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Taking from the Disadvantaged? Consumption Tax Induced Poverty Across Household Types in 11 OECD Countries

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Abstract

Consumption taxes are a pivotal yet largely unaddressed policy tool that shape the income distribution and potentially thwart the redistributive goals of social policy. Previous research showed how consumption taxes can elevate inequality and poverty on the macro level. However, different household types might be affected differently due to diverging income positions and consumption needs. In this study, I aim to examine the change in income poverty across household types when accounting for consumption tax payments. To address my research interest, I draw on harmonised data from 11 OECD countries provided by the Luxembourg Income Study (LIS). I estimate implicit indirect tax rates from national accounts and investigate poverty rates of household types before and after subtracting consumption taxes. Using logistic regression models, I scrutinise the probability of falling under the poverty line due to consumption tax payments. The results indicate significant variation in poverty changes across household types. In most countries, people in large families and single parent households have a higher probability of falling under the poverty line when compared to couple households. Ultimately, results from linear probability models with country-fixed effects indicate that the consumption tax rate is positively associated with the elevation in poverty for single parents.

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Introduction

For the last 50 years, taxes on consumption have been on the rise in many countries. Consumption taxes are taxes and excises levied on the purchase of goods and services. In contrast to income taxation, consumption taxes accrue when a household spends its disposable income on consumption. Therefore, inequality and poverty measures of disposable income do not take consumption tax payments into account. In a globalised economy, consumption taxes allow states to secure a steady source of revenue because the consumption of households is less mobile than, for instance, capital. It was, thus, quite extraordinary when the German federal government announced an unexpected temporary cut of the value-added tax (VAT) rates as part of the stimulus package against the economic impact of Covid-19 in 2020. Economists quickly pointed out how a cut in VAT-rates could not only boost private consumption but also particularly help the poor (Bach, 2020).

Like most social policy instruments, consumption taxes affect what households can or cannot afford. Poor households pay a higher share of their disposable income in consumption taxes simply because the share of income spent on consumption does not increase proportionally with income. By affecting different strata differently, consumption taxes contribute to the redistribution of income, which is a core domain of social policy. By particularly assigning a burden on the poor, consumption taxes, however, often undermine the redistributive goals of social policy (Collins et al., 2020). Therefore, social scientists interested in redistribution tend to overestimate the resources of households when looking at disposable income. Hence, I argue that to properly address the life chances of individuals and the way social policy influences them, consumption taxes have to be taken into account – and particularly so at the lower end of the distribution.

Poor individuals, high consumption expenditures and, hence, consumption taxes, are not randomly distributed across household types. Some types of households are more exposed than others because they have systematically lower income levels and persistently higher consumption needs. In particular, single parent households and large families are more prevalent among the poor. Couples might be affected less by consumption taxes due to similar consumption patterns, while large families and single parents might not benefit from economies of scale in the same way because family members have substantially different consumption needs (for instance, schooling equipment expenses, age-dependent clothing or even diapers). Thus, I argue that the consumption tax vulnerability, that is the impact of consumption taxation on poverty, differs across types of households. Differences in consumption tax vulnerability matter because politicians may not be aware of the particular burden some household types have to bear and, therefore, neglect the significance of consumption taxes for social participation. The study at hand, therefore, aims at examining the relevance of consumption taxes for poverty across household types.

Previous research has largely neglected the impact of consumption taxes on inequality in general and poverty in particular. While social scientists provided detailed examinations of the anti-poverty effects of social benefits (Nelson, 2004), little scrutiny is available regarding consumption taxes. Foremost, this is due to problems with the availability of income and expenditure data (Blasco et al., 2020) as well as methodological challenges such as the estimation of consumption tax payments. Still, some studies address the crucial relevance of consumption taxes for the poor (Newman and O'Brien, 2011) or estimate their impact on inequality at the country level (Blasco et al., 2020). Regarding the effect of consumption taxes on poverty rates, some empirical evidence is available on a national case study basis (Cabrera et al., 2015) or for developing countries only (Lustig et al., 2014), but this research does not distinguish between different household types.

How consumption taxes are linked to poverty within developed countries remains unclear.

Since income positions and consumption patterns differ systematically across household types, an examination of consumption taxes across types of households is of particular interest because poverty rates of household types may be affected differently. Looking only at the overall pattern could overlook the variations in vulnerability across household types. Furthermore, because taxes on consumption vary greatly across countries, a comparative setting should provide additional insights in the role of consumption taxes. Due to this cross-national variation, a comparison of public redistribution and poverty levels across countries without taking into account consumption taxes provides only an unfinished picture. Therefore, this article aims at addressing the research interest of *how consumption taxes elevate poverty across household types and countries*.

To address poverty due to consumption taxes, I calculate poverty rates that emerge after subtracting consumption taxes paid from disposable household income. This is sometimes referred to as *consumable household income* (Lustig, 2018). Following the approach of Eurostat when examining the change in poverty that is due to housing costs or public transfers (Eurostat, 2018; Maestri, 2015), I fix the poverty line at 50 percent of median disposable household income to calculate poverty rates after deducting consumption taxes. By definition, therefore, this measure of *consumable income poverty* will be above the disposable income poverty level. I estimate the increase in poverty for different household types. In addition, I evaluate the probability of *consumption tax induced poverty* for different household types – that is the probability of non-disposable income poor households of falling under the fixed poverty line due to their consumption tax payment. I examine the difference in the probability of consumption tax induced poverty of small families, large families, single-parents and singles compared to couples without children, where 'small families' refer to couples with less than three children and

'large families' to those with three or more. Ultimately, I address the association of the consumption tax rate and consumable income poverty as well as consumption tax induced poverty for every household type.

To exploit the comparative setting, I examine consumption tax induced poverty across 11 OECD countries that show substantial variation in consumption tax rates. To this end, I rely on harmonised income and expenditure data from the Luxembourg Income Study. Furthermore, I draw on OECD statistical data from national accounts. To estimate taxes on consumption, I apply the Eurostat procedure of calculating implicit indirect tax rates by dividing total national household expenditures by consumption tax revenue (for further details, see Quest et al., 2019).

By examining consumption tax induced changes in poverty for different household types in different countries, this article contributes to our understanding of the social and economic consequences of consumption taxes. More specifically, this study examines how different types of households are affected differently and, hence, provides valuable evidence for policymakers.

Previous research

Recently, scholars addressed the relevance of the tax mix for income inequality at the macro level (Iosifidi and Mylonidis, 2017). Within the last years, however, taxation as a means of social policy has been on the rise (Ruane et al., 2020). Within the field of the socio-economic consequences of tax policy, consumption taxation, however, remained largely overlooked. Due to the low availability of reliable income and expenditure data on the cross-national level, comparative research on consumption taxes is scarce. Because consumption is often used as an indicator for the standard of living in the developing world, existing research on indirect taxation often focused on non-OECD countries

(Lustig et al., 2014). Most literature on the topic, however, looks at post-consumption tax inequality at the macro-level only (Decoster et al., 2010). These studies highlight the regressive nature of indirect taxes and, hence, their particular burden on the poor (Newman and O'Brien, 2011). Nevertheless, Family Sociology and Family Economics have lamented the lack of attention towards the role of consumption taxes in the redistributive effort of taxes and public transfer systems when investigating poverty rates for different types of households (Maldonado and Nieuwenhuis, 2015; Rothwell and McEwen, 2017). This article aims at filling this gap.

Regressivity and inequality

Previous research uniformly highlighted the regressive nature of indirect taxes (Prasad and Deng, 2009; Ruane et al., 2020). In general, a tax is called 'regressive' when the share of income spent on the tax decreases with income. Studies evaluated the regressivity of consumption taxes and the corresponding distribution of indirect tax burdens across the income strata (Decoster et al., 2010). National case studies provided compelling evidence of how consumption taxes elevate the Gini index (Rossignolo, 2018). Others examined the overall change in income inequality that emerges after taking consumption taxes into account across a wide range of countries (Blasco et al., 2020). They estimate a rise in the Gini index due to consumption taxes of about 0.03 at the mean. However, the change in inequality that is due to consumption taxation provides only a general picture. While a change in Gini could also come from changing patterns in the upper income strata, the focus on poverty enables me to particularly address those to who consumption taxes do the most harm.

Poverty

As Martin and Prasad (2014) pointed out, we still know little regarding how taxes affect the poor. This is particularly true for regressive consumption taxes. Starting from a

historical perspective, Newman and O'Brien (2011) impressively document the lasting reliance of the Southern U.S. states on regressive taxes and the corresponding implications for the poor. Nevertheless, taking an international perspective, consumption taxes are rather low in the U.S. Comparative literature emphasises that consumption taxes are higher in European countries, particularly in the Scandinavian welfare states (Prasad and Deng, 2009). Other studies highlight the distributional effects of singular indirect taxes such as a carbon tax (Berry, 2019). Most research on poverty and indirect taxation, however, examines its effects in developing countries only. These studies are mainly attributed to the 'Commitment to Equity' project, which aims at reducing inequality and poverty by providing comprehensive tax incidence analysis for policymakers (Lustig, 2018). Scholars of the project provided invaluable insights into the modification of poverty due to consumption taxation. They show an increase in poverty rates in Argentina (Rossignolo, 2018), Brazil (Pereira, 2018), Chile (Martinez-Aguilar et al., 2018), and many other Latin American, African, and Arabic countries due to consumption taxes (Lustig, 2018). A major focus of these studies is how the modification of poverty varies between rural and urban regions and among ethnic groups (see, e.g., Cabrera et al., 2015).

Methodologically, these studies focus on extreme poverty lines, such as having disposable income below \$2.50 per day. They, therefore, hold the poverty line constant before and after the subtraction of indirect taxes. While applying an extreme poverty concept to European countries does not seem fruitful, the idea of a fixed poverty line could provide valuable insights in the change in poverty rates when subtracting consumption taxes.

Besides the scarce research on consumption taxes and poverty, there is a bulk of literature on poverty and welfare state efforts, examining for instance social expenditure and poverty (Caminada et al., 2012) or poverty and social rights (Alper et al., 2020). Furthermore, studies scrutinised the significance of social policy systems for single-

mother poverty (Brady and Burroway, 2012; Chzhen and Bradshaw, 2012). In addition, previous research evaluated poverty and social policy by addressing policy instruments separately (Leventi et al., 2019) or in the light of targeting and universalism (Brady and Bostic, 2015). For an overview of how policy and institutions shape poverty, see Brady and Burton (2017). While these and many other studies provided invaluable insights into the reduction of poverty due to tax and transfer systems, they did not consider consumption taxes.

Hence, an examination of variations in poverty due to indirect taxation across household types is still missing. If different household types are affected differently due to their household composition, then redistribution through consumption taxes is not just about vertical inequality but about penalising specific family formations. Thus, in the following, I will elaborate briefly on the main conceptual determinants of differences across household types.

Conceptual background

The effects of indirect taxation on the poverty rates of different types of households might differ from the overall findings of increased inequality and poverty in previous literature due to two major factors: First, household types are not distributed equally across the income strata, with some types of households being more prevalent among the poor than others. Second, types of households have systematically different consumption patterns, depending on the similarity of consumption needs and economies of scale. In addition, cross-country differences in indirect tax rates should lead to further variations in consumption tax induced poverty among household types across countries.

Income position

As we know from the labour market literature, single parents are particularly prevalent among the poor, while couples generally enjoy positional advantages (Maldonado and Nieuwenhuis, 2015). In general, the lack of a second earner and shared childcare and homemaking arrangements provide difficulties in time and money management. Because the vast majority of single parents are women, gender disparities might foster these structural employment disadvantages. Nevertheless, large families are known as well to be more likely at risk of poverty. For instance, in families with three and more children, mothers' educational attainment tends to be lower and early childbearing higher in the UK (Bradshaw et al., 2006). Both patterns affect labour market earnings and, hence, increase the probability of poverty (Laird et al., 2018).

In the present study, the mean equalised disposable household income of the five household types reflect these patterns. With a mean equalised monthly income of $23 000 in purchasing-power-parity adjusted US dollars across countries, couples are on average better off than all other household types although little different from small families ($22 900). Singles ($17 600) and large families ($19 700) on average have a lower income, with single parents ($16 400) being the worse positioned household type across countries. Noteworthy, disposable household income does already take government transfers into account. Consumption taxes paid may, hence, replicate this picture. Thus, I expect poverty rates after deducting consumption taxes to vary across household types similarly to disposable income poverty with higher rates for large families and single parents.

Consumption

Consumption expenditure generally varies across the income strata. While affluent households spend more in absolute terms, the share of income to be consumed decreases with increasing income. Poor households spend a higher share of their disposable income on consumption simply because consumption does not increase proportionally with income. Figure A1 in the appendix shows how consumption as a share of disposable

income decreases with increasing income quintiles in the study at hand. In addition, different household types have different consumption patterns. Therefore, they differ in their expenditure shares with large families, small families, and single parents spending a higher share of their disposable income on consumption when compared to couples.

Consumption expenditure varies across household types due to household size and household composition (Nelson, 1988). Larger families need to spend more on basic consumption to make ends meet than smaller families. Nevertheless, economies of size could alleviate the consumption pressure for larger households. Unlike singles, for instance, they can share durable goods, such as washing machines, cars, and electricity costs. Economies of scale, however, depend on the similarity of consumption needs. Besides durable goods and food, the consumed goods of children and adults might be rather different from each other. For instance, new parents in the U.S. spend up to $125 a month on diapers (Massengale et al., 2017). To account for the heterogeneity of consumption needs, researchers apply equivalisation methods with different underlying assumptions regarding economies of scale (Lanjouw et al., 1998). Previous research indicated that the consumption needs of household members vary by individual demographic characteristics, such as age (Fernández-Villaverde and Krueger, 2007) and gender (Sobhani and Babashahi, 2020). Hence, the household's demographic composition is pivotal when addressing economies of scale. If, for instance, the consumption needs of household members are divergent, the household would need more income to achieve a similar standard of living as a household with rather similar consumption needs among its members. Therefore, families with similar needs (for instance, couples without children) might benefit more than families with diverging consumption necessity (e.g., large families). Singles, however, cannot benefit from economies of scale at all. Hence, I expect couples to benefit most from economies of scale due to similarity of consumed goods. In other words, due to these differences in

consumption expenditures, some household types pay relatively more consumption taxes and should, therefore, be more vulnerable regarding to consumption tax induced poverty. Therefore, I expect the probability of falling under the poverty line due to consumption taxes to vary across household types, with large families and single parents having a higher probability compared to couples.

Indirect tax rates

Consumption taxes vary greatly across countries and may be collected in different ways. Within the OECD, value-added-tax rates (VAT) vary between zero in some states in the U.S. and 27 percent in Hungary (OECD, 2018). Many countries apply reduced rates for basic consumption; other countries do not tax certain goods at all. Beyond the value-added-taxes, countries levy excise duties on selected products, such as cigarettes, alcohol, tobacco, or fuel. In general, these excises serve to make undesired behaviour more expensive (Morse, 2009) and provide a stable revenue for the state (Beckert and Lutter, 2009). The concept of consumption taxes, however, includes VATs and excise duties alike. These different types of consumption taxes are collected 'indirectly' insofar, as the state does not collect the tax from the person who ultimately bears the tax burden (for instance, the consumer) but through intermediates (for instance, the seller). Estimating the implicit tax rate of all household expenditure, Blasco et al. (2020) confirm significant cross-country differences in indirect taxation. By dividing the total indirect tax revenue by the total household expenditure, the implicit tax rate is calculated from national statistical accounts. It, therefore, also incorporates all excise duties beyond the general VAT system. Hence, in most countries the implicit indirect tax rate is above the standard VAT rate and should provide a more comprehensive picture. Whilst the implicit consumption tax rate in Eastern European countries easily exceeds 20 percent, Switzerland surpasses the 10 percent threshold only marginally. Table A1 in the appendix shows VAT and implicit indirect tax rates for the 11 OECD-countries in the study.

The consumption tax rate is a crucial determinant for each household's consumption tax burden. Therefore, the tax payment of households should be lower where the tax rate is low, and higher where consumption taxes are high. Hence, I expect a higher consumption tax rate to be associated with a higher probability to fall under the poverty line for disadvantaged household types.

Analytical strategy

Data

I draw on microdata from the Luxembourg Income Study (LIS) database. LIS is a cross-national collection of national datasets containing harmonised data on taxes, income, and consumption expenditure. I restrict my country selection to those countries with full income and expenditure information at the household level. The 11 countries listed in Table A1 provide all requested information and are particularly well suited for my research interest for two reasons: First, this country selection is not bound to an European setting only; although, all of them are OECD countries. Hence, the countries differ substantially in their institutional contexts, be it socially, culturally, or politically – while still being economically comparable. Therefore, external validity should be considerable at least across the wider OECD area. Second, these countries provide significant variation in their consumption tax rates with implicit indirect tax rates ranging from below 10 percent to over 30 percent.

I derive the implicit consumption tax rate from OECD data using the procedure documented by Eurostat (Quest et al., 2019). The implicit consumption tax approach divides the total consumption tax revenue by nationally aggregated household expenditure. The resulting tax rate on national consumption, hence, is implicit insofar as

it does only provide implicit information on the statutory tax rate. In line with previous research, I assume that the tax burden falls entirely on the consumer (Lustig, 2018).

All income information is equalised on a per capita basis, which divides the household income by the number of household members. Unlike other equivalisation approaches, per capita equivalisation does not assume economies of scale. Since indirect taxes are endogenous to consumption expenditure and, hence, depend on economies of scale, equivalisation methods accounting for economies of scale may hide the variation of interest. However, I replicate the analysis with the LIS equivalisation in the online appendix. Ultimately, households are weighted using the LIS weights to make the results nationally representative. I impute missing expenditure information for Australia (45.8%), France (1.6%), and Hungary (18.3%) using multiple imputations (m = 5).

Concepts

The main outcome of interest is the poverty status of each household. In line with previous research, I measure poverty as below 50 percent of median disposable household income. As mentioned above, I define *consumable income poverty* as consumable income below this fixed poverty. Hence, by definition, consumable income poverty will be higher than disposable income poverty – given that every household has to pay at least some consumption taxes. A fixed poverty line is a common tool when, for instance, quantifying the effect of housing costs or social transfers on poverty (Eurostat, 2018) or the poverty alleviating effects of policy instruments (Leventi et al., 2019). Following the literature, I estimate consumable income by subtracting the consumption taxes paid from disposable household income for every household.[i] Consumable income, hence, can be denoted as

$$chi_i = dhi_i - (c_i * ict_c)$$

where dhi_i refers to the disposable household income of household i; c_i is the consumption expenditure of that household, and ict_c represents the implicit consumption tax rate of country c. Accordingly, I define consumable income poverty as whenever

$$chi_i < \widetilde{dhi}_c * 0.5$$

where $\widetilde{dhi}_c$ represents the median per capita disposable household income of country c.

Holding the poverty line constant across income concepts allows us to quantify the increase in poverty from disposable to consumable income (i.e., the increase in the head-count ratio). In addition, the poverty line is not endogenous to other households' consumption behaviour. However, the usual pitfalls of addressing poverty with a head-count ratio still apply – most notably the fact that poverty does not change if the positions of the poor worsen (for a detailed discussion, see Sallila et al., 2006).

The type of household is my main independent variable of interest. As outlined above, the household types can be couples, small families (couples with one or two children), large families (couples with three children or more), single parents, or singles. These household types make up the vast majority of households in all countries and are distinguishable with regards to household size and composition. Noteworthy, households that do not fit into this scheme (such as living with non-relatives) are not reported in the main analysis due to the lack of underlying conceptual expectations.

Method

First, I empirically address the change in poverty by comparing disposable and consumable income poverty rates across household types and countries. Second, I assess consumption tax induced poverty by constructing a dummy indicating a change from non-poor to poor as my dependent variable. The indicator equals one whenever a non-disposable-income-poor household becomes consumable-income-poor after subtracting

consumption taxes. Thereafter, I estimate separate logistic regression models for each country in the study. I regress the household type indicator on the change in poverty status indicator described above. In addition to the household type variable, the following socio-demographic characteristics are included in the analysis due to their general association with poverty. I include the head of household's *education*, provided by LIS as low, medium, or high. I also control for the head's *age, squared age*, *gender*, and *labour force status*. I present average marginal effects due to the straightforward interpretation and comparability of coefficients (Mood, 2010). Third, I explore the association of the implicit indirect tax rate and consumable income poverty as well as consumption tax induced poverty in a linear probability model with country fixed-effects and the individual level controls listed above. The country fixed-effects account for all unobserved heterogeneity at the country level (Bryan and Jenkins, 2016). Since with this approach all country characteristics are controlled for, I present and discuss the cross-level interactions of the household type and the indirect tax rate (Möhring, 2012).

Results

I aim to evaluate the change in poverty rates before and after deducting consumption taxes (consumable income poverty) and the probability of falling under the poverty line (consumption tax induced poverty) across household types. I begin with descriptively showing levels of poverty across household types and countries. Table 1 indicates the headcount ratio of people with less than 50% of median per capita disposable household income for disposable and consumable income across household types and countries. For better visual guidance, the countries in this table and all other figures are sorted ascendingly according to their implicit consumption tax rate. As the table indicates, notably variation in poverty rates and poverty increases across countries and household types exist.

Table 1: Headcount ratio at consumable and disposable income per country and household type (Poverty line at 50% of median per capita disposable household income)

		Mexico	Switzerland	Australia	South Korea	Italy	France	Estonia	Poland	Israel	Slovenia	Hungary
All	Consumable income	21.4	12.6	16.5	18.4	24.4	19.9	22.2	17.4	29.6	19.2	19.0
	Disposable income	17.4	8.8	10.4	12.4	17.4	12.4	12.2	9.8	21.1	8.7	8.3
Couple	Consumable income	12.0	5.8	12.3	25.3	6.7	5.8	7.2	5.3	11.5	11.1	8.4
	Disposable income	9.4	3.7	5.0	20.7	3.0	2.6	2.8	2.5	5.5	3.3	2.6
Small family	Consumable income	16.3	13.2	12.5	11.2	26.7	18.6	21.6	13.6	15.5	20.4	17.4
	Disposable income	12.8	8.2	7.6	6.1	17.7	10.3	11.9	6.7	9.0	10.2	5.9
Large family	Consumable income	36.1	31.0	28.4	32.4	53.7	46.8	42.0	36.2	45.2	31.5	44.6
	Disposable income	30.0	26.2	20.4	21.6	43.7	34.4	23.5	22.7	34.5	13.6	25.0
Single parent	Consumable income	17.1	24.1	35.0	22.0	35.3	39.2	35.2	29.7	34.3	29.7	31.3
	Disposable income	13.4	16.9	26.5	15.3	27.3	25.7	20.5	18.1	22.2	14.9	24.7
Single	Consumable income	4.7	4.4	8.6	32.3	6.0	10.4	12.1	4.8	14.9	16.0	11.1
	Disposable income	3.0	3.2	4.8	24.1	3.7	5.0	4.5	2.1	6.0	5.5	3.6

Note: Own calculations based on LIS data (weighted).

As expected, large families and single parents have higher poverty rates. That being said, the consumption tax induced increase in poverty of these household types is again above the poverty increase of the entire population in most countries. Nonetheless, countries differ substantially in poverty increases across household types. For instance, single parents in France and Australia have only slightly different disposable income poverty rates. After deducting consumption tax payments, however, the percentage of poor individuals in single-parent households jumps to roughly 39% in France compared to 35% in Australia.

In general, the higher poverty rates and the higher increase in poverty due to consumption taxation for large families and single parents in most countries is in line with my expectations. However, this might be entirely attributed to the socio-demographic characteristics of these households. For instance, the exceptionally high poverty rates for singles and couples in South Korea can be attributed to the extraordinary prevalence of poverty among elderly households there (Ku and Kim, 2020). It is, therefore, pivotal to address the probability of a change in poverty status from the disposable to the consumable income measure across household types while controlling for socio-demographic characteristics associated with poverty.

As argued above, the probability of falling under the poverty line should vary systematically across household types due to variations in consumption expenditure. Because members of single parent and large family households may have diverging consumption needs, they could be more likely to suffer from consumption taxes. Using couple households as my reference category, I expected single parent and large family households to have a higher probability of falling under the poverty line when controlling for basic socio-demographic characteristics. Figure 1 indicates the difference in the probability of falling under the poverty line due to consumption tax payments across household types and countries compared to couple households.
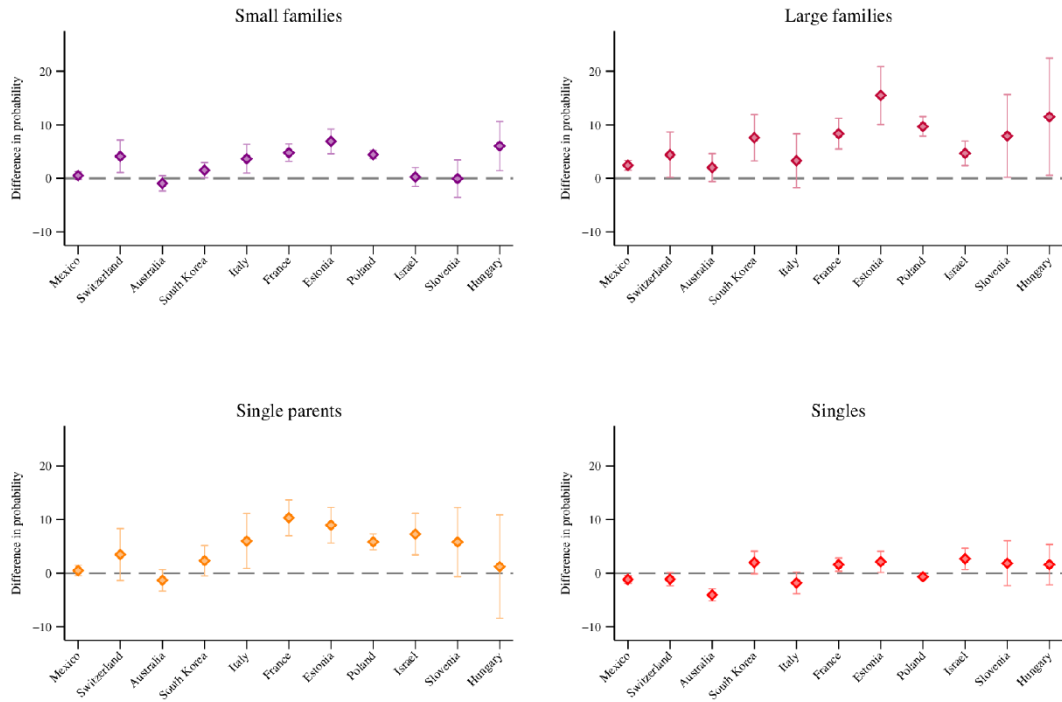
Figure 1: Difference in the probability of falling under the poverty line due to consumption taxes compared to couple households (poverty line at 50% of median per capita disposable income)

Note: Spikes indicate 95% confidence intervals (robust standard errors).

Compared to couple households, the results show some evidence for a higher consumption tax vulnerability of large families and single parents but less so for singles. For instance, controlling for socio-demographics generally associated with poverty, a French single parent household is about 10 percent more likely to fall under the poverty line compared to a couple household. Most coefficients for large families and single parents are positive, which provides some support for my expectation. Single and small

family households, however, indicate positive and negative probabilities – depending on the country. Most strikingly, therefore, estimates vary substantially across countries and do not seem to follow any pattern with regards to consumption tax level (i.e., increasing probabilities from left to right). This effectively stands against the practice of generalising case study findings.

Ultimately, to identify the association between the indirect tax rate and poverty across countries, I apply a linear probability model with country-fixed effects. Figure 2 indicates coefficients from the cross-level interaction of implicit indirect tax rate and household type (for the full model, see Table A2). Controlling for socio-demographics generally associated with poverty, I find clear evidence that the probability of being consumable poor increases with the indirect tax rate for single parents and large families. Most notably, however, a one percentage point increase in the indirect tax rate is associated with an increase in the probability of falling under the poverty line of roughly 0.3 percentage points for single parents. These findings provide strong support for the expectation that the effect of the indirect tax rate on consumable income poverty and consumption tax induced poverty is substantial for single parents.
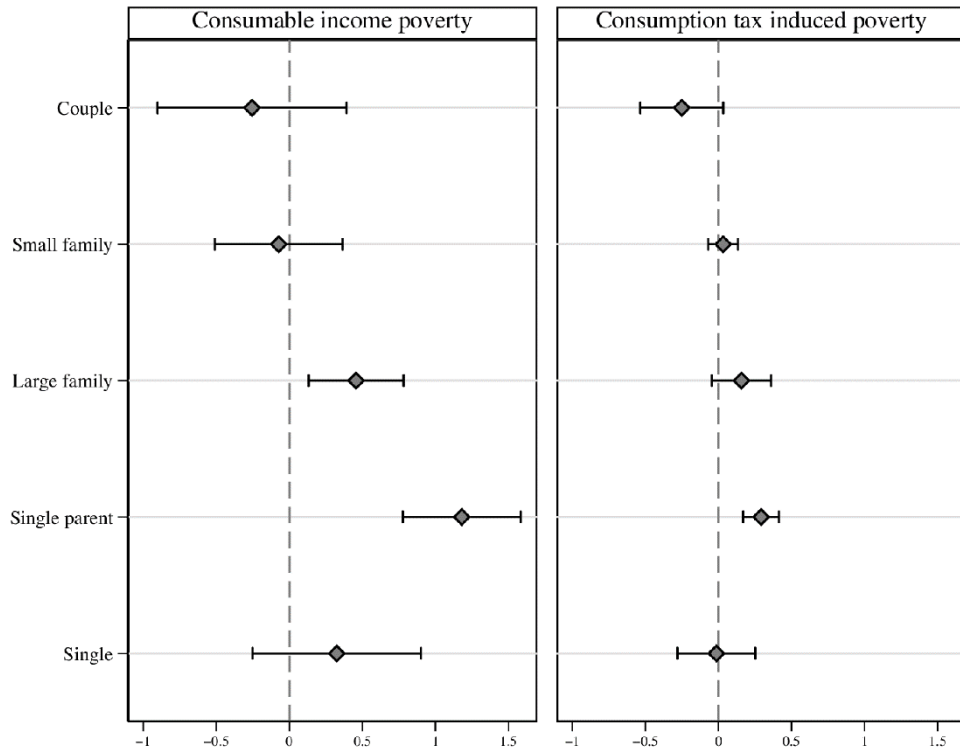
Figure 2: The effect of the ITC on the probability of being consumable income poor (left) and the probability of falling under the poverty line (right) by household type (poverty line at 50% of median per capita disposable income)

Note: Spikes indicate 95% confidence intervals (robust standard errors).

All presented results might, however, strongly depend on the chosen poverty line. Therefore, they may only reflect a pattern that occurs right around the 50 percent of median disposable income part of the distribution. This is a common problem with poverty lines. Hence, I replicate the main analysis with the poverty line set at 60 percent of median per capita disposable household income. The results are presented in the appendix (Figure A2 and A3). In addition, I run the entire analysis with square root equivalised income (LIS-scale) instead of per capita income. Unsurprisingly, poverty rates differ substantially when assuming economies of scale (Table A3). While the

difference in the probability of falling under the poverty line compared to couples increases for singles in many countries, the results remain largely unchanged for single parents (Figure A4). Furthermore, the effect of the indirect tax rate on consumable income poverty and consumption tax induced poverty for single parents is consistent with the results presented above (Figure A5). Hence, although the patterns differ across countries, the supplementary evidence generally supports the findings presented in the study.

Discussion

In this study, I have examined the association of consumption taxes and consumable income poverty as well as consumption tax induced poverty across types of households in 11 OECD countries. Using harmonised data from the LIS, I have shown that the increase in poverty due to the indirect tax payment varies substantially across countries and household types. Results from logistic regression models support my expectation of higher probabilities of falling under the poverty line for large families and single parents when compared to couple households in most countries. For singles and small families, the results are inconclusive. The findings, however, vary substantially across countries. In addition, higher implicit consumption tax rates are positively associated with consumable income poverty and consumption tax induced poverty for single parents regardless of the chosen poverty line and equivalisation scaling.

The contribution of this study is manyfold. First, by examining the implicit indirect tax rate, the study at hand contributes methodologically with an innovative implementation of an economic method to social policy research. To my knowledge, this has not been done by any social policy study to date. Second, this study contributes to the extensive literature on the modification of poverty due to public redistribution. Unlike previous research, however, I provide some first insights on poverty levels after the deduction of

consumption taxes. I thereby address the resources (or the lack of such) of households when accounting for the fiscal intervention of indirect taxation. Third, the study advances previous research by examining differences in consumable income poverty across household types. I, therefore, contribute by empirically addressing the differences across types of households that emerge due to higher consumption necessity and regressive consumption taxes. By doing so, this study sheds light on the unequal life chances of household types at the last redistributive stage.

However, the study at hand is limited in several ways. First and foremost, the implicit consumption tax approach cannot account for different tax rates on different goods. Since most countries apply reduced tax rates on some goods, ideally the composition of the bundle of goods consumed by the household would be analysed. This, however, is not feasible with the data. Hence, if, for instance, some household types are more likely to consume goods with reduced value added tax rates, the analysis overestimates the consumption tax burden of those household types. Previous research at the macro level, however, suggests that the 'bundle effect', i.e., the effect of the consumption composition on the tax rate, is of inferior relevance (Blasco et al., 2020). In addition, total consumption expenditure in the LIS includes the value of self-produced goods, which could bias the estimated tax burdens. However, this should be a less severe problem in OECD countries, where self-production is rather uncommon.

Second, poverty ought to be measured in multiple ways. Focussing only on the poverty line might be considered a poor measure of the harm consumption taxes do to the disadvantaged. However, since there is no straightforward approach to include consumption taxes in poverty measurements, the evidence provided in this study can be understood as a starting point for future research. Broader considerations of consumption taxes regarding the goals of social policy are urgently needed. As argued above, it is

pivotal to understand consumption taxes as a policy tool affecting living conditions of households and, hence, as a field of genuine interest to social policy research.

The findings are relevant for society and policymakers alike. The study of consumable income poverty indicates that the common poverty measure of disposable income neglects the dimension of consumption taxes, which substantially shape the affordability of goods. Moreover, the comparative view of standard poverty rates across countries disregards significant variations in the role of indirect taxes regarding the income distribution. Although scholars prominently emphasised the necessity to consider taxation in poverty measurement (Brady, 2003), most researchers to date seem to think of income taxation only. This study, however, particularly emphasises the systematic differences in consumption tax vulnerability across household types. By showing how single parents in particular are more likely to be pushed under the poverty line, this study highlights the unequal exposure to the hidden income deduction of consumption taxes. Hence, policymakers should bear in mind that taxes on consumption are not just particularly a burden on the poor, but furthermore, they specifically affect more vulnerable types of households.

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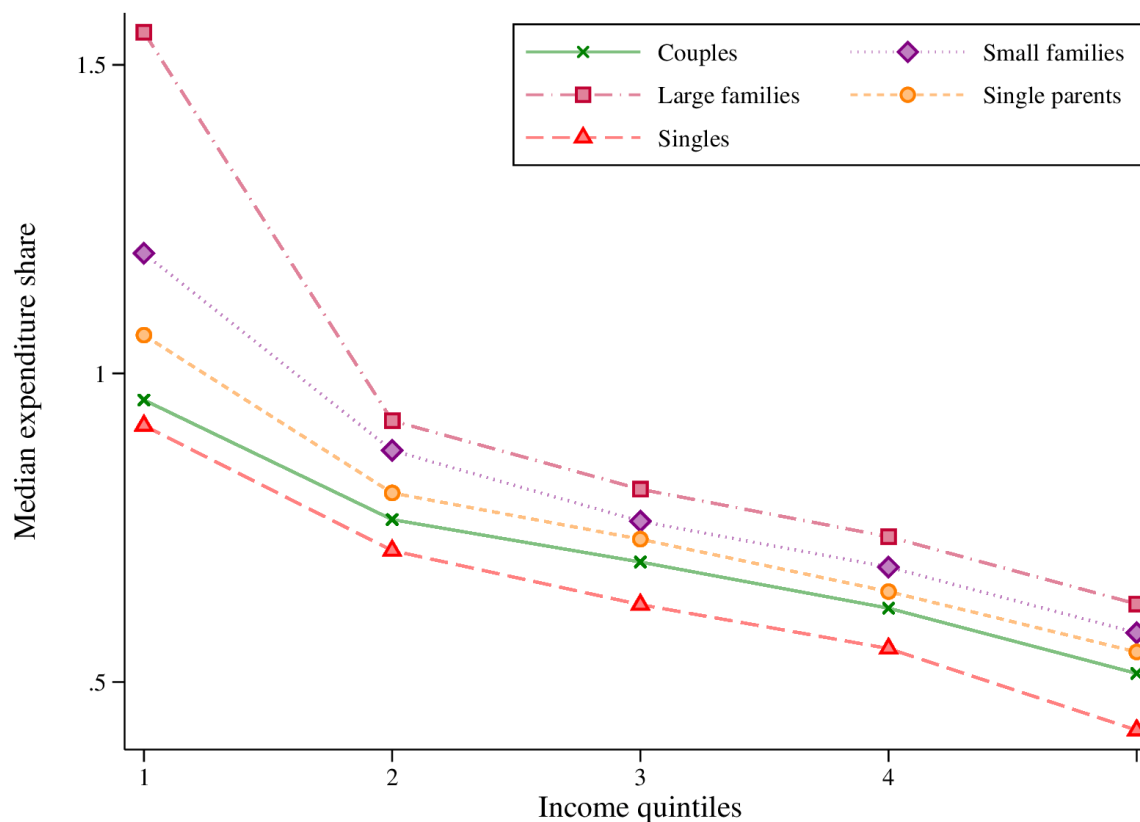
Appendix

Figure A1: Average median consumption expenditure share per income quintile across countries

Source: Own calculation based on LIS data.

Table A1: VAT rates and implicit indirect tax rate (ITR)

	Year	Standard VAT	Reduced VAT	Implicit ITR	N
Mexico[1]	2016	16.0	-	09.72	70286
Switzerland	2004	7.6	3.6/2.4	10.90	3225
Australia	2010	10.0	0.0	13.75	17920
South Korea	2012	10.0	0.0	18.22	10313
Italy	2016	22.0	10.0/5.0/4.0	19.04	7284
France	2010	19.6	5.5/2.1	19.58	15594
Estonia	2000	18.0	5.0	19.86	5844
Poland	2016	23.0	8.0/5.0	19.96	36577
Israel	2016	17.0	-	20.44	8836
Slovenia	2015	22.0	9.5	23.82	3727
Hungary	2015	27.0	18.0/5.0	33.40	2771

Source: LIS, OECD and Eurostat

Note: [1] The implicit indirect tax rate is well below the VAT rate. This could be due to significant household consumption in the shadow economy that remains untaxed.

Table A2: Linear probability model with country-fixed effects and cross-level interaction

	Consumable income poverty	Consumption tax induced poverty
Household type (ref. couple)		
Small family	0.007	-0.035
	(0.045)	(0.021)
Large family	0.144*	-0.030
	(0.053)	(0.024)
Single-parent	-0.170*	-0.066
	(0.057)	(0.033)
Single	-0.220*	-0.053
	(0.080)	(0.027)
Other	0.032	-0.033
	(0.059)	(0.024)
Age	-0.004	-0.000
	(0.003)	(0.001)
Age^2	0.000	0.000
	(0.000)	(0.000)
Education (ref. low)		
Medium	-0.140***	-0.014*
	(0.020)	(0.005)
High	-0.251***	-0.048**
	(0.024)	(0.010)
Labor force status (ref. employed)		
Unemployed	0.354**	0.025
	(0.068)	(0.011)
Not in labour force	0.259**	0.050*
	(0.050)	(0.019)
Retired	0.005	0.013
	(0.050)	(0.011)
In education	0.177	0.026
	(0.085)	(0.025)
Disabled	0.243**	0.058*
	(0.066)	(0.024)
Homemaker	0.145	0.012
	(0.078)	(0.010)
Gender	0.006	0.008**
	(0.012)	(0.002)
Cross-level interaction household#consumption tax rate		
Couple	-0.004	-0.003*
	(0.004)	(0.001)
Small family	0.000	0.001
	(0.002)	(0.001)
Large family	0.005*	0.001
	(0.002)	(0.001)
Single-parent	0.015***	0.003*
	(0.002)	(0.001)
Single	0.005	-0.000
	(0.003)	(0.001)
Other	omitted	omitted
	+ Country-FEs	*+ Country-FEs*
Constant	0.461***	0.121***
	(0.070)	(0.016)
N	182377	182377

Table A3: Headcount ratio at consumable and disposable income per country and household type (Poverty line at 50% of median equivalised disposable household income)

		Mexico	**Switzerland**	**Australia**	**South Korea**	**Italy**	**France**	**Estonia**	**Poland**	**Israel**	**Slovenia**	**Hungary**
All	Consumable income	20.5	11.3	19.7	19.5	20.1	17.4	23.9	15.2	27.5	20.6	18.1
	Disposable income	16.6	7.5	13.8	13.7	13.5	9.0	12.4	7.9	18.6	10.1	6.6
Couple	Consumable income	22.7	10.4	25.0	35.2	10.2	9.0	11.9	10.5	18.1	17.2	12.7
	Disposable income	18.6	6.1	17.2	28.4	5.5	4.0	4.7	4.9	11.3	8.4	4.2
Small family	Consumable income	18.8	7.5	10.1	10.0	17.6	12.5	17.9	11.7	16.5	17.6	11.6
	Disposable income	15.1	5.2	6.2	5.1	11.8	5.9	8.9	5.9	10.2	8.4	4.2
Large family	Consumable income	29.0	12.0	15.5	22.6	34.2	21.3	20.8	17.6	34.2	15.9	18.1
	Disposable income	23.8	9.7	10.4	12.3	26.4	10.6	10.1	9.2	23.6	5.7	7.0
Single parent	Consumable income	22.6	22.2	38.6	25.8	33.8	38.1	38.8	35.7	36.9	34.9	40.8
	Disposable income	17.7	12.5	26.5	19.1	24.7	22.5	23.0	20.5	24.6	16.5	22.7
Single	Consumable income	21.1	17.9	44.0	52.4	19.0	24.6	53.1	29.3	39.1	50.6	40.8
	Disposable income	17.1	11.8	37.5	46.9	10.9	14.0	27.9	15.1	29.7	30.7	15.9

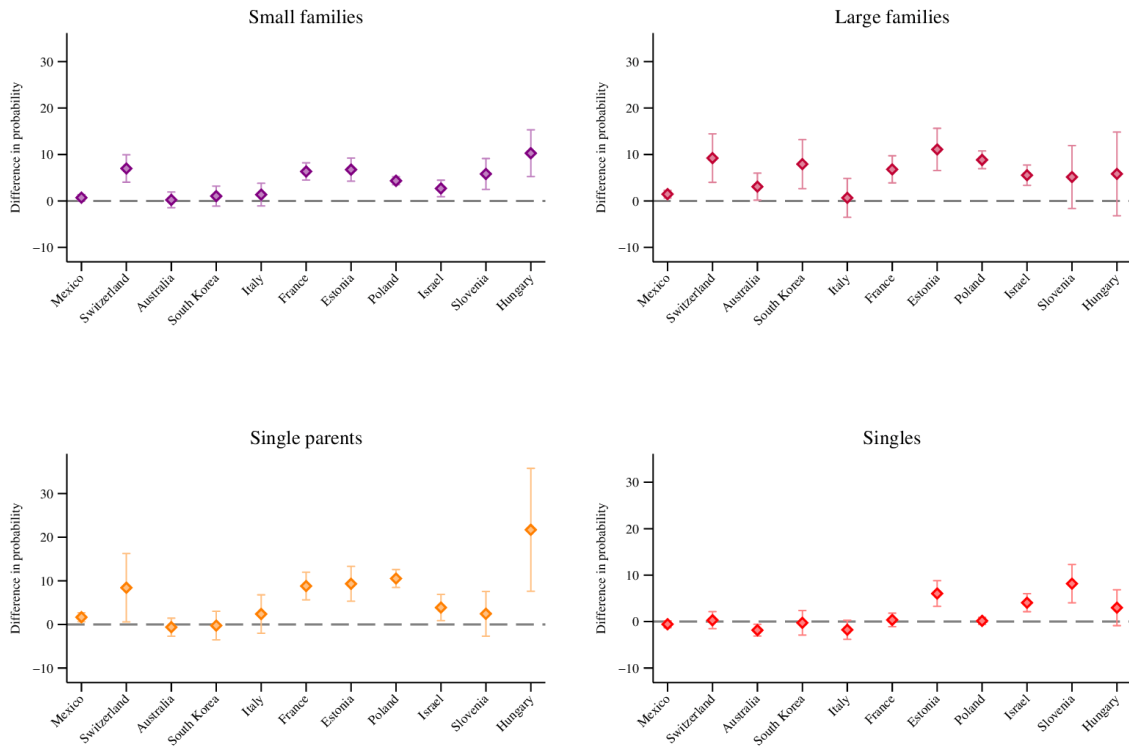*Note:* Own calculations based on LIS data (weighted).

Figure A2: Difference in the probability of falling under the poverty line due to consumption taxes compared to couple households (poverty line at 60% of median per capita disposable income)

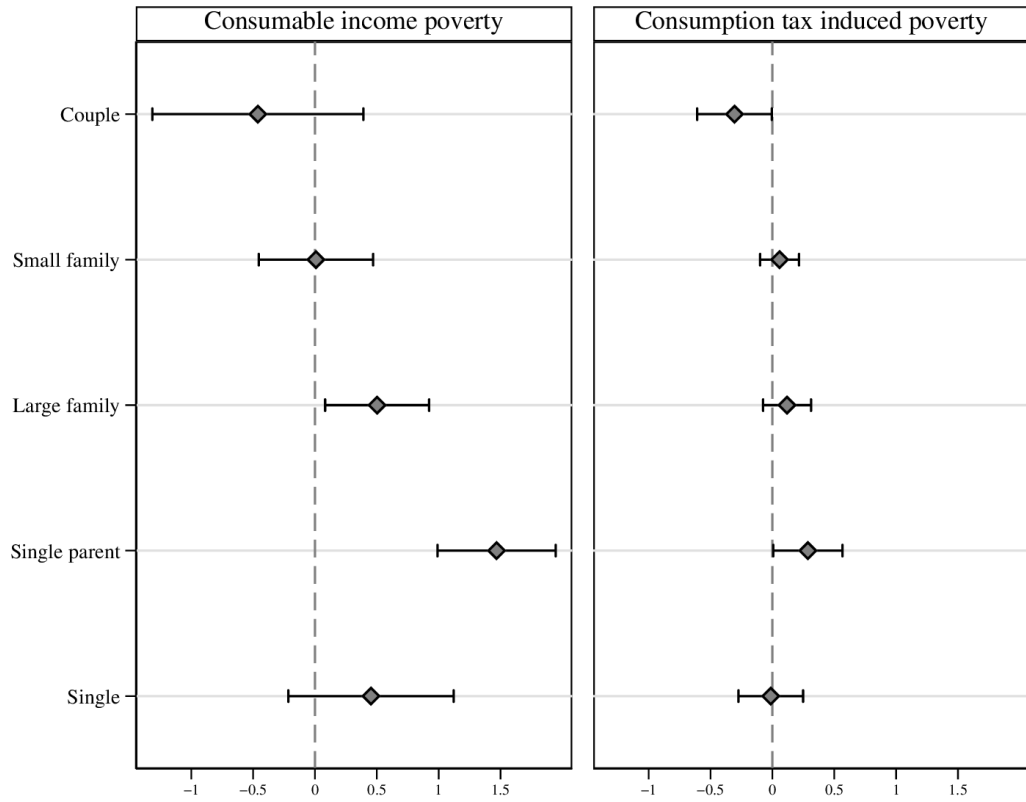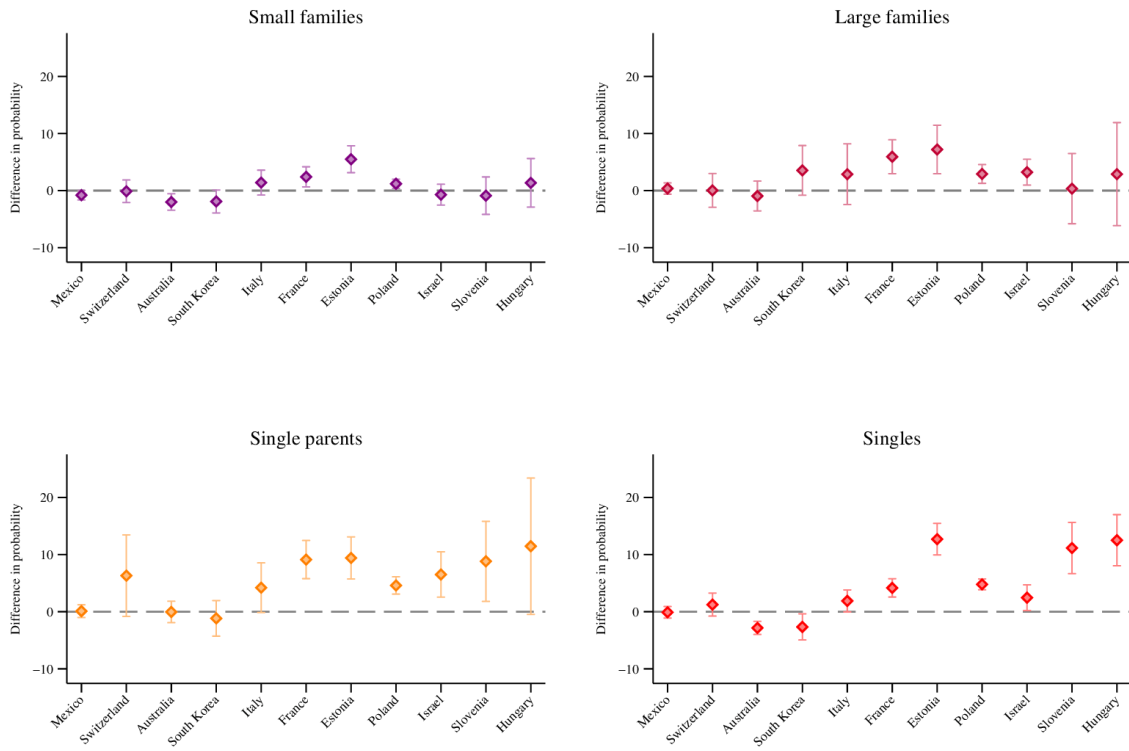Note: Spikes indicate 95% confidence intervals (robust standard errors).

Figure A3: The effect of the ITC on the probability of being consumable income poor (left) and the probability of falling under the poverty line (right) by household type (poverty line at 60% of median per capita disposable income)

Note: Spikes indicate 95% confidence intervals (robust standard errors).

Figure A4: Difference in the probability of falling under the poverty line due to consumption taxes compared to couple households (poverty line at 50% of median equivalised disposable income)

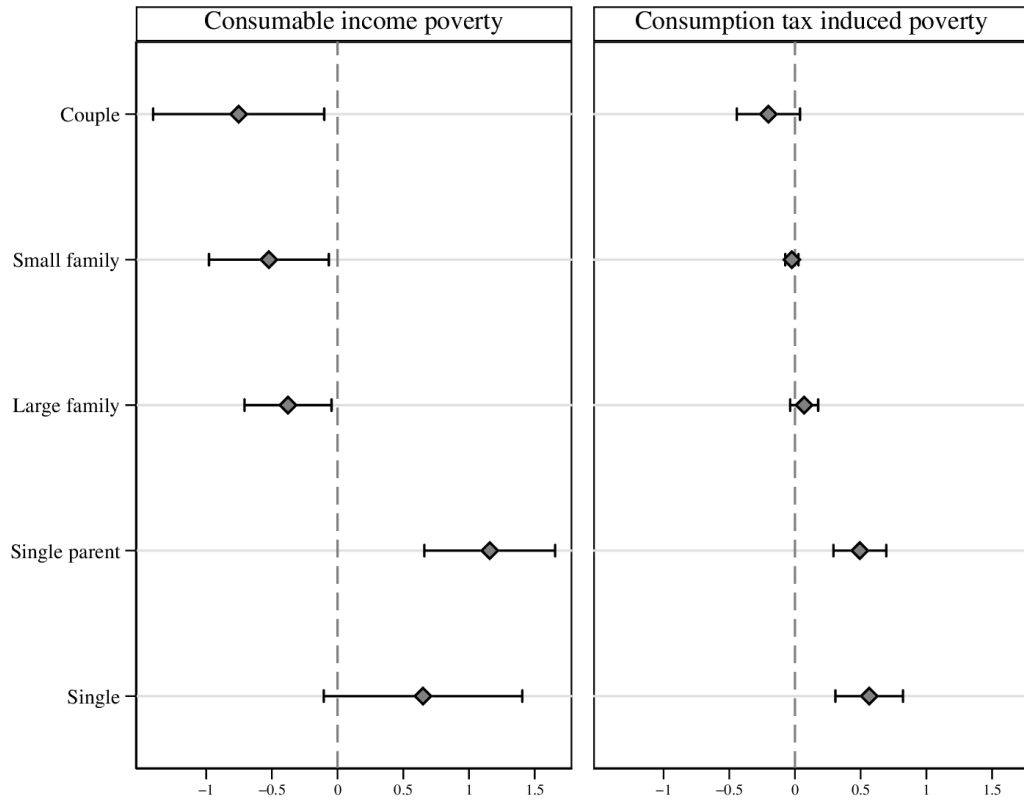Note: Spikes indicate 95% confidence intervals (robust standard errors).

Figure A5: The effect of the ITC on the probability of being consumable income poor (left) and the probability of falling under the poverty line (right) by household type (poverty line at 50% of median equivalised disposable income)

Note: Spikes indicate 95% confidence intervals (robust standard errors).

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[i] Ideally, this measure would also include food price subsidies and other indirect subsidies (Lustig, 2017). Unfortunately, this is not feasible with the data.