that for married mothers in Germany the income effect does not prevail on average. Looking at the average elasticities along the wage distribution (see table 23), a clearer picture emerges: income effects dominate the elasticity outcomes primarily in the bottom deciles of the hourly wage distribution. For Austria, especially the first to the third decile seem to dominate the overall elasticity of total hours worked. This implies that the loss of *Familienbeihilfe* leads to higher levels of hours worked to maintain a certain level of utility for women with low hourly wage levels. This result is also reflected in the high participation elasticity estimate. The effect of *Kindergeld* in Germany is similar but smaller in size. In both countries, the income effect is not predominant for mothers in high hourly wage deciles (in Germany also not for medium hourly wage earners), where it seems to be the case that non-wage income losses do not have to be compensated as much. In the Netherlands, decreases in the *Kinderbijslag* lead to income effects for all wage deciles, i.e., compensating reductions in disposable income by working more hours. This could stem from the fact that only mothers in couple households with higher incomes than their spouses claim the cash benefit (since the benefit is paid to the parent with more income). Consequently, this particular group has only relatively low levels of aggregate disposable household income, resulting in the necessity to increase working hours in order to maintain their utility levels (independent of the wage level). Although the share of recipients in Germany is also relatively low compared to Austria, this explanation seems to be relevant only for mothers in the first two hourly wage deciles.

Turning to single mothers (table 22), the results in all countries do not point towards predominant income effects. The loss of disposable income results in fewer hours worked, rather than an increase in labor supply. The size of the resulting total hours elasticity varies along the hourly wage distribution and across countries (see table 23). Whereas small positive income effects are present in the bottom decile for single mothers in Germany, elasticities are small and negative for the Netherlands and largely negative for Austrian single mothers in this case. Austrian single mothers in low wage deciles further reduce hours or exit the labor market entirely, despite their initial wage levels already being low. According to standard economic theory, a reduction in non-wage income should lead to the opposite effect.

[13]Moreover, we estimated own-wage elasticities to provide a general idea of how wage increases affect the labor supply of women in couple households and one-adult households (see appendix B).

Table 22: Total hours and participation elasticities: Scenario 1 (women in couple and one-adult households)

	Couple household		One-adult household	
Country	Total (%)	Participation (%p.)	Total (%)	Participation (%p.)
AT	2.072	2.561	-0.379	-1.646
DE	-0.392	-0.616	-0.303	-1.477
NL	0.534	1.440	-0.081	-0.355

Table 23: Total hours elasticities grouped by hourly wage deciles: Scenario 1 (women in couple and one-adult households)

	Couple household			One-adult household		
Decile	AT	DE	NL	AT	DE	NL
D1	10.921	0.145	0.333	-1.935	0.101	-0.020
D2	6.225	1.050	0.145	-1.175	-0.210	-0.050
D3	2.404	-0.111	1.831	-0.165	0.164	-0.081
D4	1.398	-0.038	0.166	-0.057	-0.329	-0.146
D5	0.749	-0.177	0.317	-0.100	-0.539	-0.135
D6	0.540	-0.489	0.315	-0.297	-0.498	-0.076
D7	0.258	-0.630	0.474	-0.149	-0.389	-0.139
D8	-0.095	-0.532	0.677	-0.075	-0.577	-0.086
D9	-0.666	-1.233	0.517	-0.042	-0.097	-0.039
D10	-0.817	-1.861	0.554	0.170	-0.647	-0.036

Scenario 2 The results from the tax burden reductions indicate that a decrease in disposable income due to changes in taxation schemes (i.e., wage income), leads to negative labor supply responses for Austrian and German mothers (in couple as well as one-adult households). In contrast, we observe a positive effect for mothers in the Netherlands. Our results show that this small particular group has to increase their labor supply to maintain their utility levels, which outweights the substitution effect. In many respects, it seems that especially for mothers with low wage income opportunities, the child allowance operates as a "non-labor income decrease" rather than as a wage-income deduction (which in the case of negative tax credit deduction indicates a higher work intensity). This is not the case for Austrian and German mothers, as primarily women with higher income or high-income partners are affected by these particular policy measures, thus decreasing their individual labor supply if the tax incentives are abolished. This deduction is highest for mothers with high income, but relatively to their incomes, mothers with lower incomes might benefit more.

Looking at single mothers, the changes in average elasticities are similar to mothers in couple households, even though their magnitude is substantially smaller. Moreover, the effects are more nuanced when considering different labor supply responses over the hourly wage distribution. In Austria, the wage income reduction leads to a decrease in labor supply, with the exception of the tenth decile of the wage distribution, which shows a small positive effect on average working hours (here income effects seem to dominate the substitution effect). In Germany, the effects for single parents are almost zero, except for the negative result in weekly working hours in the tenth decile, where more mothers are directly affected by the abolishment of the tax allowance (only then is the income high enough). In the Netherlands, single mothers who claim the tax benefit, decrease their labor supply in the absence of this instrument to maintain their utility levels within the first three deciles of the hourly wage distribution; however, the effect is positive for mothers from higher wage deciles. It seems that they can compensate the wage

income losses from tax rate deductions more easily.

Table 24: Total hours and participation elasticities: Scenario 2 (women in couple and one-adult households)

	Couple household		One-adult household	
Country	Total (%)	Participation (%p.)	Total (%)	Participation (%p.)
AT	-3.904	-7.144	-0.189	-0.658
DE	-0.307	-0.516	-0.020	-0.081
NL	0.786	4.306	0.148	-0.066

Table 25: Total hours elasticities grouped by hourly wage deciles: Scenario 2 (women in couple and one-adult households)

	Couple household			One-adult household		
Decile	AT	DE	NL	AT	DE	NL
D1	0.000	-0.004	1.180	-0.033	0.000	-0.052
D2	-2.479	-0.130	0.684	-0.952	0.029	-0.117
D3	-7.051	-0.081	2.532	-0.141	-0.011	-0.097
D4	-5.872	-0.161	0.779	-0.124	0.033	0.081
D5	-3.817	-0.217	0.453	-0.099	-0.066	0.162
D6	-5.111	-0.281	0.389	-0.286	-0.004	0.219
D7	-4.607	-0.389	0.752	-0.236	-0.003	0.388
D8	-4.521	-0.442	0.453	-0.104	-0.014	0.369
D9	-3.990	-0.657	0.374	-0.063	-0.041	0.237
D10	-1.525	-0.700	0.255	0.122	-0.119	0.288

D Poverty

Regarding the motive of poverty reduction behind income-related child benefits, table 26 displays changes in the shares of mothers in or at risk of poverty (AROP) across all countries, if either the universal cash benefit or the tax instruments are abolished. In Austria, the share of mothers below or at the AROP threshold[14] in couple households increases from 4.2% to 4.9% (a 0.7 percentage points increase if either the *Familienbeihilfe* or the *Familienbonus Plus* is abolished). For single mothers the relative increases are somewhat higher (1.5 and 1.2 percentage points), despite already being at higher rates than in couple households. Almost one fifth of all Austrian single mothers earn incomes below the AROP threshold.[15] This number increases for German single mothers to slightly over two fifths. Here, *Kindergeld* in particular makes a difference to the poverty incidence of single mothers (wheres the tax instrument only benefits middle-income earners). Generally speaking, the universal cash benefits perform better in reducing (the risk of being in) poverty than all tax instruments. This seems obvious, since they are non-means-tested benefits, but especially for mothers in couple households, this issue is often underexposed. One exception to this rule are single mothers in the Netherlands, because the *Kindgebonden budget* includes an additional amount for single parents, which is also received in the event of low or zero incomes (i.e., as a negative tax payment). Therefore, the amount of the benefit is significantly greater than the *Kinderbijslag* (NL) benefits. However, the issue of old-age poverty among women due to them having interrupted employment histories and reduced working hours as a result of them carrying out (unpaid) care work is a very concerning topic that is neither effectively addressed nor mitigated by such benefits or tax deductions. Indeed, this issue is generally much less widely addressed in poverty analyses of this kind, which tend to have a contemporary focus rather than considering potential long-term impacts once the affected women reach retirement. This should be made the subject of future research.

Table 26: Share of mothers in or at risk of poverty before/after the reform scenario changes 1 and 2

	Couple household			One-adult household		
Country	AROP rate (%)	Δ reform I (%p.)	Δ reform II (%p.)	AROP rate (%)	Δ reform I (%p.)	Δ reform II (%p.)
AT	4.2	0.7	0.7	21.5	1.5	1.2
DE	2.1	0.4	0.0	43.9	6.5	0.0
NL	3.4	1.1	0.8	25.2	3.7	6.9

[14]For the year 2019, the monthly at risk of poverty threshold–measured as 60% of the median equivalized net household income per country–amounts to €1,286 in Austria, €1,176 in Germany, and €1,090 in the Netherlands.

[15]The specific shares must be interpreted as relative percentages of mothers AROP in the specific sample analyzed. As described in section 3.1, we do not include mothers who earn some sort of self-employed income. Therefore, these shares must be understood within the context of this study and are likely higher when estimated for the whole population subgroup.

E Supplementary figures

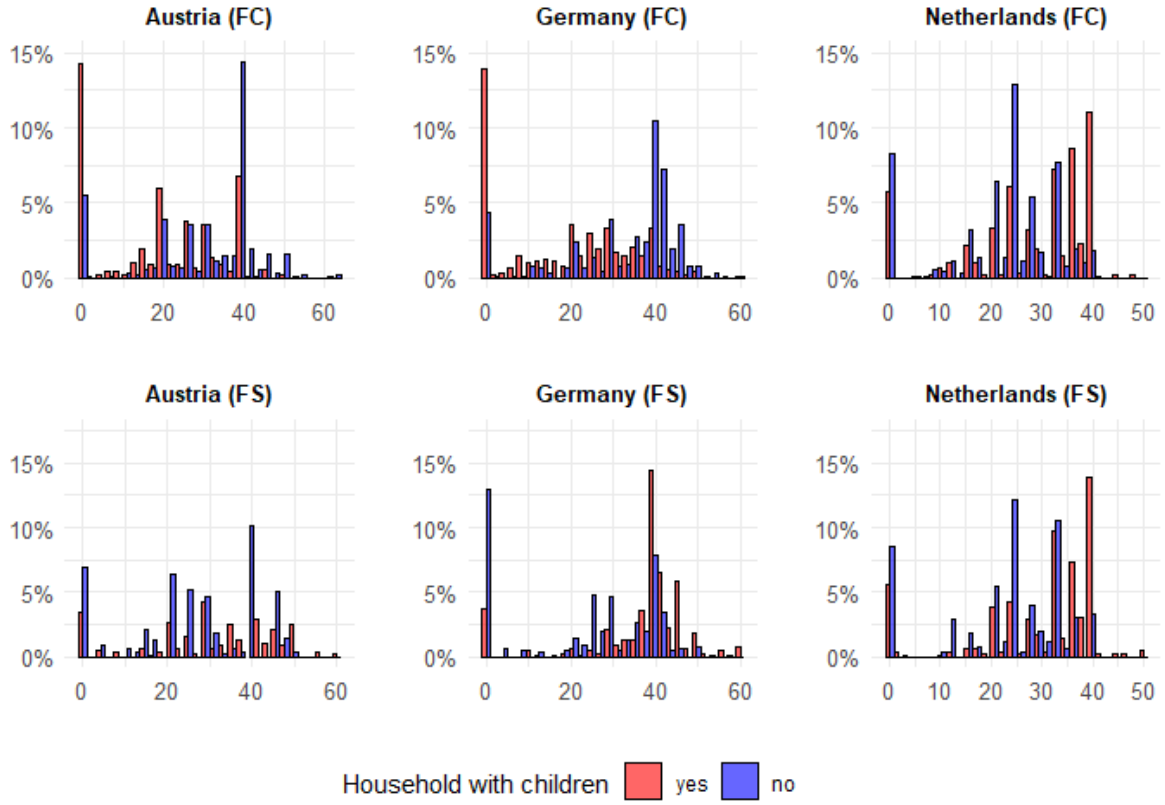

Figure 2: Frequency of weekly working hours of women with and without children in couple households (FIC) and in single-adult households (FS)