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INCOME SOURCES, INTRAHOUSEHOLD ALLOCATION AND INDIVIDUAL POVERTY

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Policies aimed at redistributing to the most vulnerable individuals must consider inequality within households as much as between households. In that spirit, many cash transfers are targeted at women rather than men. Tax legislations can also contain specific gender provisions that treat men and women differently. Whether these policies operate some intrahousehold redistribution, or are defeated by the household agency problem, is an open question. This paper provides new insights by adapting models of intrahousehold allocation to account for women's and men's net-of-tax earnings and targeted benefits as determinants of the household resource sharing function. We suggest applications using household expenditure data for Argentina and South Africa. Net-of-tax earnings and benefits commanded by women are often positively related to their and their children's resources. We provide counterfactual simulations to illustrate how women's financial power – and its sources – may modify their consumption share and thus their individual poverty status.

JEL Codes: D11, D12, D36, I31, J12

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1. INTRODUCTION

Tax–benefit microsimulation or incidence tools are powerful methods to assess the impact of socio-fiscal policies on poverty and inequality *between* households (see e.g. Bourguignon *et al.,* 2004). However, policy analyses usually rely on per capita (or equivalized) expenditure or income. They ignore the possibility of unequal sharing within families while, at the same time, a large amount of disparities between family members is evidence (World Bank, 2018). Many cash transfers in low- and middle-income countries are actually targeted at specific family members, often women (Alderman *et al.,* 1995, see e.g. Handa *et al.,* 2009). Beyond the objective of empowerment, women are also seen as more efficient in managing resources and at using the money to improve the well-being of children (Duflo, 2012; Dizon-Ross and Jayachandran, 2022). Tax legislations also contain specific provisions that treat

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men and women differently. Critically, there is limited evidence on whether these policies achieve their objective, i.e. whether women or children eventually benefit from these transfers or tax exemptions more than men. This is a difficult question given the agency problem posed by households: how earnings, transfers and other income sources are shared among household members is broadly unobserved.[1] Nonetheless, operational tools aimed at approximating the intrahousehold redistributive effects of tax–benefit policies are required, especially when tackling such policies whose goal is to improve the situation of the most vulnerable individuals with families.

A promising approach consists in the use of standard expenditure surveys combined with estimations of the intrahousehold allocation of resources. This approach is inherited from the literature on "collective models" of household decision-making (Bourguignon and Chiappori, 1992) and in particular the recent developments that allow eliciting the complete consumption allocation between men, women and children (Bargain and Donni, 2012; Dunbar *et al.,* 2013). We suggest an application of this approach with a dual purpose. First, we want to bring policy analyses closer to the conditions in which inequality can be assessed both between and within households. With the methods at hand, the basic requirement is simply that the microdata used for tax–benefit analyses also contain total household expenditure and expenditures on a subset of "exclusive" goods, i.e. spending that can be ascribed as exclusively for the benefit of one person. An exclusive good frequently used is clothing since differentiated spending on male, female and child clothing is commonly observed in standard expenditure surveys. Second, the sharing process estimated with this method may itself depend on who controls different income sources in the household. This gives an extra role to taxes and transfers since they may not only alter the distribution of income between households but also between individuals within households. In particular, by changing the relative net earnings of men versus women, progressive taxation may change intrahousehold distribution – and so do the policies that determine who receives state transfers in the household. Thus, we illustrate how net-of-tax earnings and gender-specific benefits correlate with the intrahousehold distribution of resources. By introducing different income components as determinants of the sharing rule, we characterize the extent to which control over certain types of income may affect women's bargaining position and, ultimately, the amount of resources that accrues to them and children.

We provide an application on one country from Latin America, Argentina, and one from sub-Saharan Africa, South Africa. There are different reasons for focusing on these countries. First, they provide relevant examples for both continents since these countries are characterized by relatively advanced tax–benefit systems

[1]What is expected is that a transfer paid to women disproportionally benefits them and possibly their children. The polar situation is one where the money received by women is fully redistributed to others or merely shared according to the "usual" rule of allocation in the household. To measure the exact redistributive effect of targeted payments, natural experiments are needed where the identity of the recipient is the only thing that changes over time, which is effectively rare (a well-known example is Lundberg *et al.,* 1997).

compared to poorer countries in Latin America and Africa. Second, they are also examples of countries for which the available expenditure data sets – the Encuesta Nacional de Gastos de los Hogares for Argentina and the Income and Expenditure Survey for South Africa – are rich enough to conduct general tax–benefit incidence analyses, as exemplified in the redistributive and incidence analyses of international expert groups. Third, and most important, these countries are particularly interesting for our purpose since their tax–benefit systems provide several cases of gender- or age-targeted benefits. Finally, the data sets not only record assignable expenditure used for resource sharing estimations but also the amount of gender-targeted benefits, so it becomes possible to assess the intrahousehold distributional effect of these benefits (in the conclusion, we discuss potential applications for other countries). It also serves as an example of what could be done, in terms of redistributive analysis at the individual level, with microsimulation models, since these models allow the calculation of socio-fiscal rules for each household in a survey and in particular the potential amount of benefits received by the men or women in that household.

Empirical results go as follows. First, the nature and recipient of income sources seem to alter household decisions on resource allocation. Specifically, the amounts of net earnings commanded by women – and sometimes the amount of benefits or pensions they control – are positively correlated with their resource shares in both countries. We provide counterfactual simulations to quantify how women's financial power – and its sources – modifies women's and children's actual resources at different points of the distribution. While the role of women's net earnings is substantial in the upper part, control over benefits is more limited but non-negligible, especially at low levels of household expenditure. Then, we quantify how women's actual control over resources limits the extent of total interpersonal inequality by reducing intrahousehold inequality. Finally, we derive implications in terms of individual poverty, i.e. when assessing who is poor in the household according to a person's own access to resources. Women in general, and children in Argentina, are worse off than men, and they would be significantly poorer without effective control over net labour income and state benefits. We extensively discuss the limitation of this framework but also how it can be used to approximate the impact of tax–benefit policies on the distribution of resources both between and within households. With successful implementations of this method, it may become possible to obtain a much more finely tuned picture of poverty and inequality with information that is already widely available.

2. Background

We begin with some elements that motivate our approach and in particular the existence of socio-fiscal instruments aimed precisely at redistributing between genders. We then review alternative methods to analyse resource distribution within families, and we justify and explain the use of a collective model approach. We highlight recent papers that use it to analyse the intrahousehold distributional effect of specific policies.

2.1. *Gender-Targeted Benefits and Tax Rules*

The framework suggested here may help to assess the role of any type of income, i.e. market income after tax or public transfers, on intrahousehold distribution. However, it is especially interesting to characterize the impact of benefits or taxes that are designed with a gender-specific bias, intentionally or not. Related to this, gendered fiscal incidence analyses rely on descriptive information about whether tax legislations contain specific provisions that treat men and women differently. One of the examples of "explicit biases" cited in Grown and Valodia (2010) is from India, where the tax threshold for women is higher than that for men. Acknowledging that the tax measure was introduced specifically to promote gender equality, the authors note that there is unfortunately very little evidence to suggest that this policy has effectively improved women's position in India. Another example is from Argentina, where in the case of income earned on jointly owned assets, the tax code allocates the income to the husband by default, while a female taxpayer would be allocated the income only under exceptional circumstances. Although the tax impact of this provision is to decrease the taxes paid by the female taxpayer, the tax system is operating to reinforce existing gender inequalities in the allocation and control of income earned jointly by household members.

In both examples, it is difficult to conclude about the ultimate impact of such gender-biased fiscal instruments on distribution within the household. In general, very little is known about who ultimately pays what (as tax) or receives what (as benefit). Actually, this question is not necessarily interesting in itself because the person who ultimately bears the tax burden can make up for it elsewhere if he or she has control over the household's total resources. Similarly, the person receiving public assistance may not benefit from it if the "usual" family allocation rule applies to that transfer in the same way as it dictates the use of other income sources in the household. The ultimate question is therefore about the distribution of final consumption across household members, and how it might depend, for a given level of total income, on who controls different income sources. Our approach specifically aims to estimate resource sharing using consumption data and to relate it to the levels of net-of-tax salaries or social benefits paid to women or to men.

2.2. *The Limited Scope of Alternative Approaches*

Female-Headed Households

Gendered fiscal incidence often looks at female- versus male-headed households, for which differential tax treatment can be assessed. Yet, female-headed households in particular may be very specific and not represent women in general. They may pool contrasted groups such as vulnerable widows and single mothers or more affluent single women (cf. Grown, 2010; Milazzo and van de Walle, 2017). This means that the conclusions from these analyses may not be expandable to the situation of "newcomers" in that group, for instance, to newly divorced women with their children. It may just be valid to characterize the situation of current female-headed households. In any case, this type of information is not very helpful to understand the situation – and fiscal treatment – of women and men living in couple with children.

Gender-Specific Expenditure and Outcomes

To analyse the distribution within broader households and to measure a gender bias in particular, many studies rely on outcomes and expenditures directly associated with women or children, e.g. their access to health services or their health outcomes (e.g. Thomas, 1997) as well as food-related measures, such as female/child anthropometric data and nutritional measures (e.g. Haddad and Kanbur, 1990; Haddad and Hoddinott, 1994; Duflo, 2003). In some rare surveys, individualized food expenditure or survey modules on separate components of consumption are mobilized (see for instance D'Souza and Tandon, 2018, and Brown *et al.,* 2019, for Bangladesh, Mercier and Verwimp, 2017, for Burundi, or Santaeulàlia-Llopis and Zheng, 2017, for China). Yet, this type of data does not provide a comprehensive view of individuals' control over resources and, ultimately, of women's, men's and children's welfare and poverty status. Surveys that measure individual consumption comprehensively are costly and extremely rare, especially in poor countries.[2] Efforts to measure "who consumes what" in the household are required (World Bank, 2018) but we doubt that the frequency of collection of such data could ever be high enough to study the intrahousehold impact of redistributive policies.

Decision Power Data

Another approach consists in using surveys containing self-reported measures of women's control over household decisions ('final say' questions). These measures of "decision power" have been used in many applications (e.g. Anderson and Eswaran, 2009; Reggio, 2011; Lépine and Strobl, 2013), including the assessment of gender-targeted benefits (Bergolo and Galvan 2018 for Uruguay, Handa *et al.,* 2009, for Progresa, De Brauw *et al.,* 2014, for Bolsa Familia). However, there are several concerns with these empowerment proxies. They might depend on survey conditions (e.g. the presence of men during the interview). They may reflect delegation more than power (see Baland and Ziparo, 2018, Baland et al., 2020b; also Malhotra and Schuler, 2005, for a discussion on these indicators). Most important, they do not allow quantifying the link between policies and individual poverty.

Multidimensional Indices

Note that international organizations often combine these different types of measures of individual deprivation, e.g. the Women's Empowerment in Agricultural index used by IFPRI (Alkire *et al.,* 2013) or multidimensional indices used by the UNICEF (e.g. de Milliano and Plavgo, 2014). These indicators are based on individual access to human capital (education, health), income, decent life conditions as

[2]This type of data has been collected in some rich countries: Denmark (Bonke and Browning, 2011), the Netherlands (Cherchye et al., 2012b), Japan (Lise and Yamada, 2014) and Italy (Menon *et al.,* 2012). For poor countries, we are aware of only two exceptions. One is the small database from Bangladesh used in Bargain *et al.* (2021). Since it provides the full resource allocation, the authors use it to validate the collective model approach, i.e. to check the quality of the predicted resource shares. De Vreyer and Lambert (2021) also avail of a survey containing the specific consumption of each cell in polygamous households in Senegal (each cell being a man or a woman with her own children).

well as questions on empowerment. Related studies are very useful, aiming to check if someone is poor in many dimensions and providing complementary information to purely monetary approaches such as the one suggested here.

2.3. *An Overview of the Collective Model Literature*

Collective Models and the Sharing Rule Interpretation

The approach we suggest is inherited from the literature on collective models of household decision-making. These models have been designed to account for the bargaining process underlying household decisions (Bourguignon and Chiappori, 1992), and ultimately to recover the intrahousehold allocation of resources. This approach initially rests on the assumption that households make efficient decisions, an assumption which allows the decentralization of the decision process leading to a sharing rule interpretation (i.e. a direct application of the Second Welfare Theorem). That is, household decisions are *as if* total resources were shared, then decisions made individually on the basis of each person's resources and preferences (Chiappori, 1992). Early studies have attempted to test efficiency and have obtained identification results regarding the *marginal* sharing rule, i.e. how an extra dollar is shared among household members (Chiappori and Donni, 2011; Browning *et al.,* 2014).

Recently, several studies have suggested ways to identify the complete sharing rule, i.e. the full allocation process, using consumption data. The first set of contributions have allowed identifying the sharing rule in childless couples (Lewbel and Pendakur, 2008; Browning *et al.,* 2013), while more recent ones extend the approach to couples with children (Bargain and Donni, 2012a, Dunbar *et al.,* 2013, Bargain *et al.,* 2022). In these studies, identification requires additional assumptions (i.e. preference stability, explained hereafter) and extra information (notably the observation of exclusive/assignable goods). Our set-up will be located in this tradition, but we notice that the efficiency assumption is not absolutely necessary. As in recent applications (e.g. Calvi, 2020), we just need to assume that total expenditure is shared among household members according to some rule, which we identify and estimate. Authors adopt the efficiency paradigm because it is the most commonly accepted way to justify the decentralization of household decisions leading to the sharing rule interpretation (Chiappori, 1992), but probably not the only one supporting such a sharing process (Lewbel and Pendakur, 2022, show that the departure from efficiency leads to relatively small variation in the resource sharing estimations – see also Baland and Ziparo, 2018, on the efficiency of household decisions).

Sharing Rule Identification

Some studies have provided the complete identification of the resource sharing process using a preference stability assumption, namely that some part of individual preferences are stable across marital status, so that individual Engel curves for adults in couples can be estimated using data on single individuals. In this way, Browning *et al.* (2013) suggest estimating a complete demand system and make use of price variation to recover the sharing process and scale economies for each good. Lewbel and Pendakur (2008) depart from Browning et al. and make the approach

more tractable for welfare analysis by suggesting the identification of the sharing rule – and of a composite measure of scale economies – using cross-sectional expenditure data. Bargain and Donni (2012a) and Bargain *et al.* (2015) extend the latter approach to households with children, i.e. to model and elicit resource sharing between the mother, the father and the group of children. Bargain *et al.* (2022) generalize Browning *et al.* (2013) to households with children and retrieve the contribution of each parent to child consumption. All these studies rely on exclusive goods – i.e. goods consumed by specific individuals in the household, such as adult women's clothing for instance – as well as on the use of single data combined with the preference stability assumption upon the exclusive goods. Past of the resource share identification in the presence of children indeed pertains to the intuition behind the well-known approach of Rothbarth–Gronau used to recover the cost of children (Rothbarth, 1943; Gronau, 1991).

However, people living alone are not common in the context of developing countries, and Dunbar *et al.* (2013) suggest a slightly different method to identify the sharing rule for couples with children, in this case, one that does not require data on single individuals. But because less information is used, it does not allow retrieving economies of scale. They still need the observation of some exclusive good expenditures, combined with two alternative identifying assumptions corresponding to preference restrictions upon the exclusive goods. One, known as *Similarity Across Type* (SAT), is similar to the preference stability mentioned earlier but limited to adults with children. That is, for a given person type – woman, man, child – the slope of individual Engel curves is assumed to be stable across household types; that is, it does not depend on the number of children. The other is known as *Similarity Across People* (SAP): for a given household type, the Engel curves of women, men and children are presumed to have the same slope.[3]

Recent Applications to Elicit the Distributive Effect of Gender-Targeted Policies

Some recent applications also address the specific role of redistributive policies in shaping intrahousehold resource allocation. This is of particular interest for us since it is related to the type of application suggested in the present paper, even if these studies focus on specific policies while our framework aims at more

[3]Several extensions and a validation of these approaches have been suggested. In particular, Bargain *et al.* (2021) use specific data on individualized consumption to validate the identification method and check the extent to which individual poverty analysis based on this approach dominates the standard approach based on per capita expenditure. Calvi (2020) extend the welfare analysis by identifying scale economies benefiting adults and, originally, children in the collective approach. A growing number of applications also aim to measure individual poverty related to age–gender combinations or other specific characteristics, e.g. Brown *et al.* (2019) for Bangladesh or Calvi (2020) for India. For South Africa, Bargain and Kwenda (2018) explore the sharing rule heterogeneity across segments of population. Compared to the present contribution, they use a different survey (the 2010/11 South African Income and Expenditure Survey) and focus on nuclear households, which is a relatively specific group in South Africa, but their results are in line with ours regarding gender differences in resource shares. For Argentina, Echeverria *et al.* (2019) estimate resource sharing between parents and children using a slightly different approach that relates more to the Rothbarth method, focusing on nuclear households. Their results also point to the role of mothers' employment on the intrahousehold allocation of resources and especially for child poverty.

generality. For instance, some studies evaluate the extent to which mothers and children benefit from conditional or universal cash transfers. Tommasi (2019), Sokullu and Valente (2020) and De Rock *et al.* (2020) focus on the intrahousehold redistribution that can be attributed to PROGRESA in Mexico. Borga and d'Ambrosio (2021) evaluate the role played by the Productive Safety Net Program (PSNP) in Ethiopia, the National Rural Employment Guarantee Scheme (NREGS) in India and the Juntos conditional cash transfer programme in Peru. Bargain and Colacce (2022) assess the impact of the Asignaciones Familiares-Plan de Equidad in Uruguay. Some of them attempt to embed (quasi)experimental approaches within the intrahousehold model to draw causal conclusions about policy reforms or policy features – namely a randomized programme (PROGRESA), a difference-in-difference approach (Borga and d'Ambrosio, 2021) or a regression discontinuity design (Bargain and Colacce, 2022).

Note that other studies have evaluated the intrahousehold redistributive effect of gender-differentiated policy but using specific outcomes, such as looking directly at expenses on women's and children's exclusive goods (e.g. in Lundberg *et al.*, 1997) or considering anthropometric measures for children (e.g. Duflo, 2003). Some of these evaluations rely on changes in benefit levels over time, for instance at the introduction of an old-age transfer in South Africa.[4] A few studies consider changes in tax–benefit rules regarding the identity of who receives a public transfer in the household. As mentioned in the introduction, this type of policy variation is precious since the pure bargaining effect of who receives the money can be analysed. The most prominent quasi-experiment is probably the "wallet to purse" reforms studied in Lundberg *et al.* (1997) and Ward-Batts (2008), which entailed a change in the identity of child benefit recipients from the main earner (often the man) to the main carer (often the women) without changing the amount of transfer. It was followed by a shift in expenditure patterns in favour of women and children, which is a clear rejection of income pooling and convincing evidence of an intrahousehold empowerment effect.

A Preliminary Discussion on Scope Versus Causality

In this spirit, our approach aims to test whether different sources of income affect the resource sharing function differently. Admittedly, compared to some of the studies just mentioned, our estimation is not based on quasi-experimental evidence and provides only a correlational relationship of how different income streams relate to intrahousehold decisions. Our objective is different, however, as we aim to account for the whole population and all the socio-fiscal instruments that may affect intrahousehold sharing. Provided that data requirements are met, our

[4]Case and Deaton (1998) suggest that the transfers are used much the same as other income, while Duflo (2003) finds that gender of the transfer recipient is essential for success. Note that other studies consider gendered income shocks rather than policies, but are related to the present context since they also reject income pooling. For instance, Duflo and Udry (2004) inspect weather shocks that generate unexpected variation in male versus female income and find a significant influence on consumption patterns. The components of household budget that are not controlled by the same members seem to be earmarked for certain consumption goods.

framework is readily operational to enrich socio-fiscal analyses for any country and year with an approximation of what the intrahousehold distributional effects might be. In contrast, the studies listed above draw distributional conclusions only for very specific policies and subpopulations (e.g. those around the benefit eligibility cut-off in a regression discontinuity analysis). We further discuss this point in the concluding section.

3. Theory and Empirical Strategy

3.1. *Applied Theory and Identification*

Sharing Rule

x denotes the log of total private expenditure. We start by assuming the existence of a sharing rule that governs the distribution of total private expenditure $\exp(x)$ in the household. We use $\eta_{i,s}(z^r, z^t)$ to denote the share of total resources $\exp(x)$ accruing to the group of individuals of type $i = f, m, c$, i.e. women, men and children, in a household of composition s. Resource shares depend on a vector z^r of household characteristics, mainly demographic factors. The key aspect in this paper is that sharing also depends on a vector z^t of bargaining factors, which, in our setting, include net earnings and benefits received by the different adults.[5] In principle, resource shares also depend on prices, but our setting is static so we can ignore time variation in market prices. Household composition is characterized by the number of individuals in each of the three groups, which are denoted by s_f, s_m and s_c, respectively, and stacked in vector $s = (s_f, s_m, s_c)$. With the sharing rule interpretation, each household member of type i in a family of composition s is endowed with her own private resources written in log terms as $x_{i,s} = x + \ln \eta_{i,s}(z^r, z^t) - \ln s_i$. From this expression, we make explicit the fact that we identify only the total resource share of each person type $i = c, f, m$; that is, we cannot retrieve the shares of specific individuals (e.g. girls) within a type (e.g. children). This is merely a data limitation: one would simply need goods that are assignable to sub-groups of persons (for instance, expenditures on girls' clothing and boys' clothing). This is not an impediment in our context since we mainly focus on the effect of income sources on the average poverty of (the groups of) women, men and children. Also, we can specify the sharing function in a heterogeneous way, for instance introducing the proportion of boys among children. If its coefficient is positive, the resource share of children is biased in favour of boys, indicating possible gender discrimination among children (see e.g. Dunbar *et al.*, 2013).

[5] Note that bargaining factors are different from the concept of distribution factors (cf. Bourguignon *et al.*, 2009). Distribution factors are variables that must comply with an exclusion restriction so they can be used for model identification (on the difficulty to find credible discussion factors, see Brown *et al.*, 2021). Precisely, they are variables that influence negotiation without directly affecting individual preferences or the budget constraint. In our setting, we do not need distribution factors for identification. We can focus on more general variables (and, in particular, on income sources) the balance of power in the household.

Structural Engel Curves at Individual and Household Levels

Next, we adopt a semi-parametric identification drawing from DLP, based on the assumption of Piglog indirect utility functions (Deaton and Muellbauer, 1980). It conveniently yields individual Engel curves that are linear in the logarithm of individual resources. That is, the *individual budget share* for a good k consumed by any person i is written as follows:

$$w_{i,s}^{k} = \delta_{i,s}(z^p) + \beta_{i,s}(z^p) \cdot x_{i,s}(z^r, z^t), \tag{1}$$

with preference shifters z^p and sharing rule determinants (z^r, z^t). For the sake of identification, we must assume the presence of exclusive goods, i.e. goods consumed only by specific types of individuals. This type of good is rare, and the literature often opts for clothing expenditure, since male, female and child clothing expenditures are frequently reported in standard expenditure surveys (see Deaton, 1997, for the Rothbarth approach or Browning *et al.,* 1994, Bourguignon *et al.,* 2009, or Dunbar *et al.,* 2013, for collective model estimations). We index them k_c, k_f, k_m for children, women and men, respectively. For instance, if k_f corresponds to female clothing, $w_{f,s}^{k_f}$ is the proportion of a representative woman's resources $\exp(x_{i,s})$ in a household of type s spent on clothing. As a function of (log) individual expenditure, the expression above defines individual Engel curves. We can also derive household Engel curves: by multiplying $w_{f,s}^{k_f}$ by $\eta_{f,s} = s_f \cdot \exp(x_{f,s})/\exp(x)$, we obtain the level of spending on women's clothing as a fraction of total expenditure $\exp(x)$, hence the *family budget share* on that good, denoted by $W_s^{k_f}$. Thus, we can write a system of household budget shares for exclusive goods k_i, $i = f, m, c$:

$$\begin{aligned}
W_s^{k_f} &= \eta_{f,s}(z^r, z^t) \cdot (\delta_{f,s}(z^p) + \beta_{f,s}(z^p) \cdot (x + \ln \eta_{f,s}(z^r, z^t) - \ln s_f)),\\
W_s^{k_m} &= \eta_{m,s}(z^r, z^t) \cdot (\delta_{m,s}(z^p) + \beta_{m,s}(z^p) \cdot (x + \ln \eta_{m,s}(z^r, z^t) - \ln s_m)),\\
W_s^{k_c} &= \eta_{c,s}(z^r, z^t) \cdot (\delta_{c,s}(z^p) + \beta_{c,s}(z^p) \cdot (x + \ln \eta_{c,s}(z^r, z^t) - \ln s_c)),
\end{aligned} \tag{2}$$

where the left-hand terms are observed in the data.

Restrictions and Identification

Children's resource shares are the complement to one of adult shares, i.e. $s_c\eta_{c,s} = 1 - s_f\eta_{f,s} - s_m\eta_{m,s}$, and automatically recovered once adult shares are. Then, the derivatives of the system above yield:

$$\begin{aligned}
\partial W_s^{k_f}/\partial x &= \eta_{f,s}(z^r, z^t) \cdot \beta_{f,s}(z^p),\\
\partial W_s^{k_m}/\partial x &= \eta_{m,s}(z^r, z^t) \cdot \beta_{m,s}(z^p),\\
\partial W_s^{k_c}/\partial x &= (1 - \eta_{f,s}(z^r, z^t) - \eta_{m,s}(z^r, z^t)) \cdot \beta_{c,s}(z^p),
\end{aligned} \tag{3}$$

for each s out of a total of S different family compositions. The left-hand derivatives are observed, at least to the extent that estimated household Engel curves are not flat. Empirically, one must check that the slopes of household Engel curves are

non-zero, which we verify for both countries in the empirical application below. This system of Engel curve's slopes corresponds to $3S$ equations and $5S$ unknowns ($\eta_{fs}, \eta_{ms}, \beta_{f,s}, \beta_{m,s}$ and $\beta_{c,s}$ for each s). Identification requires additional restrictions on the preference term β. We rely on the SAP assumption described above, which states that for exclusive goods, the shape of individual Engel curves is similar across person types, i.e. $\beta_{f,s} = \beta_{m,s} = \beta_{c,s} = \beta_s$ for each s. It leads to $3S$ unknowns in total ($\eta_{f,s}$, $\eta_{m,s}$ and β_s for each s) and, hence, to an exact identification. The specification and estimation procedures are described in the appendix.

We can make a few additional remarks on identification and the limitation of the present approach. First, note that SAP is a commonly used preference restriction in the demand literature and a weaker version of shape-invariance as defined by Lewbel (2010). Tommasi and Wolf (2018) show that the model of Dunbar *et al.* (2013) is weakly identified and leads to extreme variability in the estimates of the sharing rule, especially in the case of the SAT restriction. This is confirmed in simulations by Bargain *et al.* (2021) who also use direct observations of resource shares and tend to reject SAT but not SAP. Other tests of SAP hinge on indirect methods, i.e. start from alternative identification approaches that do not require SAP (e.g. using distribution factors in Dunbar et al., 2021 or Brown *et al.,* 2021), and test it as a restriction. Second, our welfare concept is not truly complete without scale economies. Further work should carry out the type of welfare analysis suggested here in a more comprehensive setting including joint consumption (as in Browning *et al.,* 2013) or some publicness in consumption, which seems particularly relevant when one aims at adequately measuring poverty and inequality. Joint estimations of resource shares and of the consumption technology leading to scale economies are suggested in Browning *et al.* (2013), for couples, and in Bargain and Donni (2012) and Bargain *et al.* (2022) for couples with children, as explained above, but these approaches require information on single individuals, which may be difficult to obtain in the context of poor countries.

3.2. *Data Sources, Selection and Key Variables*

Data and Selection

Our application focuses on Argentina and South Africa. We use the National Household Expenditure Survey (Encuesta Nacional de Gastos de los Hogares, ENGHo) 2017–2018 for urban Argentina and the Living Conditions Survey (LCS) 2014–2015 for South Africa.[6] These two data sets comply with the requirements of the approach we suggest: they contain (1) information on total expenditure and on some expenditure that can be assigned to specific household members (clothing) as well as (2) information on income sources and tax–benefit instruments. For the

[6]The former is provided by Instituto Nacional de Estadística y Censos – República Argentina (https://www.indec.gob.ar/indec/web/Institucional-Indec-BasesDeDatos-4) and the latter by Statistics South Africa (https://www.datafirst.uct.ac.za/dataportal/index.php/catalog/608). Note that having an urban survey for Argentina limits the representativity of our poverty exercise (we miss rural households, which represent around 10 per cent of the population and are likely poorer than the rest of the country). Yet our empirical application is primarily an illustration of the suggested approach.

latter, we rely directly on what is provided in the data, but tax–benefit microsimulation could also be plugged to this data to compute, for each household, the taxes paid and benefits received. To make the application simple enough, we focus on direct taxes, by considering *net* earnings, and on gender-specific benefits, which is an important part of total benefits in the countries under study. ENGHo and LCS surveys also provide detailed information on household and individual socio-demographic characteristics. We exclude a small fraction of households with missing information. For the rest, the analysis aims to be as representative as possible, so we do not impose further restriction and select all households with at least one man and one woman. Identification does not require data on single individuals, as previously emphasized, so we do not include them and focus on distribution within multi-person families. The final samples comprise information on 14,670 households for Argentina and 12,350 for South Africa. Summary statistics are provided in Table 1, gathering information on demographic composition, mean levels of income components, total expenditure and clothing expenditure.

Exclusive Expenditure Data

We report household budget shares on clothing and the proportion of nonzero expenditures. Clothing expenditures recorded separately for women, men and children correspond to clothes and footwear in Argentina; assignable expenses on accessories, repair and fabric are additionally provided for South Africa, which explains slightly larger budget shares. Expenditure data is collected using recall processes that depend on the nature of purchased items. For semi-durables such as clothing, the recall period is the month prior to the interview for Argentina and 12 months for South Africa. This explains the larger rates of nonzero budget shares for the latter country.

Incomes as Bargaining Factors

We conjecture that different income sources may give a specific financial power to the different adults. Thus, we model the set of bargaining factors as $z^t = (y^f, y^m, r^f, r^m, b^f, b^m)$, with y^i the net-of-tax earnings, r^i the amount of old-age pension and b^i the amount of benefit received by adults $i = f, m$. As discussed above, the identity of transfer recipients may matter for empowerment and, as a result, the pattern of household expenditure. The same is true for labour income so that taxation may have an influence on sharing via *net* earnings. We want to inspect the role of these bargaining factors at different parts of the (log) expenditure distribution. By anticipation, we can visualize the levels of different incomes along this distribution, as suggested in Figure 1. As expected, male and female earnings increase with expenditure levels, while benefit levels decrease and play a minor role at the top.

3.3. *Model Specification and Estimation Method*

Specification

The semi-parametric approach provides the log-linear specification of Engel curves derived from Piglog preferences, as written in equation (1). Additionally, we

TABLE 1
DESCRIPTIVE STATISTICS

Demographics	Argentina				South Africa			
	Urban (%)	Female age	Male age	Child age	Urban (%)	Female age	Male age	Child age
	1.00	41.86	40.10	2.256	0.62	41.01	36.83	4.213
	%nuclear	# women	# men	# children	%nuclear	# women	# men	# children
	0.410	2.256	1.576	1.564	0.355	4.213	1.750	1.624
Income Sources (PPP $)	Women		Men		Women		Men	
Benefits	613.7		92.17		566.5		111.1	
Pensions	1,814		1,700		471.0		418.8	
Net earnings	5,233		10,154		3,330		4,869	
Total Expenditure (PPP $)	By # of children				By # of children			
	0	1	2	3	0	1	2	3
	13,192	13,581	13,941	11,979	7,601	6,536	6,515	5,629
Clothing Expenditure	By # of children				By # of children			
	0	1	2	3	0	1	2	3
Household Budget Shares								
Female	0.0347	0.0315	0.0284	0.0256	0.0360	0.0356	0.0328	0.0296
Male	0.0400	0.0354	0.0324	0.0277	0.0450	0.0388	0.0339	0.0294
Child	–	0.0319	0.0476	0.0535	–	0.0415	0.0579	0.0675
Proportion of non-zero								
Female	0.431	0.424	0.420	0.394	0.735	0.761	0.744	0.708
Male	0.416	0.421	0.415	0.391	0.696	0.681	0.639	0.581
Child	–	0.488	0.574	0.579	–	0.846	0.887	0.893
Sample size	8,384	3,719	1,971	596	4,507	3,645	2,819	1,379

Source: Author's calculation from the National Household Expenditure Survey (ENGHo) 2017–2018 for Argentina and the Living Conditions Survey (LCS) 2014–2015 for South Africa.

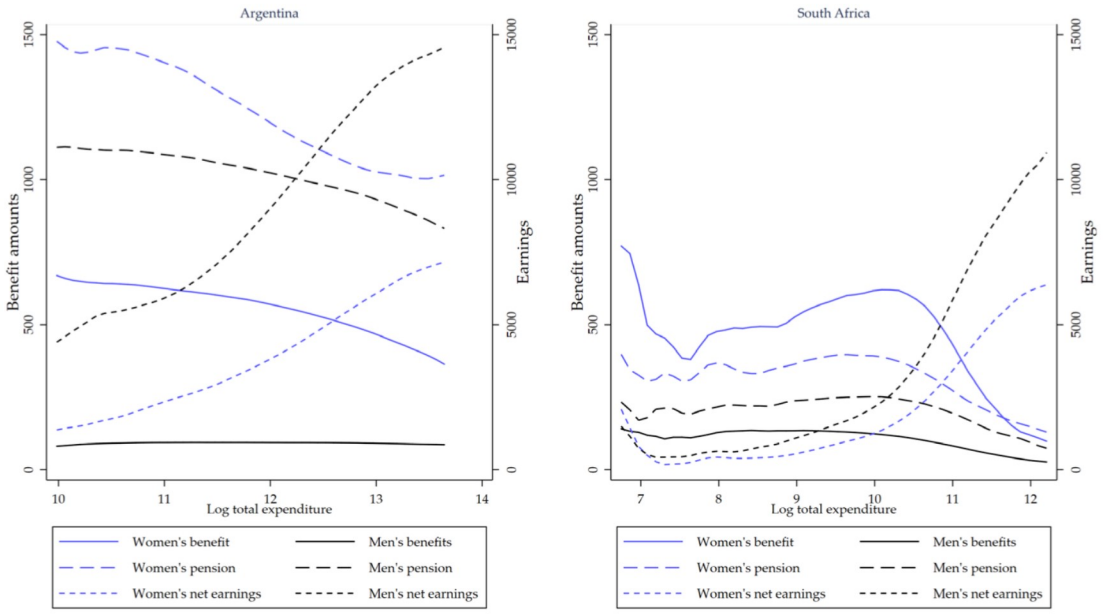


Figure 1. Gender-Specific Benefits and Net Earnings by Living Standards [Colour figure can be viewed at wileyonlinelibrary.com].

model resource shares using logistic functions to guarantee that individual shares are below 1 and sum up to 1. To estimate the model, we add error terms to household Engel curves for women's, men's and children's exclusive goods in the demand system (2), while imposing identifying the SAP condition. Thus, we estimate the following system:

$$
\begin{aligned}
W_s^{k_f} &= \eta_{f,s}(z^r, z^t) \cdot (\delta_{f,s}(z^p) + \beta_s(z^p)(x + \ln \eta_{f,s}(z^r, z^t) - \ln s_f)) + \epsilon_{f,s}, \\
W_s^{k_m} &= \eta_{m,s}(z^r, z^t) \cdot (\delta_{m,s}(z^p) + \beta_s(z^p)(x + \ln \eta_{m,s}(z^r, z^t) - \ln s_m)) + \epsilon_{m,s}, \\
W_s^{k_c} &= \eta_{c,s}(z^r, z^t) \cdot (\delta_{c,s}(z^p) + \beta_s(z^p)(x + \ln \eta_{c,s}(z^r, z^t) - \ln s_c)) + \epsilon_{c,s}
\end{aligned} \tag{4}
$$

with

$$
\eta_{f,s} = \exp(\gamma_f z^r + \rho_f z^t)/D, \;\; \eta_{c,s} = \exp(\gamma_c z^r + \rho_c z^t)/D, \;\; \eta_{m,s} = 1/D
$$

$$
\text{and} \;\; D = 1 + \exp(\gamma_f z^r + \rho_f z^t) + \exp(\gamma_c z^r + \rho_c z^t).
$$

Engel curve parameters $\delta(z^p)$ and $\beta(z^p)$ vary linearly with preference shifters z^p, which include household composition, a urban dummy (for South Africa) and the average age of each person type. For the sharing rule, we specify the logistic form with a set $\boldsymbol{z}^r$ including household composition (number of men, number of women and dummies for different numbers of siblings), an urban dummy (for South Africa), the proportion of boys and sensitivity checks that include the proportion of working women. We complete the specification with the set of bargaining factors z^t corresponding to the different income sources controlled by men and women.

Estimation Procedure and Endogeneity

Since the error terms of the model are likely to be correlated across equations, the demand system is estimated using Non-Linear Seemingly Unrelated Regressions (as, for instance, in Calvi, 2020 or Bargain *et al.,* 2021). The SUR estimator is iterated until the estimated parameters and error covariance matrices settle. Iterated SUR is equivalent to maximum likelihood with multivariate normal errors. One source of endogeneity in our setting is the likely correlation between the error terms in each budget-share function and the log total expenditure, especially if total expenditure suffers from measurement errors. Each budget share equation is augmented with the Wu–Hausman residuals (see Banks *et al.,* 1997). These are obtained from reduced-form estimations of x on all exogenous variables used in the model plus some instruments, namely a quadratic form of the log household disposable income. These instruments are very strong in predicting the log of expenditure (the F statistic on the excluded instruments is well above the usual threshold in all cases).

4. Results

4.1. *Individual Resource Shares*

Mean Shares

We begin with an investigation of the estimated resource shares. Since we deal with a majority of complex households – only 41 per cent of the sample is composed of nuclear households in Argentina, and 35 per cent in South Africa – the best comparison to examine potential gender gaps in consumption is the measure of per-person share for each person type. For this reason, the shares presented in Table 2 do not sum up to one. We report per-person shares $\widetilde{\eta}_{i,s}/s_i$ for each person type $i = c,f,m$ overall and for subgroups depending on the number of children. Resource shares are larger for men on average and in most of the demographic subgroups. Such a gender asymmetry is found in related studies (Bargain and Kwenda, 2018, for South Africa) and for many other countries (e.g. Dunbar *et al.,* 2013, and Penglase, 2013 for Malawi, Bargain *et al.,* 2015, for Côte d'Ivoire, etc.). Child shares increase with the number of Children, but at a decreasing rate, a pattern is also found in these studies. There are several explanations among which are the classic quality–quantity trade-off and the possibility of scale economies along siblings (as explored in recent contributions by Calvi et al., 2021).[7]

Beneath these numbers, there is much heterogeneity in the sharing rule. To illustrate this, we represent men's versus women's resources shares in Appendix

[7]Most studies focus on nuclear households, but some exceptions provide more comparable estimates (for instance Calvi, 2020, and Penglase, 2021). Considering all family types as we do, including large families with multiple adults beyond the nuclear household, is especially important in the context of low- and middle-income countries. For instance, Duflo (2003) recalls that a quarter of black South African children under age 5 live with a pension recipient and shows that the money received by pensioners may benefit the third generation – actually in a way that depends on the gender of the public transfer.

TABLE 2
PREDICTED INTRAHOUSEHOLD RESOURCE SHARES

	Argentina				South Africa			
	Per Child	Per Woman	Per Man	Gender Ratio	Per Child	Per Woman	Per Man	Gender Ratio
All households	0.118	0.293	0.410	1.40	0.175	0.287	0.319	1.11
Households with one child	0.140	0.255	0.373	1.47	0.237	0.286	0.285	1.00
Households with two children	0.097	0.266	0.366	1.38	0.159	0.238	0.260	1.09
Households with three children	0.068	0.229	0.312	1.36	0.102	0.179	0.223	1.24
Childless households	–	0.323	0.446	1.38	–	0.379	0.437	1.15

Notes: Predicted resource shares averaged over the whole sample. The gender ratio is the per-man share over the per-woman share.

Figure A.1. To capture the three dimensions, we show mean shares by centiles of child resource shares and indicate in three different colours the terciles of child shares. Several observations are as follows. Men command a larger share of resources than women (i.e. observations located above the 45° line) not only on average but also in most cases in Argentina and in a majority of cases in South Africa. Households with the smallest per-child shares (lighter blue) tend to have smaller female shares and larger male shares. In other words, when men control a larger share of resources, it is at the expense of both women and children. We have checked that this result is not driven by family size effects. Indeed, as seen above, children tend to have lower shares per capita when there are many siblings, but these larger households do not necessarily display a larger gender ratio in Argentina, and only in a limited way in South Africa, as reported in Table 2.

Basic Determinants

We examine the determinants of the sharing rule, looking first at demographic factors then at the key results regarding income sources. To start with, the resource share estimates for demographic factors z^r are reported in Appendix Table A.1. As expected, the resource share of children increases monotonically with the number of siblings, modelled using dummies for one child, two children or more. Given the presence of complex households, we control for the number of women and men present in the households. The number of men decreases the resource shares of women and children, while the number of women increases women's total share. There is no clear pattern regarding the role of adults' and children's average age. The proportion of boys may be of particular interest to characterize potential gender unbalance among children. For both countries, we find no trace of differential treatments between boys and girls.[8] We suggest several sensitivity checks. In Table A.2, we report estimates of a similar model that additionally controls for the proportion of working women in the household. The corresponding effect is not significant, maybe due to the fact that we already account for women's earnings, but other coefficients are stable. We also test alternative ways to control for family structure. In particular, as shown in Table A.3, results are very close to the baseline when modelling family compositing with a quadratic form of the number of siblings. Finally, note that predicted resource shares are very similar across these difference specifications, as reported in Table A.4.

Coefficients on Income Sources

Moving to the core results of this paper, we report the coefficient on income components z^t in Table 3. A first conclusion is the clear rejection of income pooling. Indeed, our estimates show that many of the income sources have statistically significant coefficients. If one dollar earned by women in the household was spent

[8]The absence of gender discrimination between children is also found by Haddad and Hoddinott (1994), Hoddinott and Haddad (1995) and Deaton (1989) for Thailand, or Bargain, Donni and Kwenda (2014) for Côte d'Ivoire. Other studies point to a pro-boy advantage, for instance in Malawi (Dunbar *et al.,* 2013), Bangladesh (Brown, Calvi and Penglase, 2018) and India (Calvi, 2020).

the same way as a dollar earned by men, our sharing function should not depend on the relative levels of male and female earnings. The same reasoning applies to old-age pension and benefits. If all income types were fungible, they would be shared according to the same allocation rule. Yet some segmentation may exist, and some money sources may tend to be channelled to specific expenditures and persons – particularly in terms of who brought in these different sources of revenue.

The second observation is the pattern revealed in Table 3. Even if merely correlational, it is rather compelling. In most cases, the income sources "controlled" by women in the household are positively related to women's or children's shares, while the opposite is true with the money in the hands of men. Note that these coefficients are conditional on total household expenditure (and on the demographic characteristics controlled for in the sharing rule, such as the average age of the different person types). That is, *for a given level of household expenditure*, the consumption share of women and children is all the higher as a larger part of these resources comes from women's income sources. These results might seem intuitive, but there is little systematic evidence of it in the literature, especially in a comprehensive framework that allows for the estimation of the complete sharing function. We interpret the results concerning earnings as telling us that bringing in more salary gives women more bargaining power and a greater expenditure share. Alternatively, since the resource shares are based on clothing purchases, results could also mean that people who have to leave home to work spend more money on clothes for work. This alternative interpretation might be valid in the case of earnings, but reassuringly, we find the same pattern for other incomes that are not work-related, namely old age pension and state transfers.

We notice that nuclear households represent a fair proportion of the sample (namely 41 per cent of the sample in Argentina and 35.5 per cent in South Africa). Therefore, it seems important to run a separate analysis in their case, all the more as the results are easier to interpret. In extended households, the internal bargaining dynamics are more complicated, and we cannot estimate the division of resources among different members of the same person type. We therefore replicate our estimations on nuclear households with children. Women in these households tend to be younger and are less likely to receive pensions, so we combine benefits and pensions in a single variable. Results are reported in Appendix Table A.5. The pattern is consistent with what we observed for the whole sample. As above, there is no systematic effect of all sources of income, but the signs of all coefficients go in the right direction, and there are enough significant coefficients to indicate a broad role for women's control of income on the intrahousehold resource allocation. In particular, we find a significant effect of the wife's benefits and net earnings on her resource share as well as negative effects of male income sources. The fact that the empirical results for a sample of nuclear versus extended households are similar is important. It tends to indicate that there is nothing relevant that we are missing out from not being able to model each adult member separately, which further supports the distributional analysis that follows.

An Illustration of the Role of Financial Control

To go further and illustrate the potential importance of women's control over income sources, we suggest counterfactual simulations using our complete sample.

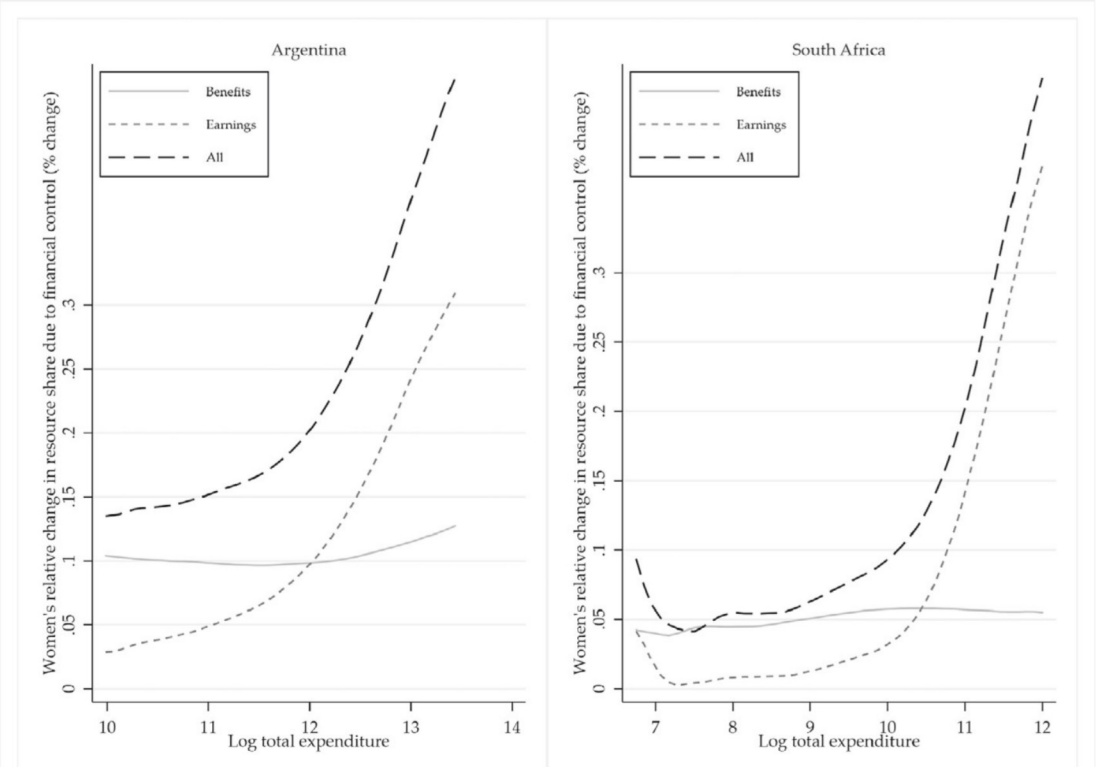
TABLE 3
RESOURCE SHARE ESTIMATES: INCOME SOURCES (ALL HOUSEHOLDS)

	Argentina		South Africa	
	Women's Resource Shares	Children's Resource Shares	Women's Resource Shares	Children's Resource Shares
Women's benefits	0.148	−0.021	0.667***	0.705***
	(0.115)	(0.149)	(0.146)	(0.165)
Men's benefits	−0.005	0.289	−0.597***	−0.611**
	(0.211)	(0.312)	(0.219)	(0.269)
	(0.211)	(0.312)	(0.219)	(0.269)
Women's old-age pension	0.303***	0.197	0.610***	0.113
	(0.087)	(0.135)	(0.125)	(0.175)
Men's old-age pension	0.007	−0.007	−0.465***	−0.268***
	(0.136)	(0.082)	(0.136)	(0.089)
Women's net earnings	0.098***	−0.008	0.242***	−0.005
	(0.014)	(0.020)	(0.022)	(0.026)
Men's net earnings	−0.069***	−0.032**	−0.124***	−0.168***
	(0.012)	(0.014)	(0.016)	(0.019)
Sample size	14,670		12,350	
R^2	0.26–0.29		0.43–0.56	

Notes: Standard errors in parentheses. R^2 range across the different equations of the NL SUR model.
Significance levels: *$p < 0.1$; **$p < 0.05$; ***$p < 0.01$.

In particular, we simulate the resource sharing that would take place if some of women's money, such as earnings or benefits, was paid to men. Such purse-to-wallet transfers, conditional on total expenditure, help characterize how much of the allocation rule depends on who brings what to the household. Let us rewrite the total female resource share in a compact way as $\eta_{f,s}^{\text{baseline}} = \eta_{f,s}(z^r, y^f, y^m, b^f, b^m)$. We compare it to the share obtained in specific counterfactual situations. In a first scenario, labelled 'benefits', the benefits received by women are assumed to be given to men, so the female share becomes $\eta_{f,s}^{\text{benefit}} = \eta_{f,s}(z^r, y^f, y^m, 0, b^m + b^f)$. In Figure 2, we represent $\eta_{f,s}^{\text{baseline}}/\eta_{f,s}^{\text{benefit}} - 1$, i.e. the relative change in female shares from moving to this scenario to the baseline. This is a pure accounting exercise, but it gives a notion of the resource share surplus that women obtain by being in control of some of the state transfers. The associated gain represents a change of around 10 per cent in women's share in Argentina and 5 per cent in South Africa (with little variation across levels of household expenditure). This is a modest but non-negligible effect.

A similar counterfactual situation consists in allocating women's net earnings to men. In this scenario, labelled "earnings", women's resource shares become $\eta_{f,s}^{\text{earnings}} = \eta_{f,s}(z^r, 0, y^m + y^f, b^f, b^m)$. In Figure 2, the relative change $\eta_{f,s}^{\text{baseline}}/\eta_{f,s}^{\text{earnings}} - 1$ is very substantial in the upper part of the distribution where labour income represents a larger share of total household budgets (namely 15 to 30 per cent in Argentina and 10 to 40 per cent in South Africa). The complete transfer



Note: Extra resource share due to women receiving the money rather than men, obtained by counterfactual simulation using estimated model.

Figure 2. Bargaining Effect from Financial Power on Women's Resource Shares

('All'), corresponding to women's shares $\eta^{\text{all}}_{f,s} = \eta_{f,s}(z^r, 0, y^m + y^f, 0, b^m + b^f)$, combines both effect. It includes the prevailing role of control over transfers in the lower part and the increasing role of control over net earnings in the upper part. Recall that this exercise is only suggestive since we cannot attribute a causal relationship between the identity of who receives a given income component – or the level of that income – and resource sharing patterns. Yet, the estimated correlations may provide a first approximation of what the implications of financial power may be, for individual welfare analyses, in terms of resource sharing.

4.2. *Interpersonal Inequality and Individual Poverty*

We can finally derive the implications of the estimations in terms of inequality *across people* in the population and in terms of *individual* poverty. Regarding inequality, it is possible to decompose interpersonal inequality into between- and within-household components. Regarding poverty, we can carry out poverty analysis at the individual level, i.e. when assessing who is poor in the household according to women's versus men's access to resources. This approach departs from usual measures where a poor individual is simply defined as one living in a poor household. A direct consequence is that poor individuals are found in nonpoor households, which makes the targeting of redistributive policies complex (see Brown *et al.*, 2019). For both exercises, we predict (log) individual resources $\exp(\widetilde{x}_{i,s}) = \widetilde{\eta}_{i,s} \exp(x)$, expressed in daily expenditure (in PPP$), and adjust child resources by an equivalence scale.[9] We also go a bit further by acknowledging the fact that who controls the money can change intrahousehold distribution and, therefore, interpersonal inequality and the relative poverty status of household members, using similar counterfactual scenarios as above.

Interpersonal Inequality

With estimated resources for each person in the sample, we can decompose total inequality (across people) into between- and within-household components. This type of decomposition is rarely carried out, especially for low- and middle-income countries. For the UK, Lise and Seitz (2011) suggest such a decomposition over the long run to assess the role of marital sorting and gender wage gaps on intrahousehold inequality. We focus here on two indices. As Lise and Seitz (2011), we first decompose the variance of log individual expenditure. We also rely on the Theil index, which belongs to the group of additively decomposable inequality measures (Generalized Entropy Class). Results are reported in Table 4. "Overall" means total inequality across persons, while "between" is the inequality between households (assuming equal sharing in households) and "within" is the residual category corresponding to intrahousehold inequality. In the baseline

[9]Assuming the same needs for adults and children would overstate child poverty. Therefore, predicted resources for children, $\widetilde{x}_{c,s}$, are deflated by an equivalent scale of 0.7 aimed to embody needs differences. Other options are possible, in particular scales that are proportional to the calorie requirements by age groups and sex, relative to adults, as suggested in FAO/WHO/UNU (1985). The choice of the scale affects the poverty level of children but not our conclusions related to the role of women's financial power.

situation, the within-household component accounts for 14.2 to 23.3 per cent (across indices) of total interpersonal inequality in Argentina, and 7.9 to 14.9 per cent in South Africa. In comparison, Lise and Seitz (2011) find that for the recent period, within-couple inequality contributes to 10 to 20 per cent of total inequality in the UK, depending on the dispersion measure and model specification. Note that this comparison is limited since we deal with different countries, use a different approach (these authors model resource sharing with a labour supply model) and consider couples with and without children. The order of magnitude given by this benchmark study is nonetheless interesting. We then assess the role of the "purse-to-wallet" transfer discussed above, i.e. a situation where women's earnings and benefits are now controlled by men. The degree of within-household inequality increases much, as indicated in Table 4. Most interestingly, total inequality increases subsequently and in sizeable proportions, namely by 2.2 to 11.4 per cent in Argentina and by 0.8 to 4.8 per cent in South Africa.

Individual Poverty

Turning to individual poverty, we compare individual resources $\exp(\widetilde{x}_{i,s})$ to per capita international poverty lines. We retain the line at \$5.50 per person per day for Argentina and \$3.20 for South Africa. The overall magnitude of poverty naturally depends on the choice of the poverty line,[10], but our conclusions on the relative poverty of different individual types, or on the role of financial power, are not affected by this choice. Figure 3A depicts individual poverty rates by level of (log) household expenditure, focusing on men versus women to explore the gender bias in different scenarios. In the legend, we report in parentheses the overall poverty rate by person type. Shaded areas represent the 95 per cent confidence bounds. The patterns are relatively similar in both countries. We first see that the lowest poverty rates are those of men (blue circles), which is consistent with their larger command of total expenditure. Women's poverty rates (black triangles) are much higher on average and significantly so at most points of the distribution (except in the tails, since everyone in the household is either poor at the lower end or nonpoor at the top). Recall that we focus on households with at least one man and one woman, so that results are not driven by single parents, absent from our analysis.

An equal-sharing scenario is also represented (green diamonds), in which we attribute the same resources to men and women (namely the mean of $\widetilde{x}_{f,s}$ and $\widetilde{x}_{m,s}$). This scenario corresponds to standard practice, i.e. the per capita approach where unequal sharing is ignored. As expected, it points to an intermediate situation, which underestimates the poverty of women. We also represent counterfactual poverty rates corresponding to the complete purse-to-wallet transfer suggested

[10]According to the World Bank (http://www.worldbank.org/poverty), approximately 9.6 per cent of the population of Argentina was living in poverty in 2018 when using an international poverty line at \$5.50 per person per day, corresponding to the threshold recommended for upper-middle-income countries. The official figure is much higher, around 32 per cent, as it is based on a poverty line around \$6.7. See also: https://www.indec.gob.ar (Condiciones de vida, Vol. 4, no. 4). For South Africa, poverty was evaluated at 37.6 and 57.1 per cent of the population in 2014 when using the poverty lines at \$3.20 and \$5.50 per person per day, respectively (the former corresponding to the threshold recommended for lower-middle-income countries). See also http://www.statssa.gov.za/?p=12075.

TABLE 4
IMPLICATIONS FOR INTERPERSONAL INEQUALITY

	Argentina			South Africa		
	Baseline	Purse to Wallet Simulation	Change	Baseline	Purse to Wallet Simulation	Change
Variance of log individual expenditure						
Overall	0.852	0.871	2.2%	1.017	1.025	0.8%
Between households	0.731	0.731	0.0%	0.937	0.937	0.0%
Within household	0.121	0.140	15.7%	0.080	0.088	10.0%
% variance due to "within"	14.2%	16.1%		7.9%	8.6%	
Theil of individual expenditure						
Overall	0.331	0.369	11.4%	0.582	0.610	4.8%
Between households	0.254	0.254	0.0%	0.495	0.495	0.0%
Within household	0.077	0.115	49.0%	0.087	0.115	32.2%
% variance due to "within"	23.3%	31.1%		14.9%	18.8%	

Notes: Inequality based on individual resources (adjusted for difference in needs in the case of children). "Overall" means total inequality across person. "Between" is the inequality across persons when assuming equal sharing. The Theil indices belong to the group of additively decomposable inequality measures (Generalized Entropy Class).

above (orange squares). In this situation, the incidence of poverty increases significantly for women at almost all expenditure levels. While financial control seemed to have relatively modest effects on resource shares in the previous section, its implication in terms of poverty turns out to be important.

Finally, similar results are obtained for children in Figure 3B (we focus here on households with at least one man, one woman and one child). Children seem much poorer if we ignore difference in needs (green diamonds) compared to the baseline (black triangles). They otherwise have similar poverty rates in South Africa, or higher poverty rates in Argentina, compared to men. According to the counterfactual simulation (orange squares), the fact that women control some of the money

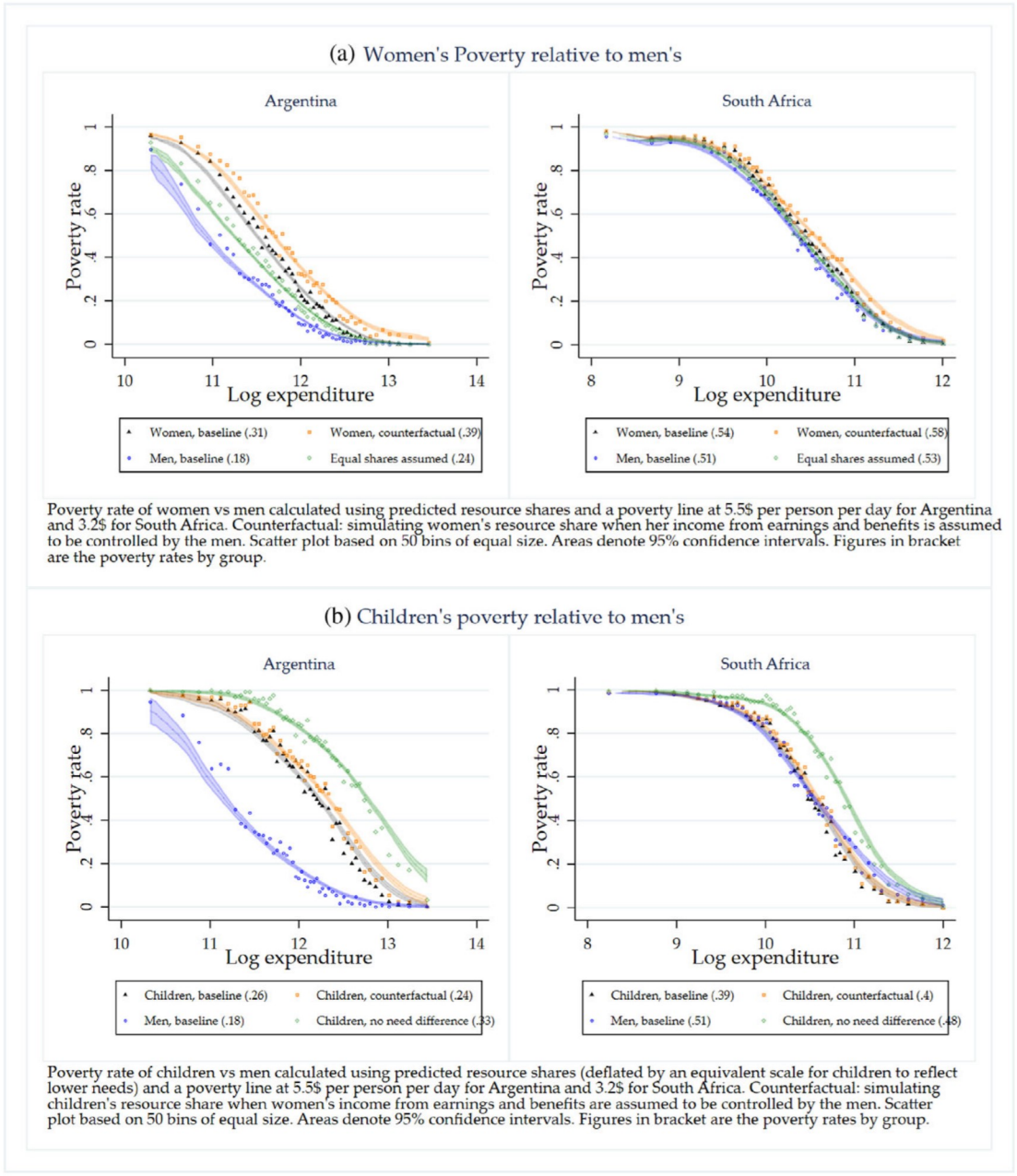


Figure 3. Implications for Women's and Children's Poverty [Colour figure can be viewed at wileyonlinelibrary.com].

in the household affects child poverty, especially in the intermediary part of the distribution.

5. Concluding Discussion

Redistributive instruments such as direct taxes and social transfers may induce redistribution towards specific individuals, or may be designed to do so and improve targeting when there is much inequality within families (Brown et al., 2020). However, it is not clear if they succeed and, more generally, how income streams direct to specific individuals eventually benefit these people. So far, because of the difficulties surrounding the estimation of household resource allocation, this question was most often ignored in socio-fiscal analyses based on microdata. Recent approaches can be mobilized to go a little bit further and start to bring such an intrahousehold dimension to policy analyses. The present paper attempts to illustrate it. We show how survey information on differential household income sources – in particular those held by women rather than men – correlates with cross-member variations in consumption shares. In Argentina and South Africa, women's financial power modifies the amount of total resources accruing to women and children – and does so differently at different points of the distribution, depending on the nature of incomes women control. Among richer households, women's net earnings influence their resource shares, giving room for potential redistribution through direct taxation, while women's control over benefits is important in the lower half of the distribution, reinforcing the role of gender-targeted transfers for poverty alleviation among women and children. We quantify the magnitude of these effects in terms of individual poverty.

This framework rests on transparent assumptions and is easily operationalized with standard expenditure data containing information on exclusive or assignable goods (such as male, female and child clothing). As such, it can enrich tax–benefit analyses, for instance those based on microsimulations, by adding the intrahousehold distributive consequences of any policy reform. While several (quasi)experimental studies focus on the intrahousehold redistribution induced by specific policies (and corresponding to subpopulations), our approach is very comprehensive and can be applied, as here, to a whole country and to deal with all tax–benefit instruments that matter at each point of the distribution.

The disadvantage is naturally the correlational nature of the estimates of the income components in the sharing rule. This framework can be seen as providing a first approximation of what the intrahousehold incidence of tax–benefit policies might be. Confounders may well exist – they would be factors that affect empowerment and, at the same time, affect the household likelihood to receive a benefit (to take it up or to comply with conditions of a CCT) or pay a tax. To the extent that these confounders are observed demographic factors, this concern can be mitigated by controlling more precisely for the household detailed age–gender composition in the sharing rule, even if doing so also reduces the degree of non-parametric identification of the effect of the benefits. If confounders are unobservables, it seems unlikely that they systematically bias the estimates all along the distribution and for all household types. Further research should nonetheless consider ways to

assess how reliable the first approximation we suggest here is. A way to circumvent the endogeneity issues caused by the fact that our estimations include *actual* taxes and benefits (taken from household surveys) is to rather use the "potential" taxes paid and benefits received by the household, in an IV fashion, using tax–benefit microsimulation.

A broad question is how to apply this approach more systematically. We have emphasized the advantage of working here with expenditure data that contain both assignable expenditure (for resource sharing estimations) and information on benefits with, in particular, the presence of gender-targeted benefits (so the intrahousehold distributional effect of these benefits can be evaluated). Potential extensions to other countries hinge on the same type of data requirement, namely an expenditure survey that contains information on assignable goods such as clothing as well as information on taxes and benefits, which can be taken from the data or, as recommended above, calculated by microsimulation.

Further research could also extend our approach to more comprehensive welfare assessments. First, this would require to incorporate both elements of time and economies of scale in consumption. Regarding time, research efforts are required to simultaneously model time allocation and consumption within the collective framework (see Cherchye et al., 2012b, or Browning *et al.,* 2020). Regarding scale economies, it is possible to build on comprehensive approaches such as Browning *et al.* (2013). Second, some of the intrahousehold disparity may not be as inequitable as it seems. For instance, in very poor settings, inequality in nutrient in-take may be due to labour market specialization of certain family members in energy-intensive tasks (Pitt et al., 1990). This is a difficult question, both normatively and in terms of measurement.

Finally, new types of normative questions arise when evaluating the redistributive effect of social and fiscal policies on individuals rather than households. Indeed, vertical and horizontal equity may be in conflict. A related question has received some attention in the context of inequality. Trannoy and Peluso (2009) show that if intrahousehold inequality increases with living standards, Pigou–Dalton transfers operate a double redistribution: they reduce both between-household inequality and within-household inequality. Yet, the conclusions may not be so straightforward when the objective is to reduce poverty. Consider two households: A is very poor but treats its members equally, while B is a bit less poor but very unequal so that some of its members are worse off than those of A while others are better off. In this situation, a Pigou–Dalton transfer would aggravate the situation of the poorest. A lot remains to be done to characterize anti-poverty policies in the presence of intrahousehold inequality.

References

Alderman, H., P. A. Chiappori, L. Haddad, J. Hoddinott and R. Kanbur, "Unitary versus Collective Models of the Household: Is It Time to Shift the Burden of the Proof," *World Bank Research Observer*, 10, 1–19, 1995.

Alkire, S., R. Suseela Meinzen-Dick, A. Peterman, A. R. Quisumbing, G. Seymour and A. Vaz, "The Women's Empowerment in Agriculture Index," *World Development*, 52, 71–91, 2013.

Anderson, S. and M. Eswaran, "What Determines Female Autonomy? Evidence from Bangladesh," *Journal of Development Economics*, 90, 179–91, 2009.

Baland, J. M. and R. Ziparo, "Intra-Household Bargaining in Poor Countries," in S. Anderson, L. Beaman, and J.-P. Platteau (eds), *Towards Gender Equity in Development*, Oxford University Press, Oxford, 69–96, 2018.
Banks, J., R. Blundell and A. Lewbel, "Quadratic Engel Curves and Consumer Demand," *Review of Economics and Statistics*, 79, 527–39, 1997.
Bargain, O. and M. Colacce, *Gender-targeted Policies and Empowerment: Embedding Discontinuities in the Collective Model*, Mimeo, 2022.
Bargain, O. and O. Donni, "The Measurement of Child Costs: A Rothbarth-Type Method Consistent with Scale Economies and Parents Bargaining," *European Economic Review*, 56, 792–813, 2012.
Bargain, O., O. Donni and I. Hentati, "Resource Sharing in Households with Children: A Generalized Model and Empirical Evidence from the UK," *Journal of the European Economic Association*, 20, 2468–96, 2022.
Bargain, O., O. Donni and P. Kwenda, "Intrahousehold Distribution and Poverty: Evidence from Côte d'Ivoire," *Journal of Development Economics*, 107, 262–76, 2015.
Bargain, O., G. Lacroix and L. Tiberti, "Validating the Collective Model of Household Consumption Using Direct Evidence on Sharing," *Economic Journal*, 132, 865–905, 2021.
Bargain, O. P. and M. Kwenda, "Ntuli, "Gender Bias and the Intrahousehold Distribution of Resources: Evidence from African Nuclear Households in South Africa"," *Journal of African Economies*, 27, 201–26, 2018.
Bergolo, M. and E. Galván, "Intra-household Behavioral Responses to Cash Transfer Programs. Evidence from a Regression Discontinuity Design," *World Development*, 103, 100–18, 2018.
Bonke, J. and M. Browning, "Spending on Children: Direct Survey Evidence," *Economic Journal*, 121, F123–43, 2011.
Borga L. G. and C. D'Ambrosio, "Social Protection and Intrahousehold Resource Allocation: Evidence from Three Large-scale Programs," AFD working paper, 2021.
Bourguignon, F., M. Browning and P. A. Chiappori, "Efficient Intra-Household Allocations and Distribution Factors: Implications and Identification," *Review of Economic Studies*, 76, 503–28, 2009.
Bourguignon, F. and P. A. Chiappori, "Collective Models of Household Behavior: An Introduction," *European Economic Review*, 36, 355–64, 1992.
Bourguignon, F., F. Ferreira and N. Lustig, *The Microeconomics of Income Distribution Dynamics in East Asia and Latin America*, World Bank, Washington, DC, 2004.
Brown, C., R. Calvi and J. Penglase, "Resource Sharing, Undernutrition, and Poverty: Evidence from Bangladesh," *Journal of Public Economics*, 200, 2021.
Brown, C., M. Ravallion and D. van de Walle, "Most of Africa's Nutritionally Deprived Women and Children are not Found in Poor Households," *Review of Economics and Statistics*, 101, 631–44, 2019.
Browning, M., F. Bourguignon, P. A. Chiappori and V. Lechene, "Incomes and Outcomes: A Structural Model of Intra-Household Allocation," *Journal of Political Economy*, 102, 1067–96, 1994.
Browning, M., P.-A. Chiappori and A. Lewbel, "Estimating Consumption Economies of Scale, Adult Equivalence Scales, and Household Bargaining Power," *Review of Economic Studies*, 80, 1267–303, 2013.
Browning, M., P.-A. Chiappori and Y. Weiss, *Economics of the Family*, Cambridge University Press, New York, 2014.
Browning, M., O. Donni and M. Gørtz, "Do You have Time to Take a Walk Together? Private and Joint Time within the Household," *Economic Journal*, 131, 1051–80, 2020.
Calvi, R., "Why are older Women Missing in India? The Age Prole of Bargaining Power and Poverty," *Journal of Political Economy*, 128, 2453–501, 2020.
Calvi, R., J. Penglase, D. Tommasi and A. Wolf, "The More the Poorer? Resource Sharing and Scale Economies in Large Families," *Journal of Development Economics*, 160, 2023.
Case, A. and A. Deaton, "Large Cash Transfers to the Elderly in South Africa," *Economic Journal*, 108, 1330–61, 1998.
Chiappori, P.-A., "Collective Labor Supply and Welfare," *Journal of Political Economy*, 100, 437–67, 1992.
Chiappori, P.-A. and O. Donni, "Non-Unitary Models of Household Behavior: A Survey of the Literature," in A. Molina (ed), *Household Economic Behaviors*, Springer, Berlin, 2011.
D'Souza, A. and S. Tandon, "Intra-household Nutritional Inequities in Rural Bangladesh," *Economic Development and Cultural Change*, 67, 625–57, 2018.
de Brauw, A., D. O. Gilligan, J. Hoddinott and S. Roy, "The Impact of Bolsa Família on Women's Decision-Making Power," *World Development*, 59, 487–504, 2014.
de Milliano, M. & I. Plavgo, "*CC-MODA-Cross Country Multiple Overlapping Deprivation Analysis: Analysing Child Poverty and Deprivation in sub-Saharan Africa*," Innocenti Working Papers no. 2014-19, Unicef, Florence, 2014.

De Rock, B., T. Potoms and D. Tommasi, "Household Responses to Cash Transfers," *Economic Development and Cultural Change*, 70, 625–52, 2020.
De Vreyer, P. and S. Lambert, "Inequality, Poverty and the Intra-Household Allocation of Consumption in Senegal," *World Bank Economic Review*, 35, 414–35, 2021.
Deaton, A., "Looking for Boy-Girl Discrimination in Household Expenditure Data," *World Bank Economic Review*, 3, 1–15, 1989.
Deaton, A., *The Analysis of Household Surveys: A Microeconometric Approach to Development Policy*, Johns Hopkins University Press, Baltimore, 1997.
Deaton, A. and J. Muellbauer, *Economics and Consumer Behavior*, Cambridge University Press, Cambridge, 1980.
Dizon-Ross, R. and S. Jayachandran, *Dads and Daughters: Disentangling Altruism and Investment Motives for Spending on Children*", Working Paper 29912, National Bureau of Economic Research, 2022.
Duflo, E., "Grandmothers and Granddaughters: Old Age Pension and Intra-Household Allocation in South Africa," *World Bank Economic Review*, 17, 1–25, 2003.
Duflo, E., "Women Empowerment and Economic Development," *Journal of Economic Literature*, 50, 1051–79, 2012.
Duflo, E. and C. Udry, "*Intrahousehold Resource Allocation in Cote D'Ivoire: Social Normas, Separate Accounts and Consumption Choices*," NBER Working Paper 10498, 2004.
Dunbar, G., A. Lewbel and K. Pendakur, "Children's Resources in Collective Households: Identification, Estimation and an Application to Child Poverty in Malawi," *American Economic Review*, 103, 438–71, 2013.
Dunbar, G., A. Lewbel and K. Pendakur, "Identification of Random Resource Shares in Collective Households Without Preference Similarity Restrictions," *Journal of Business & Economic Statistics*, 39, 402–21, 2019.
Echeverria, L., M. Menon, F. Perali and M. Berges, "*Intra-Household Inequality and Child Welfare in Argentina*", CEDLAS Working Paper, N° 241, 2019.
FAO/WHO/UNU, *Report of a Joint Expert Consultation: Energy and Protein Requirements*," Technical Report Series 724, WHO, Geneva, 1985.
Gronau, R., "The Intrafamily Allocation of Goods – How to Separate the Adult from the Child," *Journal of Labor Economics*, 9, 207–35, 1991.
Grown, C. in C. Grown, and I. Valodia (eds), *Taxation and Gender Equality: A Conceptual Framework, In Taxation and Gender Equity: A Comparative Analysis of Direct and Indirect Taxes in Developing and Developed Countries*. Routledge International Studies in Money and Banking Series, Routledge, New York, 1–22, 2010.
Grown, C. and I. Valodia (eds), *Taxation and Gender Equity: A Comparative Analysis of Direct and Indirect Taxes in Developing And Developed Countries*, Routledge, New York, NY, 2010.
Haddad, L. and J. Hoddinott, "Women's Income and Boy–Girl Anthropometric Status in the Côte d'Ivoire," *World Development*, 22, 543–53, 1994.
Haddad, L. and R. Kanbur, "How Serious is the Neglect of Intrahousehold Inequality?" *Economic Journal*, 100, 866–81, 1990.
Handa, S., A. Peterman, B. Davis and M. Stampini, "Opening up Pandora's Box: The Effect of Gender Targeting and Conditionality on Household Spending Behavior in Mexico's PROGRESA Program," *World Development*, 37, 1129–42, 2009.
Lépine, A. and E. Strobl, "The Effect of Women's Bargaining Power on Child Nutrition in Rural Senegal," *World Development*, 45, 7–30, 2013.
Lewbel, A., "Shape-Invariant Demand Functions," *Review of Economics and Statistics*, 92, 549–56, 2010.
Lewbel, A. and K. Pendakur, "Estimation of Collective Household Models with Engel Curves," *Journal of Econometrics*, 147, 350–8, 2008.
Lewbel, A. and K. Pendakur, "Inefficient Collective Households: Cooperation and Consumption," *Economic Journal*, 132, 1882–93, 2022.
Lise, J. and S. Seitz, "Consumption Inequality and Intra-Household Allocations," *Review of Economic Studies*, 78, 328–55, 2011.
Lundberg, S., R. A. Pollak and T. J. Wales, "Do Husbands and Wives Pool their Resources," *Journal of Human Resources*, 32, 463–80, 1997.
Malhotra, A. and S. R. Schuler, "Measuring Women's Empowerment as a Variable in International Development," in N. Deepa (ed), *Measuring Empowerment: Cross-Disciplinary Perspectives*, World Bank, Washington, DC, 2005.
Menon, M., K. Pendakur and F. Perali, "On the Expenditure-Dependence of Children's Resource Shares," *Economics Letters*, 117, 739–42, 2012.
Mercier, M. and P. Verwimp, "Are We Counting All the Poor? Accounting for the Intra-Household Allocation of Consumption in Burundi," *Journal of Demographic Economics*, 83, 307–27, 2017.

Milazzo, A. and D. van de Walle, "Women Left Behind? Poverty and Headship in Africa," *Demography*, 54, 1119–45, 2017.
Penglase, J., "Consumption Inequality among Children: Evidence from Child Fostering in Malawi," *Economic Journal*, 131, 1000–25, 2021.
Pitt, M., M. Rosenzweig and N. Hassan, "Productivity, Health, and Inequality in the Intrahousehold Distribution of Food in Low-Income Countries," *American Economic Review*, 80, 1139–56, 2021.
Reggio, I., "The Influence of the Mother's Power on her Child's Labor in Mexico," *Journal of Development Economics*, 96, 95–105, 2011.
Rothbarth, E., "Note on a Method of Determining Equivalent Income for Families of Different Composition," in C. Madge (ed), *War-time Pattern of Saving and Spending*, Cambridge University Press, Cambridge, 1943.
Santaeulàlia-Llopis, R. and Y. Zheng, "*Why Is Food Consumption Inequality Underestimated? A Story of Vices and Children,*" *Working Paper 969*, Barcelona Graduate School of Economics, 2017.
Sokullu, S. and C. Valente, "Individual Consumption in Collective Households: Identification Using Panel Data with an Application to PROGRESA," *Journal of Applied Econometrics*, 37, 286–304, 2020.
Thomas, D., "Incomes, Expenditures and Health Outcomes: Evidence on Intrahousehold Allocation," in L. Haddad, J. Hoddinott, and H. Alderman (eds), *Intrahousehold Resource Allocation in Developing Countries*, Johns Hopkins University Press for IFPRI, Baltimore, 1997.
Tommasi, D., "Control of Resources, Bargaining Power and the Demand of Food: Evidence from PROGRESA," *Journal of Economic Behavior & Organization*, 161, 265–86, 2019.
Tommasi, D. and A. Wolf, "Estimating Household Resource Shares: A Shrinkage Approach," *Economics Letters*, 163, 75–8, 2018.
Ward-Batts, J., "Out of the Wallet and into the Purse: Using Micro Data to Test Income Pooling," *Journal of Human Resources*, 43, 325–51, 2008.
World Bank, *Poverty and Shared Prosperity 2018: Piecing Together the Poverty Puzzle*, World Bank, Washington, DC, 2018.

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Appendix S1. Supporting information.